CANADIAN SOCIETY OF PLASTIC SURGEONS
SOCIÉTÉ CANADIENNE DES CHIRURGIENS PLASTICIENS

2021 ONLINE SCIENTIFIC PRESENTATIONS
PRÉSENTATIONS SCIENTIFIQUE EN LIGNE 2021

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ORAL PRESENTATIONS

Psychometric validation of the FACE-Q craniofacial module for facial nerve paralysis

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PURPOSE: Systematic reviews have identified the need for a patient-reported outcome measure (PROM) specific to facial nerve paralysis (FNP). Our team developed a PROM for children and young adults with facial conditions, i.e., FACE-Q Craniofacial module. The aim of this study was to describe the development and validation of this PROM in a combined sample of children and older adults with FNP. **METHODS**: Data were collected between December 2016 and December 2019. For the qualitative study, samples of patients who varied by age, gender, and severity of FNP were interviewed. For the field-test study, data were collected from patients aged 8 years and older with FNP. Participants completed relevant appearance, facial function, and health-related quality of life scales. Rasch measurement theory analysis was used to examine reliability and validity of the scales in the FNP sample. **RESULTS**: The qualitative sample of 25 patients provided 2052 codes related to 4 top-level outcome domains: appearance, physical, psychological and social function. Many of the concerns expressed by participants were common across age. The field-test sample included 235 patients aged 8 to 81 years. Of the 13 FACE-Q Craniofacial module scales examined, all 122 items had ordered thresholds and good item fit to the Rasch model. For 12 scales, person separation index values were >0.79 and Cronbach alpha values were >0.82. The 13th scale's reliability values were >0.71. **CONCLUSION**: The scales described in this study can be used to collect and compare evidence-based outcomes data from children and adults with FNP. Teaching Objectives: Participants will understand the methods used to examine the psychometric properties of a newly developed patient-reported outcome measure. **LEARNING OBJECTIVES**: Participants will understand the methods used to examine the psychometric properties of a newly developed patient-reported outcome measure.

Patient-reported quality of recovery after local anesthesia and brachial plexus block in hand surgery: a prospective randomized controlled study

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PURPOSE: In hand surgery, both local and regional anesthesia are commonly used analgesic modalities. Local anesthesia (LA) is simple and efficient, though the brachial plexus block (BP) is often favoured for more complex hand surgeries despite requiring greater time and resources. The recovery of patients after undergoing hand surgery has never been directly compared between these two modalities. The primary objective is to compare the quality of recovery of patients who receive LA or BP. Secondary objectives are to compare post-operative pain and opioid use. **METHODS**: This prospective randomized controlled study enrolled adult patients undergoing surgery distal to carpal bones. Participants were randomized to receive local anesthesia as a wrist/digital block, or regional anesthesia as an infraclavicular brachial plexus block. Participants completed the Quality of Recovery-15 questionnaire (QoR-15) on POD1, reported their pain level on the Numerical Pain Rating Scale (NPRS) and their narcotic use on POD1 and 3. **RESULTS**: A total of 76 patients completed the QoR-15 (LA 46, BP 30). There was no statistically significant difference in QoR-15 score between LA (127.5 [IQR 28]) and BP (123.5 [IQR 31]). The non-inferiority of LA was demonstrated at the 95% CI. The post-operative pain and narcotic use for LA and BP on POD1 (NPRS 5 vs 4, $p>0.05$; oxycodone pills 0.5 vs 1, $p>0.05$) and POD3 (NPRS 1 vs 1, $p>0.05$; oxycodone pills 2 vs 1, $p>0.05$) were not significantly different. **CONCLUSIONS**: In hand surgery, LA is non-inferior to BP for quality of recovery, post-operative pain, and narcotic use. This study supports more widespread use of local anesthesia in complex hand surgeries, which may greatly benefit OR efficiency, convenience, and costs. **LEARNING OBJECTIVES**: To understand the effect of anesthesia type on patient-reported recovery, pain level and narcotic use after hand surgery.

Effect of surgery delay on outcomes after nerve transfer to restore elbow flexion

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PURPOSE: This study aims to investigate the impact of surgery delay on elbow flexion strength in patients with traumatic BPIs undergoing single fascicular nerve transfer (SFT) or double fascicular nerve transfer (DFT). **METHOD**: The protocol was registered with PROSPERO and PRISMA guidelines were followed. MEDLINE, EMBASE, and The Cochrane Library were systematically searched. English studies investigating the outcomes of SFT or DFT for restoration of elbow flexion in BPI were included. Two independent reviewers completed screening and data extraction. Data analyses were performed to determine the predictors of elbow flexion strength; surgery delay, age, injury level, and SFT versus DFT. **RESULTS**: The literature search identified 1,046 unique articles. Studies (n=31) reporting individual patient data (n=408 patients) who underwent SFT (n=341) or DFT (n=67) for restoration of elbow flexion were included for analysis. The mean age, time from injury to surgery, and follow-up was 29.6 years, 6.5 months, and 27.1 months, respectively. Good elbow flexion strength was found in most patients; MRC >=3 in 352 (86.3%) and MRC >=4 in 288 (70.6%). In the adjusted analysis, increased age ($p=0.0219$), surgical delay (<0.0001), C5-7 ($p=0.0036$) and pan-plexus injuries ($p<0.0001$) were associated with worse motor recovery. A 32% reduction in the odds of a favourable motor recovery was observed with a 3-month delay to surgery. Patients who had their nerve transfer within 6 months of injury had 2.4 times the odds of favourable motor recovery ($p=0.0003$, 95% CI: 1.50 to 3.92). **CONCLUSIONS**: Worse motor recovery was observed following nerve transfers in BPI with delay to surgery. SFT and DFT provides excellent elbow flexion strength in the majority of patients, and should be considered as a reconstructive option to restore elbow flexion following BPI. **LEARNING OBJECTIVES**: Participants will understand the impact of surgery delay on elbow flexion strength in nerve transfers for BPI.

The volume of perioperative fluids in microsurgical free flap surgery: a retrospective study

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PURPOSE

The aim of this retrospective study is to determine if there exists a correlation between the amount of IV crystalloids administered during free tissue transfers and free flap failure. **METHODS:** Retrospective data was collected for 115 patients who underwent free flap transfers by plastic surgeons in our institution between 2016 and 2020. Data collected included patient demographics, free flap information, fluid administration and flap loss. The primary outcome measured was free flap survival. **RESULTS:** Out of 115 patients, a total of 6 (5.2%) surgeries resulted in flap failure. Patient age (p=0.218), body mass index (BMI)(p=0.135), tobacco use (p=1.0), the American Society of Anesthesiologists (ASA) category (p=0.161) and type of free flap (p=1.0) were not statistically significant in relation to complications and flap failure. However, the mean infusion rates observed for surgeries with failed free flaps (5.73±2.59 cc/kg/h) were found to be greater than for those that succeeded (4.01 ±1.825 cc/kg/h) resulting in a statistically significant correlation (rpb=0.202, p=0.03). **CONCLUSIONS:** The results of this study suggest that avoiding excessive intra-operative fluid resuscitation may improve overall flap survival. **LEARNING OBJECTIVES:** Participants will gain an understanding of the pathophysiology of free flaps, and why they are more predisposed to oedema formation. Learners will identify high volumes of intra-operative fluid as a risk factor for free flap failure. Attendees will be capable of applying safer limits to intra-operative fluid administration and potentially improve free flap success within their individual practice.

The Global Registry of Adverse Clinical Events (GRACE)©: A prospective, multicenter, observational, cohort study investigating the safety of aesthetic injectables

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PURPOSE: Adverse events (AEs) following injectable treatments for aesthetic indications are significantly underreported in the literature. In an attempt to increase reporting, investigators have recently developed and deployed a novel electronic data capture system: The Global Registry of Adverse Clinical Events (GRACE©). The GRACE© Portal was designed to specifically capture AE data, in order to better identify the incidence of complications following injectable treatments. **METHODS**: Aesthetic physicians, including plastic surgeons, dermatologists and otolaryngologists, from ten Canadian sites were recruited. Physicians were instructed to report any AE related to the use of aesthetic injectables. The demographic and clinical data of patients experiencing an AE were recorded within the portal. Physicians treated patients and managed AEs according to their standard of care. Data related to treatments conducted within the first 24-months of study startup were assessed. Safety data were collected for an additional three months, to allow for sufficient follow-up of subjects treated near the study end date. **RESULTS**: Throughout the active phase of the trial (24 months), 123,124 injectable treatments were conducted. One-hundred and eleven patients, experiencing a total of 235 AEs, were entered into the portal. This equated to an incidence rate of 0.19% (235/123,124), for at least one AE per treatment. Thirty unique products were associated with AEs; including two sculptors, three neurotoxins and twenty-five hyaluronic acid- based fillers. In total, there were 112/235 (47.66%) mild AEs, 88/235 (37.45%) moderate AEs and 35/235 (14.90%) severe AEs. The most common complication (n = 48/235; 20.43%) was swelling, with a prevalence of 0.04%. Of the documented AEs, only one was reported to Health Canada and four to the respective manufacturer. **CONCLUSIONS**: Findings support the implementation of the GRACE© Portal as an effective outreach strategy for increasing AE reporting by health care professionals. Given the achieved sample size, this data likely represents a more accurate depiction of the safety profile of approved aesthetic injectables in Canada. **LEARNING OBJECTIVES**: At the end of this lecture, the learner will be able to describe AEs associated with injectables, including signs, symptoms and incidence rates.

Reporting outcomes and outcome measures in thumb carpometacarpal joint osteoarthritis: A systematic review

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PURPOSE: In the thumb carpometacarpal joint (CMCJ) osteoarthritis (OA) literature, there is substantial heterogeneity in outcome and outcome measure reporting. This could be rectified by a standardized core outcome set (COS). This study aims to identify a comprehensive list of outcomes and outcome measures for thumb CMCJ OA, which represents the first step in developing a COS. **METHODS**: A computerized search of Medline, EMBASE, Cochrane, and CINAHL was performed to identify randomized controlled trials, as well as observational studies involving at least 50 participants, over the age of 18 undergoing surgery for thumb CMCJ OA. Reported outcomes and outcome measures were extracted from these trials and summarized. **RESULTS**: This search yielded 3498 unique articles, of which 97 were used for analysis. Thirty-three unique outcomes and 25 unique outcome measures were identified. The most frequently utilized outcomes were complications (78/97), postoperative pain (73/97), radiologic outcomes (64/97) and grip strength (63/97). Within each reported outcome, there was substantial variation in how the outcome was measured. Of the 25 unique outcome measures, ten were validated. Of the remaining 15, 12 were created ad hoc by the author. The DASH was the most commonly reported outcome measure (34%). **CONCLUSIONS**: There is a lack of consensus on critical outcomes following surgery for thumb CMCJ OA. A standardized COS created by stakeholder-consensus would improve the consistency, and therefore the quality of future research. **LEARNING OBJECTIVES**: 1. Identify the outcomes and outcome measures that have previously been used in the CMC joint arthritis literature. 2. Appreciate the heterogeneity in outcome reporting. 3. Consider the need for outcome standardization for CMC joint arthritis.

Exploring breast surgeons' reasons for women not undergoing immediate breast reconstruction

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INTRODUCTION: Rates of immediate breast reconstruction (IBR) hinge on referral patterns from general to plastic surgeons, informed by subsequent discussions with patients about their goals and risk tolerance. We sought to understand the reasons Alberta breast surgeons report as to why patients are not receiving IBR. **METHODS:** Two years of operative records were accessed from a synoptic operative reporting system utilized by 95% of Alberta breast cancer surgeons. Within this report are mandatory questions regarding whether a patient is receiving IBR and, if not, the reasons why not. We hypothesized that system related resource limitations would be the predominant reasons why IBR was not undertaken. Chi-squared was used for categorical variables with a p¬-value of 0.05 considered significant. **RESULTS:** Of 6253 patients undergoing breast cancer surgery over the two-year time frame, 2649 underwent mastectomy and 615 mastectomy patients received IBR for an IBR rate of 23%. The most commonly reported reasons by breast surgeons that patients did not undergo IBR were patient preference (55%), high likelihood of postoperative radiation therapy (20%), and high risk due to patient co-morbidities (12%). Resource limitations was a suprisingly rare determinant (2%) as was failing to discuss reconstruction as a possibility (3%). **CONCLUSIONS:** This study provides a unique look into general surgeon reported reasons patients are not receiving IBR. These provocative surgeon-reported results might reframe further thinking about the relatively low Canadian reconstruction rates. **LEARNING OBJECTIVES:** 1. Recall indications and contraindications for IBR: 2. Recognize general surgeon reported barriers to IBR in Alberta; 3. Understand the limits of the Synoptec ™ report in determining why Alberta patients are not being referred for IBR.

Impact of the COVID-19 pandemic on the wellness of Canadian Plastic Surgery residents: A survey of program directors and residents

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PURPOSE: To determine the effects of the COVID-19 pandemic on Canadian plastic surgery resident practice, wellness, and overall training. **METHOD:** Surveys for program directors and residents were disseminated to all English-speaking Canadian plastic surgery residency training programs. Survey results were collected for two weeks, pooled and presented as a percentage of responses for each question. **RESULTS:** Program directors believed that the COVID-19 pandemic has a negative effect on resident wellness. Eighty-percent of program directors (n=4/5) believed that their residents were coping effectively. The support they were providing for resident wellness was rated as neutral (20%; n=1/5) or supportive (80%; n=4/5). Most programs (80%; 4/5) introduced strategies to support resident wellbeing, such as: appointment of a wellness director. All program directors were concerned about the effects of the pandemic on training, with the most concern for PGY5s. Trainees reported minimal changes to their practice. Most trainees (84%; 16/19) reported the pandemic as having a negative effect on their wellbeing, with worse emotional, social, psychological, and physical wellness, as well as feelings of burnout. Trainees reported neutral (37%; n=7/19) or effective (42%; n=8/19) coping strategies. Residents felt that their wellness was supported by: their own resilience (89%; n=17/19), family members (74%; n=14/19), friends (74%; n=14/19), their partner (68%; n=13/19), or co-residents (53%; n=10/19). Most rated the support that their program is providing for their wellness during the pandemic as neutral (58%; n=11/19) or supportive (32%; n=6/19). Most residents (89%; n=17/19) expressed some concern over the effects of the pandemic on their training. **CONCLUSION:** Given our findings of negative effects of the COVID-19 pandemic on the wellness of Canadian Plastic Surgery trainees, we aim to optimize support by leaders in postgraduate medical education. **LEARNING OBJECTIVES:** Programs can better support their residents with wellness initiatives, ranging from check- ins to virtual group events.

