

# ABSTRACTS/RÉSUMÉS

## Canadian Society of Plastic Surgeons Société Canadienne des Chirurgiens Plasticiens

Abstracts presented at the  
62nd Annual Meeting / 62<sup>e</sup> Réunion annuelle  
June 24 – 28 2008, St John's, Newfoundland

**Dr Gordon Wilkes:** President / Président

**Dr Achilleas Thoma:** Vice-President / Vice-Président

Chair, Scientific Program / Président, Programme scientifique

**Dr Arthur Rideout:** Chair, Local Organizing Committee / Président, Intendance générale

### Educational Foundation Symposium

#### EF01

#### COMMUNICATION IN THE OPERATING ROOM

##### L Lingard

Team communication is essential to patient safety, and research suggests that poor or insufficient communication is a primary cause of medical errors. Strong team communication may be facilitated through the use of communication protocols that are standardized within an organization or team. This presentation will describe a research program - "Team Talk" - which has implemented and evaluated preoperative briefings to structure interprofessional discussions among surgeons, anesthesiologists, and nurses prior to surgical procedures. Results will include the team briefing's impact on team communication failure rates and collaborative work processes, followed by a discussion of challenges and lessons learned.

##### LEARNING OBJECTIVES:

At the end of this presentation, audience members will be able to:

1. Understand the relationship between team communication and patient safety
2. Explain how preoperative team briefings can impact communication breakdowns and work processes
3. Appreciate the facilitators and barriers to implementing new communication routines in the operating room.

#### EF02

#### THE BURNED FACE: ACUTE CARE AND RECONSTRUCTION

##### R Spence

##### OBJECTIVES:

1. Understand recent advances in acute care of the burned face.
2. Understand an approach to the analysis and reconstruction of severe facial burn deformities.
3. Understand techniques used personally in the reconstruction of total and subtotal facial reconstruction.

##### OUTLINE:

###### Advances in Treatment of Acute Burns of the Face

###### Determination of depth of burn

Usual criteria – make most diagnoses

Laser Doppler Imaging

###### Superficial burn – topical treatment

Deep burn – excision and grafting

Thick split-thickness skin grafts

IntegraTM synthetic dermis

###### Burn Reconstruction of the Head and Neck

###### Problems in Facial Burn Reconstruction

Scarcity of donor sites, esp. in large burns.

Leave deforming donor sites.

Require multiple operations.

Beyond skill, patience, and/or courage of most reconstructive surgeons.

###### Fundamental Principles

Gillies Principles

Aesthetic units (Gonzalez-Ulloa)

Matching of skin qualities (e.g. color, texture, thickness)  
(Gonzalez-Ulloa, Edgerton & Hanson)

Optimize use of original facial skin.

###### Ideal Facial Reconstruction System:

Reliable and reproducible.

Provides economy of tissue.

Results in adequate well-matched skin.

Minimizes donor site deformity.

Minimizes hospital stay and operations.

Within the skill and patience of most reconstructive surgeons.

Use of patient's own tissues – no rejection/immunosuppression.

###### The Story

Expanded full-thickness skin grafts

Expanded transposition flap

###### The Algorithm

Distinct regions of the face

###### Peripheral

*Resurface large areas with skin with similar qualities to facial skin.*

*Flap better than skin graft.*

###### Central

*Reconstruct fine architectural structures.*

*Resurface with thin skin well-matched in qualities.*

*Flap generally too thick for resurfacing.*

###### Combination of Peripheral and Central

*Shoulder/Chest skin available – expanded transposition flap provides both flap for peripheral and FTSG for central deformities*

*Shoulder/Chest skin not available – expand available normal skin and resurface with expanded FTSG.*

###### Techniques:

###### Skin Grafts

Full-thickness skin grafts – Workhorse

Defatting – drum dermatome technique

Neck contracture releases

Central portion of the face

*Lower lip-chin resurfacing*

*Upper lip – aesthetic units*

###### Nose

Peripheral areas when local skin not available for flaps

###### Split thickness skin grafts

###### Eye lids

*Upper – dynamic*

*Lower – static*

###### Forehead

###### Miscellaneous

###### Composite Grafts

Philtrum reconstruction

Nasal ala reconstruction

###### Ear reconstruction

Conchal transposition flap

Prosthetics

###### Tissue expanders

Scalp

Direct for advancement flap  
To develop skin for FTSG  
Expanded transposition flaps

**EF03****QUALITY OF LIFE, FACIAL APPEARANCE AND THE BURDENS OF CARE: IS THE QUEST FOR NORMALCY ETHICAL OR REALISTIC?****R Strauss**

This talk will begin with an examination of stigma experiences as reported by US adolescents with facial differences and their mothers. From an appreciation of stigma experience, we will consider how surgeons and teams can practically work towards improving the quality of life for young people with craniofacial conditions. We will examine ways that clinicians and society can build resilience – find blessings in disguise – and further positive life strategies in the families and individuals affected with facial differences. We will examine the benefits and costs of multiple surgeries and consider whether the quest for “normalcy” is ethical and realistic. This presentation will convey some very straight-forward steps a surgeon can take to help patients with craniofacial and cleft conditions experience “the good life” and reduce the burdens of care.

**LEARNING OBJECTIVES:**

Participants will:

1. understand the stigma experience of people with facial differences
2. become aware of the role of resilience in responding to facial differences
3. understand the role of medicalization, normalization and medical activism in the care of facial differences
4. learn about strategies to promote patient resilience and positive family responses to the care of facial differences.

**Canadian Society of Plastic Surgeons Annual Meeting****01****NEGATIVE PRESSURE THERAPY VERSUS STANDARD WOUND CARE: A META-ANALYSIS OF RANDOMIZED TRIALS****D Suissa, A Danino, PG Harris, JS Sampalis, A Dionyssopoulos, A Nikolis**

**PURPOSE:** The majority of technology assessments and review articles on the benefit of negative pressure therapy (NPT) for chronic wounds are inconclusive; as such, a quantitative meta-analysis of the effectiveness of NPT for the management of chronic wounds was conducted.

**METHOD:** Medline, Embase, and Cochrane databases were searched from January 1993 to November 2007 to identify all randomized controlled trials comparing NPT with standard wound care (SWC) for chronic wounds. Measures of wound size and time to healing, along with the corresponding p-values, were extracted from these randomized controlled trials. Relative change ratios (RCR) of wound size and ratios of median time (RMT) to healing were computed for each study and were combined using a random effects model for meta-analyses.

**RESULTS:** Nine trials of NPT versus SWC were identified. These included a total of 207 patients in the NPT group and 201 patients using SWC. The majority of the studies followed patients for 6 weeks. All studies used the Kinetic Concepts Inc (KCI) Vacuum-Assisted Closure system. Wound size decreased significantly more with NPT than with SWC (RCR=0.73; 95% CI 0.54-0.98). Time to healing was significantly shorter with NPT (RMT=0.73; 95% CI 0.65-0.82). Seven of the nine studies were funded by the NPT apparatus provider, one study was not sponsored, and one study's funding source could not be determined despite multiple attempts.

**CONCLUSIONS:** This quantitative meta-analysis of randomized trials suggests that NPT is an effective treatment for chronic wounds. However, as these studies varied in methodological quality and many were industry funded, further independent research is warranted. NPT should be part of a global strategy for wound healing and not a used as a single therapy as in most of the studies included.

**LEARNING OBJECTIVES:**

At the end of this workshop, the learner will better understand the potential types of biases in meta-analyses.

**02****CRANIOFACIAL OSSEointegration: A REVIEW OF SIXTY PATIENTS AND AN APPROACH TO MINIMIZE IMPLANT FAILURE****ML Lessard, A Izadpanah**

**INTRODUCTION:** Craniofacial osseointegration has stood the test of time with excellent results. The concept of a durable permanent skin/metal interface was a paradigm in our surgical armamentarium initially. However it involves a long-life skin care strategy to keep the osseointegration interface intact and avoid failure of the implant. Our series include 10 years of patients who have received osseointegrated implants for ear, nose, eye, and hearing aids (BAHA) for craniofacial reconstruction.

**OBJECTIVE:** The objective of this review is to demonstrate that it is possible to achieve a very low complication rate with few technical modifications and specific post-op care.

**PATIENTS AND METHOD:** A retrospective review of 60 cases/74 implants is presented with an analysis of the complications. The skin-interface inflammation is also documented up to 10 years post-operatively in several patients. Patients were seen or contacted to evaluate their satisfaction after implant insertion/reconstruction and their incidence of interface inflammatory event.

**RESULTS:** Out of sixty patients (M:F ratio = 41:19) three ‘sleeper’ fixtures (2%) were used at the beginning of the series. Fifty-eight patients had associated syndromic anomalies. The mean age at the time of surgery was 12.5 years (range 3 – 63 years). Only one patient (2%) lost an implant subsequent to a skin/metal interface infection. There were three patients with some skin growth over the abutment which reversed with simple skin care management. The 5% additional implant loss in this series was all due to major head trauma.

**CONCLUSION:** We have reported a very low complication rate of 2% implant failure secondary to an infection at the skin/metal interface in a series of craniofacial osseointegration cases done with the exact same technique of skin graft around the implant and a specific postoperative skin care protocol.

**LEARNING OBJECTIVES:**

Participants will be able to learn about the beneficial impact of proper skin/titanium-abutment interface.

**03****Canadian Expert Series****NERVE TRANSFERS****J Bain****LEARNING OBJECTIVES:**

1. To understand the experimental evidence supporting nerve transfers.
2. To understand the clinical indications for nerve transfers.
3. To become familiar with common nerve transfers for proximal nerve injuries.

**04****REHABILITATION AFTER MANDIBULAR RECONSTRUCTION WITH FIBULA FREE FLAP: CLINICAL (OUTCOME) AND QUALITY OF LIFE ASSESSMENT****SOP Hofer, AC Hundepool, AG Dumans, N Fokkens, SS Rayatt, EH van der Meij, KP Schepman**

**PURPOSE:** Tumors (benign or malignant), osteoradionecrosis, or osteomyelitis sometimes lead to large segmental resections of the mandible. Osteo (cutaneous) fibula free flaps (OFFF) are used to reconstruct these defects. New anatomical relationships as well as possible irradiation of oral tissues make dental rehabilitation complicated. The aim was to determine the rate of dental rehabilitation with an implant-retained lower denture or

fixed appliances, after segmental resection and reconstruction of the mandible with an OFFF.

**METHODS:** Data were obtained from 70 patients, who underwent segmental mandibular resection due to various causes followed by reconstruction of the defect with an OFFF over a 10-year period (1995-2005). Dental rehabilitation was defined as, a patient, who after segmental mandibular resection and reconstruction with an OFFF, received an implant-retained lower denture or fixed appliances. Clinical and functional assessments, as well as quality of life and denture satisfaction were evaluated.

**RESULTS:** Twenty-four out of 70 patients received dental implants. Eighteen patients received complete dental rehabilitation. Functional assessment and denture satisfaction were 5.8 and 7.7, respectively on a 10-point visual analogue scale.

**CONCLUSIONS:** A relatively small percentage of patients with segmental mandibular reconstructions with an OFFF received complete dental rehabilitation. Main reason was due to poor survival after treatment of malignant tumors of the oral cavity. The beneficial effects of dental rehabilitation with an implant-retained denture or fixed appliances, mainly favored cosmetic aspects, rather than oral function.

#### LEARNING OBJECTIVES:

The audience will appreciate the complexity of dental rehabilitation after mandible reconstruction with fibula free flap and the limited expectations that should be communicated with patients.

## 05

### SOFT TISSUES NEO SEGMENTATION OF THE FACE AFTER HIGH ENERGY INJURY BY A SINGLE LATISSIMUS FREE FLAP A SURVEY OF 12 CASES

**AM Danino, PG Harris, A Nikolis, JM Servant**

Severe injuries to the face create complex, composite defects. The aim of the strategy is a significant reduction of the hospitalization and to restore a neo segmentation of the face.

**METHOD:** (1) Large debridement, stabilization with external fixation of bone, and tracheotomy (2) definitive early reconstruction of soft-tissue and bony defects with one composite free latissimus dorsi-scapular osteomusculocutaneous flap. (3) Several refinement will optimize the results. Retrospective case series of 12 patients were evaluated for age, gender, mechanism of injury, anatomic sub sites involved, surgical procedures, flaps used, complications, and functional outcomes. The tracheotomy closure and the beginning of the psychiatric treatment were evaluated.

**RESULTS:** 11 defects were gunshot wounds, 1 after chain saw accident. 12 free flaps all with scapular bone. No failures. All the patient could have a psychiatric treatment after 22 days (7 - 29), the tracheotomy could be removed in 10 patients with normal alimentation in all cases.

**CONCLUSIONS:** Free tissue transfer techniques allow simultaneous reconstruction of the bony framework and overlying tissues with a single flap. The discussion in some cases must be oriented in the facial allograft direction.

#### LEARNING OBJECTIVE:

Description of the face segmentation concept.

Discussion of the results and limits of microsurgical reconstructions in the face.

Introduction of facial allograft concept.

## 06

### LIPOFIBROMATOSIS HAMARTOMA: A SPECTRUM OF NERVE INVOLVEMENT

**JC Lin, SC Tan, E Arruda, MJ Lax, D Anastakis**

**PURPOSE:** Lipofibromatosis hamartoma (LFH) is a rare benign condition of peripheral nerves characterized by the proliferation of adipocytes between fascicles. LFH has been characterized by the involvement of single distal peripheral nerves often in association with nerve compression. There are only three documented cases of LFH involving the brachial plexus. Using MRI, this study aims to investigate the incidence of brachial plexus involvement in patients diagnosed with characteristic distal focal LFH of the upper limb.

**METHOD:** Seven patients with LFH of the upper limb (total of eight

affected limbs) were studied. MRI images were obtained from the metacarpo-phalangeal joints to the nerve roots. Each extremity was imaged in 2-3 sections with axial and longitudinal acquisitions. The brachial plexus was imaged in the coronal, sagittal and axial planes. T1-W and T2-W fat-saturated sequences were acquired.

**RESULTS:** Four limbs (50%) showed LFH involvement of the cords of the brachial plexus, demonstrated by thickening and increased intervening fat signal. Of these, three demonstrated involvement of multiple nerves. The fourth had continuous LFH of the entire ulnar nerve. The other limbs studied showed no involvement of the brachial plexus. Two had isolated distal median nerve involvement, and two had discontinuous median nerve involvement.

**CONCLUSION:** In our study, contrary to the usual description of LFH in the literature, 50% of limbs with seemingly focal disease had brachial plexus involvement. Based on the LFH patient's specific clinical findings, additional MRI of the brachial plexus may be indicated. LFH may represent a spectrum of disease; from focal nerve involvement to a more widespread condition also affecting the brachial plexus.

#### LEARNING OBJECTIVES:

- 1) To review the clinical presentation and pathophysiology of LFH.
- 2) To review the MRI findings and indications for MRI investigation in LFH.

## 07

### THE IDEAL ROTATION FLAP: AN EXPERIMENTAL STUDY

**CH Lo, FW Kimble**

**BACKGROUND/ PURPOSE:** Numerous modifications exist and opinions vary between surgeons in regards to the design of the ideal rotation flap. A literature review revealed inconsistencies as well as three different designs of rotation flap (Standard Rotation Flap, Ahuja's Modified Rotation Flap, Divine Rotation Flap) based on entirely different concepts. It is not clear which of these designs serve its purpose best in wound reconstruction since they have not been previously examined experimentally and directly compared.

The aim of this study is to determine the optimal rotation flap design in wound reconstruction. Several modifications of the Standard Rotation Flap are examined and the three different rotation flap designs are directly compared.

**METHODS:** This study tests the ability of various rotation flaps to close triangulated defects on sheets of neoprene, a synthetic rubber compound. Section A examines four important features in the design of the Standard Rotation Flap: triangulation of a lesion, rotation flap circumference, pivot point and the back cut. Section B compares the Standard Rotation Flap, Ahuja's Modified Rotation Flap and the Divine Rotation Flap. Tension resulting from wound closure is measured and the length of scar calculated.

**RESULTS/ CONCLUSION:** The Standard Rotation Flap remains superior in comparison to the Modified Rotation Flap and Divine Rotation Flap. Triangulation of a lesion should be performed with care and in particular, the apex of the triangle should coincide with the geometrical pivot point. A flap circumference more than five times the width of the defect is of minimal benefit. The back cut is an effective modification and should be used if necessary.

#### LEARNING OBJECTIVES:

At the end of this presentation, the audience will be able to design a more efficient rotation flap.

## 08

### EARLY PROTECTED MOVEMENT FOR HAND FRACTURES

**DH Lalonde, A Higgins, S Kean**

**PURPOSE:** Since Dr Kleinert introduced early protected movement after flexor tendon injuries in the late 1960's, results of treatment have greatly improved. The advance came when it was accepted that risking tendon repair rupture was worth it in order to avoid stiff fingers. However, in hand fractures, it is still all too common that hands are immobilized far too long in order to protect a beautiful post reduction x-ray<sup>1</sup>. Non union of hand and finger fractures is very uncommon, but stiffness is all too common. In our center, we have been applying and refining various methods of early

controlled movement of hand fractures for over 25 years. The risk is losing the perfect post reduction seen on X-ray film but the benefit is better hand function.

**METHOD:** This paper will review the principles, protocols and splinting techniques that we have evolved to permit early protected movement of hand fractures. Parallels with early protected movement of repaired flexor tendons will be drawn.

**RESULTS:** Our stiffness rates are low, and tenolysis after hand fractures is very uncommon in our center. Losing our reduction is also uncommon. Representative cases will be presented with films of the resulting movement obtained.

**CONCLUSIONS:** Early protected movement is as beneficial in hand and finger fractures as it is in flexor tendon injuries. The focus of treatment should be the movement outcome, not the appearance of a post reduction X-ray.

**LEARNING OBJECTIVES:**

1. At the end of this lecture, the leaner will have a different focus on the principles of fracture immobilization
2. The attendee will be able to apply the concept of early protected movement to hand and finger fractures as he is already applying them to flexor tendon repair.

*Disclosure statement: Dr. Lalonde is a consultant for ASSI - Accurate Surgical and Scientific Instruments*

<sup>1</sup>Feehan LM, Bassett K. Is there evidence for early mobilization following an extraarticular hand fracture? *J Hand Ther* 2004 Apr-Jun;17(2):300-8.

## 09

### DISCHARGE PRACTICES, READMISSION, AND LIFE-THREATENING COMPLICATIONS FOLLOWING PRIMARY CLEFT LIP REPAIR IN 23 CHILDREN'S HOSPITALS

**RA Hopper, J Starr, M Garrison, C Lewis**

**PURPOSE:** to characterize discharge practices, readmissions, and life-threatening complications following primary cleft lip repair (PCLR) in infants across multiple institutions.

**METHODS:** Stata analysis was performed on 2558 PCLRs from 23 children's hospitals that had both inpatient and outpatient data collected and recorded within the Children's Healthcare Corporation of America Pediatric Hospital Information Set (PHIS). Outcome variables were presence of a life-threatening complication; readmission; and discharge timing. Linear mixed models with a random effect for hospital were fit to assess the independent association of the covariates with each outcome variable while accounting for the correlated nature of the data within each hospital.

**RESULTS:** 28% were discharged the same day as the surgery, with the remainder admitted at least one night. Factors significantly associated with same-day discharge, on adjusted analysis, were: older age, absence of co-morbidity and not having Medicaid. 1.88% of all patients had an unscheduled readmission within 48 hours of discharge which was associated with Medicaid insurance or having had a surgeon with a higher CL volume. 1.36% of same-day admissions had potentially life threatening complications within 48 hours of their surgery, with co-morbidity being the only predictor. There was a trend ( $p=.07$ ) toward an association between surgeons with lower cleft lip repair volume and a life threatening complication on the adjusted analysis.

**CONCLUSIONS:** Co-morbidity and socioeconomic factors associated with Medicaid coverage are justified considerations when deciding to admit an infant post-PCLR. Although life threatening events occur following less than 2% of surgeries, this risk needs to be included in the decision on discharge timing along with other factors such as nutrition, pain control and family satisfaction.

**LEARNING OBJECTIVES:**

- 1) To recognize the incidence of early post-operative life threatening events following primary cleft lip repair.
- 2) To identify patient and hospital factors associated with readmission following primary cleft lip repair.
- 3) To identify discharge practices following primary cleft lip repair across 23 independent institutions.

## 10

### THE DEVELOPMENT OF A MULTIMEDIA TEACHING AID FOR THE ACTIVE MOVEMENT SCALE: AN EVALUATIVE TOOL FOR INFANTS AND CHILDREN WITH OBSTETRICAL BRACHIAL PLEXUS PALSY

**C Mason, CG Curtis, N Woolridge, MB Mackay, HM Clarke**

**PURPOSE:** The Active Movement Scale (AMS) is a valid and reliable tool developed to quantify movement in the upper extremities of infants and children with obstetrical brachial plexus palsy (OBPP). Teaching the techniques required to apply this system of evaluation is not ideally suited to a written medium. The purpose of this project was to produce a more accessible, visual teaching aid for healthcare professionals who wish to use the AMS tool.

**METHOD:** A joint venture between the Division of Biomedical Communications at the University of Toronto and the Division of Plastic Surgery at the Hospital for Sick Children (HSC), partially funded by the Canadian Society of Plastic Surgeons, led to a collaborative partnership between a Masters student and the Brachial Plexus Clinic team at HSC. This facilitated contributions from medical, clinical and biomedical experts in the development of a multimedia teaching tool, which demonstrates the AMS. The use of DVD-formatted video footage was believed to be the most appropriate tool to promote learning of this evaluation process. A manual of written information is under development to further aid in the dissemination of the AMS.

**RESULTS:** A DVD has been produced and is now available for distribution that features the examination and grading of four infants and children with varying degrees of upper extremity weakness using the AMS. An excerpt from the DVD will be shown to highlight aspects of this multimedia teaching approach.

**CONCLUSIONS:** A mutually beneficial collaboration between a Masters student and clinicians has resulted in the creation of an educational aid for the administration of the Active Movement Scale.

**LEARNING OBJECTIVES:**

1. Participants will be able to evaluate the usefulness of a DVD-based multimedia tool, which teaches the use of the Active Movement Scale.

## 11

### ISOLATED PIERRE ROBIN SEQUENCE-PREDICTION MODEL FOR LENGTH OF HOSPITAL STAY AND TREATMENT PLAN

**BM Stubenitsky, D Peters, C Kelly, M Harkness, C Forrest**

**BACKGROUND:** Treatment of airway obstruction and feeding difficulty among newborns with isolated Pierre Robin Sequence (PRS) is challenging. Lack of a clear guideline may lead to prolonged Hospital stay and delay in treatment. A prediction model for length of stay and treatment is presented.

**METHODS:** Multivariable retrospective review of 46 patients admitted with isolated PRS at the Hospital for Sick Children, Toronto (2000-2007). During the initial 4 weeks following admission, data regarding duration of hospital stay, management of airway obstruction, respiratory rate, management of feeding difficulty and reflux therapy were collected.

**RESULTS:** Airway obstruction requiring intervention beyond positional therapy was seen in 43% of the neonates. Correlation between length of hospital stay, the management of the airway obstruction and weight gain during the initial 4 weeks was noted.

Days of Hospital stay	28-56	56-84	84-133
% patients with nasopharyngeal tube	8%	50%	88%
Total weight gain in initial 4 weeks	956.4 ( $\pm 189$ )	634.4( $\pm 123$ )	555.2( $\pm 153$ )

No correlation was found between respiratory rate, supplemental oxygen, reflux therapy and length of Hospital stay.

**CONCLUSIONS:** Feeding difficulties in isolated PRS correlate to the degree of airway obstruction. A prediction of length of hospital stay can be made based on the need for a nasopharyngeal tube and weight gain during the initial 4 weeks in newborns with isolated PRS. Based upon the prediction model, a treatment plan to reduce length of hospital stay can be initiated.

**LEARNING OBJECTIVES:**

1. To understand the pathophysiology of isolated PRS.
2. To understand the role of a prediction model for length of hospital stay.
3. To direct treatment based on predicted hospital stay.

