

## ABSTRACTS

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### 26: BIONIC ARM, FICTION OR REALITY?

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**Background:** The Alfred Hospital Melbourne is a major trauma centre. The plastic surgery unit performed the first limb osseointegration (OI) in 1998 and the first targeted muscle reinnervation (TMR) surgery in Australia for myoelectric prosthetic control in 2016. Simultaneously there have been significant improvements in myoelectric prosthesis (MEP) and software programs. Since then TMR and OI has routinely being used in upper extremity amputees.

**Objectives:** We review results from TMR and OI surgery in upper extremity amputees at the Alfred Hospital and ask the questions, Is a bionic arm a reality? How have these techniques improved the outcomes in upper extremity amputees and what are the limitations?

**Methods:** Upper extremity amputees undergoing TMR and or OI at the Alfred Hospital have data collected in an institution database. Demographic data and patient reported outcome measures are included. Retrospective data analysis of amputees undergoing TMR for pain management.

**Findings:** TMR improves the number and quality of electromyography signals and MEP control. It also improves amputee pain. OI improves prosthetic retention and prosthetic use. The two combined have offered new hope in upper extremity amputees. A bionic arm has now become a reality. Despite all these advances there are significant shortfalls including weight and responsiveness of MEP, composite movements and sensation.

**Conclusions:** Significant advances in upper extremity amputees have made the bionic arm a reality, however there is a long way to go.

### 27: TARGETED MUSCLE REINNERVATION FOR PAIN MANAGEMENT IN AMPUTEES. A MAJOR TRAUMA CENTRE EXPERIENCE

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**Background:** Phantom limb pain (PLP) and residual limb pain are huge problems in major limb amputees. The Alfred Hospital Melbourne is a major trauma centre. The plastic surgery unit performed the first targeted muscle reinnervation (TMR) surgery in Australia for myoelectric prosthetic control in 2016. Since then TMR has routinely being used for pain management in amputees.

**Objectives:** We review results from TMR surgery at the Alfred Hospital.

**Methods:** Patients undergoing TMR at the Alfred Hospital have data collected in an institution database. Demographic data and patient reported outcome measures are included. Retrospective data analysis of amputees undergoing TMR for pain management.

**Findings:** TMR is a promising technique in the management of amputee pain. Prophylactic TMR at the time of amputation is a great preventative technique. TMR conducted later when amputees present with pain is a good option although the results are not as good.

**Conclusions:** All amputees should be offered TMR at time of amputation. Delayed TMR is a good option in amputees that present with pain later on. Although delayed TMR is not as good as in the acute setting, patient selection, a thorough assessment in a multidisciplinary setting and surgeon experience will improve the results.

<sup>a</sup> Excludes abstracts when no permission was given to publish during the submission process.

### 63: ADVANCING VOLAR DIGITAL RECONSTRUCTION IN MULTI-FINGER INJURIES: THE VERSATILITY OF THE FREE THENAR FLAP

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**Background:** Volar digital injuries, including penetrating trauma, degloving injuries and burns, are frequently encountered in both domestic and industrial settings. These complex injuries demand an optimal reconstructive approach—one that provides durable, sensate, glabrous skin while minimising donor site morbidity and preserving early range of motion. Traditional reconstructive options, such as cross-finger flaps, are limited by the need for an uninjured adjacent digit and prolonged immobilisation. Over the past three decades, refinements in free tissue transfer techniques have expanded reconstructive options, with the free thenar flap emerging as an excellent solution for volar digital defects.

**Objective:** This presentation will provide a comprehensive review of the evolution and clinical utility of the free thenar flap in the setting of multiple digital injuries, where traditional reconstructive options may be contraindicated. We will highlight the flap's indications, advantages, modifications and potential pitfalls, offering practical strategies to optimise outcomes. A case example will illustrate its successful application in reconstructing volar soft tissue over a primary tendon repair in a patient with multiple digital injuries, where a heterodigital flap was not viable.

**Conclusion:** The free thenar flap is a reliable, versatile technique that expands the reconstructive armamentarium for volar digital defects, particularly in cases of multi-finger injury. This discussion will reinforce its role as a robust, single-stage reconstructive option, enabling functional restoration while minimising donor-site morbidity.

### 67: ESTABLISHING A NEURALGIA-RELATED HEADACHE PRACTICE: EARLY OUTCOMES OF OCCIPITAL AND TRIGEMINAL NERVE DECOMPRESSION IN A NOVEL PROSPECTIVE CASE SERIES

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**Background:** Neuralgia-related headache disorders, including occipital neuralgia, are often underdiagnosed and inadequately treated, leading many patients to rely on long-term medication with limited relief. To address this gap, a dedicated multidisciplinary neuralgia-related headache practice has been established, offering a multimodal approach, including surgical decompression, to manage these complex conditions.