Lymphaticovenous anastomosis and vascularized lymph node transfer for the treatment of lymphoedema - a single center case series

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PURPOSE: Lymphedema is a chronic and debilitating condition. This study aims to assess the efficacy and common complications of patients treated with lymphaticovenular anastomosis (LVA) and vascularized lymph node transfer (VLNT) for lymphoedema. **METHODS**: We performed a retrospective analysis of a consecutive series of adult patients who were treated for lymphedema with LVA and/or VLNT from February 2018-2020 in a university center hospital. Sixteen limbs met inclusion criteria. The presence of any patent lymphatic channels was assessed via indocyanine green lymphangiography. Patients with patent lymphatic ducts were offered LVA, those without were offered VLNT. Pre and post-operative circumferential limb measurements, use of compression garments and post-operative complications were recorded. **RESULTS**: Seven lymphedematous limbs underwent LVA, 8 underwent VLNT, and one underwent both procedures. Minimum follow up was 9 months. Pre-operatively, 81% of patients (13) wore compression garments daily. Post-operatively, all but two patients (88%) were able to cease daily compression garments. The average resultant volume with LVA and VLNT after an average of 1 year was 90% and 90.5% respectively (range 81- 99% for LVA, 58-106% for VLNT). Forty-three percent of patients (6) reported episodes of recurrent cellulitis pre-operatively. Post-operatively, three of those patients (50%) reported one single episode of cellulitis. No surgical or post-operative complications occurred. **CONCLUSION**: Patients with lymphedema can benefit from microsurgery. The greatest effect of surgery is decreased dependence on daily compression garments to maintain a stable and reasonable limb volume. Almost all of our patients were able to cease daily compression garments. Reduction of limb circumference after one year was similar with LVA and VLNT. Episodes of cellulitis were significantly lower after intervention. **LEARNING OBJECTIVES**: The learner will be able to evaluate the

efficacy of LVA and VLNT to reduce lymphedema, to decrease the need of compression garments and to minimize the risk of cellulitis.

Outcomes of immediate breast reconstruction in triple negative breast cancer: A propensity-score matched analysis

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PURPOSE: Triple negative breast cancer (TNBC) patients have a significantly worse prognosis and survival rate compared to non-TNBC patients. MIBR is associated with higher incidence of post-operative complications. Our aim was to evaluate the effect of TNBC on oncological outcomes among breast cancer patients treated with mastectomy and IBR (MIBR). **METHODS**: A 6-year prospectively maintained database at The Ottawa Hospital between Jan 1, 2013 to May 31, 2019 was reviewed for MIBR patients. Patients with distant metastasis, locoregional recurrence, and neoadjuvant therapy history were excluded. Propensity-score matching with logistic regression methods was performed to compare oncological outcomes in TNBC and non-TNBC patients. Kaplan-Meier methods were used to determine disease-free interval (DFI), defined as time from MIBR to locoregional recurrence or disease-specific mortality. **RESULTS**: Of 277 eligible patients, 153 patients were matched 2:1 according to age, tumor stage, and disease grade [TNBC: 51(33%), Non-TNBC: 102(67%)]; which were significant covariates identified using logistic regression ($p<0.05$). The rates of delays to first radiochemotherapy [TNBC: 17(33%) vs. Non-TNBC: 14(14%), p=0.125], post-operative complications [TNBC: 13(26%) vs. Non-TNBC: 34(33%), p=0.473], or locoregional recurrence [TNBC: 2(1.96%) vs. Non-TNBC: 1(1.96%), p=1] were statistically similar. Overall survival was not significantly different comparing TNBC and non-TNBC patients [TNBC: 2.9-years vs. Non-TNBC: 3.2-years, p=0.518]. DFI was not significantly different comparing TNBC and non- TNBC patients (log-rank p = 1); At 6-years, 91% of patients were censored. **CONCLUSION**: This propensity-score matched study demonstrated that TNBC in patients treated with MIBR was not associated with worse oncological outcomes, including DFI, compared to matched non-TNBC patients. It appears oncologically safe to offer immediate breast reconstruction to TNBC patients that meet certain criteria. **LEARNING OBJECTIVES**: Participants will be able to appreciate the importance of studying TNBC in MIBR for breast cancer, as well as explore the clinical implications from our propensity-score matched findings.

Enhanced recovery after surgery (ERAS) in autologous breast reconstruction: A pilot randomized controlled trial

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BACKGROUND: Enhanced recovery after surgery (ERAS) is an approach to perioperative care shown to shorten hospital length of stay (LoS) and decrease opioid use after colorectal surgery. There is increasing interest in applying ERAS to breast reconstruction, but the supporting evidence is limited. In this pilot study we evaluated the feasibility of conducting a randomized controlled trial (RCT) comparing ERAS to standard perioperative care among patients undergoing abdominal-based autologous breast reconstruction (AABR) for breast cancer. **METHODS**: We conducted a parallel two-arm pilot RCT of adult patients undergoing AABR between November 2019 and April 2020. Patients were randomly assigned to ERAS or standard perioperative care. Feasibility outcomes included patient rates of eligibility, recruitment, retention, and adherence to study protocol. The primary clinical outcome was median hospital length of stay. Secondary clinical outcomes included in- hospital opioid use, adverse events at 30-days, and quality of life questionnaires including BREAST-Q and EQ-5D-5L at 30-days. **RESULTS**: Of 22 screened patients, 21 (95.4%) were eligible for the study and 20 patients (95.2% of eligible) consented to study enrollment. Two patients did not undergo surgery due to COVID-19 related cancellations. Among the 18 randomized patients (90%) 10 received the study intervention and 8 received standard care. All patients undergoing surgery completed the trial with 30-day follow-up. There was 85.8% adherence to study protocol items in the ERAS group. The ERAS group had a slightly shorter median hospital length of stay (ERAS 4 days, IQR 3-5; Standard care 4.5 days, IQR 3.25-5.75) and lower mean total oral morphine equivalent consumed (ERAS 82.3mg, SD 66.5; Standard care 408.1mg, SD 368.6). **CONCLUSIONS**: This pilot study supports the feasibility of a larger RCT evaluating effectiveness of ERAS, as demonstrated by high rates of patient recruitment, study completion, and adherence to study protocols. Effectiveness outcomes also encourage a larger RCT. **LEARNING OBJECTIVES:** 1. Participants will be able to describe the ERAS model in perioperative care for breast reconstruction; 2. Participants will be able to describe the role of pilot feasibility studies prior to conducting a full scale randomized controlled trial.

SMaRT assessment tool: An innovative approach for objective assessment of local flap designs in facial reconstruction

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PURPOSE: Teaching and assessment of ideal surgical markings of local flaps for optimal aesthetic and functional outcomes remains a challenge in the present era of competency based surgical education. The SMaRT assessment tool represents an innovative approach for the objective evaluation of local flap designs in plastic surgery. **METHODS**: Using bilobed flaps as a proof of concept, Procrustes principles of statistical shape analysis were used for SMaRT assessment tool development and establishment of computational and practical performance boundaries. Subsequently, this tool was implemented on a cohort of trainees and plastic surgery educators in order to establish its construct and content validity. **RESULTS**: A total of 23 subjects, representing a cohort of 10 senior medical students, 4 junior plastic surgery residents, 6 senior residents, and 3 attending plastic surgeons participated. Construct validation was established through the tool?s ability to report on significant differences in pre-training

performance between novice and expert participants ($p<0.0001$). Following simulation-based digital training, the tool was proven capable of quantitively reporting on cognitive skill acquisition that result in competent trainee designs ($p<0.05$), with medical student and junior resident performance approaching that of attending plastic surgeons. Lower pre-training confidence significantly correlated with greater time spent on the training module, and subsequently, better score improvements. **CONCLUSION**: The SMaRT assessment tool represents a novel, validated model of incorporating unsupervised, objective feedback to trainees with the goal of achieving competence in local flap design, with potential for adoption to other fields of plastic surgery to automatize assessment of surgical designs. **LEARNING OBJECTIVES:** 1. Participants will be able to utilize statistical shape analysis concepts in objective assessment and education of surgical markings. 2. Participants will be familiarized with value of specific, objective, feedback during deliberate practice exercises.

Beware the boxer's fracture imposter: Where does the metaphysis end and diaphysis begin?

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PURPOSE: Boxer fractures, fractures of the metaphysis of the 5th metacarpal, are a common injury in children. They are often regarded as stable and heal uneventfully even following closed reduction. Fractures of the metacarpal diaphysis, conversely, tend to be unstable and may require surgical intervention. Clinically, however, it is not clear at which point fractures of the 5th metacarpal should be considered unstable. We thus aimed to identify the location at which 5th metacarpal fractures are at risk for surgical intervention. **METHODS:** A 2-year retrospective analysis of all children (age <18) with 5th metacarpal fractures presenting to a Pediatric Plastic Surgery clinic was performed. Patient and clinical data were acquired from patient charts. Fracture location was measured as a percentage of the total metacarpal length on PA radiographs. Descriptive statistics were performed, and multivariate logistic regression was used to identify surgical predictors. **RESULTS:** One hundred and eleven patients met criteria for review. Mean age was 14.0 years (SD 2.2), and 95% were male. Fifty-one (45.9%) patients underwent closed reduction, and 10 (9.1%) patients required surgical fixation. Increased fracture angulation on initial lateral radiograph (OR: 1.04 (1.00-1.11 95%CI), p=0.039) and more proximal fractures (OR: 0.94 (0.88-0.99 95%CI), p=0.022) were identified as independent predictors of the need for surgery. Sensitivity testing demonstrated that fractures occurring proximal to 70% of metacarpal length would result in accurate detection of those requiring surgery with 70% sensitivity, 75% specificity, and 95% negative predictive value. **CONCLUSIONS:** Fracture location in 5th metacarpal fractures is an independent predictor for the need for surgery. Fractures occurring more proximal than 70% of the metacarpal length in children may be unstable and should be observed carefully. **LEARNING OBJECTIVES:** a. Understand common presentations of 5th metacarpal fractures in children; b. Identify possible predictors for the need for surgery in 5th metacarpal fractures.

Experience in a single practice with explantation of textured surface breast implants: indications and procedure selection

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In 2019, Allergan voluntarily withdrew Biocell textured implants and tissue expanders from the entire market. Within the last few years, many patients with textured implants have been consulting their surgeons to seek guidance on how to best manage their current risk profile. In this study we sought to identify reasons why women in a single surgical practice are choosing to undergo explantation surgery and analyze the intraoperative findings to help better guide future decisions for patients with textured implants. This is a retrospective review of textured breast implant cases from 2016 to 2020 from one surgeon in Toronto, Canada. A database review was performed which included both a private and hospital setting. 162 patients with confirmed textured implants were identified with a total of 316 implants. The top two reasons for seeking consultation in both the round and anatomic implant groups were aesthetic concerns (45% for round and 28% for anatomic) and clinical symptoms (25% for round and 27% for anatomic). The top three indications for surgical explantation for the round implant group were aesthetic concerns (28%), size change (16%), and fear of ALCL (12%), while the top three in the anatomic group were fear of ALCL (19%), implant rupture (18%), and aesthetic concerns (18%). We note that 2019 was the year with the most explantations (n= 153, 48%). It is the only year where the effect of media and friends is the greatest source of consultation (at 27% of all reasons for appointments for that year). Overall, our study demonstrated that explantation of textured breast implants increased annually between 2016 and 2019. Although the elevated awareness of BIA-ALCL was a prominent factor, most patients underwent surgery due to aesthetic concerns or implant rupture. The majority of patients choosing to have their textured implants removed, chose to have them replaced with smooth surface devices. Looked at as a subset of all women with breast implants, those with textured surface devices will benefit from counselling and regular follow up in order to educate and monitor for unique changes attributable to their textured surface implants. **LEARNING OBJECTIVE:** 1. To gain a better understanding of why women are choosing to undergo explantation surgery of their textured breast implant devices.

Assessing the nasal midline in rhinoplasty: how good are we?

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PURPOSE: Asymmetry is a significant reason for high revision rates (5-15%) in rhinoplasty. We hypothesize that this is due, in part, to the fact that assessment of nasal alignment in three dimensions can be challenging. Using a validated computer algorithm for nasal alignment (developed in our lab) as the gold standard, we were able to determine the accuracy with which plastic surgeons can assess deviation of the nasal midline from the facial midline. **METHOD:** Twenty 3-D images of faces were

chosen from the Binghamton University 3D face database. Deviation from facial midline of the mid-dorsal line for the upper, middle and lower thirds of the nose was measured using the algorithm. Surgeons were asked to assess degree of deviation from facial midline for each third of the nose using a linear analog scale. Spearman correlations were performed comparing the surgeons' results to the algorithm measurements. Eleven residents and 9 consultant surgeons were tested. **RESULTS:** Surgeons' assessment of deviation correlated poorly with the algorithm in the upper 1/3 ($r=0.28$, $p<0.0001$) and moderately in the middle 1/3 ($r=0.44$, <0.0001) and lower 1/3 ($r=0.39$, $p<0.0001$). No difference in performance was found between trainee and consultant surgeons ($p=0.51$), and greater experience (>10 years performing nasal surgery) did not significantly affect performance ($p=0.15$). **CONCLUSION:** Surgeons have difficulty visually assessing the nasal midline in three dimensions irrespective of experience. These findings support the utility of tools for pre-operative and intra-operative assessment of nasal symmetry, the latter being particularly challenging. **LEARNING OBJECTIVES:** 1. Understand the challenges of assessing nasal symmetry in three dimensions. 2. Understand the utility of a computer-based measurement tool as an adjunct in rhinoplasty.

Oncoplastic breast-conserving surgery versus lumpectomy: An analysis of surgical complications and oncological outcomes in 633 breast cancer patients

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PURPOSE: Oncoplastic breast-conserving surgery (OBCS) is a safe and reliable procedure that has expanded indications for breast conservation while maintaining a superior aesthetic outcome. However, many women continue to opt out of tissue rearrangement in fear of cancer recurrence or delay in their adjuvant care. The objective of this study is to compare OBCS and lumpectomy with respect to oncological outcomes, complications, and disease-free survival (DFS). **METHODS**: A 12-year retrospective chart review of breast cancer patients treated with curative-intent lumpectomy or Level I-III OBCS +/- contralateral balancing mammoplasty/mastopexy between January 2008-2020 was performed at the Ottawa Hospital. Patient demographics, clinicopathologic characteristics, and tumor histopathologies were reviewed. The primary outcome was delay in adjuvant therapy. Secondary outcomes included complications and oncological outcomes. **RESULTS**: Of 1000 women reviewed, 633 met inclusion, 88 of which underwent OBCS and 545 (86%) underwent lumpectomy. All OBCS patients and 474 (87%) lumpectomy patients received adjuvant therapy (chemotherapy/radiation). Mean age was significantly lower among women with OBCS compared to lumpectomy (55 vs. 60 years, [$p<0.001$]) while mean BMI was significantly higher (29 vs. 27, [$p=0.009$]). OBCS was associated with a longer median clinical delay to adjuvant radiotherapy 4(2-6) months vs. 3(2-5) months [$p<0.001$], as well as higher minor complication rates: wound infection (7.95 vs. 2.39%, [$p=0.01$]), dehiscence (5.68 vs. 0.73%, [$p=0.003$]), and fat necrosis (9.09 vs. 1.83%, [$p<0.001$]). There was no difference in positive margins, mastectomy conversion, recurrence rate, and DFS in OBCS compared to lumpectomy ($p>0.05$). **CONCLUSIONS**: Despite higher rates of minor complications and delays in adjuvant therapy, OBCS showed similar locoregional recurrence rate and DFS compared to lumpectomy alone, thereby confirming its oncological safety in treating breast cancer. **LEARNING OBJECTIVES**: Participants will be able to appreciate the clinical implications of OBCS and the effect it may have on adjuvant therapy timing and consequently, outcomes, complications, and safety.