**12****PSYCHIATRIC ISSUES IN CHILDREN WITH CLEFT LIP AND PALATE****N Keyhan**

**INTRODUCTION:** A review of the literature suggests an increased likelihood of psychological difficulties in children with cleft lip and palate, but fails to document the type and prevalence of psychiatric disorders in this population. The purpose of this study was to conduct an audit to determine the types and frequencies of psychiatric issues in children with facial clefts seen at the Hospital for Sick Children, Toronto.

**METHODS:** A retrospective chart review was completed for 43 non-syndromal children (mean age 12, range 6 to 17 years; 26M, 17F) seen between September 2005 and May 2006 at the Hospital for Sick Children. All children underwent a 1 hour psychiatric screening evaluation as part of a one day multi-disciplinary cleft staffing.

**RESULTS:** Over half of the children (53%) demonstrated psychiatric difficulties in a variety of realms. Anxiety (19%) and Attention Deficit (16%) disorders were most frequent, and exceeded prevalence rates found in the normal population (10% and 8%, respectively).

**CONCLUSIONS:** The findings support the literature suggesting that children with cleft lip and palate have an increased likelihood of psychiatric issues. This suggests that healthcare professionals should be aware of the psychological impact of having a cleft lip and palate, and should consider psychiatric evaluations on these children. Further research is necessary to determine the prevalence and types of psychiatric illness in this population, and to further elucidate the associated precipitating, perpetuating, and protective factors.

**LEARNING OBJECTIVES:**

1. Participants will gain a better appreciation of the psychological impact of having a cleft lip and palate and consider psychiatric screening of these children.
2. Participants will understand the limitations of the literature, and appreciate the need for further studies to better understand and address this issue.

**13****Canadian Expert Series****VASCULAR ANOMALIES****P Bortoluzzi****LEARNING OBJECTIVES:**

At the end of this lecture participants will be able to:

- 1) classify vascular anomalies
- 2) understand their clinical presentation and natural evolution
- 3) identify indications for treatment as well as the treatment alternatives available

**14****NON-SURGICAL CORRECTION OF STAHL'S DEFORMITY: AN INEXPENSIVE, SHORT-TERM, REPRODUCIBLE METHOD OF SPLINTING****K Boyd, D Matic**

**PURPOSE:** Stahl's deformity is a congenital deformation characterized by the presence of an abnormal third crus, running transversely across the scapha, resulting in unfurling of the helical rim. Previous literature describes splinting in infancy for correction of this deformity. Various splinting materials have been described including Reston foam, dental stopping, wire, thermoplastic material and Putty Soft. Duration of splinting is controversial; however mean treatment times reported are 6 to 12 weeks. We present our experience using an inexpensive, reproducible and effective splinting method for correction of Stahl's deformation in the neonate.

**METHODS:** An 8-French red rubber catheter is placed on the anterolateral aspect of the ear perpendicular to the abnormal third crus and adjacent to the helical rim. It is held in place with Steri-Strips (3M St. Paul MN). Splinting is initiated within the first week of life and left intact for one week.

**RESULTS:** Since 2004, this method has been used in 11 neonates with 15 affected auricles. Splints were applied between day 1 and 4. Duration of splinting averaged 7 days (range 6 to 14). Fourteen of 15 ears were judged to have complete correction, both by the senior author and parents.

**CONCLUSIONS:** We present our experience in one of the largest reviews of non-surgical correction of Stahl's ear deformity in the literature. A variety of splinting methods have been described, however we present an option that is easily instituted without the necessity of a custom splint using materials that are found in any hospital. This method produces reliable correction of Stahl's deformity using a short duration of splinting.

**LEARNING OBJECTIVES:**

1. To understand the definition of Stahl's deformity.
  2. To understand the role of non-surgical correction for Stahl's deformity.
- Disclosure statement: Dr. Matic receives Fellowship support from Synthes Canada (July 2007 - June 2007)*

**15****PREVALENCE OF MALIGNANT SKIN TUMORS IN CHILDHOOD AT THE HOSPITAL FOR SICK CHILDREN****TKS Cypel, V Vijayasekaran, G Somers, RM Zuker**

**PURPOSE:** Although benign and metastatic tumors occur in children, primary malignant skin tumors are uncommon in the pediatric population. In this study, we aimed to detect the epidemiology, etiological factors, treatment, reconstruction details and outcome of our patients with malignant skin tumors.

**METHODS:** The records of the Pathology Department at The Hospital for Sick Children were searched for all cases of malignant skin tumors operated between January 2000 and September 2006.

**RESULTS:** Twelve patients had been diagnosed with malignant skin tumors. The mean age was 8.8 years. Diagnosis of malignant melanoma was made in 8 (67%) patients, basal cell carcinoma in 3 (25%) and squamous cell carcinoma in only 1 (8%). The most common sites of occurrence were trunk (34%), face (33%), lower limbs (17%) and scalp and upper limbs (8%). Gorlin syndrome was an underlying predisposing condition in all patients with basal cell carcinoma. Xeroderma pigmentosum was a predisposing condition in the squamous cell carcinoma case. All cases of Basal Cell Carcinoma and Squamous Cell Carcinoma underwent surgical resection and primary closure. Of the patients with Malignant Melanoma four underwent surgical excision and primary closure, two had excision and skin graft, one patient underwent excision and composite graft and one required a local flap reconstruction following excision. All patients underwent sentinel node biopsy. Five of the eight melanoma cases were treated with regional lymph nodes dissection and interferon as an adjuvant therapy due to positive regional lymph nodes. There were no recurrences in this series.

**CONCLUSIONS:** Malignant skin tumors are rare in children. In accordance with the prior literature, malignant melanoma was the most frequent tumor as well as we found in our study.

**LEARNING OBJECTIVES:** At the end of this lecture, the learner will be able to

1. diagnose malignant skin tumors in children
2. treat malignant skin tumors

**16****CARTILAGE GRAFTING TECHNIQUES IN SECONDARY CLEFT RHINOPLASTY****C Forrest**

**INTRODUCTION:** The management of the cleft nasal deformity in adolescents and young adults requires improving tip projection, creating nasal symmetry and definition and establishing facial balance. Due to the scarred inflexible nature of the soft tissue envelope, this is virtually impossible to do without cartilage grafting. The purpose of this study is to

describe the application of cartilage grafts in the surgical management of the cleft nasal deformity.

**MATERIALS AND METHODS:** 132 cleft patients (78 unilateral, 45 bilateral, 9 atypical; 68 male, 72 female; mean age 15.7 yrs, range 9 to 22 years) who have undergone cleft septorhinoplasty since 1999 by a single surgeon at the Hospital for Sick Children were assessed. All patients had undergone previous cleft rhinoplasty.

**RESULTS:** All surgery was performed through a mid-columellar gull-wing incision connected with bilateral alar rim incisions. Cartilage was obtained from nasal septum (91%) or rib (9%). The following cartilage grafting techniques were applied:

- Medial crural strut – 100%
- Columellar shield graft – 94%
- Stacked tip grafts – 80%
- Alar rim batten grafts – 75%
- Spreader grafts – 45%

No infections or delayed healing were encountered. Improvement in tip shape was obtained in all patients. Residual asymmetry persists in virtually all unilateral cleft patients. Alar batten grafts were found to substantially improve alar rim slumping in both unilateral and bilateral cases.

**CONCLUSIONS:** Cartilage grafting techniques are successful in de-stigmatizing the cleft nasal deformity in adolescents and young adults. The introduction of alar batten grafts has had a powerful impact on improving cleft rhinoplasty results. Technical details and limitations of this technique will be presented.

#### **LEARNING OBJECTIVES:**

1. Understand the application of cartilage grafting techniques in cleft rhinoplasty
2. Understand the techniques and limitations of cartilage grafting techniques in cleft patients

## **17**

### **ASSOCIATION OF MIDFACE HYPOPLASIA AND PREMATURE FUSION OF CRANIAL BASE SYNCHONDROSES IN SYNDROMIC CRANIOSYNOSTOSIS**

**MS Gilardino, E Chen, R Frank, L Whitaker, S Bartlett**

**PURPOSE:** Syndromic craniosynostosis is associated with abnormalities in skull shape and variable amounts of midface hypoplasia (MH). Although the etiology of MH is unclear in these patients, animal studies suggest that premature fusion of the spheno-occipital (SO) and sphenoid-ethmoidal (SE) skull base synchondroses may be involved. Thus, the purpose of the present study was to determine the frequency of premature SO and SE synchondrosis fusion in syndromic craniosynostosis patients and analyze any correlation with MH.

**METHOD:** In a retrospective manner, high-resolution CT scans of syndromic craniosynostosis patients treated at the Children's Hospital of Philadelphia were evaluated for fusion of the SO and SE synchondroses and compared with those from patients with nonsyndromic bicoronal synostosis and no MH. Midface growth data based on clinical examinations was extracted from patient charts.

**RESULTS:** A total of 10 syndromic and 10 nonsyndromic patients were studied. Syndromic patients had a statistically significant earlier pattern of SO and SE synchondrosis fusion when compared with nonsyndromic patients. Premature synchondrosis fusion correlated with the presence of MH.

**CONCLUSION:** MH in syndromic craniosynostosis patients may be caused by premature fusion of the SE and SO synchondroses.

#### **LEARNING OBJECTIVES:**

- 1) Participants will be able to describe the relationship between midface hypoplasia and premature fusion of skull base synchondroses in syndromic craniosynostosis patients.

## **18**

### **Canadian Expert Series**

#### **TREATMENT OF MICROTIA**

**L Kasrai**

**BACKGROUND AND PURPOSE:** The Nagata techniques for autologous ear reconstruction will be reviewed. The application of these techniques for the reconstruction of all forms of microtia and various acquired ear deformities will be demonstrated.

#### **LEARNING OBJECTIVES:**

1. To highlight the advantages of Nagata's techniques in ear reconstruction compared to previously described techniques.
2. To outline the technical aspects of the surgery: local soft tissue flaps, subperichondrial rib harvest and 3D cartilage framework construction.

## **19**

### **THE EMERGING ROLE OF THE PLASTIC SURGEON IN BREAST CANCER PROPHYLAXIS**

**E Botros, R Moufarrege, P Harris, A Hamid, A Nikolis**

**PURPOSE:** To identify the role of the plastic surgeon in breast cancer prophylaxis.

Breast cancer remains the most frequent and the second killer cancer in women, just after lung cancer.

We know the importance of breast reduction procedures in the plastic surgeon's practice.

Nowadays, we should maybe not only reduce a breast without taking care of several accompanying factors.

Our objective is to determine whether plastic surgery practice applies a standardized way to treat patients with a breast hypertrophy or adapt different measures for each particular patient in regard to their personal high risk to breast cancer.

Is it common tradition to screen patients in term of their high risk to breast cancer, modifying consequently our strategy in their treatment and follow up?

**METHODOLOGY:** Our study evaluates all breast reductions performed for non oncological indications over a period of 13 months by 11 plastic surgeons in 3 hospital centers (233 bilateral reduction mammoplasties, 466 breasts from March 2003 to April 2004). Thirty three different pre, per and post-operative criteria of daily surgical practice and patient outcomes were evaluated, six of which have a major impact on patient risk for developing breast cancer. Results were compared to the most available recent recommendations and guidelines published in the literature to assess surgeon compliance with established recommendations.

**RESULTS:** Plastic surgeons do not always meet current guidelines and recommendations in breast cancer prophylaxis.

**CONCLUSION:** The role of the plastic surgeon in breast cancer prophylaxis needs further to be defined.

#### **LEARNING OBJECTIVES:**

A new approach including patient risk evaluation, screening, specific surgical approach and follow-up is here elaborated and recommended.

## **20**

### **BILATERAL REDUCTION MAMMOPLASTY FOLLOWING BREAST CANCER: A CASE-CONTROL STUDY**

**C Knight, F Farrokhyar, A Dal Cin**

**PURPOSE:** To review outcomes of patients that undergo bilateral reduction mammoplasty after lumpectomy and radiation for breast cancer, focusing on complications and the need for additional surgery.

**METHODS:** This is a matched case-control study with patients serving as their own control (treated breast cancer breasts were "cases" and healthy breasts were "controls"). Patients were identified through hospital records between 1980 and 2007. Patients who had been treated by lumpectomy and radiation with subsequent bilateral breast reduction surgery were included. Data on demographics, medical history, and peri/post-operative complications were collected. Outcomes measured were: hematoma/seroma, delayed wound healing, infection, nipple-areolar complex problems, scarring, asymmetry and the need for further surgery.

Continuous variables are reported as mean  $\pm$  standard deviation. Categorical variables are reported as proportions. Univariate analysis was performed using the McNemar chi-squared test.

**RESULTS:** Delayed wound healing occurred in 22% of cases. Wound infections occurred in 66.7% of cases, with 22.2% having a second wound infection. One patient experienced partial nipple-areolar complex loss on the radiated breast. There was abnormal scarring in 33.3% of radiated breasts. Post-operative asymmetry occurred in 77.8% of cases. Additional surgery was performed on 3 patients (33.3%).

**CONCLUSIONS:** This study suggests that women with a past history of breast cancer treated by lumpectomy and radiation have a higher occurrence of post-operative complications on the radiated breast following bilateral breast reduction. Patients need to be informed of these potential risks when consenting for reduction mammoplasty and warrant careful post-operative follow up. Due to the sample size, the chi-squared test could not be applied. Therefore, an appropriately powered, prospective multi-centred study is required to draw definitive conclusions.

#### LEARNING OBJECTIVE:

To better understand the risks of reduction mammoplasty in the radiated breast cancer patient.

## 21

### FACTORS AFFECTING SURGICAL WAIT TIMES FOR BREAST RECONSTRUCTION

**K Boyd, C Temple, D Ross**

**PURPOSE:** The purpose of this study is to quantify wait times for women seeking breast reconstruction and to examine the factors impacting upon timely treatment.

**METHODS:** Data were prospectively collected and then retrospectively reviewed for 57 women seeking breast reconstruction between 2001 and 2004. Wait time data were calculated for: referral to specialist consultation, consultation to surgery and total time from referral to surgery. The impact of several factors upon wait times was examined. These included: immediate vs. delayed reconstruction, pathologic diagnosis, number of surgeons involved, and type of breast reconstruction. Groups were compared using nonparametric tests: the Mann-Whitney Test to compare two groups, and the Kruskal-Wallis Test (nonparametric ANOVA) to compare more than two groups (significance:  $p>0.05$ ).

**RESULTS:** Women seeking delayed reconstruction waited longer from referral to surgery than women seeking immediate reconstruction (359 vs. 98 days,  $p<0.0001$ ). Women with DCIS or invasive cancer had a shorter wait (43 days and 40 days respectively) from referral to surgery than women with non-acute diagnoses ( $p=0.0272$ ). Wait times for autologous free tissue reconstruction were longer than for alloplastic reconstruction for both acute (56 vs. 44 days) and delayed (369 vs. 239 days) reconstructions but not significantly so ( $p>0.20$ ). Although patients requiring only the presence of a single plastic surgeon for the procedure waited longer than patients requiring two or more surgeons ( $p<0.05$ ), this appeared to reflect the underlying pathology, suggesting coordination of multiple surgeons could be done in a timely fashion.

**CONCLUSIONS:** Women with DCIS or acute cancer appear to be treated in a timely fashion. Prophylactic or delayed reconstructions continue to face significant wait times.

**LEARNING OBJECTIVES:** At the end of this presentation attendees will: 1) understand the magnitude of waiting times for women seeking breast reconstruction and, 2) understand the factors impacting upon these.

## 22

### SINGLE STAGE RECONSTRUCTION OF THE NIPPLE AND AREOLA COMPLEX AND BREAST MOUND USING THE LATISSIMUS DORSI MUSCULOCUTANEOUS FLAP

**DC Hammond, C Bernier**

**PURPOSE:** Reconstruction of the nipple and areola complex (NAC) after mastectomy is typically performed at the end of a two stage reconstructive process. The reconstructed breast is therefore without a NAC during the entire process, and any NAC revision would require a third

stage. To address these concerns, we report our experience using the purse string technique for immediate NAC reconstruction using a latissimus dorsi (LD) flap.

**METHODS:** A retrospective chart review of 36 NAC reconstructions performed in 21 consecutive patients undergoing immediate breast reconstruction with LD flap and tissue expander was performed. A skin sparing mastectomy pattern was utilized and the NAC reconstructed using the purse string technique. Measurements were performed to document the long term nipple projection. A questionnaire was developed to assess patient satisfaction with the immediate NAC approach.

**RESULTS:** Of the 36 reconstructed nipples, 32 healed primarily without incident. Partial necrosis was noted in three of the nipples and complete necrosis in one. In three of the four cases complicated by tissue loss, obesity and/or a smoking history was present. The second stage surgery was used as an opportunity to revise 29 of the 36 reconstructed NAC. Mean nipple projection was 4.7 mm after an average of 16 months. Overall satisfaction with the immediately reconstructed NAC was rated as good or excellent by all patients.

**CONCLUSIONS:** Immediate reconstruction of the NAC in LD flap breast reconstruction can provide excellent long term nipple projection along with a high level of patient satisfaction. The opportunity to revise the NAC at the second stage can enhance the overall aesthetic result. Care should be taken with smoker or obese patients.

#### LEARNING OBJECTIVE:

At the end of this presentation, the learner will be able to:

- Understand the rationale for immediate NAC reconstruction
- Utilize the pursestring technique
- Predictably maintain long term projection of the reconstructed nipple

#### Tips & Pearls

#### TP01

### SILDENAFIL IN THE MANAGEMENT OF DIGITAL ISCHEMIA

**GB Brock, J Pope, BS Gan**

The treatment of digital ischemia remains difficult. We have used Sildenafil (Viagra), a selective phosphodiesterase inhibitor used for the treatment of erectile dysfunction, as an adjunct in the management of critical digital ischemia. Particularly in patients with an underlying disease such as scleroderma that may result in a vasospastic component, we have observed a marked improvement in digital blood flow.

#### TP02

### LOOKING AT SEPTAL PERFORATIONS FROM A NEW ANGLE

**CH Wilkes**

Repairing septal perforations is often unsuccessful because of scarring in the septum, friable mucosal flaps, and poor visualization. A surgical approach to the septum through an open rhinoplasty technique offers several advantages and has been used to successfully repair two septal perforations.

#### TP03

### KEEPING THE PAIN OF LOCAL ANESTHETIC INJECTION TO A MINIMUM FOR WIDE AWAKE HAND SURGERY

**DH Lalonde**

The deletion of the risks and inconveniences of the tourniquet and general anesthesia for hand surgery has many benefits. However, the pain of local anesthesia is inevitable. Pearls of nerve blocks and proximal to distal timing of injections will keep the pain of injection to a minimum.

*Disclosure statement: Dr. Lalonde is a consultant for ASSI – Accurate Surgical and Scientific Instruments*

**TP04****"WITCHES' HAT" ABDOMINOPLASTY – FLEUR-DE-LIS REVIVED****SB Heddle**

To address the post-gastric by-pass patient who presents for Bariatric abdominal reconstruction, and the need to deal with skin redundancy vertically and horizontally, to construct a new abdominal skin "vest". This technique also works well for the non by-pass patient with reservations.

**FOCUS:** This "Tips & Pearls" focuses on

- planning
- procedural tips
- patient selection.

**TP05****COAL ASH POULTICE: AN UNUSUAL CAUSE OF A CHEMICAL BURN****AN Morrit, S Bache, DR Ralston, AJ Stephenson**

Poultries are an ancient holistic treatment for inflammation and myalgia. We present an interesting case of a patient who sustained full thickness burns following application of a poultice made from coal ash, cold water and olive oil for ankle pain.

**TP06****PUTTING STRUCTURE IN THE ELECTIVE SURGERY CONSULTATION****DC Birdsell**

Prospective patients have a better understanding and an appreciation for information that is simple, organized and given terms they are familiar with. Pamphlets are helpful but not customized, so the author developed a concise "check-list" that is personalized and given to the patient. This is a time efficient way to educate the patients and leave them feeling empowered and more confident in themselves and in you as an organized, thorough and attentive surgeon.

**LEARNING OBJECTIVES:**

At the end of this presentation surgeons will be able to construct a framework for a consultation that is organized, concise, easily understood and impressive to prospective patients who are seeking elective surgery.

**TP07****POST AUGMENTATION IMPLANT REPOSITIONING****MJ Haugrud**

A common occurrence after submuscular breast augmentation is implant displacement down and lateral with resultant loss of shape and lateral discomfort. The implant pocket has become enlarged and requires closure of the capsular space infero-laterally. Described is a simple corrective technique that maintains implant position.

**TP08****REDUCING TURRICEPHALY IN APERT SYNDROME: POSTERIOR CRANIAL VAULT DISTRACTION PRIOR TO ANTERIOR VAULT SURGERY****DA Peters, B Stubenitsky, CR Forrest**

Cranial vault reconstruction of Apert syndrome with fronto-orbital advancement is problematic due to severe turricephaly. We describe a technique of posterior craniotomy and cranial vault expansion by distraction osteogenesis. This creates increased intracranial volume and facilitates subsequent anterior vault reshaping or monobloc advancement.

**TP09****HOME MADE SUCTION BACKGROUND FOR MICROSURGERY****P Bortoluzzi**

Optimal field conditions when performing microvascular anastomosis are always eagerly sought. The following is a step by step demonstration of the makings of an already described homemade suctioning device, using readily available materials, that allows for continuous suctioning of surrounding liquid accumulations when performing microsurgery.

**23****IPRAS 2011 VANCOUVER****DH Lalonde**

An invitation to attend the 16th Congress of the International Confederation for Plastic, Reconstructive and Aesthetic Surgery hosted by the CSPS.

May 22-27, 2011 in Vancouver

**24****A.W. Farmer Lecture****LATISSIMUS DORSI BREAST RECONSTRUCTION****D Hammond**

The latissimus dorsi flap is emerging as an excellent option for both immediate and delayed breast reconstruction. The purpose of this presentation will be to describe the rationale, markings and operative technique for successfully performing a latissimus dorsi flap for both immediate and delayed breast reconstruction. Case examples will document the efficacy of this procedure in both primary and secondary cases. Representative complications will also be discussed.

At the conclusion of this presentation, the learner will be able to:

1. understand the rationale for utilization of the latissimus dorsi flap;
2. describe the basics of the operative technique related to the use of the latissimus dorsi flap;
3. be aware of the modifications and technique designed to avoid complications.

*Disclosure of interest: Dr. Hammond: 1) has a royalty agreement with Specialty Surgical Products, Inc. related to the sale and use of the Dermaspan tissue expander; 2) receives compensation prescribed via research protocol for participation in implant related clinical studies with the Inamed and Mentor Corporation; 3) has a consulting agreement with the Mentor Corporation; 4) has a consulting agreement with Organogenesis; 5) has a consulting agreement with Ethicon.*

**25****ACTIVATED PROTEIN C IMPROVES THE SURVIVAL OF CRITICALLY ISCHEMIC SKIN FLAPS IN RATS THROUGH THE MODULATION OF ANGIOGENIC AND PRO-INFLAMMATORY GENE EXPRESSION****M Bezuhly, R Juskevicius, RW Currie, KA West, SF Morris, RS Liwski**

**PURPOSE:** Flap necrosis remains a major complication in reconstructive surgery. Techniques to prevent necrosis have included vascular delay and the use of angiogenic and anticoagulant agents. Recently, activated protein C (APC), an anticoagulant in serum, has been shown to possess angiogenic and cytoprotective properties. We tested the hypothesis that systemic APC can improve ischemic skin flap survival.

**METHODS:** A cranially based dorsal skin flap was elevated on each rat. Animals received three tail vein injections, the first at 45 minutes prior to ( $n=5$  per group) or following (post-treated,  $n=12$  per group) flap elevation. Remaining injections were performed at 3 and 24 hours post-flap elevation. Experimental groups received APC (25  $\mu$ g/kg). Control groups received phosphate-buffered saline. At 3 hours and 24 hours, biopsies were taken for real-time PCR analysis. Histological specimens were collected at 48 hours and day 7. Skin flap survival was measured on day 7.