**Methods:** A key focus of this practice is careful patient selection, followed by anatomically guided botulinum toxin injections or surgical decompression of the greater,

lesser and third occipital nerves or peripheral branches of the trigeminal nerve—procedures well-established internationally and increasingly recognised as an effective treatment for neuralgia-related headaches/migraines. This presentation reports a case series evaluating early surgical outcomes. Five patients underwent head and neck nerve decompressions and are being prospectively followed for 12 months to assess headache frequency, severity, medication use and quality of life.

**Results:** Preliminary findings indicate significant clinical improvement, with patients reporting a substantial reduction in headache intensity and frequency, decreased dependence on pain medication, and enhanced functional and psychological wellbeing. These outcomes align with international evidence supporting trigeminal and occipital nerve decompression for selected patients with refractory headache disorders.

**Conclusion:** This presentation outlines the clinical rationale, surgical technique and patient selection criteria, alongside early outcome data. The broader implications for clinical practice, patient access and future research in headache surgery will also be discussed. With Melbourne's first dedicated neuralgia-related headache practice now established, this approach and technique has the potential to redefine headache management and offer new hope for patients with chronic, debilitating headaches and migraines.

### 73: A COMPARISON OF REVISION RATES BASED ON ADM/MESH TYPES IN THE AUSTRALIAN BREAST DEVICE REGISTRY

Gillian Farrell,<sup>1,2</sup> Patrick Garduce,<sup>3</sup> Dilinie Herbert,<sup>3</sup> Arul Earnest,<sup>3</sup> Melanie Walker,<sup>4,5</sup> Yvonne Chow,<sup>5</sup> Joseph Dusseldorp,<sup>6</sup> Simon Chang-Hao Tsao,<sup>7,8</sup> Susannah Ahern<sup>3</sup>

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**Background:** The use of acellular dermal matrix (ADM) and surgical mesh in patients undergoing breast reconstruction post-mastectomy is common in Australia. These materials are promoted as providing structural support, integration with surrounding soft tissue and reduction in implant malposition.

**Objectives:** This study aims to investigate revision outcomes of reconstruction using three ADM/mesh types (Flex/TiLOOP/Veritas) and no ADM/mesh (comparator).

**Methods:** A registry-based cohort study of ADM/mesh use in post-cancer/risk-reducing, direct-to-implant (DTI) and two-stage (TS) procedures in Australia between 2015–2021 captured in the Australian Breast Device Registry. The revision rate for each ADM/mesh was calculated and compared with procedures with no ADM/mesh. Data includes descriptive patient and procedure characteristics and time-to-revision data, presented as crude and risk-adjusted survival analysis.

**Findings and conclusions:** A total of 12,233 cases (6415 DTI and 5818 TS) were analysed. The crude unadjusted all-cause revision incidence at five years in DTI registrants was: 22.7% Veritas, 21.0% Flex, 17.4% TiLOOP and 18.0% no ADM/mesh. In contrast for TS procedures the revision incidence was 23.5% TiLOOP, 22.7% Veritas, 18.7% Flex and 20.0% no ADM/mesh. The most common complications associated with revision are malposition, capsular contracture, deep wound infection, seroma and haematoma. Risk-adjusted comparisons will be presented at the conference.

Preliminary analysis suggests that the use of ADM/mesh in DTI breast reconstruction does not reduce the incidence of revision, although this is often the justification for their use. This should reinforce the importance of judicious decision-making regarding use of ADM/mesh in breast reconstructive surgery with implants.

### 83: NOVEL TECHNIQUES FOR INFRASPINATUS REANIMATION IN BRACHIAL PLEXUS PALSY

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**Background:** Brachial plexus injuries frequently result in shoulder paralysis, including loss of external rotation. As the primary external rotator, the infraspinatus muscle is an extremely important target for reconstruction. When conventional spinal accessory to suprascapular nerve transfer is not feasible due to injury severity or location constraints, alternative strategies are necessary. This case series presents three patients with upper brachial plexus injuries requiring tailored surgical approaches to reinnervate the infraspinatus.

**Methods:** Three patients with upper brachial plexus injuries underwent customised nerve transfer procedures based on their specific injury patterns. The surgical techniques included triceps, thoracodorsal and direct spinal accessory nerve transfers to the infraspinatus. Each procedure was performed using a posterior surgical approach, allowing for direct visualisation, precise nerve coaptation and optimal tension-free repair.

**Results:** Postoperative follow-up demonstrated significant functional recovery in all cases. Each patient regained external rotation strength of at least Medical Research Council (MRC) grade 4, with active range of motion restored between 90° and 135°.

**Conclusion:** This case series underscores the importance of individualised surgical planning for infraspinatus reinnervation. When spinal accessory to suprascapular nerve transfer is unavailable, alternative strategies—including triceps, thoracodorsal and direct spinal accessory to infraspinatus nerve transfers—can effectively restore shoulder external rotation. These techniques provide valuable reconstructive options for optimising function in complex brachial plexus injuries.