The burden of plastic surgery disease in Canada: a perspective based on the 2019 Global Burden of Disease study

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PURPOSE: Identifying the burden of disease related to plastic and reconstructive surgery in Canada will provide timely population-based data, inform policy, and generate support for research funding. **METHODS**: Data on the burden of disease i.e. prevalence, incidence, mortality, years of life lost (YLLs), years lived with disability (YLDs), and disability adjusted life years (DALYs), were extracted from the Global Burden of Disease 2019 results tool for all relevant plastic surgery diseases. The economic burden of disease in Canadian dollars was calculated based on prior studies. Data are presented as either rates (per 100,000) with the associated uncertainty interval [UI]. **RESULTS**: In 2019, plastic surgery related conditions in Canada had an overall age- standardized DALY rate of 556 per 100,000 [463 - 664]. Of these conditions, breast cancer was responsible for over 50% of the overall burden of disease, with an age- standardized DALY rate of 268 per 100,000 [244 - 294] followed by squamous cell carcinoma (66 per 100,000 [45 - 94]) and thermal burns (61 per 100,000 [46 - 82]). Age- standardized incidence rates were highest for cellulitis (2654 per 100,000 [2502 - 2812]). Breast cancer had the highest age-standardized cost of care of all plastic surgery related diseases, at $5.1 billion, approximately half of the total age-standardized cost of $10.6 billion for included plastic surgery diseases. **CONCLUSION**: Plastic and reconstructive surgery related diseases, particularly breast cancer, thermal burns, and malignant melanoma, are responsible for a high burden of disease and significant cost to the Canadian healthcare system. These results will help guide national healthcare policy and should provide support to directing funding and research efforts toward impactful diseases facing the Canadian healthcare system. **LEARNING OBJECTIVES**: 1. To understand and appreciate the burden of disease addressed by Canadian plastic surgeons. 2. To equip Canadian plastics surgeons with validated data to advocate for healthcare resources

Breast implant related adverse events during mammography: An assessment of the FDA MAUDE database

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PURPOSE: The FDA states adverse events occurring in patients with breast implants during mammography include implant rupture, pain, and impaired visualization. However, the data supporting these claims were collected in 2004. Since then, newer generations of breast implants

have been developed and the rate of implantation has increased by 41%. This paper aims to determine the current incidence of adverse events reported related to breast implants during mammography. **METHOD**: We analyzed reports regarding silicone and saline breast implants published in the FDA MAUDE database of medical device adverse events between 2008 and November 2018. Search terms included: 'mammogram', 'mammography', 'radiograph', 'breast cancer screening', 'breast cancer test' and 'x-ray'. **RESULTS**: We identified 20,539 breast implant-related reports in the MAUDE database. 427 of these reports included our search terms, with 41 describing adverse events occurring during mammography. More precisely, 34 of the 41 cases (82.9%) reported implant rupture during mammography. Amongst them, 16 (47.0%) were reported by the patient directly and 16 (47.0%) by health care professionals. 16 ruptures (47.0%) were silicone implants, whereas 18 ruptures (52.9%) were saline implants. Other adverse events reported include pain (29.3%), change in implant appearance (14.6%) and swelling (7.3%). **CONCLUSION**: Our data demonstrate minimal adverse events in patients with breast implants during mammography. However, implant rupture, pain, change in implant appearance, and swelling can occur. It should be noted that the risk of rupture remains extremely low and that it should neither prevent patients from adhering to breast cancer screening programs nor deter patients from seeking breast implants. Patients should be aware of this risk and discuss screening options with their breast cancer screening team. **LEARNING OBJECTIVES:** 1. Learn about the most frequent adverse events of mammograms on breast implants. 2. Understand the importance of breast cancer screening despite the presence of breast implants.

Impact of COVID-19 on plastic surgery training in Canada. A national survey

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Restrictions placed during the COVID-19 pandemic to prevent viral spread led to substantial transformation of surgical resident education. The aim of this study was to assess the positive and negative impact of COVID-19 on plastic surgery education and training, and provide recommendations for continued competency. A cross-sectional online survey of plastic surgery residents across Canada was used to evaluate the impact of COVID-19 on clinical exposure, experience with virtual education, and long-term impact of COVID-19 on surgical training. This study included 61 plastic surgery residents (40% participation rate). Common educational modalities used during COVID-19 included online seminars (95%) and workshops (58%). Teaching sessions were effective if structured around patient cases (72%); recorded (66%); and limited to one hour (64%).There were mixed reactions towards online education sessions and included feeling: grateful (54%), motivated (38%), enthusiastic (28%), overwhelmed (41%), pressured to participate (23%), and anxious (13%). There were significantly less residents who felt that their clinical exposure was sufficient during (21%) versus before (72%) pandemic restrictions ($p<0.001$). Overall, 87% of residents felt that the pandemic had a negative impact on their training; associated with surgical skill development, fellowship plans, and job prospects. During COVID-19, residents faced altered educational opportunities, which elicited positive and negative emotions with concern regarding surgical skill development and impact on future career plans. Characterising early educational impact on residency training to identify opportunities for change is worthwhile as the overall effect of the pandemic is ongoing and remains uncertain. **LEARNING OBJECTIVES**: 1) what is the impact of Covid on plastic training in Canada? 2) what are the online learning modalities used by residents during Covid? 3) what is the impact of online teaching on plastic training in Canada during Covid?

Use and financial feasibility of small size human acellular dermal matrix in the prevention of recurrent capsular contracture in revision aesthetic breast surgery

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PURPOSE: Acellular dermal matrix (ADM) has been utilized infrequently in revision aesthetic breast surgery despite a few published studies reporting relatively low capsular contracture recurrence rates of 0-2.8%. The main deterrent being the high cost of ADM for aesthetic patients paying out-of-pocket due to the size of the pieces utilized. The purpose of this study is to present a single surgeon experience with small size human- ADM (h-ADM) in the management of capsular contracture and discuss the technical details allowing financial feasibility in aesthetic breast surgery. **METHODS**: A retrospective review of all patients undergoing revisional aesthetic breast surgery for capsular contracture was performed. All patients underwent bilateral implant exchange under manufacturer warranty and a sub-total capsulectomy. Human ADM was placed centrally and anteriorly over the implant. **RESULTS**: 39 Patients (78 breasts) underwent surgery for capsular contracture. 32 patients received Alloderm RTU and 7 patients received Flex HD. Thirty-five patients received a 4X6 cm piece of h-ADM in each breast, 2 patients received a 4X8 cm piece of h-ADM in each breast, and 2 patients received small contour perforated sheets. 2 cases of recurrent clinically significant capsular contracture (Baker III/IV) occurred unilaterally. Average surgical cost increase incurred, including additional operative time, surgical fees and product cost for previous surgical patient was $2600 CAD. **CONCLUSION**: Human ADM represents a viable alternative treatment for the long-term prevention of recurrent capsular contracture in revision breast aesthetic surgery. The size of h-ADM required is much smaller than used in reconstructive surgery thereby minimizing the costs incurred to the patients. **LEARNING OBJECTIVES:** 1. To present outcomes associated with small size ADM for the treatment of capsular contracture in revision breast aesthetic surgery. 2. To analyze cost feasibility for the use of ADM in the treatment of capsular contracture for aesthetic breast patients.

An anatomical study of the musculocutaneous nerve and relevance in nerve transfer surgery

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INTRODUCTION: Nerve transfers to and from branches of the musculocutaneous nerve (MCN) have been described. The aim of this anatomical study describing the MCN, its branches and its course relative to a static bony landmark is to provide clinically relevant data on motor nerve branches that can potentially be used in nerve transfer surgery. **METHODS**: Two investigators performed the dissection of 15 upper extremities from 8 cadavers. The number of branches to the coracobrachialis, the short and long heads of the biceps, and brachialis was recorded. The distance from the coracoid process to where the MCN pierces the coracobrachialis and to where its branches innervate the coracobrachialis, biceps, and brachialis muscles were recorded. **RESULTS**: The mean distance from the coracoid process to where the MCN pierced the coracobrachialis muscle was 8.17 cm (range 4.5-11 cm, ± 1.79 cm). The mean number of branches coming from the MCN to the coracobrachialis was 1.20 (range 0-3). The mean number of MCN branches going to the short head of the biceps brachii was 1.67 (range 1-3), and the mean number of MCN branches going to the long head of the biceps brachii was 2.00 (range 1-3). The mean number of MCN branches to the brachialis muscle was 2.47 (range 1-5). **CONCLUSION**: This study provides objective data related to the course of the MCN and its branches to the coracobrachialis, biceps brachii, and brachialis in relation to the static position of a bony landmark. Quantitative data such as that presented in this study allows for an in-depth understanding of the anatomy of potential recipient or donor nerves for nerve transfer, further facilitating peri-operative decision-making related to reconstructive surgical planning. **LEARNING OBJECTIVE**: Participants will learn the anatomy of the MCN and its branches that can potentially be used for nerve transfer surgery.

Accuracy of natural language processing in breast cancer outcomes research : A pilot study for algorithm development and validation in synoptic reports

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PURPOSE: Health outcomes research demands large volumes of data derived from various sources and phases of clinical care. This study aimed to develop a Natural Language Processing (NLP) algorithm for synoptic (structured) data and test its accuracy in automated data extraction from health records of immediate breast reconstruction (IBR) patients. **METHODS:** With ethics approval, a retrospective review of patients undergoing IBR from 2018-2019 was completed and data extracted for salient variables in outcomes research. Standardized data collection for input variables from clinical pathology reports, totalling 38 clinical variables, formed testing and validation samples. Two independent reviewers extracted data from 100 pathology reports, containing structured and unstructured data. Gold standard was defined as human extracted data, with quality assured by third reviewer, and kappa analysis was completed for inter-rater reliability. An NLP algorithm was developed to extract 38 identical fields of interest (FoIs) from each report. Accuracy of NLP algorithm automatic data extraction was evaluated against manual human extraction. **RESULTS:** A total of 1938 inputs was used for testing and validating the NLP algorithm. Human data extraction had excellent inter-rater reliability (k =0.88) and 2.3% error rate (n=45 inaccuracies) before correction by third reviewer. Development of a rule-based NLP computer algorithm was achieved following pre-processing of records with optical character recognition and training based on FoI. Mean accuracy of the algorithm was 96.4% (SD 4.3%) across all 38 FoIs. In comparison with human-extracted data prior to third reviewer corrections, 12 FoIs displayed 100.0% accuracy, indicating computer-extracted values were a superset of the human-extracted values. **CONCLUSIONS:** High accuracy in automated data extraction was achieved with applied NLP algorithm and will be further optimized with data sampling and variability. **LEARNING OBJECTIVES:** 1. Understand principles of NLP and its application in clinical care and research. 2. Recognize utility and limitations of NLP algorithms.

Can we reach a consensus on the appropriate use of before and after photos in breast surgery?

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PURPOSE: Breast surgery is an area of practice where patients value before and after photographs (BAPs). Consensus is needed to develop guidelines to address the deficit in the literature regarding appropriate use of BAPs in informed consent. **METHODS**: Expert breast reconstructive surgeons participated in a modified Nominal Group Technique (NGT) to establish expert consensus on categories and criteria to be used when evaluating appropriate use of BAPs as part of informed consent. Endorsement rate of 75% and coefficients of variance within and between rounds were conducted to determine validity of each criterion item's rank order. **RESULTS**: Eight experts participated in the NGT in-person meeting and subsequent online survey. 5/7 categories were endorsed for discussion: Purpose, Image Type, Anatomy, Results, and Photographic Integrity. Overall consensus was obtained for 6/11 criteria. Criterion items found to have consensus were: patients considering surgery being the intended photograph audience (100% endorsement, CV1-CV2=0.01), using photographic images (75% endorsement, CV1-CV2=0.04), defining the standard clinical photograph by having patients in the same body position (100% endorsement, CV1-CV2=0.14), anonymizing images by removing digital tags (88% endorsement, CV1-CV2=0.03) and patient identifiers (75% endorsement, CV1-CV2=0.00), not limiting the number of photograph sets needed for sufficient representation (100% endorsement, CV1-CV2=0.07), and representing average outcomes (100%, CV1-CV2=0.06). **CONCLUSIONS**: Early use of this validated and effective technique helps identify potential consensus categories and criteria that surgeons recommend for the use of BAPs in the informed consent process. Further study is required. **LEARNING OBJECTIVES**: After this presentation one should be able to: 1. Appreciate the utility of NGT methodology when evaluating topics with limited literature. 2. Understand the need for comprehensive standards/guidelines for BAPs as these may ultimately play a significant role in the breast surgery consent process.

Nipple sparing mastectomy in the ptotic breast: A systematic review of outcomes in single-stage skin reducing nipple sparing mastectomy techniques

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PURPOSE: Reconstruction following nipple sparing mastectomy (NSM) in the ptotic breast cancer patient presents unique problems. The oncologic urgency of the mastectomy precludes a staged mastopexy, necessitating immediate skin reduction techniques in order to achieve an aesthetically pleasing result, however these are often associated with NAC complications. A systematic review was performed to identify different single-stage skin reducing nipple sparing mastectomy (SR-NSM) patterns and compare their surgical outcomes. **METHOD**: A systematic electronic search was performed using the PubMed database. Search terms used were: "Skin-reduction", "Skin-reducing", & "Nipple-Sparing Mastectomy". Studies reporting ischemic complications following one-stage SR-NSM with prosthetic-based reconstruction were included. **RESULTS**: 25 articles met the inclusion criteria, representing 777 SR-NSM procedures. Four classes of skin-reducing patterns were identified: Wise-Pattern (433), Vertical (203 breasts), Peri-areolar (50 breasts), and Horizontal (91 breasts). Major complications, minor complications and Nipple-Areolar Complex complications for each technique were as follows: Wise-Pattern: [9(2.1%), 37(8.5%), 47(11%)]; Vertical: [9(4.4%), 16(7.9%), 20 (9.8%)]; Peri-areolar: [0(0%), 5(10%), 8(16%)]; and Horizontal: [3(3.2%), 12(13.2%), 11(12.1%)]. Additional analysis further revealed different pedicle designs within each category of skin-reducing technique. The technique with the lowest complication rate was the Wise Pattern- inferior pedicle [Major: 5(2.4%); Minor: 13(6.3%); NAC: 10(3.4%)]. **CONCLUSIONS**: Following single-staged SR-NSM with immediate prosthetic based reconstruction, the Wise-pattern reduction with inferiorly based NAC pedicle had lowest total and ischemic NAC complication rates. These data can help plastic surgeons plan skin reductions in NSM to minimize post-operative complications and reduce delays in delivering adjuvant cancer treatments. The risks associated with single-stage SR-NSM should be discussed in detail with breast cancer patients seeking this procedure. **LEARNING OBJECTIVES**: Special care should be taken when considering the skin reduction patterns and NAC pedicle in ptotic patients undergoing SR-NSM. The wise reduction pattern with inferior NAC pedicle shows promise for optimal surgical outcomes for single- staged, prosthetic-based SR-NSM.

Patient reported outcomes in gender affirmation chest surgery: A systematic review

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PURPOSE: Gender-affirming chest surgery is a fast-growing field in part due to growing acceptance of its ability to save lives and increase quality of life. Nonetheless, we do not have validated outcome measures to evaluate the patient perspective in this marginalized population. Therefore, this systematic review aims to compile current patient-reported outcome tools for gender-affirming chest surgery in transgender and non-binary individuals. **METHOD:** In accordance with the Cochrane Handbook for systematic reviews with the help of a research librarian, MEDLINE, Cochrane Library, EMBASE, PsychINFO, and Scopus were searched for studies evaluating gender-affirming chest surgery in a non-cisgender population in January 2021. Two independent reviewers and an arbitrator assessed articles for inclusion criteria. Data was collected for characteristics of the study and patient-reported outcomes. **RESULTS:** A total of 840 studies were screened on title, abstract and full text. After review, a total of 15 articles met inclusion criteria. The majority of studies analyzed outcomes for transmasculine patients. Eight studies used ad-hoc questionnaires, two incorporated questions from the BREAST-Q. Common characteristics of patient-reported outcome tools used to evaluate patients pre-operatively and post-operatively included aesthetic outcome, functional outcome, and mental health parameters. One-third of studies focused only on physical characteristics of scar, nipple-areolar complex and chest contour. There was a high degree of heterogeneity and a clear lack of validated surveys in this patient population. **CONCLUSIONS:** There is a high degree of heterogeneity amongst patient-reported outcome measures used in gender-affirming chest surgery which makes it difficult to compare the patient perception of different surgical techniques. To better serve this population it is imperative that statistically validated, well-organized tools continue to be developed with the goal of better patient-centered care. **LEARNING OBJECTIVE:** 1. Evaluate the current tools used to measure patient-reported outcomes in gender affirmation chest surgery.