**RESULTS:** Skin flap survival in post-treated experimental animals was significantly improved versus controls ( $67.2 \pm 6.3\%$  versus  $38.2 \pm 2.0\%$ ,  $p < 0.001$ ). At 3 hours, expression of angiogenic factor Egr-1 was two-fold higher in experimental animals than in controls ( $p < 0.01$ ), while ICAM-1 levels were three-fold lower ( $p < 0.05$ ). At 24 hours, further changes in gene transcripts, including iNOS, VEGF, and TNF- $\alpha$ , were noted. Histologic analysis at 48 hours revealed decreased inflammatory cell infiltration, and improved muscle viability in experimental versus control animals. Higher blood vessel density was seen in the experimental versus control group on day 7.

**CONCLUSIONS:** Systemic APC improves ischemic skin flap survival through the modulation of genes involved in angiogenesis, inflammation and apoptosis.

**LEARNING OBJECTIVES:**

1. Learn how APC reduces inflammation associated with ischemia through the downregulation of pro-inflammatory cytokines, and adhesion molecules.
2. Understand APC's upregulation of Egr-1 can promote angiogenesis.
3. Appreciate how APC may be used to protect ischemic flaps from necrosis.

**26****THE EFFECT OF TOPICAL APPLICATION OF AN ANTI-INFLAMMATORY DOMINANT NEGATIVE I-κB VECTOR ON THE BURN MILIEU OF A MURINE SCALD WOUND MODEL****J Kennedy, S Bertsch, C Schrag, O Reid, M Trotter, R Lindsay,****BW Winston**

**PURPOSE:** To evaluate the effect of the topical application of a dominant negative NF-κB inhibitor on the inflammatory cascade and fibroproliferative activity in a murine scald-burn wound model.

**METHOD:** *E. coli* were transfected with a His-Tat-IκBα<sub>S32A/S36A</sub> plasmid for recombinant protein production and purification using a 6x His tag. Thermal injuries were induced in 36 mice (C57BL/6) using a previously validated standardized model of partial thickness scald burn. Control mice received topical application of 50% glycerol while treated mice received the study protein in 50% glycerol. Mice were sacrificed and burn wounds biopsied on days 6, 10, 14 and 21 days post-burn. Outcomes examined bioactivity of the His-Tat-IκBα<sub>S32A/S36A</sub> construct to ensure dominant negative function, scar thickness using H/E stained sections, and immunohistochemistry to demonstrate tissue penetration of the protein construct.

**RESULTS:** Bioactivity assays initially showed mixed results. However, there was consistently enhanced inhibition of TNF-α stimulated NF-κB expression following exposure to the mutant protein compared to the vehicle control. Scar tissue thickness in the treatment group was significantly reduced at 10 and 14 days post-burn. Immunohistochemical staining using confocal microscopy demonstrated penetration of the construct into burned tissue.

**CONCLUSIONS:** Topical penetration of a dominant negative I-κB construct and associated reduced scar thickness in a murine scald-burn wound signify the potential value of NF-κB inhibition on burn scar formation and progression.

**LEARNING OBJECTIVES:** At the end of this presentation participants will be able to:

1. Identify the role of NF-κB in wound healing
2. Realize the potential of topical agents in adjusting burn scars.

**27****VIMENTIN IMMUNOSTAINING: IS THERE A UTILITY IN BURN DEPTH DETERMINATION?****KM Cross, F Khan, V Koljonen, L Leonardi, W Hanna, J Fish, D Ghazarian**

**INTRODUCTION:** In 1996, a pillar paper describing the use of vimentin immunostaining became widely accepted as the new gold standard for burn depth determination. However, this technique has not been validated and there is no clear description of its utilization in the clinical realm. The purpose of this study is to investigate the utility of vimentin as a clinical burn depth determination tool.

**METHOD:** The Ross Tilley Burn Centre contains one of the largest histology burn biopsy collections. Paraffin blocks were chosen from patients with acute thermal injuries < 1 week old at the time of surgery. The blocks were sectioned and stained using Hematoxylin and Eosin (H&E) and Vimentin. H&E was used to place the burn wounds into respective burn depth categories. Vimentin slides were reviewed for stain intensity (weak vs. strong) and the location of a demarcation line. The slides were reviewed by two dermatopathologists blinded to the clinical diagnosis. Chi-square analysis was used to analyze the categorical data with statistical significance achieved with  $p<0.05$ .

**RESULTS:** The 185 burn specimens were categorized into superficial partial thickness ( $n=78$ ), deep partial thickness ( $n=63$ ) and full thickness ( $n=44$ ) injuries. Vimentin staining produced a clear demarcation line in 70.5% of the full thickness burns ( $p=0.0001$ ). However, 54% of

the superficial partial thickness injuries and 75% of the deep partial thickness injuries had similar findings. The intensity of the stain was strong in 66% of the full thickness, 67% of superficial partial thickness and 37% of the deep partial thickness burns ( $p=0.001$ ).

**CONCLUSION:** There were statistically significant results which differentiated the burn depth categories using vimentin. Despite the statistical significance, it is difficult to utilize these results in the clinical decision making process.

**LEARNING OBJECTIVES:**

Participants will be able to identify new areas of progress in the gold standard for burn depth.

**28****THE FEASIBILITY OF USING SIDE-TO-SIDE NERVE GRAFTS TO "PROTECT" NERVE PATHWAYS DURING AXON REGENERATION FROM SURGICALLY REPAIRED PROXIMAL NERVE INJURIES****A Ladak, P Schembri, N Tyreman, J Olson, T Gordon**

**PURPOSE:** The goal in the surgical repair of peripheral nerve injuries is the precise union of the proximal and distal stumps of the transected nerve such that optimal nerve function is achieved. It has been established that there is a narrow window of opportunity for axonal regeneration so that with high ulnar nerve lacerations for example, long-term neuronal axotomy and chronic denervation of distal nerve stumps will progressively reduce regenerative potential to almost zero. In this study we used side-to-side nerve bridges on the distal nerve stump as a means to "protect" the distal nerve stumps and counted the number of motorneurons that regenerated their axons through the bridge(s).

**METHODS:** Sprague Dawley rats ( $n=43$ ) were divided into 4 groups, all of which were subjected to unilateral excision of a 6mm segment of the common peroneal (CP) nerve to use as a side-to-side nerve bridge in Groups II, and III. In Group I, an 18mm contralateral CP nerve graft (cCPgraft) was harvested to bridge between the ipsilateral CP nerve stumps using end-to-end anastomoses. In Group II, a cCPgraft was again inserted between the ipsilateral CP nerve stumps AND a side-to-side ipsilateral CP nerve graft joined the tibial and CP distal nerve stumps. In Groups III and IV, the CP nerve was transected and NOT bridged end-to-end by the cCP graft; one (Group III) or 3 (Group IV) side-to-side nerve CP graft(s) joined the tibial (TIB) and CP distal nerve stumps.

**RESULTS:** Axonal regeneration through the contralateral CP nerve graft in Groups I and II showed exceptional recovery: ~90% of CP motorneurons regenerated axons through the cCP graft. In Group III, there was minimal TIB axon regeneration with  $8\pm 3$  (mean  $\pm$  SE) labeled motorneurons in 8 out of 15 rats in contrast to the significantly better regeneration of  $76\pm 30$  backlabelled motorneurons in 7 out of 7 rats in Group IV.

**CONCLUSIONS:** Our data demonstrate the feasibility of using multiple rather than single side-to-side nerve bridges to "protect" the distal nerve stump after surgical repair of proximal nerve injuries.

**LEARNING OBJECTIVES:**

1. To evaluate novel approaches for peripheral nerve surgery
2. To review techniques used in assessing axonal regeneration

**29****PROGNOSTIC INDICATORS IN MAJOR BURNS: A 10-YEAR CENSUS OF BURN CARE IN NOVA SCOTIA, CANADA****S Colohan, L Sigurdson**

**PURPOSE:** Major burn injuries represent complex management problems with high associated mortality rates. The current study was designed to identify factors that predict mortality in patients admitted to a tertiary burn unit, and to create a prognostic model.

**METHOD:** A retrospective chart review of 301 eligible patients admitted to the QEII Burn Unit in Halifax, Nova Scotia, between 1995-2004 was carried out. The primary outcome was in-hospital mortality. Analysis included descriptive, univariable, and multivariable logistic regression. A prognostic model was created, and discrimination testing and calibration were carried out.

**RESULTS:** The overall case fatality was 8.3% (25 deaths). Most patients

were male (78.7%). Those who died were older (median 61.1 vs. 41.1 years). Overall, the number of annual admissions decreased over time. The median surface area burn (% TBSA) was 10% (range 0-100%). Logistic regression demonstrated that age group, % TBSA and % full thickness trunk burn were all risk factors for in-hospital mortality. The final model was:

$$\text{Odds of death} = \\ -9.09 + 0.082(\text{age}) + 0.075(\% \text{ FT trunk}) + 0.048(\% \text{ TBSA})$$

This model showed excellent discrimination and good calibration.

**CONCLUSIONS:** In this cohort of burn patients, predictors of in-hospital mortality included age, %TBSA and % full thickness burn. This is consistent with prior studies, with the exception of inhalational trauma that did not appear to be a major risk factor for in-hospital mortality in this cohort.

**LEARNING OBJECTIVES:**

1. To identify factors that predict in-hospital mortality among burn patients.
2. To identify the odds associated with these prognostic indicators, and create a model to predict in-hospital mortality.
3. To become aware of burn census data from Nova Scotia, and encourage other provincial burn units to participate in census data collection.

### 30

#### **IN VITRO INTERACTIONS BETWEEN MELANOMA CELLS AND THE CAPILLARY-LIKE NETWORK IN TISSUE ENGINEERED ENDOTHELIALIZED SKIN**

**O Boa, G Laure, B François, G Todd, FA Auger**

**PURPOSE:** Tumour cells are known to influence their vascular environment and to spread at distant sites by haematogenous way. This reciprocal relationship has generated much interest in recent years because of the multiple potential applications for therapeutic options in oncology. This study examined the tumoral angiogenesis phenomenon in our endothelialized reconstructed skin (ERS) model using cultured human melanoma cells.

**METHOD:** Two human malignant melanocytic cellular lines were used: A375 and RPMI-7951, isolated respectively from primary and metastatic melanoma lesions. These cells were cultivated *in vitro* on sponges both alone and with human keratinocytes, fibroblasts and umbilical vein endothelial cells for 31 days. Immunohistochemical staining characterized the microscopic remodeling of the ERS microvascular network in the tumour environment.

**RESULTS:** The A375 cells proliferated in the ERS, creating nodules of about 450 $\mu$ m in diameter just below the epidermis. In contrast, the RPMI-7951 cells penetrated the entire length of the sponge and even produced extracellular matrix when cultured alone. Immunohistochemical assays showed that the A375 cells inhibited the microvascular network of the ERS, whereas the RPMI-7951 appeared to promote neovascularisation.

**CONCLUSION:** We were able to culture melanoma cells from two different sources in our tridimensional ERS model. Cells isolated from distant melanoma metastases appeared to have a positive effect on the capillary network of their environment and were able to create their own living matrix. These characteristics may explain why some tumour cells invade distant sites while others do not. This model therefore shows excellent potential in the testing of different anti-angiogenic therapies as part of our anti-tumour therapeutic arsenal.

**LEARNING OBJECTIVES:**

Following this presentation, the audience will better understand how tissue engineering may contribute in the development of new anti-tumoural strategies.

### 31

#### **PATIENT EXPECTATIONS FOR SURGICAL OUTCOME IN EXTREMITY SOFT TISSUE SARCOMA**

**K Davidge, R Bell, P Ferguson, J Lipa, R Turcotte, J Wunder, A Davis**  
**OBJECTIVES:** Patients' expectations regarding their post-surgical recovery

can have a significant influence on their health outcomes. The purpose of this study was to examine the relationship between pre-treatment outcome expectations and post-operative function and health-related quality of life (HRQL) in patients undergoing limb salvage surgery for extremity soft tissue sarcoma (ESTS). Additionally, we sought to evaluate predictors of outcome expectations in this population.

**METHODS:** Demographic and clinical data was prospectively collected on 181 ESTS patients (60.2% male, mean age 54 years) treated with limb-preservation surgery between 2001 and 2004. Outcome expectations regarding length of recovery, complications, and difficulty performing daily activities were evaluated using a self-report questionnaire. The relationship of outcome expectations with function and HRQL at 1 year follow-up was analyzed. Factors predicting patient expectations were investigated using logistic regression.

**RESULTS:** Expectations regarding recovery were significantly associated with function and HRQL scores in this study ( $p<0.05$ ), with patients anticipating a shorter and easier recovery having the best outcome. Education level and living alone were the most significant predictors of outcome expectations. Patients with lower levels of education were more likely to state that they did not know what to expect with regard to length of recovery ( $p = 0.001$ ), complications ( $p = 0.005$ ), and difficulty with daily activities ( $p = 0.016$ ) than patients who completed high school or above. Similarly, individuals living alone either did not know what to expect ( $p=0.026$ ) or anticipated a longer recovery time ( $p=0.012$ ) than patients who cohabitated.

**CONCLUSION:** Outcome expectations can affect function and HRQL outcomes in patients with extremity sarcoma. Individuals with low levels of education and who lack social support have uncertain outcome expectations, and may benefit from further educational interventions.

**LEARNING OBJECTIVES:** To recognize the relationship between outcome expectations and post-operative outcome. To explore the predictors of outcome expectations.

### 32

#### **VERSATILITY OF PROPELLER FLAPS: A CREATIVE APPROACH FOR RECONSTRUCTION**

**C Lecours, E Mailhot, C Bernier, A Gagnon, A Chollet**

**BACKGROUND:** Perforator flaps offer reliable soft tissue coverage without the functional loss associated with musculocutaneous flaps. Though often used as a free flap, the pedicled form is also a useful tool. Because of the wide availability of feeding vessels, more local options become available for a given deficit. The propeller flap design can further increase the range of these local perforators flaps and thus their versatility.

**PURPOSE:** To demonstrate the versatility of propeller flaps.

**METHOD:** A case series of multiple soft tissue defects of various locations and sizes were reviewed ( $n=12$ ). These defects were all reconstructed with pedicled propeller flaps.

**RESULTS:** Flap survival and complete coverage were obtained in all cases. Minor local complications ( $n=3$ ) occurred in two patients. Minimal skin slough in the distal part of the flap occurred in one case and required a secondary skin graft procedure. The same patient presented with a seroma that required drainage by needle aspiration. A hematoma occurred in one patient and surgical evacuation was done, without consequence on the functional and aesthetic result.

**CONCLUSIONS:** Propeller flaps constitute a novel approach in the closure of complex defects. Their use in lower limb reconstruction is remarkable especially for this challenging anatomic region. This type of flap has a wide applicability for several reconstructive problems. Therefore it should be incorporated as an additional option in the reconstruction ladder.

**LEARNING OBJECTIVES:**

- 1) Participants will be able to describe the basic principles of propeller flaps.
- 2) Participants will recognize the versatility of propeller flaps and will incorporate them in their reconstruction ladder.
- 3) Participants will understand the advantages of propeller flaps in lower limb reconstruction

**33**
**RECURRENT INFECTION IN PATIENTS PREVIOUSLY  
TREATED FOR DEEP STERNAL WOUND INFECTION BY  
STERNAL OSTEOSYNTHESIS**
**G Gaudreau, C Houde, D Cloutier, B Dionne, R Baillot, L Montalin**

**PURPOSE:** Since 2002, vacuum assisted therapy (VAC) followed by sternal osteosynthesis is used to cure poststernotomy deep sternal wound infection (DSWI) at Laval Hospital. We analysed risk factors in patients presenting a recurrent sternal wound infection who necessitated osteosynthesis hardware removal following DSWI.

**METHOD:** From 2002 to 2007, 10 665 patients underwent open-heart surgery with a DSWI rate of 1.4% (n=149). During this time, 124 (83,2%) patients were treated with VAC therapy in which 91(73,4%) underwent additional sternal osteosynthesis with Titanium plates fixation (Synthes®). A retrospective analysis was performed to identify risk factors for recurrent sternal infection necessitating hardware removal.

**RESULTS:** Out of the 91 patients who underwent sternal osteosynthesis, 9 (9,9%) showed recurrent sternal infection in whom sternal plates had to be removed although preserving chest wall integrity. Univariate analysis revealed that the preoperative MRSA status ( $p=0,03$ ,  $n=3/9$ ), prolonged assisted-ventilation ( $p=0,05$ ) and post operative delirium ( $p=0,01$ ) were significant predictors of this endpoint. In 44% (n=4), recurrent infection was caused by *s. epidermidis*, followed by *s. aureus* in 33% (n=3). The mean hospital stay of these infected patients was prolonged following osteosynthesis ( 31 vs 14 days /  $p=0,03$ ).

**CONCLUSION:** DSWI remains a major clinical challenge and is associated with prolonged hospital stay. Our study demonstrated that preoperative MRSA status is a significant risk factor for recurrent sternal infection following osteosynthesis. Sternal preservation and chest wall integrity has been maintained in these patients despite hardware removal.

**LEARNING OBJECTIVES:**

At the end of this lecture, the learner will be able to

- 1- Identify risk factors for recurrent sternal wound infection following osteosynthesis after poststernotomy mediastinitis.
- 2- Manifest concern about the preoperative MRSA status.

**34**
**TEACHING EAR RECONSTRUCTION USING AN  
ALLOPLASTIC CARVING MODEL**
**A Murabit, D Fisher, L Kasrai, G Wilkes**

**PURPOSE:** Ear reconstruction is challenging surgery often with a poor esthetic outcome. Our purpose was to develop an accurate surgical training model.

**METHODS:** This study incorporates silicone costal cartilage models in a workshop-based instructional program. Residents were randomly divided into two groups. The "Workshop group" (WG) participated in an interactive session and carved a Nagata-type framework under supervision. The "Non-Workshop group" (NWG) members (control group) did not participate in the initial workshop. Standard Nagata templates were used. The groups were combined after the first carving due to frustration in the NWG. Two further frameworks were created, first with supervision and then without. Subjective assessment was carried out by three experienced ear surgeons, blinded to the origin of the reconstructed frameworks. The frameworks were rated out of 10 using Likert and Visual Analog Scales.

**RESULTS:** Our results show the cartilaginous frameworks from the WG scored better for the 1st carving session (WG 5.6 vs. NWG 4.4); the NWG caught up for the 2nd carving (WG 6.4 vs. NWG 6.7); and both groups scored lower with the 3rd unsupervised carving (WG 6.2 vs. NWG 5.9). The combined scores after three frameworks were not statistically significantly different between original groups. There was a statistically significant improvement demonstrated for all carvers between the 1st and 2nd sessions, but not between the 2nd and 3rd sessions. This suggests the necessity of further practise in an in-vitro setting until a high score can be achieved and maintained without supervision. Only then should one embark on carving a real cartilaginous framework. The quality of the carvings was also shown not to be related to resident's level of training.

**CONCLUSIONS:** An alloplastic carving model for ear reconstruction is

beneficial for surgical training, and hopefully will lead to improved surgical results.

**LEARNING OBJECTIVES:**

1. demonstrate an in-vivo surgical ear training model
2. illustrate the need for practising cartilage carving in an in-vitro setting prior to performing this operation in patients
3. demonstrate the utility of an interactive, innovative workshop using accurate models and appropriate surgical instruments

**35**
**THE EFFECTS OF GINGIVOPERIOSTEOPLASTY ON BONE  
PRODUCTION AND MIDFACIAL GROWTH IN PATIENTS  
WITH BILATERAL CLEFTS**
**SM Power, DB Matic**

**PURPOSE:** The role of gingivoperioosteoplasty (GPP) in the surgical management of bilateral clefts remains unclear. The purpose of this study is to evaluate bone production and midfacial growth following GPP versus secondary bone grafting (SBG) in patients with bilateral clefts.

**METHODS:** Patients with complete bilateral clefts of the primary palate past permanent canine eruption were included. Ethics approval and informed consent were obtained and demographic data recorded retrospectively. Following clinical examinations, periapical radiographs and lateral cephalograms were evaluated by one blinded rater. Three radiographic grading scales were applied to periapical films (Bergland, Witherow, Long et al.). Cephalometric landmarks were analyzed using Dolphin 8.0 software. Repeat measurements were recorded to assess intrarater reliability. Measurements were grouped according to GPP vs. SBG and compared using parametric and non-parametric tests.

**RESULTS:** Fifty-three patients (43 GPP, 10 SBG) met inclusion criteria. Average age was 15 years and 66% were male. Thirty-five patients had periapical films (70 cleft sites: 50 GPP, 20 SBG) and lateral cephalograms (25 GPP, 10 SBG). GPP was clinically less successful than SBG, 59% vs. 85%, respectively. The radiographic failure rate of GPP was 70%. SBG demonstrated higher Bergland ( $p<0,03$ ), 8-Point ( $p<0,02$ ), and Location ( $p<0,01$ ) gradings, and less alveolar notching ( $p<0,05$ ). Maxillary projection at A point was decreased for GPP vs. SBG with respect to both anterior ( $p=0,023$ ) and total ( $p<0,01$ ) cranial base. Vertical dimensions and skeletal occlusion were not statistically different between groups.

**CONCLUSIONS:** Bone quantity and location were inferior following bilateral GPP, the majority requiring salvage bone grafting. Anteroposterior maxillary development was also disrupted. SBG therefore remains our gold standard for alveolar repair of bilateral clefts.

**LEARNING OBJECTIVE:**

To identify differences in bone production and midfacial growth following GPP vs. SBG in bilateral clefts.

**36**
**COMPARING THE ACCURACY BETWEEN LASER SURFACE  
SCANNING, COMPUTERIZED TOMOGRAPHY AND  
DIRECT MEASUREMENT FOR EXTERNAL EAR  
ANTHROPOMETRY**
**A Allazzam, G Wilkes, J Olson, F Karimi-Boushehri, A Grosvenor,  
B King, M Sylvester, A Regunathan**
**INTRODUCTION:**

- The development of new laser scanning (LS) techniques enables the capture of 3-D images which can be quantitatively assessed permitting their use for surface measurements of the ear .

• Laser scanning techniques are used to plan the construction of prosthetic ears . dimensional measurements of the existing normal ear, its position, level and prominence are used to plan the siting and shaping of the reconstructed ear or prosthesis.

**OBJECTIVE:**

- To compare dimensional measurements on computer images generated from data captured digitally by 3 different methods (computerized tomography and two types of laser scanning (hand held and ciprus) to those obtained directly from natural ears and their moulage.

• Determine the accuracy of laser service scanning as fast, non invasive technique for accurately measuring ears pre and post surgical intervention.  
**Method**

• Using a patient data base, five adult patients who previously had a CT scan of the head (temporal bone and ears) , had laser surface scanning to obtain 3-D data images of their ears. This data was compared to direct measurements from their ears and a standard moulage.

**RESULT:**

- No significant differences existed in measurements captured by the various methods (i.e., direct measurement , CT scan , and two types of laser scanning ) for obtaining dimensional measurements of the external ear .
- Non invasive laser scanning may be a good alternative for capturing objective long term data following ear reconstructive surgery.

**LEARNING OBJECTIVE:**

Participants will be able to determine that laser service scanning is considered as fast, non invasive and good alternative technique for accurately measuring external ear pre and post surgical reconstruction.

**37****A QUANTITATIVE ASSESSMENT OF VOLUME LOSS TO IMMEDIATE AUTOLOGOUS BREAST RECONSTRUCTION SECONDARY TO POSTOPERATIVE RADIATION THERAPY**

S Haykal, N Guay

**PURPOSE:** Postoperative radiation therapy (PORT) is an increasingly common adjunctive treatment after mastectomy. Immediate autologous tissue reconstruction at the time of mastectomy is standard for most comprehensive breast centers. A review performed by the senior author of all immediate autologous breast reconstruction at UCLA from 1989-1999, showed that 22/417 (5.3%) of immediate autologous tissue breast reconstruction received PORT, 3/22 (13.6%) of the radiated autologous tissue reconstruction required secondary surgical correction in majority due to volume loss. The goal of autologous tissue breast cancer reconstruction in our center is to complete it with a single general anesthesia, Single Stage Breast Cancer Reconstruction. If an intra-operative finding precludes PORT to an autologous tissue reconstruction, can we overcorrect the reconstruction to counteract the volume loss due to PORT, and complete the immediate breast cancer reconstruction with one general anesthesia?