### 93: POLLICISATION IN PAEDIATRIC MUTILATING HAND INJURIES

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**Background:** Mutilating hand injuries in children are rare but have devastating lifelong impacts on hand development, growth and psychosocial function. Injuries involving the thumb, which contributes 40% of hand function, are challenging to reconstruct with the goal of producing a stable, opposable and sensate post. Pollicisation, a technique traditionally used for thumb hypoplasia, may be considered for replacement of the mutilated thumb in the paediatric population in the setting of a viable index finger and intact first carpometacarpal joint.

**Case report:** A two-year-old child was referred after a ride-on lawnmower injury to the hand. In addition to a heavily contaminated wound with skin loss to the dorsum of his hand and webspace, they suffered an amputation of the thumb at the level of the proximal metacarpal distal to the physis, as well as segmental bone loss of the middle, ring and little finger metacarpals and segmental injury to extensors to all four fingers. Following serial debridement, their hand was reconstructed with an ALT free flap to achieve soft tissue closure. Modified pollicisation of the index finger was also performed to replace the non-viable thumb, given its stable skeletal structures and intact neurovascular pedicle.

**Discussion:** Thumb reconstruction in young children following a traumatic injury is technically and logistically challenging. Careful consideration should be given to growth potential, impacts on family and potential difficulties with postoperative care due to patient compliance. Increased cortical plasticity in children may allow use of techniques from the congenital hand field to restore function, however careful attention to vascular supply in zones of trauma is required.

### 102: PREOPERATIVE AND INTRAOPERATIVE RISK FACTORS FOR ABDOMINAL BULGE FOLLOWING BILATERAL ABDOMINAL-BASED BREAST RECONSTRUCTION SURGERY

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**Background:** Deep inferior epigastric perforator (DIEP) flap is commonly considered the preferred technique for autologous breast reconstruction due to its reduced injury to the rectus abdominis muscle. Yet, the risk factors responsible for postoperative abdominal weakness and bulge remain unclear.

**Objectives:** Our study aimed to identify the potential risk factors for abdominal weakness in patients after bilateral flap harvest.

**Methods:** This retrospective case-control study included bilateral abdominal-based breast reconstruction patients that had preoperative computed tomography angiography (CTA) scans between June 2019 and April 2024. The scans

were used to measure rectus abdominis muscle thickness, inter-rectus distance and to determine the branching pattern of the deep inferior epigastric artery (DIEA). Logistic regression models compared patients with and without bulge, and those with and without abdominal weakness.

**Findings:** Among 145 patients, six (4.1%) developed a postoperative abdominal bulge, four patients reported feelings of abdominal heaviness without a definitive bulge, and one patient who underwent robotic-assisted DIEP flap reconstruction developed an epigastric hernia at the laparoscopic port site. Overall, 11 patients (7.6%) experienced complications related to abdominal weakness. Multivariate analysis revealed that a bilateral type I DIEA branching pattern (OR 8.87;  $p = 0.005$ ) and a wider inter-rectus abdominis distance (OR 1.12;  $p = 0.012$ ) were significantly associated with postoperative abdominal weakness.

**Conclusions:** Understanding preoperative and intraoperative risk factors for abdominal weakness can help surgeons predict and prevent complications. High-risk patients, such as those with a bilateral type I DIEA branching pattern and wider inter-rectus abdominis distance, may benefit from mesh insertion and less invasive dissection techniques.

#### 140: NOSE PAIN, MUCH TO GAIN: SURFACE SCANNING TO 3D PRINTING IN A CADAVERIC SIMULATION OF AN OPTIMAL BIODEGRADABLE STRUCTURAL SCAFFOLD IN MENICK TRILAMELLAR HEMIRHINECTOMY RECONSTRUCTION

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The nose is a complex structure of skin, semi-rigid cartilage and mucosa, where full thickness defects such as hemirhinectomy provide a challenge for the reconstructive surgeon in restoring form and function. Three-dimensional (3D) printing has revolutionised reconstructive surgery by enabling patient-specific solutions for complex defects. This project utilised low-cost surface scanning technology to design and fabricate 3D-printed scaffolds for the structural lamella in a simulation of a Menick three-stage forehead flap reconstruction of a hemirhinectomy defect in three cadaveric models. High-resolution, low cost (~AU\$700) surface scanning accurately captured the contours of the nasal defect. To simulate both preoperative and delayed reconstruction scenarios, 3D models were designed from ipsilateral preoperative nasal ala and contralateral ala that was mirrored in post-production. A biocompatible 3D-printed scaffold was made, achieving a natural nasal aesthetic in the cadaveric model. This approach avoids the issues related to autograft donor site and paves the way for further investigation into ideal polymer selection to provide a suitable replacement for native fibrofatty and cartilaginous elements in nasal reconstruction. The use of accessible surface scanning for modelling and 3D printing in nasal reconstruction presents a promising advancement in personalised reconstructive surgery, offering a tailored and reproducible method for complex nasal defect management.