Strategies to optimize functional recovery in a distal nerve transfer

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PURPOSE: Distal nerve transfers (DNTs) are common reconstructive technique for peripheral nerve injuries. As DNTs require the donor nerve to innervate new targets, synaptic plasticity is integral to success. Exercise therapy (ExT) improves plasticity and enhances regeneration following a nerve injury, but its effects have never been evaluated in DNTs. We have shown that conditioning electrical stimulation (CES) significantly improves DNT recovery. Herein, we compare these two perioperative therapies. **METHODS**: In all animals, the common fibular nerve was crushed (day 0), CES was delivered to the tibial nerve (day 7) and a DNT was performed by coapting a tibial nerve branch to the common fibular nerve (day 14). Rats were randomly divided into i) CES, ii) ExT, iii) CES and ExT (CES-ExT), and iv) DNT. ExT and CES-ExT cohorts were run daily on a treadmill for either four ('short-term') or thirteen ('long-term') weeks while CES and DNT animals remained in their cages. Outcomes included axonal extension, skilled locomotion and gait analysis. **RESULTS**: Animals treated with CES-ExT had greater regeneration and functional recovery than all other cohorts. Axon extension in CES-ExT nerves was longer than other cohorts ($p<0.05$). These animals had improvements on the horizontal ladder test and earlier recovery of dorsiflexion when compared to other cohorts. Restoration of a symmetrical gait was improved among CES-ExT treated

animals ($p<0.01$), with increased weight-bearing and contact-time of the affected limb compared to the other groups ($p<0.01$). No significant difference was identified between short- and long-term ExT. **CONCLUSIONS**: CES-ExT enhances regeneration and functional recovery following DNT. As both CES and EXT are clinically feasible, this perioperative strategy may improve functional recovery for DNT patients. **LEARNING OBJECTIVES**: 1) CES-ExT improves outcomes following DNT; 2) Combining CES with exercise has greater effects than individual techniques; 3) short-term exercise is as effective as long-term in enhancing regeneration.

Tissue engineered nerve graft for the repair of peripheral nerve gap

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PURPOSE: Our goal is to produce a fully autologous viable nerve tube (NT) seeded with endothelial cells (ECs) and Schwann cells (SC) to offer an autologous surgical alternative to the nerve autograft for the treatment of large nerve gap. **METHODS**: NT's consist of human fibroblast sheets seeded with both EC and SC's which are rolled to form a full tubular structure (NTECSC). NT were implanted in 30 New Zealand white female rabbit immunosuppressed by tacrolimus to repair a 40 mm peroneal nerve defect. The functional recovery was periodically assessed every 3 weeks by electrodiagnostic studies, electromyography and toe-spreading test. Graft remodeling was evaluated by histology and by axonal migration quantification using immunofluorescent staining of neurofilament M and toluidine blue after 38 weeks of implantation. Atrophy measures were done at necropsy. **RESULTS**: The internal structure of the NTECSC was quickly remodeled. Revascularization was observed along the entire tube length. Nerve fibers migrated and reached the distal nerve stump. Myelinated fibers were present in both the controls and the NTECSC. Electrodiagnostic results, functional recovery and muscle weight were superior compared to the non-repair group. **CONCLUSION**: The development of a pre-vascularized NT with autologous ECs seeded with SC may respectively support rapid in situ revascularization of the graft and successful axonal migration. This new technology may provide an alternative to nerve autograft without the morbidity and the limited amount of donor sites. **LEARNING OBJECTIVES**: At the end of the presentation, the participant will be able to list novel areas of nerve tissue engineering for reconstructive surgery. **ACKNOWLEDGEMENTS**: Financial support was received from Canadian Institutes of Health Research (CIHR).

Perineal reconstruction following abdominoperineal resection or multivisceral resection for cancer: A retrospective study

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PURPOSE: Perineal reconstruction following abdominoperineal resection (APR) or pelvic exenteration constitute a significant challenge. However, there is no clear consensus supporting one particular flap technique. The aim of the present study is to compare outcomes of various flap reconstruction techniques performed at our institutions after APR or multivisceral resection (MVR) for cancer. **METHOD**: We conducted a multicenter retrospective study of patients who underwent immediate perineal reconstruction after APR or MVR between 2009 and 2020. Patients demographics, peri-operative data and post-operative complications were collected using electronic medical records. Major perineal wound complications, overall complications and mortality rates were compared between groups. **RESULTS**: 52 patients were identified. Of these, 29 (55.8%) underwent reconstruction with gluteal flap, 14 (26.9%) with vertical rectus abdominis myocutaneous (VRAM) flap, 6 (11.5%) with Singapore flap and 3 (5.8%) with combined flaps. Major perineal wound complications occurred in 10 (34.5%), 3 (21.4%), 3 (50.0%) and 2 (66.7%) patients respectively. However, there was no statistically significant difference between groups. We observed significantly lower rates of re-operation in gluteal and VRAM flaps compared to other groups (gluteal=1 [3.4%]; VRAM=1 [7.1%]; Singapore=2 [33.3]; combined=2 [66.7%], $p=0.0053$). 30-day mortality was identical (0%) in all groups. **CONCLUSIONS**: To our knowledge, this is one of the biggest series comparing gluteal flap to other types of flap. In our experience, gluteal flaps are not associated with a statistically significant increase in major perineal wound complications compared to VRAM flaps. Hence, considering the shift toward laparoscopic surgery, this makes it an invaluable tool in the armamentarium of reconstructive surgeons. **LEARNING OBJECTIVES**: At the end of this lecture, the learner will be able to compare different flap techniques in perineal reconstruction after extensive oncological resection and will be able to select them judiciously.

Medico-legal closed case trends in Canadian Plastic Surgery

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BACKGROUND: In order to enhance patient safety and prevent medico-legal complaints, their current trends and impacts must be understood. These data have not been previously published for Canadian plastic surgery. This study aims to characterize the Canadian plastic surgery medico-legal patterns in many dimensions. **METHODS**: This retrospective descriptive analysis of CMPA data between January 1, 2013 - December 31, 2017 included closed regulatory body complaints and civil-legal actions involving plastic surgeons. Class action legal cases and hospital complaints were excluded. We collected data on patient allegations, procedure types, healthcare- related patient harms, and peer expert criticisms. The primary outcome of interest was physician medico-legal outcomes. **RESULTS**: We found 414 cases met the inclusion criteria: 253 cases involved cosmetic procedures and 161 involved non-cosmetic procedures. The annual incidence among plastic surgeon members of regulatory body complaints and civil-legal actions was 12.1% and 6.7%, for a combined incidence of 18.8%. The most common allegations were deficient clinical assessment, inadequate informed consent,

delayed or misdiagnosis, and inadequate monitoring. Leading contributing factors were identified to be physician-patient communication breakdown, deficient clinical judgements, and inadequate documentation. The top procedural complications included cosmetic deformity, poor scarring, upper extremity stiffness or deficit, major structural injury, and mental health disorder. Less than half of cases (47.8%, 198/414) had unfavorable medico-legal outcomes for the surgeon. Patients were compensated in 43.4% (86/198) of civil-legal cases. **CONCLUSIONS**: Plastic surgeons experience more medico-legal complaints related to cosmetic versus non-cosmetic procedures. To minimize medico-legal risks, plastic surgeons should focus on strong physician-patient communication, patient education/ consent, thorough clinical assessment, minimizing potentially preventable complications, and maintaining relevant documentation. **LEARNING OBJECTIVES**: Participants will understand the general medical-legal trends in Canadian plastic surgery, how to prevent medical-legal complaints and improve medical-legal outcomes.

Analgesic prescribing patterns and predictors of higher analgesic requirements among patients with burn injuries

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PURPOSE: Large quantities of analgesics are prescribed to control pain among patients with burn injuries and may lead to chronic use and dependency. This study aimed to: (1) determine whether analgesics are overprescribed at discharge; (2) identify factors that influence prescribing patterns; and (3) identify predictors that increase patient analgesic requirements. **METHODS**: Patient charts between July 1, 2015 - 2018 were reviewed. Quantities of opioid and neuropathic pain agents (NPAs) prescribed before and at discharge were compared. Patient requirements 24 hours pre-discharge were also obtained. Regressions models were used to identify factors that increased prescription quantity and predictors of higher analgesic requirements among patients. **RESULTS**: Providers did not overprescribe the daily dose of analgesics but overprescribed the duration required. For every increase in percent TBSA, 14 MEQ more narcotics and 203mg more NPAs were prescribed ($p < 0.05$). Surgery was a predictor for higher opioid and NPA prescriptions ($p = 0.03$), while length of stay was associated with fewer NPAs prescribed ($p = 0.04$). Patients with a history of substance misuse ($p = 0.01$) or who were managed surgically ($p = 0.02$) required higher doses of opioids at discharge. Similarly, patients who had undergone debridement required more NPAs ($p < 0.001$). For every percent increase in TBSA, patients also required 14 mg more NPAs ($p = 0.01$). In contrast, older patients ($p = 0.006$) and those with a longer hospital stay ($p = 0.009$) required fewer amounts of NPAs before discharge. **CONCLUSIONS**: Characterizing prescribing patterns and factors that increase analgesic use may help optimize discharge prescriptions and improve patient safety. **LEARNING OBJECTIVES**: 1. Describe whether burn surgeons overprescribe analgesics at the time of discharge. 2. Describe patient factors that may influence how pain medications are prescribed. 3. List predictors of higher analgesic requirements among patients with burn injuries.

Prospective long-term analysis of patient-reported digital replantation outcomes from a single quaternary trauma center

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PURPOSE: Digit replantation can have a life-long impact. Although predictive factors of digit survival have been extensively studied, there is a paucity of literature on long-term outcomes from a patient?s perspective. This prospective cohort study aimed to determine long-term patient-reported functional, aesthetic, and psychosocial outcomes in those who underwent digital replantation, with or without subsequent revision amputation. **METHODS:** All patients who underwent digital replantation from 2000-2018 were reviewed for patient characteristics, injury patterns, and operative details. Prospective primary outcomes were collected by survey with the Decision Regret Scale (DRS), Disability of the Arm, Shoulder and Hand (DASH) questionnaire, and relevant sections of the Michigan Hand Outcomes Questionnaire (MHQ), and Short Form 36 (SF36). Statistical analysis was conducted with Fisher exact and Wilcoxon rank-sum tests. **RESULTS:** Of the 146 contacted eligible patients, 55 respondents were included (37.7% response rate). Non-responder analysis confirmed a representative sample. Mean follow-up time was 9.9 ± 4.7 years. Thirty-four patients (61.8%) had a least one successful replant and 21 patients (36.2%) ultimately underwent revision amputation. Mean age, surgery and ischemia time did not differ between groups. Decision regret was reported as high for all replantation patients, with significantly higher scores in those who required revision amputation ($p < 0.001$). Long-term functional disability was low for all patients, with no significant difference in DASH scores between replantation and revision amputation groups ($p=0.56$). Emotional and appearance scores were both unfavorable and did not differ between groups ($p=0.55$, $p=0.48$). **CONCLUSIONS:** Decisional regret for undergoing replantation is greater for those who require revision amputation. Nearly a decade following digit replantation, regardless of revision status, patients report low disability, dissatisfaction with appearance, and detriment of emotional and psychosocial states. **LEARNING OBJECTIVES:** 1. To determine long-term patient-reported clinical outcomes and decision regret in digital replantation.

Introducing automation in virtual surgical planning for unicoronal craniosynostosis

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PURPOSE: Cranial vault remodelling (CVR) is a primary method of treating unicoronal synostosis (UCS), and is challenging due to the asymmetric nature of the deformity. Computer automated surgical planning has demonstrated success in reducing the subjectivity of surgical decision making for CVR and reducing planning time. The objective of this study is to introduce automated surgical planning into a CVR virtual workflow. **METHOD:** Virtual surgical workflows were developed using FreeformPlus software and a 3- month-old female with right-sided UCS as the index case. Hausdorff distances and color maps were used to compare reconstruction models to the pre-operative

model, as well as to a control skull. Models were categorized as high or low performing based on similarity to the normal skull and advancement of the frontal bone (FB) and supra- orbital bar (SOB) achieved. Boolean operations and model registration were automation techniques introduced in the workflow in an iterated fashion. Fifteen iterations of partially and fully automated workflows were carried out. **RESULTS:** The amount of FB and SOB advancement achieved using the workflows ranged from 3.08 -10.48 mm, and -1.75 - 7.78 mm, respectively. The distance from normalcy ranged from 0.85 - 5.49 mm at the FB and 5.40 - 10.84 mm at the SOB. The highest performing model had an advancement of 8.43 mm at the FB and 7.73 mm at the SOB, and differed to a comparative normal skull by 0.02 mm at the FB and 0.48 mm at the SOB. **CONCLUSIONS:** This is the first known attempt at developing an automated virtual surgical workflow for CVR in asymmetric craniosynostosis. Boolean operations and image registration were techniques used that successfully outlined key regions of interest and suggested surgical steps that resulted in a more normal post-operative skull morphology. **LEARNING OBJECTIVES:** 1. Demonstrate how simple tools in computer automation can aid in virtual surgical planning.