**METHODS:** 356 Breast cancer reconstructions were performed in 5 years. 66 immediate breast cancer reconstruction performed by the senior author from 2001 to 2006 were reviewed to identify the patients who received PORT. The immediate postoperative complication rate of patients who did receive PORT was compared to the patients who did not receive PORT. The medical records of the patients who received PORT were reviewed. Assessment of volume loss secondary to PORT was performed with serial surface casting and displacement techniques.

**RESULTS:** From the 66 immediate breast reconstructions, 5 (7.5%) received post-operative radiation therapy. 29/66 (43.9%) of patients that did not require PORT were free flaps, 8/66 (12.1%) were pedicled flaps (8 pedicled TRAM, 0 latissimus dorsi flaps) and 29/66 (43.9%) were implants. 3 radiated breast reconstructions were free flaps and 2 were implants. Immediate postoperative complications in both immediate autologous breast reconstruction groups are compared. The senior author's experience at UCLA brought us to overcorrect every autologous tissue breast cancer reconstruction by 10% and, in case of potential post-operative radiation therapy to the autologous tissue an estimated overcorrection of 20% was performed. Serial surface casting and displacement technique has shown an average 18% volume loss at an average of 12 months after PORT.

**CONCLUSIONS:**

1. Only a small percentage (7.5%) of immediate breast reconstruction patients required post-operative radiation therapy.
2. Post-operative radiation therapy to autologous tissue causes aesthetic compromise, mainly volume loss.
3. An overcorrection of an immediate autologous tissue breast reconstruction, assessed at 18%, can counteract the deleterious effects of radiation therapy allowing even a radiated autologous tissue breast reconstruction to be potentially completed with a single general anesthesia.

**LEARNING OBJECTIVES:**

- 1) Evaluate volume loss after post-operative radiation therapy
- 2) Evaluate overcorrection to compensate for volume loss

**38****META-ANALYSIS OF ANTIBIOTIC PROPHYLAXIS IN BREAST REDUCTION SURGERY**

R Shortt, MJ Cooper, F Farrokhyar, J Bain

**PURPOSE:** Breast reduction surgery is a very common procedure. Despite the surgery's frequency, there is still no consensus as to whether antibiotics should be used peri-operatively. The purpose of this study was to review the world literature and perform a meta-analysis of the studies comparing wound infection rates with antibiotic use in breast reduction surgery.

**METHODS:** A literature search was performed using the following databases: Medline, Cochrane Database of Systematic Reviews, Cochrane Database of Clinical Trials, Embase, and CINAHL. Subject headings and relevant subheadings for "Breast", "Breast Reduction", "Reduction Mammoplasty", "Mammoplasty" were combined with "Antibiotics" and "Antibacterial Agents". The list of titles was assessed by this study's authors and abstracts were reviewed. All relevant papers were then independently reviewed by this paper's two primary authors and Jadad scoring was used to assess the quality of the included articles.

**RESULTS:** From the original search, three randomized controlled trials were included in the meta-analysis of pre-operative antibiotics. The meta-analysis revealed a 75% reduction in wound infections with pre-operative antibiotics (OR = 0.25, 95%CI: 0.09, 0.72). Only one randomized controlled trial analysed post-operative antibiotics. A single, well designed retrospective study also assessed post-operative antibiotics. A systematic review of post-operative antibiotic use combining these studies could not, however, be performed due to the heterogeneity between them.

**CONCLUSIONS:** Pre-operative antibiotics should routinely be used prior to breast reduction surgery. The use of post-operative antibiotics was inconclusive in this combined systematic review. A further randomized study looking at post-operative antibiotics is needed.

**LEARNING OBJECTIVES:**

- 1) To understand the current world literature, and its limitations, with respect to the use of antibiotics in breast reduction surgery.
- 2) To appreciate the impact peri-operative antibiotics have on surgical site infections after breast reduction surgery.

**39****EVALUATION OF PUMP CONTROLLED ANALGESIA IN AUTOLOGOUS BREAST RECONSTRUCTION**

C Medawar, G Landes, R Demetrios, H Ciaburro, A Gagnon, A Armour, P Harris, A Nikolis

**METHOD:** A prospective cohort study including 50 consecutive patients who had undergone unilateral autologous breast reconstruction was designed. 20 patients following pedicled TRAM flap received an infusion of 0.25% bupivacaine via 2 catheters at a constant rate of 2cc/hr each. Treatment began in the recovery room, and ended on post-operative day 3. A second group of 20 patients with pedicled TRAM flap did not have donor site analgesia. A third group consisted of 10 patients who had undergone unilateral DIEP flap. The McGill pain questionnaire (short-form) was used for 5 post-operative days. Data collected also included daily narcotic use (converted to morphine IV equivalence) and length of hospital stay.

**RESULTS:** Compared to the TRAM group, patients receiving local infusion pain pump required 64.2% less narcotics ( $p<0.01$ ), had a significantly better pain control 5 days post-operatively, and a shorter hospital discharge (4.5 versus 5.9 days;  $p<0.05$ ).

Patients following DIEP flap required 53.5% less narcotics than the TRAM group ( $p<0.01$ ). Results were comparable between the "pain pump" group and the DIEP group in terms of post-operative analgesia and length of hospital stay (4.5 versus 4.2 days).

**CONCLUSION:** Postoperative continuous infusion of bupivacaine in the operative site is efficient following unilateral pedicled TRAM flap surgery. It is associated with a better control of post-operative pain, significantly

reduced narcotic use, as well as faster hospital discharge. The difference in post-operative analgesia requirements between pedicled TRAM and the DIEP flaps could be diminished with a continuous infusion of bupivacaine at the donor site.

#### **LEARNING OBJECTIVES:**

The participants will be able to evaluate the benefits associated with the use of continuous infusion of bupivacaine at the donor site, following pedicled TRAM flap for breast reconstruction and to compare the results to a DIEP flap.

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#### Canadian Expert Series

#### **PATIENT RECRUITMENT PROBLEMS IN SURGICAL TRIALS AND POSSIBLE SOLUTIONS**

##### **A Thoma**

One of the most common challenges of clinical trials is related to problems with recruitment. Investigators often overestimate many-fold the pool of available patients who meet the inclusion criteria. Insufficient or untimely patient recruitment into clinical trials has serious consequences. The length of the trial may need to be extended, leading to increased costs and resource utilization. Lengthy trials delay the availability of potentially beneficial treatments to the public. The integrity and validity of the study also relies on an adequate sample size. If the sample size is not achieved, there is an increase in type II error (you are more likely to find no difference between treatments when one may actually exist). The trial may have to be abandoned and the results may not be publishable.

The following strategies help with timely recruitment of patients:

1. In the Study Protocol Phase:
  - a. Achieve adequate sample,
  - b. Know your patient population and likely sources of patients,
  - c. Simplify the study protocol
2. In the Study Conduct Phase:
  - a. Re-evaluate the inclusion and exclusion criteria if recruitment is poor
  - b. Identify sites or collaborators with consistently low recruitment and address the site-specific problems. Add new investigators and sites if necessary
  - c. Set recruitment quotas and provide incentives to maintain investigator interest
  - d. Spend adequate time with patients and answer any questions about the study.
3. In the Study Follow-up Period
  - a. Exclude patients who are unlikely to comply with required follow-up.

#### **LEARNING OBJECTIVES:**

By the end of this presentation:

1. The audience will be made aware that the recruitment of patients in their future study may not be easy as they would like to think.
2. The audience will be made aware that common pitfalls in recruitment can occur at various stages of a Trial
3. The audience will learn some strategies to enhance the recruitment of patients in their future Clinical Trial

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#### **THE USE OF IRRADIATED INTERNAL MAMMARY VESSELS FOR MICROVASCULAR BREAST RECONSTRUCTION**

##### **G Althubaiti, M Choi, T Hayakawa, E Buchel**

**PURPOSE:** Choice of recipient vessels for microvascular anastomosis in free tissue breast reconstruction is an important consideration. Many authors favor the use of the internal mammary (IM) vessels. However, some studies have suggested that pre-operative chest radiation makes these vessels unusable. We reviewed our experience with IM vessels in patients who had pre-operative radiation.

**METHODS:** All breast cancer patients who completed radiotherapy and subsequently proceeded to undergo autologous free tissue breast reconstruction were reviewed. The IM vessels were attempted in all cases.

Outcomes measured included, successful arterial and venous anastomosis, thrombosis, fat necrosis, and flap loss.

**RESULTS:** 1006 microsurgical cases were reviewed from July 2004 until December 2007. A total of 61 patients with 63 flaps fulfilled the inclusion criteria. In all cases, the IM vessels were sufficient size to perform an end to end anastomosis. Six flaps (10%) demonstrated fat necrosis. Two flaps (3%) were taken back to the operating room for venous thrombosis. One flap (1.5%) ultimately was lost secondary to venous hypertension of the IMV.

**CONCLUSIONS:** Pre-operative radiation should not exclude the IM vessels as potential recipient vessels for free tissue transfer breast reconstructions.

#### **LEARNING OBJECTIVES:**

1. Demonstrate the utility of the internal mammary vessels as recipient vessels for free tissue transfer in breast reconstruction.
2. Demonstrate the utility of the internal mammary vessels in irradiated patients.

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#### **DOSE UNIFORMITY FOR POST-MASTECTOMY**

#### **IRRADIATION: A QUANTITATIVE STUDY USING TISSUE EXPANDERS WITH INTERNAL METALLIC PORTS, SALINE IMPLANTS, AND SILICONE IMPLANTS**

##### **S Seal, A Dal Cin, K Murphy, B Strang**

**PURPOSE:** Literature is lacking regarding dosimetric implications of irradiating breast implants and expanders with internal metallic ports. This paper is a continuing study investigating the presence of a titanium port and rare earth magnet in breast expanders, and the presence of a saline or silicone implant, for potential effects on dose uniformity across the breast with various photon and electron energies.

**METHODS:** Tissue equivalent torso phantoms with overlying tissue expanders, saline and silicone implants were irradiated using tangential fields with 9MeV, 12 MeV electrons. Doses for 6MV and 18MV photon data were re-examined for silicone implants. Doses were collected using 24 Thermoluminescent Dosimeters (TLD) in a specified arrangement around the expander, saline and silicone implants. Comparisons were made between the measured doses and the expected radiation level for each TLD position by a CT computer generated radiation planning program.

**RESULTS:** There were no differences in the TLD measurements for all energy modalities for the expander and the saline implant (95% CI). Higher doses (>5%) were recorded for a significant number of TLD positions for the silicone implants with all energy levels.

**CONCLUSIONS:** The presence of saline implants and saline expanders with metallic ports did not alter the measured dosimetry. Dose recordings for the silicone implant were higher than predicted. This study supports that it might be safe to irradiate both saline implants and saline expanders with internal metallic ports. Further investigation is required for silicone implants (Spring 2008 – data pending).

#### **LEARNING OBJECTIVES:**

1. Participants will be familiar with the effects of metallic ports in tissue expanders versus saline and silicone implants on radiation dose distribution.
2. Participants will be familiar with radiation treatment modalities and protocols used for Breast Cancer therapy.

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#### **PAIN PUMPS FOLLOWING ABDOMINOPLASTY: A PROSPECTIVE RANDOMIZED DOUBLE BLINDED CONTROL TRIAL**

##### **J Lee, G Wilkes, G Moysa**

**PURPOSE:** To determine if continuous infusion of a local anesthetic directly into the surgical site via pain pump reduces post-operative pain.

**METHODS:** 20 patients undergoing abdominoplasty ± liposuction were given a pain pump post-operatively containing either placebo (saline) or analgesic (0.5% plain Marcaine without epinephrine) infused at 4cc/hr. In addition, they were given an anti-emetic and narcotic (Percocet, Demerol, or Tylenol No. 3) around-the-clock for 48 hours post-operatively.

Following this interval, these medications were taken as needed. During the first five post-operative days, patients recorded their medication, frequency of use, and dosage. A 10-point visual analogue scale and SF-36 form were used for evaluation.

**RESULTS:** Our data suggest no significant difference in pain while mobilizing ( $p = 0.13$ ) or at rest ( $p= 0.11$ ) between the placebo and Marcaine treatment groups. Over five days, the average pain rating out of ten for the placebo group was  $4.48 \pm 2.46$  at rest and  $5.66 \pm 2.62$  while mobilizing. For the Marcaine group, pain rating at rest was  $2.78 \pm 1.35$  and mobilizing was  $4.03 \pm 1.41$ . There was also no significant difference in nausea between the two groups ( $p=0.66$ ). The average nausea rating out of ten for the placebo group was  $1.31 \pm 1.61$  compared to  $0.95 \pm 1.50$  in the Marcaine group. Differences in the SF-36 ratings for moderate activity ( $p = 0.94$ ) and walking 1 block ( $p= 0.31$ ) were also not significant. Finally, there was no significant difference in the quantity of prescription medication taken between the two groups while on the pain pump.

**CONCLUSION:** This study suggests that the post-operative use of pain pumps in abdominoplasty patients does not offer a significant improvement in pain control over routine analgesia.

**LEARNING OBJECTIVE:**

Participants will be able to understand the effectiveness of pain pumps following abdominoplasty

#### **44**

#### **BIOMECHANICAL PROPERTIES OF FACIAL RETAINING LIGAMENTS IN THE CADAVERIC MODEL: PLATYSMAL- HYOID LIGAMENT DESCRIBED**

**A Hassa, K Roth, B Wherli, C Moore**

**PURPOSE:** A number of retaining ligaments in the face have previously been described and hypothesized to play a role in the characteristic changes seen in the aging face. This study investigates the biophysical properties of these ligaments and describes a new platysmal-hyoid ligament in the neck.

**METHODS:** Five fresh frozen cadaver heads, yielding 10 hemi-faces and necks were dissected to expose the orbital, zygomatic, bucco-maxillary and mandibular osteocutaneous ligaments and the platysmal-hyoid ligament. Following their isolation, these ligaments were biomechanically tested using the Instron 8501 to obtain force-displacement curves from which force to initial and terminal failure as well as a stiffness coefficient were obtained. The platysmal-hyoid ligament was histologically examined using H&E and 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 platysmo-hyoid structure revealed a force-displacement curve consistent with that of the other ligaments. Histological micrographs confirm the origin of the platysmal-hyoid ligament fibres from the hyoid and to be passing through the platysma muscle.

**CONCLUSIONS:** The biomechanical properties of the osteo-cutaneous facial ligaments have been quantitated. There is strong variation in ligament strength which is associated with subject age. The viscoelastic properties of the platysmal-hyoid structure are consistent with that of the other ligaments. Thus, the platysmal-hyoid ligament may be a retaining ligament in the neck and also contribute to the definition of the cervico-mental angle.

**LEARNING OBJECTIVES:**

1. Describe four osteocutaneous retaining ligaments in the face.
2. Compare biomechanical properties of facial retaining ligaments.
3. Discuss the newly described platysmal-hyoid ligament and its potential role in neck aesthetics.

#### **45**

#### **COMPARISON OF TITANIUM VS. ABSORBABLE PLATING SYSTEMS IN THE TREATMENT OF ZYGOIMA FRACTURES: A COST BENEFIT ANALYSIS**

**N Strumas, A Kattan**

**PURPOSE:** The purpose of this study is to conduct a cost benefit analysis comparing titanium and biodegradable plating systems for fixation of zygoma fractures from the Ministry of Health's perspective to help resource allocation decisions.

**METHODS:** A decision board was developed for this study and its reliability and validity were tested. The board was used to perform a willingness to pay survey and bidding algorithm to evaluate preferences between the two methods of treatment. 284 healthy individuals from different areas of Hamilton, Ontario participated in the study. Participants were interviewed using the decision board and then asked a series of questions on their preferred method of treatment and reasons of preference in addition to willingness to pay with a bidding algorithm. Demographic data and consents were collected. McNemar's Chi Square and Paired T-Test were used for data analysis.

**RESULTS:** 277 (97.5%) of the participants preferred Absorbable plates ( $p<0.0001$ ) and 74% (205) of that group were willing to pay an extra amount in taxes in order to make the absorbable plates available ( $p<0.0001$ ). The overall mean of the Willingness To Pay (WTP) was 0.74\$. The net social benefit was 0.54\$ compared to 0.18\$ of incremental costs for introducing the absorbable system.

**CONCLUSION:** Absorbable plating systems provide a positive net social benefit compared to the titanium plating systems. This CBA can aid decision makers in determining how to most efficiently allocate resources.

**LEARNING OBJECTIVES:**

At the end of the presentation the audience should:

- 1- Have a general idea on development and application of decision boards
- 2- Have a general understanding of cost benefit analysis
- 3- Be able to use the results to help resource allocation

#### **46**

#### **LACTOSORB FIXATION IN CRANIOFACIAL RECONSTRUCTION**

**JS Cheng, S Gregory,DJ Courtemanche**

**PURPOSE:** To review the outcomes of LactoSorb resorbable fixation in our craniofacial reconstruction practice.

**METHOD:** A retrospective chart review of patients undergoing craniofacial reconstruction with LactoSorb fixation at B.C. Children's Hospital, Vancouver Hospital and the University of British Columbia Hospital from 1997-2005 was performed.

**RESULTS:** A total of 36 operative procedures with LactoSorb fixation were performed in 33 patients. Patient age ranged from 3 months to 37.8 years (mean 8.8 years). Follow-up times ranged from 17 days to 13.0 years (mean 3.1 years). Indication for surgery included 24 congenital, 9 traumatic and 3 post-oncologic deformities. LactoSorb fixation was used in 17 frontal-cranial, 10 nasal root, 22 periorbital, 13 midface, 5 mandibular and 1 sternal reconstructions. Sixteen patients had bone graft reconstruction. Reconstructive goals were met in 35 patients (97.2%). LactoSorb fixation had no effect on subsequent growth and development. Four patients had further surgery at the same operative site and there was no evidence of LactoSorb (range 9-30 months, mean 21 months). There were 5 complications (13.9%): 1 cellulitis, 2 abscesses, 1 seroma and 1 fixation failure due to incorrect distraction. Secondary surgery was required in 3 patients (8.3%) for incision and drainage of 2 abscesses and 1 hardware revision.

**CONCLUSION:** In this descriptive study we have demonstrated that LactoSorb is safe and effective in all indications and locations including the mandible for craniofacial reconstruction in the pediatric population. This fixation system may potentially be used for bony fixation in other locations in addition to the craniofacial skeleton and in the adult population.

**LEARNING OBJECTIVES:**

- 1) To identify potential uses of LactoSorb in addition to pediatric craniofacial reconstruction.

**47**
**THE PEDIATRIC CRITICAL SIZE DEFECT FOLLOWING CRANIAL VAULT EXPANSION FOR NON-SYNDROMIC SINGLE SUTURE CRANIOSYNOSTOSIS – PART II**
**ID Stein, C Gilles, D Matic**

**PURPOSE:** Cranial vault expansion (CVE), performed to treat craniosynostosis, creates full-thickness skull defects that demonstrate variable ossification post-operatively. The largest cranial defect capable of completely ossifying is defined as a critical size defect (CSD). The CSD remains unknown in the pediatric population creating a clinical dilemma as to which defects might benefit from primary bone grafting. The purpose of this study is to quantify the pediatric CSD.

**METHOD:** 20 consecutive patients with non-syndromic single suture synostosis treated with CVE at 9-12 months of age were enrolled. Ethics approval and informed consent were obtained. Using 3D volume rendering software (AMIRA and id3D), the percent closure of a given skull defect was determined by comparing its original surface area on immediate post-operative CT with its surface area as seen on a spatially registered, one year post-operative CT. The surface area of a defect capable of achieving 100% closure was considered the CSD. Defect variables included surface area, proximity to the synostosed suture, and proximity to vascularized bone. Non-parametric and correlation tests were used for statistical analysis.

**RESULTS:** 120 defects were analyzed. The CSD for children is highly variable and the ability of a given defect to ossify was influenced by its original size and proximity to vascularized bone and the diseased suture. Furthermore, brain growth appeared to perpetuate or even expand certain defects.

**CONCLUSIONS:** The pediatric CSD following CVE is influenced by proximity to the diseased suture, vascularization and potentially underlying brain growth. Further work is required to establish an algorithm capable of predicting defect closure accounting for these various parameters.

**LEARNING OBJECTIVE:**

The participants will be able to:

- o Identify factors that affect skull defect healing
- o Understand techniques used to measure complex shapes from CT images using commercially available software.

**48**
**FACIAL TRANSPLANT AND ITS IMPLICATIONS**
**M Bélanger, P Harris, A Nikolis, M-A Danino**

**PURPOSE:** Was there any difference in the reports of the 3 allograft? Was there a good correlation between the media and the scientific world?

**METHODS:** The internet sites of 3 major newspapers were used for the media database. (Le Monde, Times and NY Times) Those results were compared to those found with Pubmed between January 2005 and December 2007 by using these key words: facial graft/facial allograft/composite tissue allograft and by using the name of the authors of the graft. We did a comparative analysis by using word processing software.

Numerous elements were analysed (respect of privacy, image distribution, nature of articles, history, results)

**RESULTS:** 51 articles from the media database (20 from Le Monde, 12 from NYT, 19 from the Times) were analysed and 6 from the scientific database.

The cases were unequally distributed with reports on the first graft representing 70% (Le Monde), 89% (The Times) and 92% (NYT) of the media publications compared globally to 6 % on the second French graft and 10% on the Chinese one. In the scientific database, 100% of the articles implicate the first graft and respect the privacy of the patient compared to 67% of the media who unveil the identity.

Different logic exists about the communication used for these first 3 grafts. The first graft by Dubernard ET coll. is characterized by a powerful communication in the scientific world as much as in the media with a strong personalization of the case and without much correlation of the information between those 2.

**CONCLUSION:** The communication following a medical premiere depend a lot of the team who realized the act. Ethical considerations are different for the media and for the scientists. The management of the

media needs and takes preparation and evaluation like all the other results.

**LEARNING OBJECTIVES:**

- 1) Participant will be able to critically analyse the difference that exist between the media and the scientific community
- 2) Participant will consider the importance of privacy of patients

**49**
**COMPUTER ASSISTED PARAMEDIAN FOREHEAD FLAP DESIGN: A CASE REPORT**
**P Kwan, G Moysa**

**PURPOSE:** Traditionally, Plastic Surgery has used time-proven templates and rules-of-thumb for flap design often requiring intra-operative tailoring to the specific defect.

Computer Assisted Design (CAD) has found wide applicability in the field of industrial design by allowing detailed planning and modeling prior to implementation. This makes CAD an appealing avenue for flap design both by allowing detailed planning pre-operatively and minimizing donor site size and morbidity.

**METHOD:** A 33 year-old male TC suffered a human bite injury to the nasal tip resulted in extensive composite loss of the left and right nostril and nasal tip including some lining, portions of the lateral cartilages, and right medial crus. This was allowed to heal using a split thickness skin graft and the patient was brought back in 3 months for a 3 stage paramedian forehead flap reconstruction.

The traumatic defect was characterized using a 3D surface laser scanner and life-size models of the patients face, forehead, and nose were then constructed using this data. The appearance of the patient's nose pre-injury was determined using photographs and also modeled in life-size. These models were then used to create a template for the paramedian forehead flap and fit carefully to the patient and models.

**RESULTS:** By using the CAD template a precise paramedian forehead was created and inset in conjunction with a septal cartilage graft. It was subsequently divided 5 weeks later. Several further revision surgeries were performed with good reconstructive results.

**CONCLUSIONS:** The use of CAD for this patient's flap design demonstrates the potential use of this technology in a complex reconstructive procedure, and its extension to other flaps and defects is a potentially interesting area of research.

**LEARNING OBJECTIVES:**

1. Participants will gain an understanding of the potential applications and limitations of 3D laser scanning in facial soft-tissue defects.
2. Participants will learn techniques for constructing life-size 3D models and templates using Computer Assisted Design.