#### 160: TOWARDS THE TRANSLATION OF SCAFFOLD-GUIDED BREAST RECONSTRUCTION: A PRECLINICAL PORCINE STUDY ON REGENERATIVE AND REMODELLING PROCESSES USING 3D-PRINTED LARGE-VOLUME POLYCAPROLACTONE SCAFFOLDS

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**Background:** Worldwide, around two million breast implant surgeries are performed annually. However, a 46% increase in device-removal surgeries throughout the last three years underscores the severity of long-term side effects such as capsular contracture, a disease caused by foreign body reaction and associated with bacterial colonisation. Hence, antimicrobial-coated biodegradable breast scaffolds provide a two-way solution to this predicament by preventing bacterial adhesion and providing a proregenerative environment within the slowly degrading scaffold, which is eventually fully replaced by the patient's own tissue.

**Objectives:** We here present the comprehensive preclinical early-timepoint study results on the safety and feasibility of biodegradable breast scaffolds with and without an antimicrobial tannic acid (TA) and human serum albumin (HSA) coating.

**Methods:** Twenty-four 3D-printed porous 100 ml medical-grade polycaprolactone breast scaffolds, either coated with 1% TA/5% HSA (group 1) or 10% TA/1% HSA (group 2), or non-coated (control), were implanted into four pigs underneath the mammary glands. In vivo computed tomography was performed immediately, and one, two and three months postoperatively. At the three-month endpoint, specimens were retrieved, and magnetic resonance imaging, biomechanical testing and histological and immunohistochemical analyses were performed.

**Findings and conclusions:** Postoperatively, no device-related complications were observed at any time. Progressive tissue regeneration from the scaffold periphery towards the centre was depicted in clinical imaging, however with qualitative and quantitative variability with

no difference between the groups. Overall, our histological and immunohistochemical analyses allowed us to gain profound knowledge on spatiotemporal immune-cellular and regenerative processes to investigate the safety and efficacy for a deliberate bench-to-bedside transition.

#### 161: DIEP-ERAS: NOVEL PERSPECTIVES FROM AUSTRALIA'S ONLY CANCER-SPECIFIC PUBLIC HOSPITAL

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**Background:** Enhanced recovery after surgery (ERAS) pathways are increasingly applied in autologous breast reconstruction. This study compares outcomes from our centre's newly standardised electronic ERAS pathway (2023–24) to a transitional ERAS cohort from 2017–18.

**Study design:** A perioperative ERAS protocol was introduced for patients undergoing DIEP flap reconstruction for treatment or prophylactic mastectomies. Key elements included preoperative discharge planning, regional intraoperative liposomal bupivacaine, mitigated opioid use, early mobilisation and diet reintroduction. Outcomes from the 2023–24 cohort were compared to the 2017–18 cohort. The primary endpoint was length of stay (LoS, days), and secondary endpoints were total oral morphine-equivalent daily dosage (oMEDD, mg) and incidence/duration of patient-controlled analgesia (PCA, hours).

**Findings:** A total of 102 patients were analysed (transitional ERAS,  $n = 48$ ; standardised ERAS,  $n = 54$ ). LoS decreased from 5.8 days (5.0–6.6) to 4.5 days (4.1–5.0),  $p = 0.007$ . Total oMEDD reduced from 155.0 mg (134.3–175.5) to 111.6 mg (85.0–138.2),  $p = 0.011$ . PCA incidence remained unchanged at 16.7%, but duration decreased from 31.8 hours (19.9–43.8) to 14.2 hours (11.7–16.7),  $p = 0.010$ . These trends were consistent across subgroup analysis. No significant difference in major complication rate was observed. Minor complications showed a marginal decline.

**Conclusions:** The implementation of our standardised ERAS pathway for DIEP flap reconstruction resulted in a 1.3-day reduction in LoS, alongside reduced opioid consumption and PCA use. Our findings provide valuable Australasian data to guide best practices in autologous breast reconstruction.

#### 165: STREAMLINING PLASTIC SURGERY SYSTEMATIC REVIEWS WITH AUTOMATION AND COLLABORATION

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**Background:** The number of systematic reviews being conducted in plastic surgery is rapidly increasing. This is combined with ever-growing requirements for surgical candidates to have a research background and produce quality research outputs. Methods to make the systematic review process easier and more accurate are very valuable.

**Objectives:** A protocol for producing semi-automated and collaborative systematic reviews is presented.

**Methods:** Prospective review registration on the PROSPERO database is performed. Example literature is entered into the Systematic Review Accelerator (SRA) Word Frequency Analyser to determine key terms. The SRA Search Refinery tool is then used to produce a final PubMed term. The Polyglot Search Translatory converts this into search terms for other databases. The SRA Deduplicator tool removes duplicates and then the list of articles is exported to Covidence. This online collaborative platform allows for two authors to screen by title and abstract and generates a Cohen's kappa for concordance. Full texts are then uploaded and reviewed by two or more authors and a list of final articles generated. Covidence can also be used to populate the data extraction form and complete an assessment of quality of reporting.