A novel Plastic Surgery residency bootcamp: Structure and utility

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PURPOSE: Transitioning from medical school to surgical residency is a difficult endeavour. To facilitate this period, the University of Montreal's Plastic Surgery program developed and implemented an intensive 1-month 'bootcamp' rotation. It is the only one of its kind amongst Plastic Surgery residency programs in North America. It includes didactic teachings in anatomy, cadaveric dissections and surgical approaches for an array of procedures from basic ones to free flaps. Technical skills are reviewed with seniors and attendings. Research opportunities and case scenarios are also covered. **METHODS:** An anonymous online 29-question survey was created and sent to all residents who participated in the bootcamp rotation between 2013 and 2020. Questions evaluated residents' knowledge of anatomy, basic surgical skills, common approaches, flaps and calls, before and after the bootcamp. **RESULTS:** Seventeen Plastic Surgery residents responded to this questionnaire (81%). The majority confirmed that the bootcamp helped them prepare for residency, research and calls, as well as expand their knowledge of anatomy, surgical skills and flaps, much more so than medical school. The residents responded positively to the bootcamp's structure and set-up. **CONCLUSIONS:** This study proposes that surgical programs could benefit from a bootcamp rotation at the beginning of their curriculum. The purpose is to facilitate the transition between medical school and post-graduate training and ensure a leveling of the junior residents' preparedness to residency. This rotation serves to train versatile, confident, collaborative junior residents in Plastic Surgery. Further prospective studies could demonstrate the bootcamp's impact in board certification rates and acceptation into fellowship training programs. **LEARNING OBJECTIVES**: 1. Provide a review of adult learning in surgery; 2. Share the structure of a bootcamp rotation; 3. Illustrate the interest in and need of such rotations

Examining breastfeeding policies for surgical residents across Canada

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PURPOSE: Breastfeeding is increasingly terminated prematurely for surgical resident physicians (?SRPs?) due to the challenges of residency training and lack of policies to support lactating mothers. Due to smaller program sizes, plastic surgery residents have increased challenges with breastfeeding upon return. This study aims to examine current breastfeeding policies for surgical residents across Canada and provide recommendations for future policy creation. **METHODS**: A multi-disciplinary team consisting of a lactation consultant, human resource specialist, board-certified surgeon, health information specialist, and two trainees was assembled. SRP breastfeeding policies were collected from post-graduate medical education offices in Canada, provincial resident unions, and divisional and department levels. A sample of American residency programs were also surveyed to gather additional policies. A literature search of breastfeeding policies was conducted using PRISMA?s Extension for Scoping Reviews. Pertinent policy details were extracted. **RESULTS**: Abstracts(n=275) were reviewed, and four publications on policies met inclusion criteria. Our manual search and correspondence yielded an additional five policies (n=1 from a Canadian university). Seven policies indicated where one can express breastmilk, five indicated available equipment for breastfeeding, seven stipulated timing and/or duration of breaks, five defined support for residents and breastfeeding rights, and four indicated resident responsibilities. None were created by an interdisciplinary team. **CONCLUSIONS**: There is a paucity of SRP breastfeeding policies available. Moreover, there are a number of deficits in existing breastfeeding policies. Policies focus primarily on breastfeeding spaces but fail to establish criteria for timing and duration of breaks and the responsibilities of residents and supervisors. There is also a lack of sufficient consideration for the particular challenges surrounding surgical responsibilities as a breastfeeding resident. The absence of comprehensive SRP-specific breastfeeding policies in Canada presents an opportunity for developing policies to support mothers as they return to residency after childbirth. **LEARNING OBJECTIVES:** 1. Describe existing breastfeeding policies for surgical trainees; 2. Determine recommendations for future breastfeeding policies

Upper extremity agonist-antagonist myoneural interface improves force matching accuracy compared to standard transradial amputation

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PURPOSE: Agonist-antagonist myoneural interface (AMI) is a surgical technique to improve proprioception after amputation. Agonist and antagonist muscle pairs are joined over a gliding surface to restore normal biomechanics to improve proprioception. AMI has been reported to improve

prosthesis embodiment and function in the lower extremity, but has not been adopted in the upper extremity, and proprioception has not been quantitatively evaluated. We report a novel case of upper extremity AMI and quantify proprioception using a force matching experiment comparing AMI to standard amputation and no amputation. **METHODS:** The upper extremity AMI technique and postoperative course are described. The proprioceptive performance of AMI was compared to standard amputation and no amputation using a force matching task. Participants wore a force sensing armband around their proximal forearm which measures flexion and extension forces to move a virtual ball into a target as shown on a computer screen. Moving the ball into the target required a specific force. Once participants learned this target force, visual feedback was removed, and participants were asked to match the force only using proprioception. This was repeated for 300 trials. Target forces and reference forces for each participant was modelled using linear regression in a pilot study (n = 3). Correlation coefficients (r) were calculated with r = 1 representing perfect force matching accuracy. **RESULTS:** The AMI amputee (r = 0.9688) outperformed the standard amputee (r = 0.6557) and approached the performance of a participant without amputation (r = 0.9796). **CONCLUSIONS:** AMI following wrist disarticulation appears to improve force matching compared to standard transradial amputation. AMI may improve proprioception in amputees and warrants further study. **LEARNING OBJECTIVES:** AMI surgical technique in the upper extremity. Quantifying and comparing proprioception in amputees.

The effect of flexor digitorum profundus repair position relative to Camper's Chiasm on tendon loads and work of flexion

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PURPOSE: To study the impact of repairing a zone II flexor digitorum profundus (FDP) laceration inside Camper's Chiasm versus outside on tendon loads and work of flexion (WOF). **METHODS**: Twenty digits from five cadaveric specimens were tested using an in-vitro active finger motion simulator under two FDP tendon repair conditions: inside the chiasm (INC) and outside of the chiasm (OC). Tensile loads in FDP and flexor digitorum superficialis (FDS) and WOF were measured using in-line load cells and electromagnetic tracking. Results were analyzed using two-way Repeated Measures ANOVA tests. **RESULTS**: INC repairs decreased FDS loads and WOF by 0.8±1.1 N (p=0.168) and 31.6±60.1 N.mm (p=0.089), respectively, and increased FDP loads and WOF by 0.9±1.5 N (p=0.420) and 26±48.6 N.mm (p=0.082), respectively, compared to the intact condition. OC repairs decreased FDS loads and WOF by 1.5±1.2 N (p=0.015) and 67.3±111.2 N.mm (p=0.042), respectively, and increased FDP loads and WOF by 3.8±2.9 N (p=0.014) and 115.3±56.3 N.mm (p<0.001), respectively, compared to the intact condition. OC repairs increased FDP loads by 2.8±2.2 N (p=0.014) and WOF by 89.3±65.1 N.mm (p<0.001) compared to INC repairs. **CONCLUSIONS**: In this cadaveric model, repair of FDP outside of Camper?s Chiasm increased tendon loads and work of flexion compared to repair within the chiasm. Reconstitution of the anatomic relationship of FDP and FDS, by placing FDP within Camper's Chiasm, during the repair of zone II flexor tendon lacerations is recommended based on this study. **LEARNING OBJECTIVES**: After this presentation the attendee will appreciate the biomechanical implications of FDP position relative to Camper's Chiasm following zone II tendon repair and will be able to apply this to practice.

Interfascicular Anatomy of the Motor Branch of the Ulnar Nerve: A Cadaveric Study

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PURPOSE: The motor branch of the ulnar nerve contains fascicles that innervate the intrinsic musculature of the hand. The internal topography within the motor branch has yet to be reported. **METHODS**: Five fresh frozen cadaveric specimens with an average age of 74 years were dissected. The ulnar nerve was exposed and transfixed to underlying tissues to maintain its orientation throughout dissection. The fascicle to the first dorsal interossei (FDI), flexor pollicis brevis (FPB), and abductor digiti mini (ADM) were identified as they entered respective muscles. Internal neurolysis was performed to identify the interfascicular arrangement of these fascicles. The insertion and take off of specific motor fascicles was measured using a 3D surface scanner with 0.05mm accuracy and recorded relative to the pisiform. **RESULTS**: The internal topography of the motor branch was consistent among all specimens. Proximal to the pisiform, the arrangement from radial to ulnar was: volar sensory branch (VSB), FPB, FDI/intrinsic muscles, ADM, dorsal cutaneous branch (DCB). The position of these branches remained consistent as the deep motor branch curved radially within the palm and travelled to terminal musculature. The location of the average branch points of the FDI, ADM, and DCB with respect to the pisiform were as follows; FDI: 4.6cm distal (range: 4.1-4.9 cm), 4.5cm radial (range: 4.1-4.9 cm). ADM 0.65cm distal (range: 0.3-1.1 cm), 0.7cm radial (range: 0.3-1.1 cm). DCB 7.7cm proximal (range: 4.2-10.1 cm), 0.4 cm ulnar (range: 0.3-0.8 cm). **CONCLUSIONS**: The internal topography of the ulnar nerve motor branch was consistent among specimens studied. This work may inform clinical interventions targeting specific muscular branches during nerve transfers. **LEARNING OBJECTIVES**: Describe internal topography of ulnar nerve motor branch

Outcomes of pediatric dynamic facial reanimation after two decades

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PURPOSE: The gold standard for reconstruction of pediatric facial paralysis is dynamic facial reanimation with free muscle transfer. Long term outcomes data beyond 10 years is scarce in the literature. This study evaluates surgical and patient-reported outcomes 20 years after facial reanimation. **METHOD:** This cross-sectional study enrolled patients who were at least 20 years post-facial reanimation with a staged cross face nerve graft and free muscle transfer. Masseteric nerve patients were excluded. Commissure excursion was quantified using the MEEI FACE-Gram software to analyze frontal photographs in

repose and maximal smile. Patient-reported outcomes were measured using the FaCE Scale instrument for subjective facial impairment and disability and the FACE-Q scales for Satisfaction with Outcome and Social Function. Results are reported as median [IQR]. **RESULTS**: Eleven patients were included (6F:5M; 7.3 [6.3] years at time of surgery). For surgical outcomes, commissure excursion was -1.3 [0.7] mm prior to surgery, 4.6 [2.7] mm at one year post-surgery, and 4.7 [3.6] mm at long term follow up of 23.7 [5.6] years. Commissure excursion increased significantly from prior to surgery to post-surgery ($p<0.05$) and from prior to surgery to long term follow up ($p<0.01$). Commissure excursion did not change significantly from post-surgery to long term follow up. For patient-reported outcomes, FaCE Scale median total score was 75/100. On the FACE-Q Satisfaction with Outcome scale, 10/11 respondents chose 'Somewhat agree' or 'Definitely agree' with the statement 'I am pleased with the result.' On the FACE-Q Social Function scale, 10/11 respondents chose 'Somewhat agree' or 'Definitely agree' with the statement 'I feel confident when I participate in group situations.' **CONCLUSIONS**: Dynamic facial reanimation in children results in long-lasting improvement in commissure excursion. As adults, these patients report a high level of subjective satisfaction and social functioning with their smile reconstruction. **LEARNING OBJECTIVES**: 1. To discuss long-term outcomes of pediatric facial reanimation

Conjoined twin separation - Review of 30-year case experience and lessons learned

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PURPOSE: Conjoined twinning is a rare medical phenomenon and numerous challenges still remain with respect to surgical separation and reconstruction. The purpose of this study is to present a detailed discussion of our institutional experience with eight conjoined twin separations over the last three decades, focusing on challenges and lessons gleaned from these cases. **METHODS**: The records of all patients who underwent conjoined twin separation at The Hospital for Sick Children in Toronto, Canada from 1984 to 2018 were retrospectively reviewed. **RESULTS**: Eight sets of conjoined twins were analyzed. Half of the sets (n=4, 50%) were female. There were four sets (50%) of ischiopagus twins, three sets (37.5%) of omphalopagus twins, and one set (12.5%) of craniopagus twins. The median age at separation was 6.75 months. Our centre was the first to employ tissue expansion in the conjoined twin population, endovascular separation of cerebral circulation, and a lower extremity transplant in our seventh set of twins. The mean duration of ICU and hospital stay were 14.1±12.9 days and 4.9±4.8 months, respectively. Mean length of follow-up was 6.7±4.4 years. Three deaths occurred in our series, with an overall survival rate of 81%. Two sets of twins experienced expander-related complications such as infection and bowel perforation. Three twins required re-operation due to flap necrosis or dehiscence post- separation. **CONCLUSIONS**: Our results highlight the unique nature of each operation and the great ingenuity required in managing the particular anatomic considerations and soft tissue defects of each case. A number of novel strategies were first employed at our centre and have now become commonplace. The lessons learned from such procedures may improve care for future generations of patients. **LEARNING OBJECTIVES:** Understand the outcomes of conjoined twin separation and the lessons learned from these procedures as a means to improve success rates of future operations.

Health utilities from children with cleft lip and/or palate in Ethiopia: A cross sectional study

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PURPOSE: Ethiopia established a national Health Economics and Financing Analysis team to guide policymakers with resource allocation. They use utilities, a measure of health outcomes in economic evaluations. Although primary patient data has been collected for other diseases, utilities for surgical diseases like cleft lip and/or palate (CLP) are missing from low-resource settings. **METHODS**: This seven month cross-sectional study was conducted at the only two Ethiopian multidisciplinary cleft hospitals. Standardized in-person interviews for direct utility assessments (visual analogue scale (VAS), time trade-off (TTO), and standard gamble (SG)) were conducted for proxies of children with CLP under 18 years who are untreated, or treated with surgery +/- speech care. Mean values were compared using a two-sided t-test. Multivariate analysis assessed the effect of treatment after adjusting for potential confounders. Statistical significance was set at $p<0.05$. **RESULTS**:312 patient-proxies were assessed for eligibility and 304 participants were included in the final analysis. On bivariate analysis, there was a higher mean VAS and TTO for treated CLP children ($p<0.05$). Possible confounders assessed on multivariate analysis were cleft type, patient age, and proxy education, income, sex, religion, ethnicity and geography. Treatment remained associated with a higher VAS ($p=0.0004$) after adjusting for income ($p=0.03$) and cleft type (CL compared to CLP ($p=0.003$)), and a higher TTO ($p=0.01$) after adjusting for income($p=0.03$) and religion($p=0.0053$). SG demonstrated poor construct validity, a finding consistent with other proxy publications. **CONCLUSIONS**: This is the first study to provide health utilities from a patient-proxy surgical perspective in a low-income country. This can help inform future health policy in improving access to care for children with CLP in similar settings. **LEARNING OBJECTIVE**: Understand how health utilities can help inform resource allocation in global surgery.

Novel application of a surgeon-operated clysis delivery system in burn surgery

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BACKGROUND: Tangential excision of burns is associated with significant bleeding. Sub-eschar insufflation of epinephrine-containing clysis has shown to decrease blood loss and associated complications. Clysis is typically delivered with the assistance of a perfusionist-operated system. This method however, is associated with significant cost, and is dependent on personnel availability. This study evaluated the use of a novel surgeon-operated fluid management system, Thermedx®, in the delivery of clysis in burn surgery. **METHODS**: We present our initial

experience with the Thermedx ® FluidSmart System. We collected insufflation data, burn characteristics, and complications. A cost-effectiveness analysis was conducted. **RESULTS**: Thirty-seven consecutive cases comprising 22 adult patients (15/22, 68% male), with a mean age of 49 years (+/- 19), were include. The mean % total body surface area burned was 39 (+/- 21.7). The mean temperature, pressure and volume of administered clysis was 32.2 °C (+/- 4.4), 265.04 mmHg (+/-56.17), and 5805.8 mL (+/- 4844.4), respectively. The mean dose of epinephrine administered was 14.5mg (+/- 12.1). Intra-operative temperature of patients ranged from 32.80 °C (mean 36.20 +/- 1.02) to 38.60 °C (mean 37.47 +/- 0.55). The mean drop in temperature was 1.1 °C (+/- 1.2). Total mean packed red blood cells (PRBC) transfused was 507.6 mL (+/- 624.4). There were no recorded complications. When compared to a traditional perfusionist-operated infiltration method, the Thermedx® led to a cost savings of $20,766 CAD over the index year. **CONCLUSIONS**: We present a novel application of the Thermedx ® Fluid Management System. This technique provides rapid and safe infiltration of warmed clysis in burn surgery. We are able to maintain intra-operative euthermia despite large volume of administered clysis. In addition, this technique may be transfusion-sparing. The introduction of the Thermedx® system was associated with significant cost savings. **LEARNING OBJECTIVES:** 1. Participants will be able to describe the major benefits of Thermedx ® in burn surgery. 2. Participants will be able to identify the cost-savings associated with the application of Thermedx ® in burn surgery.