**50**
**MEASURING OUTCOMES IN KEY PINCH AND GRASP IN TETRAPLEGIC PATIENTS**
**JM Prince, M Whittaker, S Gregory, PJ Gropper**

**PURPOSE:** Surgical procedures that restore key pinch and grasp function can significantly impact the lives of cervical spinal cord injury patients. The purpose of this study was to evaluate clinical outcomes of tetraplegic patients following reconstructive hand surgery in a single surgeon's practice over the past 12 years.

**METHODS:** The Lamb and Chan questionnaire was administered to determine patient satisfaction with surgery and its impact on activities of daily living. Pinch and grip strength were compared between the operative and non-operative hands using the B & L Pinch Meter and the Jamar Hand Dynamometer respectively. The Link Hand Function Test (LiHFT) was used to evaluate hand function across a range of activities.

**RESULTS:**

Twenty-four patients received procedures to restore key pinch. Twenty patients completed the questionnaire. Seventeen (85%) reported that the surgery had positively influenced their quality of life. Sixteen (80%) felt it allowed them to become more independent. Patients with active tendon transfers demonstrated greater satisfaction with surgery than those with tenodesis procedures. Average post-operative pinch strength was 4.1 lbs and 2.1 lbs following key pinch active transfers and tenodeses procedures

respectively, compared with 0 lbs on the nonoperative sides. Average post-operative grip strength was 9.6 lbs following hook grip active transfers, compared to 0 lbs on the non-operative sides. Active tendon transfers improved performance on the LiHFT.

**CONCLUSIONS:** This was the first outcome study to use a hand function test specific to the tetraplegic patient population. This study supports previous findings that tendon transfers in tetraplegic patients can profoundly impact hand function, activities of daily living, and quality of life.

**LEARNING OBJECTIVES:**

1. At the end of this presentation the learner will be able to appreciate the impact functional hand reconstruction has on the lives of tetraplegic patients.

## 51

### UTILITY THEORY – A NOVEL EVALUATION TOOL FOR ASSESSING REPLANTATION OUTCOMES

O Tessler, G Landes, JP Brutus, HB Williams, A Nikolis

**PURPOSE:** Improvements in microsurgical technique have dramatically increased replant survival rates to over 90% since the initial report of upper extremity replantation in 1964. Tissue survival however, does not always correlate with useful extremity function. Measuring functional outcomes has been historically difficult because of the heterogeneity of mechanisms involved in the injury, patient factors, and associated injuries. Research in this field has thus attempted to develop increasingly specific evidence-based surgical indications. Utility theory represents a group of economic game theory-derived Health Related Quality of life assessment tools designed to help quantify uncertainty in medicine. It has been used extensively in medical decision-making over the past 40 years and has proven to be valid, reliable, and responsive for a large number of clinical conditions. This study is a novel attempt to examine the validity of utility theory measures as it applies to upper extremity replant patients.

**METHODS:** Patients treated by the Quebec Replant Center were evaluated at a point of one year or greater from their final reconstructive procedure. Using the EuroQol, Visual Analog Scale (VAS), Time Trade-Off (TTO), and Standard Gamble (SG) questionnaires, we compare scores to the previously validated hypothetical clinical marker states of monocular and binocular blindness and to traditional replant outcome measures, including objective (ROM, sensibility, etc.), subjective (satisfaction, pain, etc.), and DASH assessments.

**RESULTS:** We report that utility theory can represent a highly reliable, valid, and responsive standardized tool that can be used universally in assessing replantation results.

**DISCUSSION:** It is our belief that utility theory can be developed as a simple and unified score for the multitude of surrogate measures in use to evaluate replantation outcomes.

**LEARNING OBJECTIVES:**

1. Participants will be able to identify patients who will likely benefit from surgical replantation.
2. Participants will be able to communicate realistic outcome expectations with patients.
3. Participants will be able to develop more specific treatment algorithms for upper extremity replant programs.

## 52

### THE HISTOLOGIC EFFECT OF TENSION IN NERVE REPAIRS ON IN VITRO HEALING OF THE SCIATIC NERVE IN RATS

A Card, S Rabah, J Bain

**PURPOSE:** Peripheral nerve injuries are a relatively common component of trauma to the upper limbs. When these injuries occur there can be partial loss of length or a simple disruption of continuity. The best healing and long-term outcomes are achieved with tensionless nerve repairs. All repairs will have some minor or major tension unless nerve grafting is done. In many cases this tension is deemed acceptable to the surgeon in order to prevent the sacrifice and harvesting of another nerve. It has been shown *in vivo* that increased levels of tension result in irregular scar tissue formation, which interferes with axonal development. We hypothesized that increasing levels of tension repair of transected

rats' sciatic nerve segments are associated with increasing internal fibrosis.

**METHODS:** 25 Lewis rats (50 sciatic nerve segments) were randomized into 5 groups of varying tension: 0, 3, 6, 9, and 12 gm. For every rat, one nerve segment was transected and micro-surgically repaired; the other was kept intact to serve as a control. Nerves were fixed in paraffin and two representative areas of each nerve were selected for slide preparation. These slides were fixed and prepared with histochemical stains (H&E, PAS, Bielschowsky, Masson's Trichome, and Luxol Fast Blue) in order to identify areas corresponding to cellular components, fibrous tissue, myelin sheath tissue, and axonal tissue. Slides were digitized and analyzed (Sigma Scan) by computer.

**RESULTS:** A qualitative histological analysis was performed to assess the difference in healing patterns across the repaired gaps in the different groups. We measured total cross sectional area, percentage fibrous and neural tissue. Failure rates for the repairs and degree of nerve elongation were also measured and compared.

**CONCLUSIONS:** A comparison of the ratios of Schwann cells to fibroblasts and amount of collagen showed that increased tension results in decreased neural tissue production compared to fibrous tissue. Final quantitative results are still pending but will be complete for presentation.

**LEARNING OBJECTIVES:**

At the end of this lecture the learner will understand the basis of nerve regeneration and how stress and stretch increase the presence of fibrous tissue.

## 53

### THE THORACODORSAL TO LONG THORACIC NERVE TRANSFER: AN EFFECTIVE SURGICAL TREATMENT OF LONG THORACIC NERVE PALSY

M Momtazi, J Olson, M Morhart

**PURPOSE:** Nerve transfers involve the placement of an uninjured nerve source close to a target muscle. The concept is predicated on the ability of motor axons to reinnervate motor endplates irrespective of whether the connection between donor nerve and target muscle is anatomically correct. The purpose of this case series is to illustrate the use of the thoracodorsal to long thoracic nerve (LTN) transfer to reinnervate the serratus anterior muscle. Study objectives include demonstration of the effectiveness of this reconstructive option, surgical technique and postoperative clinical outcomes.

**METHODS:** This case series consisted of 3 patients with symptomatic scapular winging who were diagnosed with LTN palsy. Mechanism of injury involved heavy lifting in two patients and hockey injury in one. After failing conservative therapy consisting of periscapular muscle strengthening, patients were treated with end-to-end thoracodorsal to LTN transfer. Average interval from symptom onset to nerve transfer was 14 months  $\pm$  2.94 (range, 10 to 17 months). To date, the average follow up is 10 months  $\pm$  2.45 (range, 7 to 13 months).

**RESULTS:** Six months postoperatively all patients demonstrate increased range of shoulder motion, decreased scapular winging, increased shoulder strength and a reduction in pain symptoms. Electromyographic analysis shows new motor unit potentials as evidence of serratus anterior reinnervation.

**CONCLUSIONS:** The thoracodorsal to LTN transfer results in electromyographic evidence of serratus anterior reinnervation. These results correspond clinically with functional recovery of the muscle, decreased scapular winging and resolution of pain symptoms.

**LEARNING OBJECTIVES:**

Participants will be able to:

1. Identify surgical options for LTN palsy
2. Explain the concept of nerve transfer and describe the surgical procedure involved
3. Consider thoracodorsal to LTN transfer as an effective reconstructive option for LTN palsy

**54****LEVEL OF EVIDENCE IN PLASTIC SURGERY JOURNALS****V Panchapakesan, CR Forrest, BA Graham**

**PURPOSE:** Grading of different levels of medical evidence was introduced over 20 years ago as a means of concisely appraising the quality of a clinical research study. The number of citations an article receives after publication reflects its recognition, or "influence" in the scientific community. The purpose of this study was to assess the level of evidence of highly cited influential articles in the plastic surgery literature over a fifteen-year period.

**METHODS:** A search for highly cited articles from four sample years over a fifteen-year period (1990, 1995, 2000, 2005) was undertaken. Articles were identified using the Science Citation Index Expanded (SCI-EXPANDED, 1945-present). All published articles in a given year from fourteen plastic surgery journals were ranked by number of citations. The one hundred most highly cited articles from each sample year were then assessed for level of evidence.

The level of evidence was assigned using a modified version of the system published by the Oxford Center for Evidence Based Medicine. Study Type (Therapeutic, Prognostic, Diagnostic, or Economic) and Level of Evidence (I-V) was assigned to each article. All articles were first reviewed by the primary author (VP). A random sample of articles were then reviewed by the secondary authors (CRF, BAG). Inter-observer agreement was then calculated.

**RESULTS:** The most common subject areas were breast (21%), craniofacial (18.2%), and aesthetic surgery (11.2%). Over half (55.8%) of the articles were published in *Plastic and Reconstructive Surgery*, 11.2% in *Annals of Plastic Surgery*, 10% in the *British Journal of Plastic Surgery*, and the remainder in subspecialty journals. According to ratings of study type, 84.5% were therapeutic, 11.8% were prognostic, 3.3% were diagnostic, and 0.5% were economic studies. Overall, 3.5% were rated as Level I evidence, 8.5% were Level II, 12.5% were Level III, 69% were Level IV, and 6.5% were Level V. The percentage of higher level of evidence (Level III and above) studies steadily increased from 14% in 1990, to 21% in 1995, 30% in 2000, and 33% in 2005 ( $p<0.05$ ).

**CONCLUSIONS:** The level of evidence in the plastic surgery literature has been steadily increasing. The majority of published, influential articles however, are Level IV evidence. Clinical investigators should pursue studies with a higher level of evidence whenever possible.

**LEARNING OBJECTIVES:**

At the end of this presentation, the listener should be able to:

1. Understand how to apply a level of evidence rating.
2. Implement simple ways of improving the quality of a study.

**55****RECENT CANADIAN PLASTIC SURGERY GRADUATES: ARE THEY PREPARED FOR THE REAL WORLD?****CE Ferron, V Lemaine, B Leblanc, A Nikolis, JP Brutus**

**PURPOSE:** The purpose of this study was to evaluate the correlation between plastic surgery education received through residency in Canadian programs and perceived preparedness for independent clinical practice among recently graduated plastic surgeons.

**METHOD:** All practicing plastic surgeons having graduated from a Canadian program between 1996 and 2007 were surveyed. An itemized web-based questionnaire was designed and distributed by e mail with the assistance of all program directors.

**RESULTS:** Eighty of the 173 plastic surgeons (46.2%) that graduated in Canada in the last ten years responded to the survey. The majority of respondents were satisfied with their training in most aspects. Only 22% of respondents had done part of their training in a foreign center but 68% of these agreed that it was beneficial to their training. Clinical research was encouraged in 92% of the respondents' programs but dedicated time was only allocated in 29% of these. At the beginning of their practice, the majority of respondents felt comfortable or very comfortable in all sub-specialties except for pediatric plastic surgery and ancillary procedures.

**CONCLUSION:** Our results describe the tendencies in type and duration of the training that Canadian graduates had over the last ten years. The

majority of respondents were satisfied with most aspects of their residency programs and felt comfortable practicing different sub-specialties early in their careers. Expectations imposed during residency and the resources available in order to meet these expectations are also revealed. This study will help improve residency programs by identifying existing gaps in the preparedness of surgeons.

**LEARNING OBJECTIVES:**

After attending this presentation, the participants will be able to better define the goals and expectations of future plastic surgery graduates with regards to their future practice.

**56****RECONSTRUCTING AN IDENTITY: DEFINING THE CURRENT PRACTICE PROFILE OF QUEBEC PLASTIC SURGEONS****DS Guberman, CE Ferron, J-P Brutus, C. Guertin****PURPOSE:**

- a. To define the current public practice profile of Quebec Plastic Surgeons
- b. To evaluate our concept of the 'typical' plastic surgery practice vs reality (point a.)
- c. To determine if plastic surgery residents are being adequately trained to carry out the current practice as defined by point a.

**METHODS:** Data from the RAMQ databases from 2002 to 2007 was amassed and the top 12 surgical procedure codes for each year were compared. Data for procedures we thought represented well our curriculum goals were also tabulated from 2002 to 2007 and compared to the actual top 12 procedure data. A questionnaire was also given to 20 residents of the University of Montreal plastic surgery training programme asking them which top 10 procedures were most important to master by the end of residency.

**RESULTS:** The top procedures from 2002 to 2007 were consistently dominated by minor oncological skin resections (20%), carpal tunnel release (9%), breast reduction (5%), sebaceous cyst removal (6%), trigger finger release (3%), ganglion cyst removal (2%), palmo-digital fasciectomy (3%), local flaps (3%), extensor tenorrhaphy (1%), complex laceration repair (2%), and primumauris correction surgery (2%). These top 10 procedures made up an average of 56% of all codes between 2002 and 2007. Our own hypothesized top list of procedures representing current plastic surgery residency program curriculums actually comprised on average only about 4% of the total codes. The questionnaire results are still pending.

**CONCLUSIONS:** The current plastic surgery public practice in Quebec is greatly dominated by minor procedures such as skin oncological and cyst resections, carpal tunnel release and breast reduction whereas traditional curriculum-based procedures such as free flap surgery, microsurgery, breast reconstruction, oral-maxillo-facial fracture repair, and wrist surgery make up only a small minority of the current plastic surgery practice in Quebec.

**LEARNING OBJECTIVES:**

At the end of this presentation, the learner will be able to :

- a. better appreciate the reality of what comprises the current public plastic surgery practice in Quebec.
- b. Review factors influencing current public plastic surgery practice profiles in Quebec.

**57****A QUESTION OF ETHICS: HOW ETHICS APPLICATIONS AFFECT THE RESEARCH OF CLINICIANS.****N Hallgren, D Duffy, D Courtemanche, C Verchere**

**PURPOSE:** to evaluate the impact of the ethical review process on research output within the department of surgery, urology, orthopedics, and anesthesia. To determine the best process by which a research idea receives ethical approval and to understand the inherent obstacles, if any, to the "occasional academic researcher" in this process.

**METHOD:** a questionnaire was mailed out to the active staff and residents in the departments of surgery, urology, orthopedics, and anesthesia. The data from the questionnaire was collected and descriptive and categorical data obtained and analyzed by analysis of variance and regression analysis

**RESULTS:** The process by which ethical approval is obtained at UBC affects research greatly. The data is currently being gathered, but preliminary data suggest that although ethics may help refine a project, it appears to be negatively impacting the output of minimal risk studies. This can be correlated with the number of revisions required by the ethical review board as well as the ability to renew an already approved project.

**CONCLUSIONS:** Research is of paramount importance in the pursuit of an evidence based surgical practice. The ethical process – although necessary and invaluable, may be negatively impacting the ability of full time clinicians to put research ideas into motion. It is our hope that with this research we can recommend resources which help busy clinicians put their research ideas into reality.

**LEARNING OBJECTIVES:**

- a) participants will be able to evaluate key factors facilitating and inhibiting research within a busy surgical community
- b) participants will be able to identify the amount of time and revisions on average are required to make a successful minimal risk research application

**58****ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA LECTURE****Ian Jackson, MD****59****THE SURGICAL CARE OF PEDIATRIC FACIAL BURN INJURY: IS FACIAL TRANSPLANTATION THE NEW RECONSTRUCTIVE PSYCHOSURGERY?****M Hanson, R Zuker, R Zlotnik-Shaul**

**PURPOSE:** The Hospital for Sick Children's composite tissue allotransplantation (CTA) team monitors advances in surgery, immunology and psychiatry relevant to CTA. CTA is contemplated for facial burns. This presentation integrates psychiatric and psychosocial factors relevant to CTA and facial burns to answer the question: Is Facial Transplantation the New Reconstructive Psychosurgery?

**METHOD:** Categories of pediatric burn literature reviewed include: (1) burn injury and associated psychiatric diagnoses, (2) psychosocial outcomes for both children and adults with histories of child hood burns and (3) psychosocial outcomes associated with disfiguring burns.

**RESULTS:** A range of psychiatric diagnoses are associated with burns including Post traumatic Stress Disorder (PTSD) plus Anxiety and Depressive disorders. Burn injury factors such as pain are mediating variables for PTSD. As facial transplantation would occur months post burn, CTA may not ameliorate these acute variables and PTSD. Repeated reconstructive surgeries and disfigurement maybe contributory to anxiety and depressive disorders. CTA with decreased reconstructive surgeries and improved facial appearance may ameliorate these outcomes. However, the identification of adverse impacts of disfiguring burns upon psychosocial outcomes has not been consistent. Furthermore, factors such as burn location and acute injury variables may contribute significantly to poor adjustment. Adult females with disfiguring childhood burns report poor psychosocial outcomes.

**CONCLUSIONS:** Our team's opinion is the hypothesized impact of CTA upon psychiatric outcomes post facial burns is reduced risk for developing depressive and anxiety disorders and/or adverse psychosocial outcomes for adult female survivors of childhood burns. CTA warrants consideration as the new reconstructive psychosurgery. CTA's impact upon early risk reduction differs from traditional psychosurgery which is used to treat intractable psychiatric conditions.

**LEARNING OBJECTIVES:** After this presentation learners will be knowledgeable regarding: (1) child and adolescent psychiatric and psychosocial adjustment post burns, (2) adult adjustment post pediatric burns and (3) CTA for facial burns.

**60****MONOBLOC ADVANCEMENT BY DISTRACTION OSTEOGENESIS IN PATIENTS WITH SYNDROMIC CRANIOSYNOSTOSIS****DA Peters, B Stubenitsky, CR Forrest**

**PURPOSE:** Traditional monobloc advancement is plagued by a high incidence of complications. We evaluated the safety and efficacy of monobloc advancement by distraction osteogenesis in patients with syndromic craniosynostosis.

**METHODS:** A retrospective analysis was conducted of 4 patients treated between 2007 and 2008 who underwent monobloc advancement by distraction osteogenesis using the rigid external distraction (RED) device. The surgical indications, course of treatment and complications are reported.

**RESULTS:** Two patients had Crouzon syndrome and two had Apert syndrome. The mean age at surgery was 65.25 months (range 23-122 mos.). All patients commenced distraction on the fifth post-operative day. Advancement of 0.5 mm was performed twice daily for 3-4 weeks. This was followed by a 3-month consolidation phase. Surgical indications were increased intracranial pressure in one patient, severe exorbitism in two patients and to improve facial balance in all patients. Three patients had previous surgery including anterior cranial vault reshaping ( n=2), myringotomy (n=2), tracheostomy (n=1) and palatoplasty (n=1). Complications included dural tear (n=2), hypernasal speech (n=2) and infection (n=1). One patient required re-operation in order to evacuate an infected seroma. No patient experienced any long-term adverse sequelae. All patients had excellent improvement of facial balance.

**CONCLUSION:** Monobloc advancement by distraction osteogenesis is an effective modality in carefully selected patients.

**LEARNING OBJECTIVES:**

1. To understand the surgical technique of monobloc advancement by distraction osteogenesis.
2. To appreciate the role of distraction in managing patients with syndromic craniosynostosis.

**61****CUSTOM PEEK (POLYETHERETHERKETONE) IMPLANTS FOR CRANIAL VAULT RECONSTRUCTION: OUTCOME AND LIMITATIONS****DA Lannon, R Backstein, G. Edwards, J Mainprize, O Antonyshyn**

**PURPOSE:** Surgical modelling of patient specific implants is rapidly gaining popularity in craniomaxillofacial surgery. PEEK is a thermoplastic material which appears to be particularly useful in the development of custom cranioplasty implants. In this paper we illustrate the technique and analyze the results of custom PEEK cranioplasty in a series of seven consecutive patients.

**METHOD:** Between February 2005 and September 2007, seven adult patients presented to Sunnybrook Health Sciences Centre with extensive cranial defects and were treated with custom PEEK cranioplasty. Computer modelling and rapid prototyping of a patient-specific implant was performed in all patients. In four out of seven cases the computer modelling was performed by the surgical team.

Six patients returned for postoperative follow-up (range 4 – 36 months, mean 14 months). Results of cranioplasty were assessed by standardized clinical and morphological evaluation. The patients' perception of residual problems with appearance was assessed using the Derriford Appearance Scale.

**RESULTS:** All patients underwent custom PEEK cranial vault reconstruction. Scalp expansion prior to cranioplasty was required in two patients. There were no complications. Morphological results were noted to be superior when computer modelling was performed by the surgical team rather than the commercial service. Technique deficiencies and design challenges were specifically identified. Patients' satisfaction with surgical results was high.

**CONCLUSION:** PEEK meets many of the requirements for an ideal cranioplasty material. Prefabrication offers many advantages such as better fit, and cosmesis, less invasive surgery, and reduced operating time.

However, the design of a patient-specific skull implant presents significant design challenges which are best addressed when modelling is performed by the surgical team with their detailed anatomical knowledge.

#### **LEARNING OBJECTIVES:**

1. Understand the principles of custom PEEK cranioplasty.
2. Appreciate the results achievable with custom PEEK cranioplasty.

**62**

### **MEASURE OF THE PRIMARY CLEFT LIP NASAL DEFORMITY BY POST HOC ANALYSIS OF PREOPERATIVE PHOTOGRAPHS**

**F Alsubhi, DM Fisher**

**PURPOSE:** The primary unilateral cleft lip nasal deformity ( $1^{\circ}$ -UCLND) can be considered a spectrum of severity. The  $1^{\circ}$ -UCLND can be reliably ranked by the subjective opinion of experts, and two objective anthropometric measures, columellar angle and nostril width ratio (NWR), have been shown to correlate with subjective expert opinion (Fisher 2008). The purpose of this study was to determine if NWRs obtained from preoperative photographs could be used as a reliable proxy for direct caliper measurement of the same.

**METHODS:** The NWR (cleft side : non-cleft side) was measured in 100 consecutive patients by direct caliper measure prior to cleft lip repair. Standardized preoperative photographs were obtained at the same time. At least five years later, the photographs were analyzed to measure the NWR. NWRs obtained by direct caliper measure were compared (2-tailed paired t-test) to NWRs obtained years later by analysis of the preoperative photographs.

**RESULTS:** NWR ranged from 1 to 3.33 (Mean = 1.94; SD = 0.59) by direct caliper measure and from 1.15 to 3.4 (Mean = 1.98; SD = 0.63) from photographic analysis. These two forms of measure were not statistically significantly different ( $p=0.242$ ); 95% confidence interval for the mean difference = -0.099 to 0.025.

**CONCLUSIONS:** Reliable grading of the  $1^{\circ}$ -UCLND is necessary to compare treatment protocols for management within the broad spectrum of observed  $1^{\circ}$ -UCLNDs. The NWR obtained from preoperative photographs is a reliable estimate of the actual NWR measured by direct caliper measure. Thus photographic analysis of NWR is a reasonable retrospective proxy measure of the  $1^{\circ}$ -UCLND if direct caliper measurements are not available.

#### **LEARNING OBJECTIVES:**

1. To review subjective and objective measures of the primary cleft lip nasal deformity.
2. To evaluate the use of preoperative photographs as a source for measure NWR.

**63**

### **BILATERAL CLEFT LIP – SURGICAL MARKINGS FOR ANATOMIC SUBUNIT REPAIR**

**DM Fisher**

**PURPOSE:** The purpose of this podium presentation is to review the author's technique for bilateral cleft lip repair with specific emphasis on the presurgical markings.

**METHOD:** Of the author's series, one patient with complete bilateral cleft lip and palate has been filmed while undergoing primary cleft lip repair.