**Findings and conclusions:** This semi-automated and collaborative approach vastly reduces the time required to complete a systematic review and is likely to reduce human errors. This protocol was used to perform a systematic review and meta-analysis of the impact of post-traumatic orbital volume on enophthalmos, which progressed from inception to publication in the *Journal of Craniofacial Surgery* in less than 10 months.<sup>1</sup>

#### Reference

- 1 Murray-Douglass A, Peters MC, Johnson N, Harris R. The impact of orbital volume on post-traumatic enophthalmos: a systematic review and meta-analysis. *J Craniofac Surg*. 2023;34(5):1420–1426. <https://doi.org/10.1097/scs.00000000000009312>

#### 168: A PROSPECTIVE STUDY OF DIEP FLAP MONITORING USING A CONTINUOUS VISIBLE LIGHT SPECTROSCOPY DEVICE (T-STAT OXIMETER) AND POSTOPERATIVE SLEEP QUALITY: A PILOT STUDY

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**Background:** Routine deep inferior epigastric perforator (DIEP) flap monitoring can be onerous on both patients and nurses.<sup>1</sup> Continuous remote monitoring with T-stat tissue oximetry may reduce need for clinical assessments, patient fatigue and provide safer flap monitoring.<sup>2</sup>

**Objectives:** This study investigates if T-stat can replace routine flap monitoring to improve patient outcomes.

**Methods:** Ten randomised controls underwent hourly Dopplers for 48 hours, 4-hourly for the next 48 hours, then 8-hourly till discharge; 10 others were on T-stat with 4-hourly Dopplers for 96 hours then 8-hourly till discharge. Consensus sleep diary, BreastQ and SF-36 questionnaires recorded sleep quality and patient satisfaction. Nurses' experiences of monitoring were documented.

**Findings:** In the first 48 hours, all T-stat patients and 76% of controls reported at least one night of good sleep and feeling well-rested the next day with mean sleep duration longer in T-stat patients (7.6 hours) than controls (5.9 hours). At 14 days, T-stat patients averaged 7.5 well-rested days while controls averaged 4.3. Nurses reported spending less time,

having greater confidence and observing better patient rest with T-stat. Hypoperfusion events were captured earlier by T-stat than clinical assessments.

**Conclusions:** T-stat monitoring improves patient outcomes and shows promise for wider use in reconstructive microsurgery.

#### References

- 1 Azizoddin DR, Soens MA, Beck MR, Flowers KM, Edwards RR, Schreiber KL. Perioperative sleep disturbance following mastectomy: a longitudinal investigation of the relationship to pain, opioid use, treatment, and psychosocial symptoms. *Clin J Pain*. 2023;39(2):76–84. <https://doi.org/10.1097/AJP.0000000000001090>
- 2 Mericli AF, Wren J, Garvey PB, Liu J, Butler CE, Selber JC. A prospective clinical trial comparing visible light spectroscopy to handheld Doppler for postoperative free tissue transfer monitoring. *Plast Reconstr Surg*. 2017;140(3):604–613. <https://doi.org/10.1097/PRS.0000000000003600>

### 169: COMBINING MUSCLE FLAP RECONSTRUCTION WITH TARGETED MUSCLE REINNERVATION: A CASE SERIES

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**Background:** Targeted muscle reinnervation (TMR) offers promising pain and functional benefits in amputees, however its application is limited in trauma patients with substantial tissue loss, where local muscle targets might be inadequate. In these cases, muscle flap reconstruction might provide new opportunities to optimise TMR. This case series describes our institution's experience combining TMR and muscle flap reconstruction.

**Objectives:** 1) To assess phantom limb and residual limb pain after muscle flap TMR surgery using patient-reported outcome measurement system (PROMIS) and numerical rating scale (NRS); 2) to evaluate functional outcomes of muscle flap TMR surgery.

**Methods:** We retrospectively review four traumatic upper limb amputees who underwent muscle flap TMR between 2018 and 2024, with at least six months of follow-up. Data on phantom limb pain and residual limb pain (PROMIS, NRS) at latest follow-up, functional nerve-muscle pairings and prostheses fitting rate were analysed.

**Findings:** Overall, our patients reported minimal to mild pain on PROMIS and NRS pain scales for both phantom limb pain and residual limb pain. Functional outcomes were favourable, with all three patients who participated in prosthetic rehabilitation successfully fitted with prostheses.

**Conclusion:** Muscle flap TMR surgery shows potential for favourable pain and functional outcomes in upper limb amputees with insufficient local muscle targets.

### 171: ROBOTIC-ASSISTED DIEP FLAP HARVEST IS SAFE AND LEADS TO DECREASED FASCIAL AND MUSCLE INCISION LENGTHS

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**Background:** Reducing abdominal donor site morbidity has been one of the goals of optimising abdominal free flap breast reconstruction. Robotic assisted deep inferior epigastric perforator (DIEP) flap harvest has emerged as a promising technique.

**Objectives:** Our study aimed to analyse the preliminary results of minimally invasive robot-assisted DIEP flap harvest for autologous breast reconstruction.