A comparison of aesthetic versus reconstructive patient responses to a Breast Implant Associated Anaplastic Large Cell Lymphoma information campaign

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BACKGROUND: Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) is concerning to plastic surgeons and their patients. The topic has gained attention in the media, prompting patient anxiety, especially in those with a history of textured implants. The authors initiated an information campaign to contact aesthetic and reconstructive patients with breast implants to educate them about the risk of BIA- ALCL. The differences in responses and management in patients who underwent textured device implantation for aesthetics versus oncologic reconstruction is explored. **METHODS**: A retrospective cohort study examined aesthetic and reconstructive patients with prior implant surgery who were contacted as part of the BIA-ALCL information campaign. Primary outcome measures were rates of (i) patient responses to the campaign (ii) follow up appointments generated in response to the campaign and (iii) subsequent surgical procedures resulting from assessment between January 2019 and December 2019. **RESULTS**: A total of 359 patients were contacted as part of the BIA-ALCL information campaign with 144 patients from the aesthetic group, and 215 in the reconstructive group (188 patients with textured implants). Of patients who responded to the campaign, significantly fewer in the aesthetic group (67.6%) sought follow up to the appointments than in the reconstructive group (100%) ($p = 0.08$). Of those, explantation rates also differed with 10.8% in the aesthetic group and 62.5% in the reconstructive group opting for surgery ($p<0.001$). **CONCLUSIONS**: Patients with textured devices for oncologic reconstruction were more likely to present for consultation and later removal in response to the BIA-ALCL information campaign when compared to aesthetic patients. **LEARNING OBJECTIVES:** 1. To understand the potential benefits of an information campaign to keeping patients informed about relevant medical updates 2. To understand the importance of maintaining adequate patient databases with up- to-date contact information to facilitate ongoing communication between patients and physicians.

Comparing facial growth in patients treated with active and passive presurgical orthopedic devices

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BACKGROUND: Presurgical orthopedic (PSO) devices are used in the management of patients with cleft lip and palate to reduce the alveolar gap prior to lip repair. There is some concern in the cleft lip/palate community that active devices cause midface growth disturbance, although this is not distinctly shown in the literature. The purpose of this study was to review all of the unilateral cleft lip and palate cases in a single surgeon's practice to see the effects of active and passive PSO devices on facial growth outcomes up to 10 years of age. **METHODS:** All patients with unilateral cleft lip and palate from a single surgeon's practice between the years 2002 to 2018 were included. Patient charts were reviewed for basic demographic information and pre-operative alveolar gap width. Patient cephalograms were taken at 5 and 10 years. Cephalometric measurements representing maxillary, mandibular, and vertical facial growth were calculated at each time point. Independent sample t-tests were used to compare measurements between the two groups. **RESULTS:** Twenty patients with an active device and 23 patients with a passive device were included. Both patient groups had similar demographic characteristics and pre-operative alveolar gap widths. There was no significant difference between the two groups for maxillary, mandibular, or vertical facial measurements at 5 and 10 years. There was no significant difference between the two groups for overall growth from 5 to 10 years. **CONCLUSION:** There is no significant difference in long-term facial growth outcomes between patients treated with an active or a passive device despite previous concerns that active PSO devices cause a midface growth disturbance. **Learning Objectives:** 1) Understand the difference between active and passive PSO devices. 2) Recognize that active PSO devices do not cause a facial growth disturbance compared to passive PSO devices.

Health literacy awareness and use of universal measures of support among surgeons

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METHODS: We conducted a cross-sectional study using an electronic survey distributed to surgeons at academic institutions. Data collected included sociodemographics, health literacy knowledge and practice surrounding the use

of supportive measures. **RESULTS**: Thirty-five respondents from various surgical specialties at four academic institutions participated. Approximately 74% of surgeons reported familiarity with the concept 'health literacy', but used general impressions to estimate their patients' health literacy levels. Patients with proficient health literacy represented 50% or less of surgeons' practice. Surgeons familiar with health literacy spent significantly more time (>15 minutes) counselling patients (38%, p=0.02) and used language at a 10th grade level or less (92%, p=0.04). Common supportive measures used included simple, non- medical terms (97%, n=34), repetition (83%, n=29), and drawing pictures/diagrams (83%, n=29). **CONCLUSION**: Surgeons estimated that the majority of their patients have limited health literacy and are a heterogeneous group. However, they also reported being unaware of supportive tools for measuring patient health literacy. **LEARNING OBJECTIVES**: This study highlights the importance of surgeon awareness with health literacy and how improved awareness may guide patient-surgeon interactions and improve the quality of care.

Growing demand: An analysis of plastic surgery workload in a Canadian training program over 11 years
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PURPOSE: The demand for plastic surgery services continues to increase in the context of an aging population and rapidly progressing techniques and technologies in reconstructive surgery. Plastic surgeons and particularly trainees, who provide essential support and patient care at academic centers, are subject to increasing burden of care. This study aimed to evaluate the workload of a plastic surgery service at a large Canadian tertiary referral centre over the last 11 years.; **METHODS**: An administrative database was retrospectively reviewed over an 11-year period (2009- 2019). Outcomes collected included volume of operative cases, number of consults, hospital admissions, and resident call. Simple linear analysis of all study years was used to assess changes in volume over time with significance determined at $p < 0.05$.; **RESULTS**: Twenty-one plastic surgeons and 12-15 residents provide coverage to a catchment area of approximately 4 million people. Over an 11-year period, there was a significant increase in annual operative volume from 4209 cases to 5686 ($p<0.0001$). The annual number of consultations also increased, from 989 to 3221 ($p<0.0001$). The annual number of hospital admissions also rose from 604 to 624 ($p = 0.32$). The number of call shifts per year performed by junior (102 to 172, $p<0.05$) and senior (486 to 540, $p<0.01$) residents rose significantly.; **CONCLUSIONS**: There has been a significant increase in the workload faced by plastic surgeons at our institution. In order to provide safe, effective, patient-centered care, novel strategies must be developed to accommodate for these increased pressures.; 5. **LEARNING OBJECTIVES**: Participants will be able to appreciate the increase in demand for plastic surgery services. Participants will identify possible strategies to mitigate burnout and manage an increasing workload in a plastic surgery residency training program.

Utility of the LeFort I osteotomy in the acute management of midface trauma
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PURPOSE: Midface fractures are complex craniofacial injuries. René LeFort originally described three fracture patterns, but pure LeFort I, II, and III fractures are rare. Typically, they occur at different levels on each side and may be complete or incomplete in nature. These factors complicate surgical management. LeFort I osteotomy is a well-described technique in management of midface deformities and malocclusion. However, there is minimal literature on its use in acute craniofacial trauma. This study describes the use of LeFort I osteotomy as a surgical maneuver to aid in reduction of complex midface fractures and re-establishment of pre-morbid occlusion. **METHODS**: Retrospective chart review was performed of all consecutive midface fractures managed by a single surgeon at the University of Alberta Hospital from 2008-2019. Inclusion criteria were adult patients who had LeFort I osteotomy in the setting of acute facial fracture management. Primary outcomes were long-term stability of fracture fixation and re- establishment of stable, reproducible occlusion. **RESULTS**: 22 cases met criteria for inclusion (4 bilateral, 18 unilateral). The most common indication was contralateral LeFort I and ipsilateral incomplete or absent LeFort I (50%). Most remaining cases were a high LeFort (II or III) on the ipsilateral side and LeFort I on the contralateral side (41%). There was one case of non-union requiring revision and bone grafting. Three patients were lost to follow-up. In all remaining cases, stable, reproducible occlusion was achieved at an average follow-up of 1.5 years. **CONCLUSIONS**: In acute facial trauma, LeFort I osteotomy is a safe and effective technique to reestablish premorbid occlusion when passive reduction of the maxilla cannot be achieved. This technique can be safely added to the armamentarium of any surgeon who manages craniofacial trauma. **LEARNING OBJECTIVES**: Describe the utility and indications for LeFort I osteotomy in the setting of acute midface trauma.

Patient and surgeon preferences to access and timing to breast reconstruction consultation and surgery
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PURPOSE: There is currently no standard protocol for timing of referral to a plastic surgeon in Canada. The objective of this study was to elucidate patient preferences for timing in referrals to plastic surgery and breast reconstruction, and practice patterns of breast and plastic surgeons in Canada. **METHODS**: Survey instruments were administered to patients (n=53) having undergone a mastectomy with immediate breast reconstruction in 2019 at the Ottawa Hospital, and to breast surgeons and plastic surgeons across Canada. Survey instruments were developed based on literature regarding patient preferences, patient comments, and discussions between breast surgeons and plastic surgeons. Semi-structured interviews were performed on a subsample of the patients (n=24) to further explore experiences in accessing breast reconstruction. Descriptive statistics were calculated for survey data, and interviews were analysed in Nvivo 12 using descriptive methodology. **RESULTS**: Most patients (43%) would prefer to see a plastic surgeon 1 week after their first

consultation with a breast surgeon. Important factors for deciding when to see a plastic surgeon were being seen promptly (53%) and having time to process the diagnosis (23%). Most patients (89%) were willing to delay surgery to undergo immediate reconstruction at time of mastectomy. Important themes in deciding about breast reconstruction were trust in the surgeon and medical team, support of the medical team, family and friends, and desire to feel 'normal'. Preliminary results demonstrate that Breast and plastic surgeons reported similar practices/beliefs for referral to plastic surgery. **CONCLUSIONS**: Preliminary results demonstrate that most patients prefer to wait 1-2 weeks between initial consultation with a breast surgeon and consultation with a plastic surgeon. Most patients were willing to delay their surgery up to 1 month to have immediate breast reconstruction. **LEARNING OBJECTIVES**: Participants will be able to consider the value of incorporating patient preferences and perspectives into referral practices.

Cost analysis of decreased operating room times at a single high-volume head and neck reconstruction centre
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PURPOSE: The objective of this study is to evaluate if the incorporation of several strategies at our institution, over a fifteen-year period to improve operative efficiency and patient care, has translated to improved cost-effectiveness of head and neck free-flap (HNFF) reconstruction. **METHODS:** A retrospective cohort study including consecutive patients undergoing HNFF reconstruction from January 2007 - February 2020 was performed. Synoptec operative reporting database and the Operating Room Information System (ORIS) were accessed. A cost analysis using a bottom-up approach was performed. The peri-operative period of the patient's care in this study was defined as the day of surgery, subsequent admission and 30 days from discharge. Total operating room cost was defined as a composite of staffing and material costs. Costs are represented in Canadian Dollars ($CAD) adjusted for inflation based on the historic mean during the study period of 1.71%. Spearman's rank correlation analysis, with a two-tailed p-value < 0.05 considered significant, was performed for cost trends. **RESULTS:** Between January 2007 and February 2020 there were 612 HNFF reconstructions. Average age was 61 years. During the study period the material cost of HNFF reconstruction increased on average by $116.23 per year. The total OR time on average decreased by 23.2 minutes per year. The total operating room cost for the study period decreased on average by $387.13 per year. **CONCLUSION:** While the material cost of HNFF reconstruction has increased over time, this seems to be offset with savings from reduced operative time. The incorporation of several strategies to optimize operative efficiency has translated to improved cost-effectiveness of HNFF reconstruction at our institution. **LEARNING OBJECTIVES:** 1) Discuss virtual surgical planning (VSP); 2) Discuss strategies employed at our institution.

Piezosurgery versus conventional cutting techniques in craniofacial surgery: A systematic review & meta-analysis
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BACKGROUND: Despite its increasing use in craniofacial surgery, the evidence for piezosurgery over conventional bone cutting techniques has not been critically appraised. The purpose of this systematic review and meta-analysis is to identify and assess the evidence that exists for the use of piezosurgery in craniofacial surgery. **METHODS**: A systematic review was undertaken using a computerized search. Publication descriptors, methodological details, and outcomes were extracted. Articles were assessed using the MINORS and Cochrane instruments. Random effects meta-analysis was completed. **RESULTS**: Thirty-nine studies were included. Most studies were published within the last five years (51.3 percent) and were randomized controlled trials (56.4 percent). The mean age of patients was 27 (range 0.2 to 57), while the mean sample size was 44 (range 12 to 180). Meta-analysis revealed that compared to conventional instruments, piezosurgery had a lower post-operative incidence of sensory disturbance principally in mandibular procedures (odds ratio: 0.29; 95% confidence interval [CI]: 0.11, 0.77; p = 0.01) and pain at postoperative day three (mean difference [MD]: -0.86; 95% CI: -1.20, -0.53; p<0.01). There was no statistically significant difference in operating room time (MD: 8.60; 95% CI: -1.27, 18.47; p=0.80) or osteotomy time (MD: 0.35; 95% CI: -2.99, 3.68; p = 0.84). Most studies were clinically homogenous (92 percent) and of high quality based on the MINORS instrument (84 percent). Few studies had domains at high risk of bias based on the Cochrane instrument (28.6 percent). **CONCLUSIONS**: Piezosurgery has considerable benefits when compared to conventional instruments. Future studies should investigate its cost-effectiveness and benefits in terms of blood loss, edema/ecchymosis, and patient satisfaction. **LEARNING OBJECTIVES**: Understand the advantages and disadvantages of piezosurgery in craniofacial cases.

Opioid prescribing patterns in Plastic Surgery for same-day breast surgery: Development and implementation of a quality improvement initiative
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PURPOSE: Awareness of opioid overprescribing and misuse has increased substantially with the focus on the opioid crisis in North America. To date, there are no published guidelines for opioid prescribing following common same-day plastic surgery breast procedures. The purpose of this study was to assess current opioid prescribing patterns, as well as to develop and implement a standardized electronic analgesia order set for same-day breast surgery. **METHODS**: A retrospective review of prospectively collected data was completed for patients who underwent breast reduction, alloplastic breast reconstruction, and transgender mastectomy before and after the implementation of a standardized electronic analgesia order set. Patient records were analyzed for baseline characteristics, postoperative analgesia prescription, complications and opioid adverse events. All opioid dosages were converted to oral morphine equivalents (OME). The primary outcome was OME prescribed postoperatively. Secondary outcomes were

complications, adverse opioid events and chronic pain. **RESULTS**: A total of 374 patients were included (278 patients and 96 patients in the pre- and post-implementation groups, respectively). Breast reduction, alloplastic breast reconstruction and transgender mastectomy accounted for 69.5%, 18.2% and 12.3% of cases, respectively. Patients in the post-implementation group had a statistically significant 27% reduction in opioids prescribed (83.1±29.3 mg OME vs, 114.1±30.5mg OME, $p<0.001$) and 54% increase in prescription of multimodal analgesia (68.7% vs. 15.1%, $p<0.001$). Mean follow-up was 11.3±4.2 months with no significant difference in complications, adverse opioid events or chronic pain. **CONCLUSIONS**: The implementation of a standardized electronic postoperative analgesia prescription reduced opioids prescribed in same day breast surgery, as well as increased the frequency of multimodal analgesia prescriptions. Further development of an ambulatory enhanced recovery after breast surgery protocol will continue to reinforce safe opioid prescribing. **LEARNING OBJECTIVES**: Participants will be able to appreciate the role of standardized electronic postoperative analgesia order sets in managing postoperative opioid prescribing.