**RESULTS:** 83 consecutive patients with bilateral cleft lip have undergone cleft lip repair by the author. To date, only one of the surgeries has been filmed. The footage of the presurgical markings for the repair is presented accompanied by preoperative and postoperative still photographs.

**CONCLUSION:** Appropriate presurgical planning is essential for satisfactory results. Surgical marking with adherence to the principles of anatomic subunit repair is reviewed.

#### **LEARNING OBJECTIVES:**

- (1) The principles of anatomic subunit repair as they apply to bilateral cleft lip will be reviewed. (2) Videotaped presurgical markings for anatomic subunit repair of bilateral cleft lip will be demonstrated.

**64**

### **AMNIOTIC BAND SYNDROME AND LOWER EXTREMITY COMPOUND FRACTURE: A UNIQUE SURGICAL CHALLENGE**

**JE Chuback, LL Ross**

**PURPOSE:** We describe the third case of amniotic band syndrome (ABS) with lower extremity compound fracture (CF).

**METHOD:** Medline was used to search: "amniotic band syndrome", "constriction band syndrome", "annular ring constriction", "annular groove syndrome", "congenital constriction bands", "intrauterine amputation", "congenital annular bands", "Streeter's dysplasia", and "Simonart's bands". An approach to address CF was conducted, with 19 months follow-up.

**RESULTS:** The patient was born with multiple limb amniotic band sequelae including a constriction band in the middle third of the right lower leg, with a CF of the tibia and fibula. Plantar light touch and capillary refill were equal to the opposite limb.

On the second day of life ORIF of the right tibia was achieved with percutaneous placement of K-wires. Closure of the associated 1cm<sup>2</sup> ulceration was achieved with band excision and Z plasters.

At six months of age, the tibial nerve was decompressed with Z-plastics. Doppler ultrasound showed arterial signals across the posterior constriction band and posterior tibial and dorsalis pedis pulses. Fluoroscopy demonstrated complete union of the fibula with partial union of the tibia. Development continued normally. Dorsal foot lymphedema and foot drop persisted. Dorsiflexion serial casting and physiotherapy failed. The patient began to ambulate on the dorsum of her right foot. MRI studies identified neurovascular anatomy. A debulking procedure with Achilles tendon lengthening and external fixator application was done at 16 months. The patient is now ambulating on the plantar surface, with no limb length discrepancy or angulation.

Two similar cases of ABS have been reported. Osseous alignment was achieved by either external fixator or casting. Skin closure was achieved with Z-plastics. Both resulted in bony angulation and limb length discrepancy.

**CONCLUSIONS:** We have described percutaneous pinning and soft tissue reconstruction to address CF secondary to ABS.

#### **LEARNING OBJECTIVES:**

To become familiar with a rare presentation of ABS, and approaches to it.

**65**

### **RESIDENTS ON OPERATION RAINBOW MISSIONS**

**DK Rai**

Operation Rainbow Canada is a non-profit organization established in Canada, providing services to third world countries. Surgical procedures done through this mission work include cleft lip and palate deformities, revisions, rhinoplasties, nasal corrections and burn contractures.

#### **PURPOSE:**

1. To show that Operation Rainbow Canada is an excellent teaching program for residents in plastic surgery, PGY4 and PGY5 in lip and palate surgery.

2. To review outcome of surgical procedures.

**METHODOLOGY:** shows techniques in the various necessary procedures and repairs in lip, palate, and burn management.

**RESULTS:** Review of photographs of pre-operative and post-operative cases done by the staff surgeons and the residents.

#### **LEARNING OBJECTIVES:**

To improve the knowledge and technical skills of a resident in cleft lip palate surgery and burn contracture surgery. Theoretical knowledge is placed into practical intensive involvement, and shows excellent outcomes through this program in resident training. Residents who had limited knowledge in the above field, complete this two week educational surgical program with excellent expertise, confidence and good technical skills.

#### **CONCLUSION:**

1. The overall impression of the staff members in training the residents has been very positive.

2. The residents feel confident.

3. Dialogue between the two training Plastic Surgeons and the residents is quite detailed.
4. Exposure to Philanthropic work,
5. Operation Rainbow Canada is a new program to train residents in plastic surgery.
6. This may bridge the gap in some established training programs in Canada.

**LEARNING OBJECTIVE:**

Operation Rainbow Canada provides an avenue for residents to learn surgical techniques and results in cleft lip and palate management.

**66****A DOUBLE-BLIND PLACEBO CONTROLLED TRIAL USING SUBCUTANEOUS INJECTIONS OF INTRON A FOR THE TREATMENT OF HYPERTROPHIC SCARRING****EE Tredget, AJ Adewale, S Matthey, H Shankowsky**

**INTRODUCTION:** Hypertrophic scars (HSc), which are firm, red, elevated scars that are disfiguring, painful and pruritic. To date, available treatments are very few, often uncomfortable and require prolonged periods of administration.

**OBJECTIVE:** To compare the treatment of post burn hypertrophic scarring in a randomized placebo controlled clinical trial of interferon using recovery parameters of the Vancouver Burn Scar Assessment and scar volume.

**METHOD:** This was a double-blind placebo controlled trial using subcutaneous injections of Intron A (IFN alpha 2b) or placebo in 20 patients with significant areas of hypertrophic scarring post-burn injury. The group similarity was evaluated in a blinded fashion using demographic and baseline characteristics (gender, age, TBSA, days post injury before treatment).

**RESULTS:** The treatment groups were similar in sex and age distributions. The mean age of patients allocated to interferon treatment was 31.3 compared to 28.6 for placebo patients. Overall, although significant improvements in scar rating were observed over time, a statistically significant benefit was found for the IFN $\alpha$ 2b group independent of time ( $p=.007$ ). From the interaction analysis, IFN treated patients had significant improvements in vascularity resolution ( $p$ -value = .023). Similarly, statistically significant improvements in the pliability/height score were found with time, but also with interferon treatment independent of time ( $p$ -value = .008). There was a marginal reduction in scar volume in interferon group compared to placebo group ( $p=0.08$ ).

**CONCLUSIONS:** Interim analysis of our phase III IFN trial has demonstrated significant improvements in overall scar assessment and a number of subcategories. Further assessment is ongoing.

**LEARNING OBJECTIVES:**

1. Describe results of a double blind placebo control trial for HTS therapy
2. Explain the putative role of IFN therapy in FPD of the skin
3. Outline future plans for evaluation of IFN therapy in HTS

*Disclosure statement: Dr. Tredget has participated in clinical trial research projects with Convatec Division of Squibb Canada, Inc, Smith + Nephew, Inc. and Canada Microsurgical, Ltd.*

**67****QUALITY OF LIFE OF BURN SURVIVORS UNDERGOING BURN RECONSTRUCTION****J Bibeau-Poirier, B Nedelec, L Duranceau, A Armour**

**PURPOSE:** With increasing success rates of acute burn care, burn scar reconstruction is regularly required for a heterogeneous group of deformities and patients. Surgical procedures performed span the reconstructive ladder, ranging from scar revision to staged expanded free tissue transfer. Surgical results can be unexpected, depending on many factors. The range of possible outcomes from burn reconstruction in terms of effect on quality of life has never been quantified. It is hoped that such knowledge would improve informed consent for burn survivors, as well as provide more comprehensive guidelines for burn reconstructive surgeons. A prospective evaluation of the impact of burn reconstruction on quality of life is proposed.

**METHODS:** Consecutive burn survivors, evaluated through a plastic surgery consultation to likely benefit from a reconstructive procedure, were

enrolled in this study following informed consent. Demographic data were collected, and deformity severity was quantified. Quality of life (SF-36) and functional outcomes (DASH, Burn Specific Health Scale, TEMPA, Breast Evaluation Questionnaire-depending on the scar location) were assessed at one month pre-operatively, as well as at one and six months post-operatively. Intrapatient comparisons of scores over time were analysed using ANOVA. Interpatient comparisons with patients of similar demographics at similar times post-burn, but pre-reconstruction, were analysed using the chi-squared test.

**RESULTS:** To date, 11 patients have been enrolled, ranging in age from 19 to 87. Burn TBSA ranged from 4% to 60%. Procedures involve either the neck or upper extremity in 100% of patients. Pre-operative SF-36 scores demonstrate significant variability in patients' pre-operative quality of life. At one month post-op, early response to surgery ranged widely; correlation with outcomes at six months will be presented.

**CONCLUSION:** Quality of life and functional outcome measures help to evaluate the relative merits of burn reconstructive procedures to burn survivors.

**LEARNING OBJECTIVE:**

To review the preliminary results of a prospective evaluation of burn reconstruction outcomes.

**68****Withdrawn****69****Canadian Expert Series****THE VERTICAL FACELIFT: THE EVOLUTION OF A STRATEGY FOR CERVICAL-FACIAL RHYTIODECTOMY****DC Birdsell**

In this presentation the author outlines the evolution of a strategy that focuses on vertical repositioning of the tissue for restoration of a natural, more youthful appearance of the aging face. Following experience gained in many years of primary and secondary facelifts, and following selective advice from many experts, the author has developed an approach that uses careful analysis of all layers and all regions of the face in order to develop a plan for a safe and effective operation with low morbidity.

Vertical descent can be ameliorated in the upper, middle, lower face and neck as individually required by emphasizing vertical repositioning. The incision must be carefully planned and often placed at the side burn hairline to avoid unacceptable hairline displacement. This placement facilitates lateral brow elevation, orbicularis oculi modification and malar fat elevation with the skin flap. Further mid face support and jowl fat repositioning is achieved by horizontal plication of the SMAS in the parotid region. The combination of this plication and the exaggerated vertical skin shift can lend to a dramatic jowl and neck correction that cannot be accomplished by a more lateral shift. Examples shown will demonstrate the technique with a preponderance of patients who are considered more common in most practices; not so-called "trophy cases" that are so often used as examples.

**LEARNING OBJECTIVES:**

At the end of this presentation the surgeon will understand the speakers approach to the analysis of the many components of facial aging and the rationale of the strategy proposed for the restoration of a natural, more youthful appearance.

**70****WHICH IS THE BEST DRESSING APPLIED TO DONOR SITES AFTER HARVESTING SKIN GRAFTS?****A SYSTEMATIC REVIEW OF THE LITERATURE****S Voineskos, B Ayeni, L McKnight, A Thoma**

**PURPOSE:** The purpose of this study is to find which dressing(s) is/are associated with the following outcomes: least pain, lowest infection rate, best healing quality, fastest healing rate, best quality of life and cost effectiveness.

**METHOD:** A systematic review was performed of all studies that evaluated dressings applied to skin graft donor sites in human subjects. A computerized search of Cochrane, Medline, EMBASE, and CINAHL from 1971 to 2007 was performed. The following combination of key words was used: "skin graft", "donor", and "dressing". Quality assessment and data extraction were performed independently by two observers with an independent arbitrator resolving any disagreements.

**RESULT:** 454 hits were generated. Of these articles, 124 were considered relevant (Kappa 0.88). Further scrutiny of these articles showed that 73 papers were eligible for analysis, 33 of which were reported as randomized controlled trials (RCT), but their methodology was weak. Moist wound dressings (e.g. DuoDERM, Kaltostat) were found to be associated with less pain, a lower infection rate, a faster healing rate and a better healing quality when compared to non-moist wound dressings (e.g. Scarlet Red). Non-moist wound dressings were associated with a lower cost. Quality of life was not measured in any study and no proper economic evaluation was done.

**CONCLUSIONS:** Moist wound dressings appear to be superior to non-moist wound dressings in terms of the outcomes measured. There remains uncertainty that the above findings are valid because of the methodological weakness of the studies. It is recommended that a methodologically sound RCT with a proper economic evaluation be considered comparing moist and non-moist wound dressings.

#### LEARNING OBJECTIVES:

Identify outcome measures for skin graft donor site dressings.  
Evaluate strengths and weaknesses of existing donor site dressings and of novel donor site dressings.

### 71

#### NOVEL THERAPEUTIC STRATEGY FOR ATTENUATION OF ISCHEMIA/REPERFUSION (I/R) INJURY IN SKELETAL MUSCLE

**SE McAllister, H Ashrafpour, N Huang, K Jindal, M Moses, C Forrest, PC Neligan, JE Lipa, CY Pang**

**PURPOSE:** Until now, research has concentrated on preischemic treatments to prevent I/R injury. Here, we test the hypothesis that skeletal muscle I/R injury occurs mainly during reperfusion, therefore, preischemic (PreP) and postischemic (PostP) pharmacological treatments are equally effective in attenuating I/R injury.

**METHODS:** Pig latissimus dorsi (LD) muscle flaps were used to study: (1) muscle infarction after 4h ischemia and 0-72h reperfusion; and (2) efficacy and mechanism of PreP and PostP treatment in attenuating I/R injury ( $n=8$ ;  $p < 0.05$ ). The clinical drug Cariporide (3 mg/kg; i.v.) was given 5 min before (PreP) or immediately after (PostP) 4h ischemia. Cariporide inhibits mitochondrial  $\text{Ca}^{2+}$  ( $\text{mCa}^{2+}$ ) overload, a common pathology in I/R injury.

**RESULTS:** There was no muscle infarction at the end of 4h ischemia. Muscle infarction was  $22 \pm 4\%$  at 2h reperfusion, increased to  $41 \pm 1\%$  at 24h reperfusion and remained unchanged at 48h ( $38 \pm 6\%$ ) and 72h ( $40 \pm 1\%$ ) reperfusion. PreP and PostP treatment with Cariporide reduced infarction from  $43 \pm 2\%$  to  $18 \pm 3\%$  and  $24 \pm 3\%$ , respectively, at 48h reperfusion. Infarct protection was similar in PreP and PostP treatment. At 1h reperfusion,  $\text{mCa}^{2+}$  content (nmol/mg prot.) was lower in PreP ( $369 \pm 38$ ) and PostP ( $283 \pm 52$ ) treatment than the control ( $537 \pm 41$ ). The muscle ATP content (umol/g prot.) was higher in PreP ( $23 \pm 3$ ) and PostP ( $22 \pm 2$ ) treatment than the control ( $9 \pm 3$ ).

**CONCLUSION:** In skeletal muscle I/R injury, lethal injury occurred mainly during reperfusion. PreP and PostP treatments with Cariporide were equally effective in attenuating I/R injury. The mechanism was associated with inhibition of  $\text{mCa}^{2+}$  overload and preservation of ATP synthesis during early reperfusion. Therefore, PostP treatment with Cariporide is a potential strategy for attenuation of I/R injury in both elective and trauma surgery.

#### LEARNING OBJECTIVES:

(1) Understand the role of calcium overload in I/R injury.  
(2) Appreciate the mechanism of cariporide in salvaging ischemic skeletal muscle from I/R injury.

### 72

#### SALVAGE OF ISCHEMIC HUMAN SKELETAL MUSCLE FROM REPERFUSION INJURY

**N Cahoon, SE McAllister, J Bou-Merhi, H Ashrafpour, N Huang, SOP Hofer, JE Lipa, CY Pang**

**PURPOSE:** We have previously demonstrated that preischemic conditioning of human skeletal muscle in-vitro, with brief cycles of ischemia/reperfusion (I/R), protects the muscle from subsequent sustained I/R injury. However, in musculoskeletal and vascular trauma, there is no such opportunity for prophylactic treatment against I/R injury. We therefore plan to investigate whether postischemic conditioning at the onset of reperfusion is also effective in salvage of ischemic human skeletal muscle from I/R injury.

**METHOD:** Hypoxia (ischemia) and reoxygenation (reperfusion) were achieved by bubbling 95%  $\text{N}_2$ /5%  $\text{CO}_2$  and 95%  $\text{O}_2$ /5%  $\text{CO}_2$ , respectively, through Krebs-Henseliet-Heves (KHH) buffer at 37°C. Human skeletal muscle strips (1mm width) were equilibrated in oxygenated KHH, then assigned to 3 groups: (1) control (5h normoxia); (2) 3h hypoxia/2h reoxygenation; and (3) post-hypoxic conditioning (PostC) with 1 cycle of 5 min hypoxia/reoxygenation. Cell energy store, injury, and viability were assessed by measuring ATP content, LDH release and MTT reduction assay, respectively.

**RESULTS:** LDH release (U/g wet wt.) increased from  $128 \pm 15$  (normoxic control) to  $231 \pm 29$  after 3h hypoxia/2h reoxygenation and PostC reduced LDH release to  $155 \pm 20$ . MTT reduction (OD/mg wet wt.) was reduced from  $1.1 \pm 0.1$  (normoxic control) to  $0.6 \pm 0.1$  after 3h hypoxia/2h reoxygenation and PostC raised MTT reduction to  $1.0 \pm 0.1$ . Muscle ATP content (umol/g protein) was reduced from  $9.2 \pm 0.9$  (normoxic control) to  $4.1 \pm 1.1$  after 3h hypoxia/2h reoxygenation and PostC restored the ATP content to  $8.8 \pm 1.3$  ( $p < 0.05$ ;  $n = 6$  for all tests).

**CONCLUSION:** These findings indicate that postischemic conditioning at the onset of reperfusion is effective in salvage of ischemic human skeletal muscle from I/R injury and allows for future testing of pharmacomimetic therapies.

#### LEARNING OBJECTIVES:

To demonstrate the efficacy of postischemic conditioning against I/R injury and provide insight into design of drug therapy against muscle infarction.

### 73

#### ISOLATED TRANS-GENE EXPRESSION IN RAT HIND LIMB COMPOSITE TISSUE ALLOGRAFTS

**MW Neumeister, D Cooney, C Chambers**

**INTRODUCTION:** Composite-tissue allografting may be an ideal solution to many of the problems of reconstructive surgery. Previous attempts to induce transplant tolerance have focused on the modification of the transplant recipient usually through systemic immunosuppression. We propose a novel approach to the induction of allograft tolerance by modifying the allograft itself by over expression of immunomodulatory cytokines.

**METHODS:** We have created vectors containing TGF beta, IL-10, and TGF beta and IL-10 combined using the adenoviral expression system. In vitro experiments have demonstrated the ability of these cytokines to produce T "regulatory" cells (TREG), expressing CD4+/CD25+/foxp3. These cells may be able to reduce or stop the rejection of the transplanted material. We have overexpressed these cytokines by introducing our viruses into whole animals and demonstrated the ability of these cytokines to increase the number of circulating CD25+/CD4+/foxp3 Treg cells present in transduced rats. A replication deficient adenovirus was produced carrying the Luceferase marker gene allowing the localization and quantification of target gene expression. Rat hindlimbs were isolated and perfused through the femoral artery. Luceferase/Adenovirus was then perfused through the limb and washed out before the limb was transplanted heterotopically into a syngeneic recipient. In vitro fluorescence imaging was used to characterize expression patterns.

**RESULTS:** Limbs demonstrated rapid expression of the target gene in as little as 12 hours, peaking at 1 week and stable to 4 weeks. No detectable expression was seen outside the transplanted limb.

**CONCLUSION:** The next phase of this work is to overexpress cytokines TGF beta and IL-10 in transplanted limbs with the aim of generating transplant-specific Treg cells. These cells should be able to reduce or prevent transplant rejections without the side effects of systemic immunosuppression.

**LEARNING OBJECTIVES:**

- Participants will understand the immunology of allograft rejection.
- Participants will learn a novel method of preventing rejections.

74

**ADAM12: A POSSIBLE REGULATOR OF DUPUYTREN'S CONTRACTURE****L Vi, A Njarlangattil, C Raykha, Y Wy, D O'Gorman, BS Gan**

Dupuytren's Contracture is currently incurable and most commonly treated by surgical resection of the disease cord. We have previously documented that DC cord contains elevated levels of  $\beta$ -catenin and that extracellular matrix (ECM)-cellular interactions affect the gene expression of primary DC fibroblasts. Ongoing work shows that DC cells are hypersensitive to a collagen-enriched environment and rapidly deplete cellular  $\beta$ -catenin levels relative to patient-matched primary fibroblasts derived from phenotypically unaffected palmar fascia. In addition, we found that DC cells are hypersensitive to Transforming Growth Factor- $\beta$  signaling and exogenous addition of this cytokine in a collagen-enriched environment negates the loss of  $\beta$ -catenin accumulation, attenuates  $\alpha$ -smooth muscle actin levels, induces Insulin-like Growth Factor Binding Protein (IGFBP)-3 production and IGFBP-3 proteolysis. Microarray and RTPCR analyses revealed that the gene encoding an IGFBP-3 protease, ADAM12, is upregulated in surgically resected DC tissue compared to control tissues. Exogenous addition of ADAM-12 to primary DC fibroblasts in collagen culture induced  $\beta$ -catenin accumulation, stress fiber formation and changes in cellular morphology. Since it has previously been shown that IGFBP-3 proteolysis enhances IGF signaling and cytoskeletal remodeling of fibroblasts and that inhibition of the tyrosine kinase activity of the Type-1 IGF receptor abrogates these effects, our data implicate ADAM-12-mediated activation of the Type-1 IGF receptor as a component of the pathophysiology of DD and identify this interaction as a potential therapeutic target for the future development of non-surgical treatment interventions.

**LEARNING OBJECTIVES:**

After this lecture, the audience should have additional understanding of new findings on the molecular pathophysiology of Dupuytren's contracture

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**THE SEE-AND-TREAT CLINIC: NO LONGER EFFICIENT, COST-EFFECTIVE AND TRAINING-FRIENDLY****M Fawzy, MA Moses, EM Sasseon**

**PURPOSE:** In 2001 we set up a see-and-treat clinic to efficiently deal with patients referred for minor surgery. At this time, the plastic surgery unit was located in a self-contained department with its own operating theatres and nursing team. Four years ago, all services were centralized in a newly-built university teaching hospital, sharing facilities and operating staff with other surgical specialties. We reviewed the past year's see-and-treat clinics and compared them with our earlier findings.

**METHODS:** Data was obtained from the day surgery computer system for the plastic surgery see-and-treat clinic for the year January-December 2006. This was compared with the equivalent data from 2001. Additional information regarding costs for services was obtained from the division manager. Patient satisfaction was assessed using a questionnaire.

**RESULTS:** There were fewer clinics (57 vs 85) and fewer patients treated (1135 vs 1582) in 2006 compared to 2001. The same number of patients had surgery on each list (18.9 vs 18.6), but in 2006, 70% of the operating lists finished later than planned (average 33min).

Cost per patient operated on was approximately 333GBP (666CAD), however the NHS tariff per patient is 133GBP (266CAD), resulting in a net loss of 200GBP (400CAD) per patient or 227,000GBP (454,000CAD) per year.

Reasons for this are discussed.

**CONCLUSIONS:** The see-and-treat clinic offers a one-stop service for the diagnosis and treatment of small skin lesions, with high patient satisfaction. However, the current service is less efficient, treats fewer patients, and offers fewer learning opportunities for juniors. In addition, it results in a substantial monetary loss for the hospital.

**LEARNING OBJECTIVES:**

- ...understand the importance of reevaluating clinical services offered to patients as an ongoing commitment to clinical governance.
- ...realize that configuring services to optimize the patient pathway may not necessarily confer economic benefits to the hospital.

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**Ross Tilley Lecture****TILLEY: DOWN SOUTH AND DOWN UNDER****A Fortin**

Dr Ross Tilley was born over a century ago. He was well known as a humanitarian and as a pioneer in burn treatment in Canada. His training was varied and for it he travelled from Toronto, to New York, and the United Kingdom. The 2005 Tilley Scholarship enabled me to obtain additional training abroad as well. This talk will outline some of my experiences while training at the University of Texas, MD Anderson Cancer Centre in Microvascular Reconstructive Surgery as well as with the Victorian Hand Associates in Melbourne Australia.

**LEARNING OBJECTIVES:**

Participants will be able to describe the scope of fellowships at MD Anderson in Houston and the Hand Surgery associates in Melbourne Australia.