**Methods:** A retrospective cohort study was performed for 25 consecutive patients who underwent robotic-assisted DIEP flap harvest between June 2022–December 2024. Each flap was harvested by a single surgeon using the da Vinci Xi robot. Data analysis included abdominal wall morbidity, intraoperative characteristics on flap harvest and patient reported outcomes measures (PROMs) (Breast-Q, SF-36 and abdominal wall modified activities assessment, AAS). Selected data was compared to 158 breast reconstruction cases performed with the standard DIEP flap harvest in the same period.

**Findings:** 48 breast reconstructions (26 immediate, 22 delayed) were performed with no significant difference in age or BMI. The average flap weight was  $560 \pm 240$  g (range: 179–1057 g). The incision lengths in the rectus abdominis muscle and anterior rectus sheath were  $3.32 \pm 2.25$  cm and  $4.67 \pm 2.93$  cm, respectively, significantly shorter than in the standard DIEP group ( $p < 0.01$ ). No bowel injuries were identified during the intra-abdominal dissection. PROM outcomes demonstrated greater postoperative physical wellbeing (abdominal) and higher physical functioning; however, these differences were not statistically significant compared with conventional DIEP flap harvests.

**Conclusions:** Preliminary results and gathered clinical experience show that the presented robotic DIEP harvest approach is safe and effective, with lower invasiveness for the abdominal muscle than the standard DIEP harvest.

### 175: PERINEAL RECONSTRUCTION REQUIRES ROBUST AND DYNAMIC SOLUTIONS: THE IPAT FLAP IN CONJUNCTION WITH GLUTEAL ADVANCEMENT

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Perineal reconstruction in the inflammatory, infectious and malignant setting is complex and demands robust and reliable surgical options. These options must be dynamic in response to the resultant resection defect, which is often larger or more complex than anticipated. Reconstruction must be robust in the face of poor wound-healing conditions exacerbated by neoadjuvant treatments, large-volume dead space defects and hostile tissues.

In this presentation we detail a single surgeon experience combining the internal pudendal artery turnover (IPAT) flap in conjunction with uni- or bilateral gluteal V-Y advancement flaps based on the inferior gluteal artery perforator (IGAP) for large perineal defects. We present seven patients (average age 53) and mean BMI 25.3, requiring perineal reconstruction in oncologic (n=3) and inflammatory bowel (n=4) settings, including posterior vaginal wall reconstruction (n=2) and following previous failed reconstruction (n=1). The average length of stay was four weeks. All flaps healed at mean time eight months postoperative. One case of flap dehiscence was encountered in the setting of laparotomy wound dehiscence requiring supine positioning for two weeks.

We present our experience with this robust reconstructive option which can be adapted to a wide variety of perineal defects, with reliable outcomes and minimal donor site morbidity.

### 177: 10 YEARS MANAGING SQUAMOUS CELL CARCINOMA OF THE LIP IN AUSTRALIA'S LIP CANCER CAPITAL

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**Introduction:** Squamous cell carcinoma of the lip (SCCL) is a malignant keratinocyte tumour with a high incidence in Australia, the highest of which is in Tasmania. It shares risk factors with both cutaneous and mucosal SCC, including sun exposure, tobacco and alcohol use, HPV infection and immunosuppression. The lip's unique anatomy, rich in neural, vascular and lymphatic networks, may contribute to early metastasis. We thought to investigate the excision and workup characteristics of our tertiary referral population in Tasmania to guide staging investigations and nodal resection.

**Methods:** We conducted a retrospective analysis of 10 years of lip SCC excisions at our centre. We extracted data for cohort demographics, preoperative investigations, excision type and pathology characteristics, recurrence and longer term follow-up.

**Results:** We identified 114 cases of excised SCCL. Our cohort consisted of mostly men (76%) with a current or past history of smoking (65%), of mean age 60 years; 83% of SCCs were on the lower lip subunit. The mean histopathological cancer diameter was 11 mm and 70% of cancers underwent wedge excision. Of the cohort, nine patients received adjuvant radiotherapy and five underwent neck dissection. No recurrences or occult metastases were observed in the five years following observation of the first five-year cohort. Preoperative CT use correlated with lesion size and immune compromised status.

**Conclusions:** In our cohort we found high rates of cure from primary surgery with low rates of metastatic disease and prophylactic neck dissection. Future studies should investigate whether lip subunit location impacts metastatic risk.

### 182: OUR EXPERIENCE WITH NEUROTISATION IN AUTOLOGOUS BREAST RECONSTRUCTION: SENSORY OUTCOMES AND PATIENT SATISFACTION ACROSS MASTECTOMY TYPES

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**Background:** Neurotisation of abdominal flaps in autologous breast reconstruction improves sensory outcomes, but its effectiveness across different mastectomy types remains unclear. This study evaluates neurotised and non-neurotised abdominal flaps, assessing both objective sensory measures and patient-reported outcomes.