POSTER PRESENTATIONS

Methodological and reporting quality of economic evaluations in hand and wrist surgery: A systematic review

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PURPOSE: Economic evaluations can inform decision-making by integrating clinical effectiveness and costs. The objective of this systematic review was to assess the methodological and reporting quality of economic evaluations in hand surgery. **METHODS**: Study periods: January 1, 2006 to April 20, 2020 (methodological quality); January 1, 2014 to April 20, 2020 (reporting quality). Extracted information included: economic evaluation type, publication year, hand condition, hand/wrist interventions, journal of publication, and country. Primary outcomes were methodological quality (Guidelines for Authors and Peer Reviewers of Economic Submissions to The BMJ (Drummond's): 33 points; Quality of Health Economic Studies (QHES): 100 points; Consensus on Health Economic Criteria (CHEC):16 points) and reporting quality (Consolidated Health Economic Evaluation Standards (CHEERS) Statement: 24 points). **RESULTS**: Forty-seven hand economic evaluations were included. Types of economic evaluation were: Cost Utility Analysis (CUA): n=9, 19%; Cost Effectiveness Analysis (CEA): n=4, 9%; Cost Analysis (CA): n=34, 72%. Average scores of full economic evaluations (i.e.: CUA, CEA) were: Drummond's: 27.08/33 (82.05%); QHES: 79.76/100 (79.76%); CHEC: 12.92/16 (80.77%); CHEERS: 20.25/24 (84.38%). Associations (Multiple R) between methodological quality scores and CHEERS were: Drummond's: 0.907; QHES: 0.909; CHEC: 0.913. CUAs had the highest average quality scores (Drummond's: 28.89/35 (82.54%); QHES: 86.56/100 (86.56%); CHEC: 14.11/16 (88.19%); CHEERS: 20.8/24 (86.67%). **CONCLUSIONS**: The use of partial economic evaluations (i.e., CA) in hand surgery is prevalent. Quality of full economic evaluations in hand surgery is strong, but has not improved over time. CHEC and CHEERS should be used in tandem when undertaking and evaluating economic evaluations in hand surgery. **LEARNING OBJECTIVES**: Familiarize surgeons with components of full economic evaluations and how to use the guidelines of CHEC (for robust methodology) and CHEERS (for robust reporting) in tandem when conducting or analyzing an economic evaluation.

The use of telemedicine for initial consultation and triage of hand trauma patients: A systematic review

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PURPOSE: The ongoing COVID-19 pandemic has dramatically impacted the delivery of medicine, and as such, practitioners are relying more heavily on telemedicine mediums. The primary purpose of this systematic review was to assess the accuracy of various telemedicine mediums in correctly diagnosing and triaging hand trauma patients. Secondary outcomes of this study were to assess cost effectiveness, impact on patient transfer volume and timeliness of assessment. **METHODS**: An online systematic review of MEDLINE, EMBASE, Pubmed and The Cochrane Library from inception to December 16, 2020 was completed. Data extracted included telemedicine medium used, accuracy of diagnosis and triage plan, cost, impact on patient transfer volume, and timeline for assessment. Study quality was assessed using the methodological index for non-randomized studies (MINORS) scale. **RESULTS**: Thirteen studies were included. All studies were published between 2004 and present. The reviewed studies showed a high rate of congruency between in-person consultants and remote tele-specialists for initial management, thus demonstrating accurate triage and management decisions via telemedicine. Seven of the reviewed studies demonstrated an improvement in access to subspecialty care. Furthermore, seven studies demonstrated cost savings to their institute or to the patients. Most, 61.5% (8/13) of the included studies were of high methodological quality. **CONCLUSIONS**: Telemedicine is an effective and feasible tool that can be utilized to accurately diagnosis and triage hand trauma patients. The articles reviewed support the use of telemedicine as a means to improve patient transfer volume, support rural communities, reduce costs, and provide patient care in a timely manner. **LEARNING OBJECTIVES:** 1. To appreciate the clinical evidence surrounding initial consultation and diagnosis of hand trauma patients using telemedicine in various forms 2. To provide information and education on current telemedicine practices to help optimize care during the COVID-19 pandemic

The benefit of online information sessions on medical student residency perspectives: A trans-Canadian survey study

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PURPOSE: The COVID-19 pandemic has undoubtedly created barriers for medical students seeking to increase their exposure to plastic surgery. With restricted electives,

students interested in plastic surgery have had to find novel ways to learn about Canadian residency programs. The current study aimed to assess whether online information sessions are beneficial to students and whether they can influence their perspectives on a given residency program. **METHODS:** An online information session was offered to medical students interested in learning about the McGill plastic surgery residency program. The session covered an array of topics including program structure, clinical exposure and research opportunities. A survey was sent to participants gauging their satisfaction with the event and the impact it had on their perspectives on a career in plastic surgery and on the McGill program. The results were pooled descriptively. **RESULTS:** The survey was completed by 34/40 participants (85%). 94% (n=32) of participants would appreciate future sessions from other programs and 100% (n=34) report that these sessions could influence their decision to pursue a specific program. 82% (n=28) reported being dissatisfied with their exposure to plastic surgery since the COVID-19 pandemic. Social media was the most common tool used by applicants to increase their knowledge about specific residency programs (53%, n=18/34) and 82% of participants (n=28/34) learned about the event through social media posts. **CONCLUSION:** Online information sessions are beneficial in educating medical students and can directly impact their decision to pursue a given residency program or specialty. Fostering a strong social media presence is important due to the restriction of electives, as applicants have been turning to these platforms to gain information on various programs amidst the COVID-19 pandemic. **LEARNING OBJECTIVES:** 1. Appreciate the impact of online information sessions for medical students; 2. Understand the importance of programs developing strong social media presence.

Need for speed: investigating publication times and impact factors of Plastic Surgery journals

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BACKGROUND: Researchers are becoming progressively disappointed with the time required to publish in scientific journals. Earlier publications can mean a higher h-index and more academic opportunities. In this study, we evaluated the publication speed of manuscripts in plastic surgery journals compared to journals in surgery and medicine. We also assessed correlations between publication speed and journal impact factors. **METHODS:** The overall indexes of all plastic surgery journals were compared with journals in the field of surgery and medicine. In addition, we evaluated original articles published in all plastic surgical journals and the highest-ranking journals from various surgical fields listed in the 2018 Journal Citation Report, assessing the time intervals from submission to publication, submission to acceptance, and acceptance to publication. The correlation between time interval and impact factors was analyzed. **RESULTS:** A total of 18 plastic surgery journals were compared with 210 surgical journals. There was a statistically significant difference in the impact factors of plastic surgery and other surgical journals based on their reporting of submission to acceptance times of the manuscripts ($P<0.05$, Wilcoxon test). The median submission-to-publication time of all plastic surgery and all surgical journals was 29.7 weeks (IQR, 12.1 and 35.8) and 22.1 days (IQR,18.8 and 36.8), respectively. **CONCLUSIONS:** There is a significant submission to publication time lag in plastic surgery journals when compared to other surgical discipline related journals. There was a positive correlation between submission-to publication and impact factors for plastic surgery journals but a negative correlation for surgery journals (Spearman Correlation). **LEARNING OBJECTIVES:** 1. To understand how publication speed varies in plastic surgery journals compared to journals in surgery and medicine.; 2. To appreciate the correlations between publication speed and plastic surgery journal impact factors.

Thumb MCP dislocations in children: more benign than previously thought?

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BACKGROUND: Dislocations of the metacarpophalangeal (MCP) joint are often worrisome due to their irreducible nature and need for surgical intervention. Less is known about thumb MCP dislocations in children. There is conflicting evidence between previous literature and our own anecdotal evidence suggesting that these injuries are more benign. We aimed to characterize the presentation and outcome of thumb MCP dislocations in children. **METHODS**: Patients under 18 years of age with a thumb MCP dislocation were identified from a prospectively maintained database of hand fractures at a tertiary pediatric center. Patient and clinical characteristics were reviewed. Outcomes included treatment coures and need for surgical intervention. **RESULTS**: Over a 2-year period, 23 patients with a mean age of 11 years of age was identified. Seventy percent (n=16) were male. The most common mechanism of injury was a fall related to sports activity. Closed reduction was successfully performed in all cases. No patients required open reduction. No patients required delayed surgical repair of the collateral ligaments for pain, laxity, or weakness with key pinch. **CONCLUSIONS**: The majority of thumb MCP dislocations in children are amenable to closed reduction and heal uneventfully with immobilization. Attempted closed reduction should be encouraged prior to consideration of surgical intervention. **LEARNING OBJECTIVES:** 1. Understand the common presentation of thumb MCP dislocations in children; 2. Recognize that most thumb MCP dislocations in children are reducible and do not require surgical intervention.

Comparing post-surgical outcomes of pre-pectoral versus dual-plane direct-to-implant breast reconstruction without increasing the use of acellular sermal matrix

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PURPOSE: Direct-to-implant reconstruction when performed using the dual- plane technique can be associated with increased postoperative pain, longer recovery, functional impairment and animation deformity. These issues can be avoided by using the pre-pectoral

technique that traditionally uses larger pieces of acellular dermal matrix (ADM) and results in increased costs. It is unclear how these two methods compare when the technique is modified to avoid the use of additional ADM. **METHODS**: A retrospective chart review was conducted of all patients who underwent direct-to-implant breast reconstruction using a dual-plane or pre-pectoral technique between January 2014 and December 2019. Pre-pectoral breast reconstruction was performed using a partial anterior coverage technique and therefore no additional ADM was used per case as compared to the dual plane technique. Rates of post-surgical complications were compared between the two groups. **RESULTS**: Of 77 patients, 48 (86 breasts) underwent dual-plane reconstruction whereas 29 (48 breasts) underwent pre-pectoral reconstruction. Mean follow-up time for the dual-plane and pre-pectoral groups was 23.3 and 8.7 months respectively ($p<0.001$). There were no significant differences in the rates of any of the short-term post-surgical outcomes between the dual-plane group and the pre-pectoral group: seroma (14% vs 6.3%, $p = 0.175$); hematoma (2.3% vs 4.2%, $p = 0.617$); skin/nipple necrosis (7% vs 10.4%, $p = 0.522$); wound skin infection (2.3% vs 2.1%, $p = 1.0$); wound dehiscence (4.7% vs 2.1, $p = 0.654$); and implant loss (1.2% vs 8.3%, $p = 0.055$). **CONCLUSIONS**: Pre-pectoral reconstruction using a partial anterior coverage technique appears to be a safe alternative to dual-plane reconstruction when considering short-term post-surgical complications. **Learning Objectives**: (1) To determine the short-term safety of a pre-pectoral direct-to-implant reconstruction technique that utilizes the same amount of ADM that is required in dual-plane direct-to-implant reconstructions.

Volar plate avulsion fracture in children

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BACKGROUND: Volar plate avulsion fractures of the proximal interphalangeal (PIP) joint are a common pediatric hand injury. In adults, conservative therapy typically has good outcomes when fracture fragments are less than 40% (Eaton type 3a). Children with similar injuries have been managed with buddy taping and limited follow-up based on anecdotal experience. It is unknown if this management is appropriate for all patients or if a subset requires closer follow-up. This study aims to characterize the outcomes of pediatric patients with volar plate avulsion fractures. **METHODOLOGY:** A retrospective review of patients under 18 years of age with a volar plate avulsion fracture were identified from a prospectively maintained database of hand fractures at a tertiary pediatric center. Patient and fracture characteristics were reviewed. Outcomes included range of motion and need for surgical intervention. A phone survey based on the Michigan Hand Questionnaire was used to evaluate patients that had no formal follow-up. **RESULTS:** Over a two-year period, 77 patients were identified. The mean age was 13 years (SD=1.9), and 36% were male. The avulsed fragment averaged 17% (SD=12%) of the articular surface with 1mm (SD=1mm) displacement. Three patients had associated dorsal dislocation. No patients required surgery and only 1 patient required physiotherapy. Thirty percent (n=23) patients were seen in routine follow up with no issues identified. The remaining 70% (n=54) of patients had no formal follow up; 21 of these patients were contacted by telephone and indicated complete healing and return of function. **CONCLUSION:** Current results demonstrate that conservative treatment with limited followup is effective for most pediatric volar plate avulsion fractures. Prospective studies may be useful in confirming these findings. **LEARNING OBJECTIVES:** 1) shine a light on the effectiveness of conservative management in pediatric population, for this mostly benign presentation. 2) Give an overview of natural progression of management, and follow up necessity

Is orbicularis oculi muscle resection necessary in upper blepharoplasty?: A systematic review

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PURPOSE: To evaluate the evidence on aesthetic effect and complications of skin - orbicularis oculi muscle (OOM) strip resection compared to skin only upper blepharoplasty. **METHODS**: A systematic search of EMBASE, PubMed, Cochrane, and Google Scholar databases were performed using our search strategy through to 31 December 2019. Only comparative studies of the two upper blepharoplasty techniques were included. Three reviewers performed study selection process, data extraction and quality assessment. **RESULTS**: A total of 6 articles were eligible for final inclusion. The included studies consist of 2 controlled retrospective cohorts and 4 small randomized controlled studies (RCT). Three of which, were double blinded. Those RCTs were assigned level 2 evidence due to small size and methodological limitations. The sample size of included studies were 407 in the 2 retrospective studies and 57 in the 4 RCTs. The outcomes showed resection of OOM with skin in upper blepharoplasty showed no difference in long-term aesthetic outcome when skin only procedure is performed. Muscle strip resection was associated with initially higher ophthalmological morbidity (edema, bruising, pain, dry eye, sluggish eye closure and lagopthalmos). Morbidity outcomes resolved with conservative treatment. **CONCLUSION**: The resection of OOM with skin in upper blepharoplasty showed no difference in long term aesthetic outcome and was associated with initially higher ophthalmological morbidity compared to skin only procedure. While we are not suggesting that OOM resection is never required, the evidence strongly supports its preservation during standard upper blepharoplasty. **LEARNING OBJECTIVES**: 1. After listening to this presentation, participants will be able to describe the clinical outcomes associated with upper lid blepharoplasty. 2. At the end of this presentation, participants will have a better appreciation of the role that preservation of the orbicularis oculi muscle has in upper lid blepharoplasty.

Patient-reported outcome measures in management of paediatric traumatic fingertip injuries using skin glue or sutures: a comparative study before and during the COVID-19 pandemic

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PURPOSE: During the first COVID-19 national lockdown, we introduced a new trauma pathway for

paediatric fingertip injuries, in anticipation of reduced workforce and limited operating capacity. Our study aims to review the patient/parent-reported outcomes and satisfaction in simple paediatric fingertip injuries managed using our new pathway (Group 1-washout and application of skin glue/steristrips in ED) compared to a matched cohort (Group 2-formal washout and closure with sutures in an operating theatre) treated before the COVID-19 outbreak. **METHOD**: Two matched cohorts of thirty patients were randomly selected over two years. Parents were contacted at least three-months post-injury. They were asked to complete a 20-item survey on patient/parent-reported experiences, including a 10-item fingertip scar assessment questionnaire to assess the finger and residual symptoms. Unpaired t-test was used for statistical analysis. **RESULTS**: In Group 1, 88.9% of patients reported normal appearance of the fingernail, 75% reported normal length of the finger, 67% reported no noticeable deformity, 88.9% reported no visible scarring. One patient from Group 1 reported slight cold sensitivity in the fingertip. Average satisfaction score is 8 out of 10. In Group 2, 94.7% of patients reported normal appearance of the fingernail, 94.7% reported normal finger length, 89.5% reported no noticeable fingertip deformity, 73% reported no visible scarring. Average satisfaction score is 9.2 out of 10. There was no statistical differences between the two groups for these measures. **CONCLUSION**: Preliminary findings suggest that there is no statistically significant difference between using skin glue/steristrips for fingertip injuries in terms of appearance and residual symptoms. To date, there are no prospective studies comparing skin glue/steristrips versus formal washout and closure in theatre for simple fingertip injuries. As fingertip injuries are common presentations in paediatric EDs, a safe and simple method for managing these injuries can reduce the burden on health services. **LEARNING OBJECTIVES:** 1. Participants will be able to evaluate pediatric fingertip injuries in consideration of cosmetic and functional outcome. 2. Participants will demonstrate understanding of the importance of evidence-based learning in developing a safe and economical pathway for the treatment of pediatric fingertip injuries.