77

**DEVELOPMENT OF A NATURAL LANGUAGE GENERATION SYSTEM FOR CREATION OF PERSONALIZED PRE-OPERATIVE PATIENT EDUCATION MATERIALS PRIOR TO RECONSTRUCTIVE BREAST SURGERY****P Bray, C DiMarco, H Covvey, D Cowan, V Di Ciccio, E Hovy, J Lipa**

**PURPOSE:** To develop a web-based software application for creation of patient-specific (personalized) education materials prior to breast reconstruction

**METHODS:** The model adopted for creation of tailored documents was that of "generation by selection and repair", in which new documents are created from a pre-existing "master document" containing all pieces of text potentially required in tailoring a version of the document for a particular patient. Relevant selections are then made, based on individual patient factors, and then are automatically repaired for form, style and coherence. Creation of the Master Document. The phases of any given surgical procedure were broken down into standard components. Text elements for each of these phases were written by reconstructive surgeons for the spectrum of procedures relevant to reconstructive breast surgery. A database of reusable text elements was thereby created and marked up with XML tags and attributes. Software Application Development. An existing Natural Language Generation engine was used as the software kernel for the tailoring system and then modified to use a standard document description language (XML). A conceptual architecture for content authoring was developed as were web-based interfaces for authoring and document creation.

**RESULTS:** A pilot web-based delivery system was implemented for the authoring and subsequent personalization of patient education materials. This initial prototype was tested by selection, through a simple "check-box" interface, of typical individual patient factors relevant to reconstructive breast surgery. Multiple variants of a sample pre-operative education document were produced, visualized as either a web presentation or print-ready brochure.

**CONCLUSIONS:** A sophisticated, prototype software application was developed for creation of personalized pre-operative patient education materials for reconstructive breast surgery. This initial "proof-of-concept" phase will be followed by additional content development, testing of educational effectiveness in a clinical setting, and extension to all aspects of plastic and reconstructive surgery.

**LEARNING OBJECTIVES:**

- Identify possible applications of web-based technology to reconstructive surgery
- Describe possible advantages of patient-specific materials to pre-operative patient education

**78****A COMPARISON OF THREE DIFFERENT METHODS OF RESIDENT EVALUATION****DJ Courtemanche, GK Blair**

**PURPOSE:** The purpose of this research is to describe and compare three different methods of resident evaluation: T-Res self evaluation, T-Res staff evaluation and CanMEDS staff evaluation.

**METHODS:** Data describing Resident self evaluation of learning, comfort and competence were retrieved from the T-Res database and matched to Resident level. Data describing Staff evaluation of Resident for preparation, theoretical knowledge, technical skill, practical ability, attitude and overall competence were retrieved from the T-Res database and matched to Resident level. Data describing Resident evaluation for the seven CanMEDS roles (medical expert, communicator, collaborator, advocate, manager, scholar, professional) were retrieved from the university Department of Surgery Resident evaluation forms and matched to Resident level.

This research was approved by the Behavioral Research Ethics Board.

**RESULTS:** Resident self evaluation using the T-Res system, which evaluates activities at a "atomic" level identified decreasing learning ( $p=0.068$ ), increasing comfort ( $p=0.057$ ) and increasing competence ( $p=0.039$ ) over the course of 5 years of training.

Staff evaluation of Residents identified a highly significant increase in all 6 attributes evaluated (all  $p$  values  $<0.01$ ).

Both systems also clearly show an increase in the level of responsibility over the course of training and Self and Staff evaluations show close agreement ( $m=0.991$ ) and the ability to identify over-confident and self critical trainees. The CanMEDs evaluation showed a decrease in expertise ( $p=0.006$ ) and no significant change for any of the other attributes.

**CONCLUSIONS:** T-Res appears to discriminate and define Resident progress through training and to evaluate overall competency to practice. CanMEDs appears to evaluate Residents at their level and does not discriminate or define progress through training.

**LEARNING OBJECTIVES:**

1. To understand resident evaluation at atomic and global perspectives
2. To incorporate a coaching style evaluation into resident evaluation
3. To consider alternatives to CanMEDS

**80****Canadian Expert Series****BROWLIFT AND PERIORBITAL AESTHETICS****R Warren****LEARNING OBJECTIVES:**

1. Audience members will understand the interrelation between eyebrow position and eyelid soft tissue, and the way the balance between these variables contributes to an attractive peri-orbital region.
2. Audience members will be able to distinguish which patients will benefit from forehead surgery, eyelid surgery or a combination of the two.
3. Audience members will be able to determine which brow lifting technique is most appropriate for different clinical scenarios.

**81****IS THE ONTARIO PROVINCIAL GOVERNMENT POLICY ON "WAIT-TIME INITIATIVE" FOR CANCER SURGERY GOING TO IMPROVE THE HEALTH CARE OF WOMEN WITH BREAST CANCER? AN ECONOMIC CASE STUDY****G Rockwell**

**PURPOSE:** There are three fundamental principles of health economics: Scarcity of resources, choice in the use of these resources, and opportunity

costs. Wait times, defined as the time from diagnosis to treatment, are very unpopular and can result in the deterioration of health, prolongation of suffering, loss of utility, and uncertainty. Wait times occur in systems with publicly funded health care where there are constraints on surgical capacity. Demand outmatches supply and a wait time is created as a means of equilibrating this imbalance. In Ontario surgical wait times are measured from time of referral to the specialist (diagnosis) to time of surgery. The inputs (time of diagnosis and referral) and outputs (surgery) are measurable. Other measurements of health and healthcare are more complex with multiple inputs (utility, needs) and outputs (improvements in health status). Wait times as they are currently being measured are not taking these complexities into consideration, and yet they are the most publicized aspect of the current health care access issue. Wait times for breast cancer treatment have increased from 1992 to 1998 by a median of 29 to 42 days. This study is a case report reviewing International and Provincial surgical wait time reduction policy. I will discuss the economic principles of wait times to address the question of whether the current Ontario Government Cancer Wait-list Initiative will improve the health care of women with breast cancer.

**CONCLUSIONS:** The Ontario "wait time strategy" is only a short term solution that will temporarily reduce the number of patients awaiting breast cancer surgery, at an additional cost, without purchasing system wide changes that could lead to long term improvements in breast cancer care. It is a politically motivated decision that does not make sound economic sense.

**LEARNING OBJECTIVES:**

1. Participants will develop an understanding of the fundamental principles of health economics.
2. Participants will understand how the current Governmental policies impact on breast cancer care in Ontario.
3. Participants will learn how policy changes can improve the economic welfare of breast cancer patients.

**82****HOW TO STAY OUT OF THE MAIN O.R.****MSG Bell**

With the contraction of resources and the expansion of the case load of traumatic hand injuries in the emergency department, plastic surgeons and their patients are faced with long delays in gaining entrance to the main operating room for surgery. These cases are often considered low priority, and not truly "serious" surgery (which is what general surgeons and orthopaedic surgeons do). Consequently we are regulated to working in the early hours of the morning with unacceptably long delays in traumatic hand injuries that can increase the complication rate.

With the advent of techniques using local anaesthesia, hand retraction devices, wrist tourniquets, and simple devices to allow fracture fixation in the emergency department, the entire complexity and frustration of waiting a turn in the main operating room can be avoided.

The author will outline some of the simple basic principles that can be employed with safety, and benefit for both the patient and the surgeon in treating tendon injuries, and hand fractures.

**LEARNING OBJECTIVES:**

- This paper presents the basic principles of wide awake anaesthesia for hand surgery. Principles of hemostasis for hand surgery are addressed.
- Non-power tool fixation of fractures and working without assistants is demonstrated.
- The surgeon will feel comfortable that most hand trauma cases can be dealt with simply in the Emergency or O.P.D. setting

*Disclosure statement: Dr. Bell is a design team member of Canica Design Inc.*

**83****IMMEDIATE AUTOLOGOUS BREAST RECONSTRUCTION IN LOCALLY ADVANCED BREAST CANCER PATIENTS: A UBC PERSPECTIVE****AL Ho, S Tyldesley, P Lennox**

**PURPOSE:** Optimal timing of radiotherapy (RT) with regards to immediate breast reconstruction in locally advanced breast cancer (LABC)

patients remains controversial. Our LABC patients undergoing autologous reconstruction receive preoperative chemotherapy and radiation, followed by immediate breast reconstruction as primary treatment. As well, different RT fractionation patterns have been used which may have clinical significance. We report the outcomes of our patients.

**METHOD:** We retrospectively reviewed LABC patients receiving immediate autologous breast reconstruction between 1997 to 2007. Data was drawn from patient records and the UBC Breast Reconstruction and BC Cancer Agency databases.

**RESULTS:** 30 patients were reviewed. 50% had stage IIIA disease, 43% stage IIIB, and 6.7% stage IIIC. 80% had nodal involvement. Median patient age was 47 (range 33-64) years. Median follow-up was 3.51 (range 1-9.4) years. All patients received preoperative anthracycline-based chemotherapy. All patients received preoperative RT with 60% receiving 1.8-2Gy/fraction and 40% receiving 2.6-2.75Gy/fraction. Local complications included partial flap necrosis 16.7%, capsular contracture 3.3%, seroma 10% and infection 6.7%. Incidence of donor site complications was 20%. 27% of patients required revisional surgery. Cosmesis of the reconstructed breasts receiving 1.8-2Gy/fraction were rated as good to excellent in 66% and 67% in patients receiving 2.6-2.75Gy/fraction. Overall 5 year, actuarial, local failure free, distant relapse free, and disease-specific survival were 80%, 65%, and 68%, respectively. There was 10% local recurrence in the 2.6-2.75Gy/fraction group and no local recurrence in the 1.8-2Gy/fraction group. Distant relapse was detected in 10% of patients receiving 2.6-2.75Gy/fraction and 3.3% receiving 1.8-2Gy/fraction.

**CONCLUSIONS:** Our findings are consistent with other studies with respect to overall local recurrence, distant relapse, and complication rates. There was no difference in the aesthetic outcome, local recurrence, and distant relapse between the different fractionation schedules. In LABC patients who desire immediate autologous breast reconstruction, chemotherapy and RT prior to reconstruction appears acceptable, irrespective of fractionation schedule.

**LEARNING OBJECTIVES:**

At the end of this presentation, the learner will be able to:

1. Discuss the timing of the treatment modalities for locally advanced breast cancer patients receiving immediate autologous breast reconstruction.
2. Compare the aesthetic and oncological outcomes of our patients to other centres.
3. Appreciate different radiation fractionation schedules and how they affect aesthetic outcome, local recurrence and distant relapse.

## 84

### PATHOGENESIS OF RADIATION-INDUCED CAPSULAR CONTRACTURE IN TISSUE EXPANDER AND IMPLANT BREAST RECONSTRUCTION

**JF Lipa, W Qiu, N Huang, CY Pang**

**PURPOSE:** Capsular contracture is the main complication in post-mastectomy tissue expander and implant breast reconstruction in patients requiring radiotherapy. The pathogenesis of radiotherapy-induced capsular contracture is unknown. The Wnt (Wingless) signaling pathway plays a role in the pathogenesis of fibroproliferation in fibromatosis and hyperplastic skin wounds, involving multiple linked events leading to upregulation of target genes such as cyclooxygenase-2 (COX-2) gene, and fibroproliferation. Since radiation-induced fibrosis occurs in human skin and capsule around expanders/implants, we tested our hypothesis that the Wnt signaling pathway regulates radiotherapy-induced fibroproliferation in human capsular tissue.

**METHODS:** At the time of second-stage implant exchange surgery, biopsies of capsule around expanders were obtained from patients with bilateral mastectomies and expander reconstruction. One side was radiated (R) and the other side was not radiated (NR). Capsular tissue was snap-frozen in liquid nitrogen. Biopsies were homogenized, and capsule lysate processed for Western blotting technique to determine protein expression of total GSK-3beta, phospho-GSK-3beta, beta-catenin, COX-2, Collagen Types I and III.

**RESULTS:** The following protein expression levels were significantly ( $p < 0.05$ ) increased in R capsule compared to NR capsule: total GSK-3beta

(7.4-fold), phospho-GSK-3beta (2.9-fold), beta-catenin (2.5-fold), COX-2 (2.9-fold), Collagen Types I (1.5-fold) and Collagen Type III (1.8-fold). **CONCLUSIONS:** Results from this study confirm the importance of the Wnt signaling pathway in the pathogenesis of radiation-induced capsular contracture in expander-implant breast reconstruction. Further studies in an in vivo animal model will allow us to test pharmacologic strategies based on mitigating or blocking the mediators of the Wnt signaling pathway in order to prevent radiation-induced excessive collagen synthesis and capsular contracture.

**LEARNING OBJECTIVE:**

After the presentation the attendee will understand a proposed mechanism for development of capsular contracture in implant breast reconstruction when radiotherapy has been administered.

## 85

### LYMPHOMA OF THE BREAST AND ITS RELATIONSHIP TO IMPLANTS

**GS Brody, D Deapen,, L Popplewell, K Chang, JS Anderson**

**PURPOSE:** To evaluate the relationship if any between lymphoma of the breast and breast implants.

**METHODS:** Two recent patients diagnosed with non Hodgkin's T-cell lymphoma of the breast, presenting as a late seroma around a breast implant, prompted a search of the literature for similar cases. When brand and style of implant was not present in the report, the author of each article was contacted for that information. The Los Angeles Cancer Surveillance Program data base was searched for similar cases

**RESULTS:** We located a total of 6 other such cases in the literature for a total of 8 patients presenting as peri-implant seromas. All were of the more aggressive T-cell non Hodgkin's variety with the tumor restricted to the capsule. In six patients where the information was available the brand and style of implant was identical. None demonstrated metastases and all were treated by total capsulectomy, radiation and chemotherapy. Two had their implants replaced. All are tumor free at this time or at the time of publication.

**CONCLUSIONS:** Eight cases of non Hodgkin's Lymphoma were noted to present as late seromas around breast implants associated in six cases with the same brand and style of implant. As these cases represent only a minuscule fraction of the total number of women with implants no statistically valid relationship can be established.

**LEARNING OBJECTIVES:**

1. While not all late seromas are malignant, the practitioner should be aware of the possibility and have the fluid analyzed cytologically, with evaluation for T-cell gene rearrangement.
2. Recurrence post aspiration, presence of the identified brand and style of device associated with our cases, or any other uncertainty should prompt open exploration with a total capsulectomy and pathologic analysis.

## 86

### "DELAYED PATTERN" IMMEDIATE BREAST RECONSTRUCTION

**S Olivier, T Hayakawa, E Buchel**

**PURPOSE:** Free flap breast reconstruction is the standard care at our institution. Patients undergoing simultaneous immediate and delayed breast reconstruction have unique symmetry considerations. In selected cases better symmetry is achieved by using a bilateral, delayed skin pattern in the reconstruction

**METHOD:** A retrospective chart review our Microsurgery Database

**RESULTS:** 606 free breast reconstructions were reviewed. 11 bilateral reconstruction patients underwent delayed skin patterns on both the immediate and delayed side. Complications included: wound separation in 2 abdominal and 2 breast incisions, and partial necrosis of one mastectomy skin flap.

**CONCLUSION:** "Delayed Pattern" immediate Breast reconstruction can offer symmetry improvements in size, shape, projection and level of inframammary fold over a standard "WISE" skin pattern. Additional advantages include reducing mastectomy flap complications in patients with large breasts, obesity or those desiring significant reductions.

**LEARNING OBJECTIVES:**

At the end of this lecture/workshop, the learner will be able to identify advantages and indications for utilizing delayed pattern immediate breast reconstructions.

**87****ANATOMIC TRAM****JS Williamson**

**PURPOSE:** To describe a consistent and reproducible technique of Free TRAM Flap breast reconstruction employing an anatomic approach to presurgical planning, flap design and fabrication, flap neurotization and primary nipple areolar complex reconstruction, as well as contralateral balancing (as indicated) at a single setting in an effort to achieve better results in less operations.

**METHOD:** A retrospective analysis of a single surgeon's eleven year experience in Free TRAM Flap technical evolution towards a reliable surgical approach for breast reconstruction based on a comparison of surgical methods and outcomes.

**RESULTS:** More consistent functional and aesthetic results with a lower revision rate and fewer operations have been realized utilizing an anatomic and bидimensionally driven single stage technique for Free TRAM breast reconstruction.

**CONCLUSIONS:** In this author's experience, Free TRAM breast reconstruction employing bidimensional flap planning and fabrication, innervation and primary nipple areolar complex reconstruction with contralateral balancing (as indicated) at a single setting has afforded a reproducible method for achieving predictably better functional and aesthetic results with a minimum of operations.

**LEARNING OBJECTIVES:**

To consider an anatomic approach to comprehensive Free TRAM Flap breast reconstruction at a single setting.

**88****A SYSTEMATIC REVIEW OF PATIENT REPORTED OUTCOME MEASURES AFTER FACIAL COSMETIC SURGERY AND/OR NON-SURGICAL FACIAL REJUVENATION****A Scott, T Kosowski, CM McCarthy, AL Pusic**

**PURPOSE:** This study identified patient-reported outcome measures developed and validated for use in patients undergoing facial cosmetic surgery and/or non-surgical cosmetic procedures.

**METHOD:** A systematic review of the English-language literature was performed. Patient-reported outcome measures designed to assess patient satisfaction and/or quality of life following facial cosmetic surgery and/or non-surgical cosmetic procedures were identified. Qualifying instruments were assessed for content and adherence to international guidelines for health outcomes instrument development and validation.

**RESULTS:** A total of 442 articles were retrieved from our systematic review. From these, 47 patient-reported outcome measures were identified. After 12 generic health instruments, 23 general psychiatric instruments, 1 visual analogue scoring system, and 2 nasal symptoms/function instruments were excluded, 9 questionnaires remained. These measures were subdivided into the following categories: rhinoplasty (n=3), skin rejuvenation (n=3), face lift (n=1), blepharoplasty (n=1), and general appearance (n=1). Detailed analysis revealed that 8 of the 9 instruments (ROE, FOE, BOE, SROE, FLO-7, GBI, FAST and DAS59) had undergone limited development and validation. The remaining measure, the Facial Line Treatment Satisfaction (FTS) questionnaire, demonstrated excellent psychometric properties, yet had some significant content limitations.

**CONCLUSIONS:** Valid, reliable and responsive instruments designed to measure patient-reported outcomes following surgical and non-surgical facial rejuvenation are lacking. A patient-based outcome measure that both represents perceptions of facial cosmetic surgery patients and satisfies accepted health measurement criteria is needed. Once developed, this instrument would be vital to research efforts evaluating patient satisfaction after elective facial procedures, allow comparisons between various techniques, and aid in identifying groups at risk for dissatisfaction.

**LEARNING OBJECTIVES:**

Upon completion of this presentation participants will be able to understand the need for rigorously developed and validated patient-reported outcome measures. Participants will also appreciate the limitations of current instruments that measure patient outcomes following facial cosmetic surgery and/or non-surgical facial rejuvenation.

**89****A NOVEL APPROACH TO RECONSTRUCTION ON STUBBORN CROOKED NOSE WITH A DIFFERENT SPREADER GRAFT: NASAL BONE GRAFTS THAT HARVESTED FROM NASAL HUMP REMOVING****I Emsen**

**BACKGROUND:** Correction of the crooked or deviated nose, a complex cosmetic and functional problem, is a big challenge for the rhinoplasty surgeon. Although corrections using a wide range of surgical techniques to straighten the nose and maximize nasal function have been proposed, recurrence is very common because of cartilage memory and scar contracture. Therefore, to prevent recurrence and to maintain the correction of the septum, a permanent support that is stable and strong, with the ability to maintain its given shape after placement on one or both sides of the septum, is needed.

**MATERIAL AND METHODS:** For this purpose, the author planned to use a nasal bone graft. In this study, the concept and technique of this graft material for correction of the crooked nose, and the authors' experience using it, are presented.

**RESULTS:** This graft material was used in 12 patients with crooked noses (8 with C-type and 4 with S-type noses). During a mean follow-up period of 20 months (range, 12–36 months), there were no complications, recurrences, or extrusions. Functional evaluation was performed using a visual analog scale before surgery and 6 months after surgery. Patients were asked to score their nasal breathing on a scale ranging from 0 to 100. The mean preoperative value was  $17.67\% \pm 1.22\%$  (range, 15–25%), and the postoperative value was  $89.88\% \pm 1.24\%$  (range, 85–95%).

In conclusion, the use of nasal bone graft as the spreader graft is a safe, effective, reliable, and permanent method for correction of the crooked nose. In the long term, the authors believe that the nasal bone grafts are provided functional recovery and increased strength against further trauma or forces of scar contracture, and have the ability to prevent recurrence attributable to cartilage memory.

**POSTERS****P01****JUVENILE XANTHOGRANULOMA OF THE EAR: A CASE REPORT AND LITERATURE REVIEW****MA Mrad, R Zuker**

**PURPOSE:** Juvenile Xanthogranuloma is an uncommon, benign cutaneous lesion that is characterized by the occurrence of one or several yellow-red nodules in infancy or early childhood. This study stresses the importance of a plastic surgeon's knowledge of different skin lesions and their variable clinical presentations.

**METHOD:** We present a case report of an unusual instance of Juvenile Xanthogranuloma occurring in the right ear of a 13-month-old girl, an unusual site for such a tumor. The lesion was resected and sent to the Pathology department. A literature review was conducted.

**RESULTS:** The pathology report confirmed JXG diagnosis. In our literature review, we have found one similar clinical variant presented previously.

**CONCLUSION:** We recommend that JXG be considered as one of the differential diagnoses of benign soft tissue tumors of the ear.

**LEARNING OBJECTIVES:**

- 1- Describe the clinical presentation of Juvenile Xanthogranuloma.
- 2- Describe the treatment of the lesion and necessary follow-up.
- 3- To include JXG in differential diagnoses in all benign soft tissue tumors of the ear.

**P02****TELEMEDICINE IN PLASTIC SURGERY: ACCURACY OF DIGITAL IMAGING FOR REMOTE MANAGEMENT OF WOUNDS****MJ Trovato, A Islur, MS Granick, GM Buncke**

**INTRODUCTION:** The ability to evaluate and triage plastic surgery patients using telemedicine has recently become a topic of great interest. Previous studies have been descriptive, relatively small in size, and dealt with feasibility rather than objective evaluation of accuracy and concordance between onsite and remote wound evaluation. To determine the accuracy of digital images as compared to bedside examination, we compared wound evaluation by onsite surgeons with viewing digital images by remote surgeons.

**METHODS:** Over 2 years, 43 wounds in 35 inpatients and 2 emergency room patients were photographed with a Canon A80 digital camera (resolution 4.0 megapixels). Agreements regarding wound description (edema, erythema, cellulitis, necrosis, gangrene, ischemia, and granulation) and wound management (presence of a healing problem requiring intervention, need for emergent evaluation, need for antibiotics, and need for hospitalization) were calculated among onsite surgeons and between onsite and remote surgeons.

**RESULTS:** Agreement between onsite and remote surgeons (46% to 86% for wound description and 65% to 81% for management) generally matched agreement among onsite surgeons (68% to 100% for description and 84% to 89% for management). Moreover, when onsite agreement was low (i.e., 68% for edema) agreement between onsite and remote surgeons was similarly low (i.e., 57% for edema). Remote evaluation was least sensitive in detecting wound drainage (46%). Regarding management decisions, remote surgeons tended to overtreat wounds; more often prescribing IV antibiotics and admitting the patient. In one case, the postoperative course of a free flap reconstruction of a lower lip was effectively managed remotely using digital images sent via electronic mail.

**CONCLUSIONS:** Digital wound evaluation is comparable with standard examination, rendering similar diagnoses and treatment plans in the majority of cases. Though remote evaluation cannot replace bedside examination, it may assist the surgeon in triage decisions, thereby decreasing ER throughput time and frequency of office visits, supplementing consultation to remote satellite facilities such as nursing homes or rehabilitation centers, and providing real-time postoperative assessments, ultimately improving quality and reducing healthcare costs.

**LEARNING OBJECTIVES:**

1. To evaluate the accuracy of digital images in remote wound assessment and management.
2. To consider the potential for telemedicine in plastic surgery.

**P04****REVASCULARIZATION OF AN ISCHEMIC ARM IN A 40-HOUR OLD PRETERM INFANT****G Althubaiti, L Ross, T Hayakawa**

**INTRODUCTION:** The most common cause of acute limb ischemia in the early neonatal period is usually iatrogenic injury from vascular catheterization to gain access for fluid and nutritional support. These ischemic vascular injuries have been treated with a variety of methods including systemic heparinization, local tissue plasminogen activator infusion, local vessel simple repair and vein grafting of the damaged vessel. A severe arterial injury from prolonged brachial artery TPN infusion and its management is presented.