**Objectives:** To compare sensory recovery across mastectomy types in neurotised and non-neurotised abdominal flaps using both Semmes-Weinstein Monofilaments (SWM) and the BREAST-Q sensation module.

**Methods:** This cohort study included 40 patients (72 breasts) who underwent autologous breast reconstruction, comprising 56 neurotised and 16 non-neurotised flaps. Skin-sparing (SSM), nipple-sparing (NSM), and simple mastectomies were analysed. Sensory outcomes were assessed using SWM across nine breast regions, with protective sensation defined as SWM < 4 g. Patient-reported sensation and satisfaction were measured using the BREAST-Q sensation module.

**Findings:** At 12 months, 80% of neurotised SSM cases achieved protective sensation in at least one region, with 20% achieving it across all regions. In contrast, no NSM or simple mastectomy cases achieved protective sensation in all regions, and 75% and 50%, respectively, reported no detectable sensation in at least one region. BREAST-Q scores showed high satisfaction, with 69.23% of patients very satisfied and none dissatisfied. However, patient-reported sensation did not always correlate with objective SWM measurements.

**Conclusions:** This is the first study to apply the BREAST-Q sensation module to neurotised flaps and stratify sensory outcomes by mastectomy type. Findings highlight the impact of neurotisation on sensory recovery and the influence of mastectomy type, emphasising the need for comprehensive objective and subjective evaluations in sensory restoration.

### 189: FACIAL REANIMATION: BRIDGING THE GAP BETWEEN STATIC AND DYNAMIC FUNCTIONAL RESTORATION

Jun Hyeok Kim

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**Background:** Facial palsy results in both static and dynamic deficits. Static impairments, due to decreased resting tone, cause facial asymmetry and sagging, while dynamic impairments disrupt intentional movements like

smiling and eye closure. Addressing both is key to restoring facial harmony. This study presents a combination surgical technique that utilises tensor fascia latae (TFL) for static fixation and temporalis muscle transfer through an intraoral approach for dynamic reanimation, effectively treating deficits.

**Methods:** In this approach, TFL was harvested and used for static fixation at three points: the lateral aspects of the nose, upper lip and lower lip, enhancing facial symmetry at rest. For dynamic reanimation, the temporalis muscle was accessed through an intraoral approach, detached from the coronoid process of the mandible and reattached to the orbicularis oris muscle. This procedure aimed to restore dynamic movement in the lower face, allowing voluntary expressions such as smiling and lip movements.

**Findings:** Postoperative assessments demonstrated significant improvements in both static and dynamic facial functions. The TFL fixation provided improved facial symmetry by addressing resting tone deficits, while the temporalis transfer restored voluntary movements, particularly in the lower face. Patients showed enhanced functional outcomes and aesthetic improvements.

**Conclusions:** The combined use of TFL for static fixation and temporalis muscle transfer for dynamic reanimation offers a comprehensive solution for facial palsy. By addressing both static asymmetry and restoring intentional movement, this method delivers significant improvements in both functional and aesthetic outcomes, contributing to enhanced quality of life for patients with facial paralysis.

### 203: IMMEDIATE LYMPHATIC RECONSTRUCTION WITH LYMPHOVENOUS BYPASS IN PATIENTS UNDERGOING AXILLARY DISSECTION FOR BREAST CANCER TREATMENT

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**Introduction:** In breast cancer patients undergoing axillary dissection (ALND), the risk of developing secondary lymphoedema ranges from 14% (ALND alone) to 33% (combined with radiotherapy).<sup>1</sup> Immediate lymphatic reconstruction with lymphovenous bypass significantly reduce the risk by restoring the physiologic lymphatic drainage.<sup>2</sup> This study reports the outcome of breast cancer patients who underwent immediate lymphatic reconstruction at an Australian institute.

**Method:** This is a retrospective review of patients who underwent immediate lymphatic reconstruction at the time of axillary node dissection. Patients underwent mastectomy and immediate autologous reconstruction concurrently. Primary outcome includes postoperative complications and development of lymphoedema based on subjective Lymph QoL score and objective bioimpedance measurement (LDex).

**Result:** From November 2021 to December 2024, 20 patients underwent immediate lymphatic reconstruction (19 female,

1 male, mean age 46.7; BMI 26.3). Follow-up ranges from 3–24 months. Sixteen patients received radiotherapy to the axilla. One patient developed seroma at axilla. One patient reported minor symptoms on Lymph QoL. Bioimpedance measurement (LDex score) did not detect early fluid accumulation suggestive of lymphoedema development.

**Conclusion:** Immediate prophylactic lymphovenous bypass reduces the risk of secondary lymphoedema development following ALND and should be performed routinely in at risk patients.