Acrometastasis to the hand: A systematic review and meta-analysis of 641 cases

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PURPOSE: To examine all known cases of acrometastasis to the hand available in the known literature. This uncommon presentation of metastatic disease is often mistaken for a benign process and is typically associated with a dismal prognosis. The objective of this review is to analysis metastasis characteristics and prognosis based on the primary tumour and provide treatment recommendations. **METHODS**: An online systematic review of MEDLINE, EMBASE, Pubmed and The Cochrane Library from inception to January 7, 2021 was completed. Studies outlining the care of a patient with acrometastases of the hand were included. Data extracted included patient age, sex, site of primary tumour, location of acrometastasis, treatment management and survival rates. **RESULTS**: Four hundred eighty-five articles published between 1889 and present were found to meet the inclusion criteria. These articles described 641 cases of metastases to the hand. The mean age among patients was 59.3 +/- 13.3 years and men were twice as likely to develop a metastasis (401:214). The most common primary cancer source was the lung (248, 38.7%), followed by the kidney (76, 11.6%) and the breast and colon (49 each, 7.6%). Majority of patients had an single metastases of the hand (500, 78%). The distal phalanx of the thumb was the most frequently cited tumour location (75, 11.7%). The most common form of treatment was amputation of the affected area. Mean survival following diagnosis of acrometastasis was 8.4 +/- 13.5 months. **CONCLUSIONS**: Acrometastasis remains an uncommon presentation of metastatic disease with poor prognosis. Treatment currently focuses on pain management and optimizing functional outcomes. **LEARNING OBJECTIVES:** 1. To appreciate the clinical evidence surrounding treatment and survival rates of acrometastasis 2. To identify areas for further research that could improve early acrometastasis identification and prognosis

Review of the referral patterns of complex peripheral nerve injuries to a specialized clinic in Ontario

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PURPOSE: Optimal outcomes after peripheral nerve injury necessitate timely assessment due to motor endplate degeneration and muscle atrophy. This study evaluated the timeline and referral patterns of patients with complex peripheral nerve injuries presenting to a specialized multidisciplinary clinic at a single centre. **METHODS**: Following ethics approval, a retrospective chart review of patients evaluated at the Combined Complex Upper Extremity Clinic at Sunnybrook Health Sciences Centre (October 2017 to March 2020) was performed. Data collected include demographics, date of injury or symptom onset, mechanism of injury, date of referral, referral specialty, location of referral, date of initial consultation, specialists and work-up completed prior to initial consultation, and date of OR. Median time from injury to referral and time from referral to consultation were calculated. **RESULTS**: A total of 113 patients were included in the study (71 males, 42 females). Referrals were most commonly made by physiatrists (33.6%), plastic surgeons (25.7%), and orthopedic surgeons (15.0%). The median time from date of injury or symptom onset to date of referral was 3.5 months (IQR 1-12 months) and to date of consultation was 4 months (IQR 3-9 months). The median time from referral to initial consultation was 42 days (IQR 17-66 days). Surgery was performed in 37 patients (32.7%). **CONCLUSIONS**: Referral patterns to the Complex Combined Upper Extremity Clinic show higher referral rates from non-surgical specialties with a large range in timing to referral. Raising awareness among referring providers of the importance of timely referral is warranted. The multi-disciplinary nature of the clinic with immediate electrophysiologic assessment may allow for more rapid management and triaging of patients to surgery. **LEARNING OBJECTIVES:** 1) To review current literature on referral patterns of peripheral nerve injuries; 2) To examine referral patterns of peripheral nerve injuries seen at a specialized clinic in Ontario.

Early post-operative complications following nerve transfer in persons with tetraplegia

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PURPOSE: Motor nerve transfer has become an increasingly viable strategy for improving function in the upper extremity (UE) of persons with cervical spinal cord injury (SCI). Fear of complications is a barrier to wider utilization of UE reconstruction in SCI. This study evaluated the early post-operative complications following UE nerve transfer in patients with SCI. **METHODS:** Data were extracted from the National Surgical Quality Improvement Program (NSQIP) database (2005 to 2018). Adults with an ICD-9/ICD-10 diagnosis of spinal cord injury, who underwent a peripheral nerve procedure were compared to those that underwent tenodesis, tendon transfer and/or joint stabilization procedures. Between-group comparisons were performed based on: demographics, co-morbidities, length of stay, and 30-day post-operative complications. **RESULTS:** There were few reported cases of nerve and tendon surgeries in persons with SCI: nerve (n=13) and tendon (n=41) reconstructions. There were no significant differences in demographics or co-morbidities. Mean age was 45 ± 15 years and 68% were male. The most common co-morbidities were smoking (n = 7; 13%), hypertension (n = 6; 11%), open wound (n = 5; 9%) and COPD (n = 4; 7%). The nerve transfer group was more likely to have an open wound pre-operatively (p = 0.049). The majority of procedures were performed as outpatient surgery (62% for nerve transfer; 68% for tendon transfer; p = 0.43) under general anaesthesia (92% nerve transfer, 76% tendon transfer; p = 0.20). The majority of cases were done by orthopedic surgeons (74%). Post-operative morbidity was low; infection (n = 1), pulmonary embolism (n = 1), urinary tract infection (n = 3). No patients required a return to the OR within 30 days. There were no significant between-group differences in complications or post-operative morbidity. **CONCLUSIONS:** This study suggests that post-operative morbidity is low for both nerve and tendon transfer procedures performed in SCI. **LEARNING OBJECTIVE:** 1. Participants will be able to value/consider nerve reconstruction as a safe and viable option for spinal cord injury patents.

Infection rate following elective eyelid surgery in a minor procedure setting: A single centre retrospective study

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PURPOSE: Surgical site infection (SSI) following eyelid surgery is a serious complication that can lead to endophthalmitis and vision loss. Although performing these procedures in a minor surgery setting is common, there is a lack of evidence in the literature about the incidence of post-operative infections. The objective of this study was to determine the infection rate associated with elective outpatient eyelid procedures performed in a minor surgery setting. We hypothesized that our infection rate would be below the acceptable rate of less than 2% for clean minor surgery. **METHODS**: A retrospective review was completed on all patients who underwent elective eyelid surgery in the minor procedure room of an academic centre between April and December 2018. Operations were performed by two senior Oculoplastic Surgeons. Data collected included the type of procedure, number of surgical incisions, type and number of sutures, use of prophylactic antibiotics, time to follow up, complications, and presence of surgical site infection. **RESULTS**: Review of 539 patients showed an infection rate of 0.37% (2/539). Infection cases were an exposed orbital implant using temporalis fascia graft and ptosis repair using frontalis sling. **CONCLUSION**: Study results demonstrated that the infection rate for elective outpatient eyelid surgery in a minor procedure setting in a single centre was below the acceptable rate of 2% for clean surgery. **LEARNING OBJECTIVES:** 1. Participants will learn about the safety and low infection rate of eyelid surgery in a minor procedure setting. 2. Participants will learn about the risks and benefits of performing eyelid surgery in a minor procedure setting.

Attitudes of Canadian plastic surgeons on the necessity of superficial temporal artery biopsy in the diagnosis and management of giant cell arteritis

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Purpose: Temporal artery biopsies (TAB) rarely impact management of patients with suspected giant cell arteritis (GCA), and carry complications. We sought plastic surgeons' perspectives on this procedure's risks and benefits. **METHODS**: An email survey was designed, piloted and refined to elicit CSPS members about TAB's diagnostic contribution, complications, usefulness as a resident education tool, and surgeons' insight into emerging diagnostic modalities like ultrasound. Text comments were sought at each question. A reminder was emailed 1 week later. Data was compared and analyzed using chi-squared test and student t-test. **RESULTS**: 83 responses were received from 435 surgeons (19%). 20% of surgeons voiced uncertainty regarding TAB indications. 40% were unsure if TAB results changed steroid duration and dose. 83% of surgeons did not see patients postoperatively. Surgeons recalled 29 cases of hematoma and 3 facial nerve injuries from TAB. 80% felt TAB was a valuable learning opportunity for residents, although residents were involved in only 21% of cases. 65% of surgeons supported a changeover to ultrasound as primary diagnostic modality. Analysis of text comments revealed a sense of futility from TAB and disdain toward being mere technicians. Several participants wished for stakeholders to collaborate and potentially endorse non-invasive diagnostic modalities. **CONCLUSIONS**: This survey demonstrated varying attitudes to TAB. Generally, plastic surgeons were uncertain of TAB's contribution on treatment, tended not to follow up on results or patients, and recognized a number of complications. Conversations are desired regarding switching from scalpel to probe to evaluate the temporal artery. **LEARNING OBJECTIVES**: 1. To investigate the peri-procedural care and impact of TAB perceived by Canadian Plastic Surgeons; 2. To describe the attitudes of Canadian Plastic Surgeons to emerging diagnostic modalities for patients with suspected GCA.

Anatomy of the breast fascial system: systematic review and clinical applications

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PURPOSE: Understanding the anatomy of the fascial and ligamentous structures of the breast is important in both aesthetic and reconstructive breast surgery. Several key structures have been identified which play a significant role in the aesthetic qualities and support of the breast, warranting consideration of these structures in the context of breast reconstruction. **METHODS**: We performed a systematic review of anatomical, clinical, histologic, and radiologic studies that have objectively described, characterized and named these structures. In this review, we have summarized and critically appraised prior research in order to clarify and define the key fascial structures of the breast, their anatomic function and positioning, and their clinical significance in aesthetic and reconstructive breast surgery. **RESULTS**: Through our review, six distinct breast fascial structures were encountered consistently in the literature. We have organized them into intra- glandular and extra-glandular structures and have reviewed their significance in the context of reconstructive breast surgery. **CONCLUSION**: The primary fascial structures of the breast are important anatomic landmarks with numerous clinical applications. Cooper's ligaments divide the breast parenchyma. The superficial and deep fascial systems encase the breast in a 'pocket', condensing into one thickened layer of fascia along the peripheral breast footprint. The inframammary fold supports and defines the inferior pole. The horizontal septum is a reliable neurovascular landmark. The vertical septum is a newly discovered fascial structure. There are certainly clinical implications that have yet to be described due to the relatively limited and disputed information on the fascia of the female breast and ultimately, more research is warranted. **LEARNING OBJECTIVES**: At the end of this presentation, learners will be able to describe and understand the anatomy, origins, and clinical applications of several breast fascial structures including Cooper's ligaments, the superficial fascial system, the horizontal/vertical septa, and the inframammary fold ligament.

Evaluation and optimization of the craniosynostosis triage pathway

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PURPOSE: Although almost one-quarter of single births display abnormal head morphology, the vast majority of cases are related to positional plagiocephaly. Diagnosis of craniosynostosis is arduous. Timely recognition is crucial to ensure optimal neurodevelopmental outcomes and for consideration of less invasive surgical corrective techniques. This study aims to determine if craniosynostosis patients experience delays in assessment in our multidisciplinary craniofacial clinic and to explore possible independent predictors associated with such delays. **METHOD**: This retrospective study included patients under one year of age referred to the pediatric craniofacial clinic at The Hospital for Sick Children for assessment of an abnormal head shape between June 2018 and December 2019. Descriptive statistics and multivariable logistic regression were performed. **RESULTS**: Out of 153 (80%) initial referrals identified as craniosynostosis, almost two thirds were found to be plagiocephaly or normal heads. Timing to referral was not statistically different for craniosynostosis versus plagiocephaly cases with median times of 5.0 months for both groups. Similarly, time to assessment was a median of 7.0 months for both groups. Only 16 (29%) craniosynostosis patients were assessed in clinic at or prior to the age of three months. In patients with craniosynostosis, being a female infant increased the odds of being assessed after three months of age. This study highlights crucial areas to optimize pediatric craniofacial clinical care. Current system limitations include: delays in referrals, misdiagnoses, overrepresentation of plagiocephaly assessments in early months of life. **CONCLUSIONS**: The delays experienced by craniosynostosis patients are likely multifactorial. Focused specialists' efforts towards enhancement of referral quality and timing are needed. A machine learning algorithm is being developed for future clinical introduction and distribution to optimize abnormal head shape triaging. **LEARNING OBJECTIVES:** To recognize limitations associated with traditional referrals pathways of pediatric abnormal head shapes and impact on clinical outcomes for children with craniosynostosis.

Presurgical infant orthopedic appliances for patients with cleft lip and/or palate do not impair facial growth: A systematic review

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PURPOSE: Presurgical infant orthopedic (PSIO) appliances aid in the correction of three dimensional deficiencies in cleft lip and palate (CL/P) deformities by delivering controlled forces to stimulate alignment of nasal, maxillary, and lip cleft segments. While PSIO appliances have been found to improve early outcomes, there is little evidence on the negative long-term effects on midfacial growth. This study aimed to investigate the impact of PSIO appliances on patients' long-term maxillary and dental cephalometrics. **METHODS**: MEDLINE, EMBASE, and conference proceedings were searched using keywords relating to cleft lip and palate, orthodontic appliances, and outcomes of interest. Eligible studies included English, human studies from 1946 to present, with unilateral or bilateral (CL/P) undergoing PSIO vs not, with at least two years of follow-up. Data extracted from selected studies included participant characteristics, intervention protocol, and reported outcomes of craniofacial morphology, dental arch relationship, and maxillary arch dimensions, measured using dental casts and cephalometrics. **RESULTS**: Of 2950 studies retrieved, 31 studies met inclusion criteria. A variety of passive and active PSIO techniques were identified. At a mean of 7.3 years (range 3-16), some studies (13) noted initial improvements in nasolabial aesthetics, palatal curvature and inter-canine width, and maxillary height. Most studies (27) found no harm in long-term midfacial cephalometrics between patients treated with or without PSIO. Some benefits were seen when PSIO appliances were used in combination with surgical

interventions. However, the heterogeneity of patients, interventions, and outcomes make the collation of data challenging. **CONCLUSIONS**: PSIO appliances have no long-term negative impact on facial and dental cephalometrics in patients with cleft lip and/or palate. Further research is required to assess outcomes of these combined treatment modalities. **LEARNING OBJECTIVES:** 1. To discuss study findings of long-term outcomes of PSIO use in patients
with cleft lip and/or palate

A multi-regression analysis of modifiable factors that reduce operative time in head and neck free flap reconstruction

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PURPOSE: Head and neck reconstruction post-oncologic resection is a complex process that often results in prolonged operative time. Increased time in the operating room has been linked to patient morbidity and costs to the healthcare system. Many factors have independently shown a benefit in reducing operative time in this cohort, however, the relative contributions of each factor have yet to be elucidated. **METHODS**: A retrospective review of patients undergoing oncologic resection and immediate free flap reconstruction for head and neck cancer between 2007-2020 was performed. Data on patient demographics, tumour characteristics, free flap reconstruction, technology used, teams involved, and returns to the operating room were collected. The relative weight of each factor on operative time was calculated using a multi-regression analysis with a repeated measures mixed effects model. **RESULTS**: 597 patients met our initial study inclusion criteria. Patients were 61 ± 12.8 years of age and most were male (69%). The most commonly performed reconstructive procedures included the radial forearm flap (53%), fibula flap (19%) and anterolateral thigh flap (17%). Five percent of patients required more than one flap for reconstruction. Over the 13-year study period, we saw a 378% increase in the frequency of head and neck reconstructions performed at our institution. This was mirrored by a 40% reduction in operative time from 723 to 440 minutes. The specific factors contributing to the reduction in operative time were analyzed using a mixed effects model. **CONCLUSIONS**: At our institution, operative time in head and neck reconstruction has dramatically decreased by 40% since 2007. Understanding the relative contributions of various modifiable factors on improving operative efficiency will be instrumental for other institutions looking to implement a streamlined pathway for this patient cohort. **LEARNING OBJECTIVES:** 1. Understand that head and neck reconstruction is a complex process with areas for improvement in operative efficiency.