**PURPOSE:** Report this successful microvascular treatment of an iatrogenic injury to the brachial artery in a 40h old preterm neoborn.

**METHOD:**

Case report

Our patient was a 40h old female at 29 weeks gestation, weighing 1291 grams. In the NICU the patient left brachial artery was cannulated at the antecubital fossa in an attempt to get intravenous access. This was complicated with progressive significant ischemia of the hand and the forearm. Exploration revealed significant intimal damage to the brachial artery that

necessitated resection of a 4cm segment. This was reconstructed with a reversed basilic vein graft.

The postoperative course was uneventful. One month after surgery the baby was able to move his wrist and digits with no signs of ischemia or contracture.

Of particular importance in this case is the contraindication to use heparin or tPA due to the increased risk of intraventricular bleeding

**CONCLUSION:** We reported a successful microvascular revascularization of the brachial artery with a 4 cm basilic vein graft in a 40 hr old 29 week preterm infant.

Despite the prolonged ischemia of more than 10 hours our patient regained an excellent hand and forearm function with no signs of ischemic contracture one month after surgery.

**OBJECTIVES:** Attendants will recognize iatrogenic cannulation injuries and understand the treatment options.

**P05****SURGICAL RESIDENT AND TRAINING PROGRAM FACTORS THAT AFFECT RESIDENT PUBLICATION RATES****FB Loiselle, B Bernard, E Campbell, A Graham, AR Harrop**

**PURPOSE:** This study is designed to identify factors that are associated with the publication rate of research projects completed by Canadian surgical residents.

**METHOD:** A complete list of residency programs was obtained from the CAPER census, generating a study population of 2802 individuals. Program Directors and residents from each program were contacted by email for participation in the survey. The Program Director survey consists of 9 questions and is focused on research requirements for residents and resources made available to their residents. The Resident survey consists of 20 questions and addresses areas including resident demographics, previous and current research experience, publication rates and LOE of resident publications, career plans, and program requirements. A modified LOE scale will be made available to residents to allow for self-evaluation of the LOE of their publications. Residents will also be requested to provide references to any publications they may have, to allow the authors to validate the self-reported values.

**RESULTS:** Data acquisition is currently underway

**CONCLUSIONS:** Our primary research question asks: Does the number of publications before commencing residency training predict the likelihood of publication during residency? Our secondary research questions will address the association between resident career aspirations and publication rate. In addition we will identify the program factor most strongly associated with publication rate.

**LEARNING OBJECTIVES:**

- 1) At the end of this presentation the learner will be able to identify three factors associated with surgical resident publication success rate.
- 2) At the end of this presentation the learner will be able to reflect on the value of active participation in research to the surgical resident.

**P06****THE RELATIONSHIP BETWEEN WAIT-LIST TIMES AND QUALITY-OF-LIFE IN PATIENTS WITH NON-MELANOMA SKIN CANCER SEEKING TREATMENT****K Meathrel, C Gabilondo**

**PURPOSE:** Our investigation aims to elucidate the relationship between wait-list times and illness related quality-of-life (QOL) in patients seeking treatment of non-melanoma skin cancers in the cervicofacial region.

**METHOD:** 120 participants were recruited in the Division of Plastic Surgery at Hotel Dieu Hospital in Kingston, Ontario. Patient inclusion was dependent on a diagnosis of cervicofacial non-melanoma skin cancer, confirmed by the results of a tissue biopsy.

Illness related QOL was measured at the time patients came in for treatment at the Division of Plastic Surgery. The patients' QOL was measured using the Skin Cancer Index, a validated paper-and-pencil questionnaire. The Skin Cancer Index consists of 15 questions that measure three distinct subscales: emotional, social, and appearance. The patients' QOL measures were correlated to the time they waited to receive treatment after

receiving a diagnosis of skin cancer. The moderating effects of demographic variables were also assessed.

**RESULTS:** Research in progress. We hypothesize that longer waiting times prior to treatment will correspond to lower measures of quality-of-life.

**CONCLUSIONS:** Research in progress.

#### LEARNING OBJECTIVES:

-Participants will be able to identify an objective link between wait-list times and quality-of-life deterioration in patients with non-melanoma skin cancers.

-Participants will be able to evaluate whether patients with non-melanoma skin cancers should be offered expedited treatment in lieu of pre-existing conditions that would deteriorate their quality-of-life.

#### P07

### GIANT BASAL CELL CARCINOMA: A CASE REPORT, DISCUSSION OF CONSIDERATIONS FOR OPERATION VS. PALLIATION AND TREATMENT ALGORITHM

**JC Dawes, CD McKenzie, P Alakija**

**PURPOSE:** Giant basal cell carcinomas are a rare, often aggressive variant of typical basal cell carcinomas that may lead to metastasis and death. They are often recurrent and deeply invasive into the underlying soft and bony tissues. Resection and reconstruction of these three-dimensional masses is complex and may lead to significant functional deficits. The purpose of this paper is to discuss the characteristics of giant basal cell carcinomas, including their potential for local destruction, various treatment options and the multitude of considerations for operation vs. palliation, including technical, tumor and patient factors. A case is described which effectively illustrates these factors and an algorithm for the treatment of giant basal cell carcinomas is presented.

**METHOD:** Case report and literature review.

**RESULTS:** The largest giant basal cell carcinoma of the face reported to date is described in a 53 year-old female. The lesion started 3 years prior to presentation and had obliterated most of the soft tissue and bony architecture of the mid-face and anterior head, with substantial skull base and dural involvement. She was blind with only a remnant of right eyelid identifiable. The tumor was deemed inoperable by the multidisciplinary surgical team and the patient was treated palliatively with radiation.

**CONCLUSIONS:** The decision of whether to reconstruct a defect left from an extensive giant basal cell carcinoma resection is currently influenced by the perceived difficulty and morbidity associated with the procedure. When considering palliative or curative resection and reconstruction, other factors, including the patient's ability to do well peri-operatively should be considered. In particular, focus should be placed on the extent to which surgery would alter the patient's quality of life. Metastasis should be ruled out definitively prior to consideration of an operation and should not be determined on the basis of the size, histology, recurrence or prior treatment. A standardized approach is impractical and each patient should be evaluated individually. The algorithm presented provides general guidance with respect to the wider range of considerations.

#### LEARNING OBJECTIVES:

- Characteristics of giant basal cell carcinomas
- Various treatment options for giant basal cell carcinomas
- Factors to consider for operation vs. palliation

#### RP01

### A PROSPECTIVE ANALYSIS OF REDUCTION MAMMOPLASTY PATIENTS: CAN WE PREDICT POST-OPERATIVE CUP SIZE?

**MJ Cooper, A Dal Cin**

**PURPOSE:** To prospectively study whether a relationship exists between pre- and post-operative bra cup size and the mass of resected tissue after reduction mammoplasty.

**METHODS:** From 2003 – 2005 reduction mammoplasty patients were prospectively studied. Data including demographics, perceived and actual (measured) bra sizes, and tissue mass resected were recorded. Bra sizes were

converted to a standardized cup size as previously described.

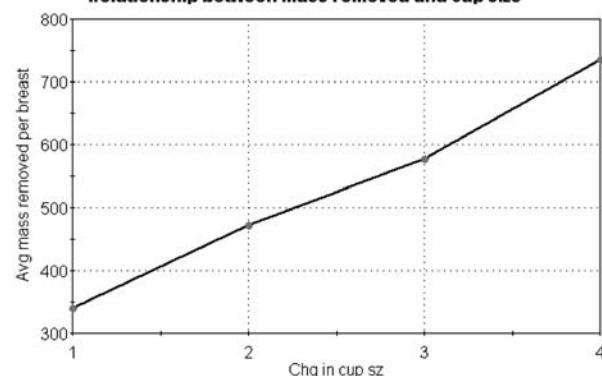
**RESULTS (PRELIMINARY):** Of 97 patients, 27 could not attend follow up and 3 were excluded. Of the 67 remaining, mean age was 44 years and BMI was 31.4 kg/m<sup>2</sup>. Follow up was 6 months. Pre-operatively, 84% of participants wore bras of incorrect size. This improved significantly post-operatively with 74% wearing the correct size. The most common standardized cup size was 8 (equivalent to 40D, 38E, 36F...) pre-operatively and 6 (38C, 36D...) post-operatively. Breast mass resected was averaged for each patient and ranged from 105 g to 1578 g (mean 537 g). Differences between pre- and post-operative standardized cup size ranged from 0 to 8, with the majority (87%) decreasing by 1 to 4 cup sizes.

**CONCLUSIONS:** Most breast reduction patients wear incorrect bra-sizes which may contribute to their symptomatology. A general trend exists between resected breast tissue and post-operative bra cup size.

#### LEARNING OBJECTIVES:

Participants will learn a new means of standardizing bra cup sizes and will better appreciate the difficulty of attempting to create a predictable cup size in reduction mammoplasty patients.

Relationship between mass removed and cup size



#### RP02

### LEFORT III FRACTURES: BICORONAL APPROACH OR NOT? A PROVINCIAL TRAUMA CENTER'S EXPERIENCE

**S Dupéré, DE Borsuk, E Bensimon**

**INTRODUCTION:** LeFort III fractures represent 10% of the total number of maxillofacial fractures every year. As such, few studies have outlined indications for specific surgical approaches to these fractures. The goal of this study is to delineate the patient population and surgical approaches of LeFort III fractures with the hope of establishing specific indications for a bicoronal incision.

**METHODS:** A retrospective cohort study of patients with a diagnosis of a LeFort III fracture between the years of 2000 and 2006 was conducted. Demographics, mechanisms of injury, associated lesions, and peri-operative outcomes were documented. Surgical and post-operative parameters of patients who had bicoronal approaches were compared to those who had other surgical approaches for LeFort III fracture reduction and fixation.

**RESULTS:** Forty-three patients with operated LeFort III fractures were identified (35 men, 8 women). Seventy-seven percent of these patients were referred from primary care hospitals in Quebec, with motor vehicle accidents being the most common mechanism of injury. Sixteen patients (37%) had a bicoronal approach. Bicoronal incisions were associated with longer operative time and higher blood loss. Fifty-six percent of bicoronal approaches for LeFort III fractures were associated with frontal sinus fractures, 75% with complex zygomatic arch fractures, and 50% with naso-orbito-ethmoid fractures. Follow-up and post-operative complications for both groups were similar.

**CONCLUSION:** This study defines the demographics of LeFort III fractures and proposes surgical indications that favour a bicoronal approach. Indications for a bicoronal approach are: 1) associated frontal sinus fractures 2) naso-orbito-ethmoid fractures 3) complex and comminuted zygomatic arch fractures 4) the inability to re-establish mid-face projection with essential anatomic landmarks unavailable through other surgical approaches.

**LEARNING OBJECTIVE:**

1) The participant will understand some indications for a bicoronal approach to LeFort III fracture reduction and fixation.

**RP03**

**THE USE OF VACUUM-ASSISTED CLOSURE (VAC) IN THE PEDIATRIC NEUROMUSCULAR SCOLIOSIS POPULATION FOR THE CLOSURE OF DEEP INFECTIONS POST-SPINAL INSTRUMENTATION**

J Toy, K Firth, J Olson

**PURPOSE:** Up to 20% of pediatric patients with neuromuscular scoliosis undergoing spinal instrumentation develop deep post-operative spinal infections. Within this group, hardware removal is required in 28%. The purpose of this study is to evaluate results following the treatment of deep spinal infections with vacuum-assisted closure (VAC) in concert with intravenous antibiotic therapy, followed by definitive surgical closure in the pediatric neuromuscular scoliosis population.

**METHODS:** The charts of pediatric patients developing deep spinal infections post-spinal instrumentation that were treated with VAC and IV antibiotics between 2006 and 2008 (Stollery Childrens' Hospital) were retrospectively reviewed and specific data was collected for analysis. Serial photographs were reviewed for wound size and progression until definitive surgical closure. The duration until wound closure was observed.

**RESULTS** (pending further data analysis): Four pediatric patients developing deep infections post-spinal instrumentation between 2005-2007 were included. Average age was 11 years old. Average wound length and width prior to VAC application was 36.3-cm and 8.8-cm, respectively. Average time to wound closure was 138.8 days. Removal of spinal instrumentation was not necessary in any patient. Definitive operative closure was attainable in all cases with no signs of infection at follow-up ranging from 10 to 25 months.

**CONCLUSIONS:** VAC in combination with intravenous antibiotics appears to be an effective method of treating deep infections post-spinal instrumentation in the pediatric neuromuscular scoliosis population, possibly reducing the need for hardware removal.

**LEARNING OBJECTIVES:**

1. To become aware of the difficulty in treating deep infections post-spinal instrumentation in the pediatric neuromuscular scoliosis population.
2. Gain an appreciation of the wound VAC as a useful tool in the treatment of deep infections in this population.

**RP04**

**OUTCOMES OF EXTREMITY SOFT-TISSUE SARCOMA RESECTION AND RECONSTRUCTION**

A Chesney, A Dal Cin, F Farrokhyar

**BACKGROUND:** Current standard practice in the management of patients with soft-tissue sarcoma of the extremity involves limb-salvage surgery, often accompanied by radiotherapy. Outcome data for patients who have undergone limb-salvage surgery and soft-tissue reconstruction is limited in the current literature.

**PURPOSE:** The purpose of this study was to retrospectively review the oncologic and surgical outcomes for patients undergoing resection and reconstruction for soft-tissue sarcoma of the extremities.

**METHOD:** A retrospective chart review of all patients with extremity soft-tissue sarcoma treated at the Juravinski Cancer Centre between 1995 and 2006 was performed. The primary outcome studied was the development of a major wound complication (MWC), defined as: secondary operation, invasive procedure or readmission to hospital for wound management, or prolonged deep packing. Secondary outcomes studied included recurrence and survival.

**RESULTS:** Fifty-three patients were identified. The majority of tumours were high grade in nature (59%) and were primarily located in the lower extremity (68%). The most common form of reconstruction was a pedicled muscle flap with a split-thickness skin graft (79%). Nine percent of patients required free flap reconstruction. Major wound complications developed in 11 patients (21%). The incidence of MWCs was 30% among patients receiving pre-operative radiotherapy, 17% among patients receiving

post-operative radiotherapy, and 15% among patients who did not receive radiotherapy. Of the patients studied, 19 developed local or metastatic recurrence and 14 died of their disease.

**CONCLUSIONS:** The population studied is generally reflective of that described in previously published studies. The significant risk of major wound complications in this patient population is an important factor in pre-operative preparation.

**LEARNING OBJECTIVES:**

1. Heightened appreciation of the incidence of wound complications following limb-salvage surgery for soft-tissue sarcoma of the extremity.

**RP05**

**DEHISCENCE FOLLOWING OPEN STERNOTOMY: A 10-YEAR RETROSPECTIVE ANALYSIS OF INCIDENCE AND CO-MORBIDITY PROFILES**

J Dawes, M Theam, R Harrop, D Nickerson, J Appoo, W Ghali

**PURPOSE:** Wound complications associated with post-sternotomy dehiscence is a serious problem with significant morbidity and mortality. Several apparent trends have been noted to have occurred at the Foothills Medical Center in Calgary, Alberta, Canada. First, the overall incidence of sternal dehiscence appears higher than the 1-2% rate commonly quoted in the literature. Secondly, it seems that the incidence of the sternal dehiscence has been increasing over the last several years. Finally, it appears that that patients requiring plastic surgery intervention for complex sternal wounds appear to be 'sicker' than in previous years. This may be due to factors related to the evolution of treatment protocols for unstable angina, or the increased use of percutaneous coronary angioplasty (PCA) over conventional coronary artery by-pass (CABG) surgery, with CABG being reserved for more complex cases. The purposes of this study are to determine the incidence of sternal wound dehiscence and compare the co-morbidity profiles of CABG patients over the past 10 years. Secondary objectives are to compare the co-morbidity profile and mortality rates of CABG and PCA patients over the same time period.

**METHOD:** This retrospective study is will be a joint venture between the Division of Plastic Surgery and the Division of Cardiac Surgery – both within the Department of Surgery at the University of Calgary. Data has been extracted from the APPROACH database for the years 1996 thru 2006. Analysis of data collected is ongoing, and being performed with the assistance of SSI statistical software.

**RESULTS:** Results are pending statistical analysis.

**CONCLUSIONS:** Conclusions are pending the results.

**LEARNING OBJECTIVES:**

- Changing incidence of sternal dehiscence following open sternotomy
- Changing co-morbidity profiles of patients undergoing open sternotomy
- Implications of the following for plastic and reconstructive surgeons:
  - a) Increased rates of sternal dehiscence, and
  - b) Worsening co-morbidity profiles among sternal dehiscence patients

**RP06**

**MULTIPLE OSTEochondroma SYNDROME RESULTING IN PERONEAL NERVE COMPRESSION: A REVIEW OF THE LITERATURE AND REPORT OF TWO CASES**

M Steiner, M Morhart, J Olson

**PURPOSE:** Most osteochondromas are asymptomatic, often go undiagnosed and the incidence of peroneal nerve compression is rare. However, in patients with multiple hereditary osteochondroma syndromes, the risk of complications such as nerve compression and sarcomatous transformation is increased. This study will review the literature and report two cases of multiple osteochondroma syndrome with peroneal nerve compression.

**METHOD:** A review of the relevant literature and health records of two cases of multiple osteochondroma syndrome that presented to the University of Alberta Hospital was performed. The patients are female, age 11 and 12, both had previous osteochondroma resections from different anatomical areas, and both presented with peroneal nerve palsy. Data collected included demographic information; pertinent investigations (including radiological and electromyography studies), treatment performed, as well as selective long term follow up.

**RESULTS:** Both patients successfully underwent nerve decompression and resection of the lesion.

**CONCLUSIONS:** The incidence of peroneal nerve compression with osteochondroma is rare although it is described in the literature as a complication of multiple osteochondroma syndromes. As a result of the paucity of information regarding the disease a diagnosis requires a high clinical index of suspicion with close follow-up. This is particularly important as the timing of treatment plays an important role in nerve recovery.

**LEARNING OBJECTIVES:**

Readers will become more aware of this rare complication of multiple osteochondroma syndrome to improve identification of the disease. As well, readers will be able to identify which are the most effective investigations, interventions and follow-up for patients suffering from multiple osteochondroma syndrome with peripheral nerve compression.

**RP07**

**MANAGEMENT OF LOWER LIMB GIGANTISM CAUSED BY VON RECKLINGHAUSEN NEUROFIBROMATOSIS: A CASE REPORT**

**W Menesi, T Hayakawa**

**BACKGROUND:** Massive plexiform neurofibromatosis is an uncommon manifestation of Type I neurofibromatosis. These tumors result in functional disability and severe disfigurement. Surgical management of the condition can be challenging, and local recurrence is common.

**METHOD:** We describe a rare case of 61-year old man with neurofibromatosis type 1 causing lower limb gigantism. This patient was initially dragging around a massive 75 lb leg. He finally ceased ambulating. The timing of surgical intervention and the difficulties of dealing with an advanced lesion are discussed.

**RESULTS:** The patient was successfully treated with an above knee amputation. Lower limb prosthesis was successfully fashioned by the rehabilitation department and the patient returned to normal daily activities.

**CONCLUSION:** Gigantism of the lower limb secondary to plexiform neurofibromatosis is a rare condition. Early diagnosis and intervention could limit the disfigurement and morbidity associated with large lesion.

**LEARNING OBJECTIVES:**

At the end of this presentation, participants will be familiar with diagnosis and management of lower limb gigantism caused by Von Recklinghausen disease.

**RP08**

**FUNCTIONAL OCULAR CHANGES AFTER FRONTO-ORBITAL REMODELING SURGERY IN PATIENTS WITH ANTERIOR SYNOSTOTIC PLAGIOCEPHALY**

**A Dumas, N Hanna, G Landes, P Bortoluzzi**

**PURPOSE:** Synostotic anterior plagiocephaly imparts a well recognized cranio-orbital deformity. Known associated ocular anomalies include astigmatism, strabismus and oculomotor muscles imbalance. No study has quantifiably compared ocular dysfunctions in these patients pre and post-operatively in an attempt to assess any potential effects of bony remodeling surgery on ocular dysfunction. The aim of this study was to evaluate the impact of cranio-orbital reconstruction on astigmatism and strabismus in patients with unilateral anterior synostotic plagiocephaly.

**METHOD:** Between 1987 to 2007, all patients presenting with a unilateral anterior synostotic plagiocephaly underwent serial prospective ophthalmologic examinations. These included evaluations of visual acuity, fundoscopy, refractions, and ocular motility, in order to evaluate strabismus (prisms diopters) and astigmatism (diopters). The initial assessment was done at 9.2 months of age, and final assessment at 22.4 months. Surgical bony correction was done at a median age of 12.09 months (4.01-36.47 months).

**RESULTS:** Ninety-eight charts of patients followed for anterior unilateral plagiocephaly were reviewed. Sixty patients were included. These consisted of 42 females and 18 males. Of these, 49 patients underwent cranio-orbital surgery. Initial preoperative assessment showed an incidence of strabismus of 57.1% (n=28). Post-operative incidence of strabismus was 63.3% (n=31). Global strabismus evaluation showed that 42.5% of operated patients had no change in their pre-operative condition after surgery,

while 30.0% had improvement (mainly vertical), and 27.5% had worsening (mainly horizontal) of their strabismus. Astigmatism decreased in 43.8%, remained stable in 40.6%, and increased in 15.6% patients postoperatively. Subsequent strabismus surgical correction was necessary in 46.9% of operated patients.

**CONCLUSION:** Fronto-orbital reconstruction for anterior synostotic plagiocephaly does not change the overall incidence of strabismus. However, our results indicate that vertical strabismus is decreased while horizontal strabismus is increased postoperatively. Astigmatism was in fact improved after surgical correction.

**LEARNING OBJECTIVE:**

To better understand presence of ocular anomalies in patients with anterior synostotic plagiocephaly.

**RP09**

**BREAST IMPLANT CAPSULES AND SUBLINICAL INFECTION**

**L Snell, M Brown**

**BACKGROUND:** Capsular contractures remain a well-recognized complication following the use of breast implants for both augmentation mammoplasty and breast reconstruction. A number of factors may be related to the development of periprosthetic capsules. Contamination of the prosthesis at the time of insertion may cause a subclinical infection and thus stimulate a chronic inflammatory response leading to the development of clinically significant capsules (Baker 3 or 4).

**PURPOSE:** The purpose of this study was to culture capsules and pericapsular tissue in women presenting for secondary breast surgery and to determine if there is an association between culture positive capsules and clinically significant implant capsules (Baker III or IV).

**METHODS:** All women with breast implants or tissue expanders presenting for secondary breast surgery during the study period were included in the study. Intraoperatively, swab cultures were taken of each patient's skin surface, implant surface, and inner capsular wall. These swabs were examined for aerobic, anaerobic, mycobacterial, and fungal contaminants. Biopsies of the capsules were also sent for culture and sensitivity examination.

**RESULTS:** Throughout the 9 month study period, 22 women were recruited into the study. 50% of the women were presenting for tissue expander-implant exchange, and the remaining 50% for a secondary procedure following bilateral breast augmentation or reconstruction of a congenital breast anomaly. Of the 11 women in the latter group, 8 presented for a secondary procedure due to grade III or IV (Baker Classification) capsular contractures. None of these women had an initial history of postoperative hematoma, infection, or other complications. Of these 8 women, 3 had culture positive capsules:

1 S. aureus, 1 S. epi, 1 Staph schleiferi. None of the other women in the study had culture positive cultures.

**CONCLUSIONS:** In our study, culture positivity of implant capsules correlated with more clinically significant capsules as graded by the Baker Classification. Contamination of breast implants or tissue expanders at the time of insertion may contribute to the formation of clinically significant implant capsules.

**LEARNING OBJECTIVE:**

Participants will recognize implant contamination as a potential cause of clinically significant breast implant capsules.