#### References

- Hill WKF, Deban M, Platt A, Rojas-Garcia P, Jost E. Immediate lymphatic reconstruction during axillary node dissection for breast cancer: a systematic review and meta-analysis. *Plast Reconstr Surg Glob Open*. 2022;10(5):e4291. <https://doi.org/10.1097/GOX.0000000000004291>
- Boccardo F, Casabona F, De Cian F, et al. Lymphatic microsurgical preventing healing approach (LYMPHA) for primary surgical prevention of breast cancer-related lymphedema: over 4 years follow-up. *Microsurgery*. 2014;34(6):421–424. <https://doi.org/10.1002/micr.22254>

### 207: A COMPLEX RING AVULSION CASE

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**Background:** Ring avulsion injuries are uncommon but are challenging to manage. Patterns of injuries lie within a spectrum from laceration to complete amputation.<sup>1</sup> Management of such injuries would require a balance between the aesthetics and functional outcomes versus the viability of tissue post injury.

**Objective:** The prognosis for such injuries remains poor. With the advancement in microsurgical technique, surgical treatment options have expanded to include revascularisation on top of the usual amputation. However, challenges arise due to the potential for a large defect vascularly/tissue-wise. This case recounts a traction injury with multilevel vascular tear resulting in a large defect managed with a vein graft in a staged procedure.

**Case:** A 27-year-old male electrician presented with a class 3 injury to the right middle finger. He had a complete amputation down to both sheaths at the base of proximal phalanx with an unstable distal interphalangeal joint due to torsional instability. Intraoperatively, a 12 cm arterial defect was noted with no suitable dorsal vein. He was managed with staged procedure and vein graft which has proven successful outcomes.

**Conclusion:** Despite conventional management of class 3 injuries with amputation, early intervention and careful debridement of the vein graft in a multiprocedural manner could produce favourable outcomes.

#### Reference

- Brooks D, Buntic RF, Kind GM, Schott K, Buncke G, Buncke HJ. Ring avulsion: injury pattern, treatment, and outcome. *Clin Plast Surg*. 2007;34(2):187–195. <https://doi.org/10.1016/j.cps.2006.11.001>

## 212: IMPACT OF SUTURES IN NERVE COAPTATION IN RAT SCIATIC NERVE INJURY MODEL

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**Background:** Tension-free neurorrhaphy is the gold standard for nerve transection repair, but suturing can disrupt axon regeneration and trigger inflammation. This study aims to evaluate impact of suture and sutureless repairs following sciatic neurorrhaphy.

**Methods:** A rat sciatic nerve transection model (n = 60) was used to compare suture repair (1, 3 or 6 sutures), Remplir nerve wrap with one suture and sutureless repair with Remplir. Histology, gait analysis, electrophysiology and muscle weight were examined at four and 12 weeks.

**Results:** Electrical conduction was restored in all groups by four weeks. At four weeks, sutureless-repaired nerves had significantly higher gastrocnemius muscle weight than one-suture-repaired nerves. Nerves with fewer sutures showed earlier dorsiflexion recovery than nerves with more sutures. At 12 weeks, Remplir-repaired nerves exhibited less hyperaesthesia, reduced toe curling, and stronger dorsiflexion in walking tests. Histology showed better stump alignment, with Remplir integrating into the epineurium without inflammation. Axon regeneration progressed well, with no adhesion of the device to surrounding tissue. Remplir-repaired nerves restored vascular structures, resembling nearly intact nerve structure. In contrast, sutured nerves showed thickened transection sites, inflammation and misaligned fascicles, with axons misdirecting to avoid suture-induced inflammation.

**Conclusion:** Less suture on coaptation site is better. Sutureless repair with Remplir showed better alignment, axon regeneration and near-normal histology.

## 217: COMPARING RADIOTHERAPY LATE TOXICITIES IN BREAST CANCER PATIENTS WITH AUTOLOGOUS OR DIRECT TO IMPLANT RECONSTRUCTIONS

Michael Chao,<sup>1,2,3</sup> Lorenz Admojo,<sup>2</sup> Sunny Jassal,<sup>3</sup> Michael Law,<sup>3</sup> Natalie Zantuck,<sup>3</sup> Charles Yong,<sup>3</sup> Su Wen Loh,<sup>2</sup> Grace Chew,<sup>2</sup> Elaine Bevington,<sup>2</sup> Suat Li Ng,<sup>2</sup> Simon Tsao,<sup>2</sup> Perry Lin,<sup>2</sup> Tristan Leech,<sup>2</sup> Peter Newton,<sup>2</sup> Wei Ming Ooi,<sup>2</sup> Derek Neoh,<sup>2</sup> Julian Liew,<sup>2</sup> Sally Ng,<sup>3</sup> Farshad Foroudi<sup>2</sup>

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**Background/objectives:** The use of radiotherapy (RT) in patients undergoing autologous reconstruction (AR) or direct to implant (DTI) may cause long-term toxicity leading to chronic pain and impact quality of life. The aim of this retrospective study is to compare the long-term consequences of RT in AR (neoadjuvant RT vs PMRT) versus DTI (PMRT).

**Materials/methods:** Retrospective comparison of long-term toxicities was performed in our patient cohort who had AR (NART vs PMRT) or DTI (PMRT) from January 2013 to June 2024. Patients were assessed for cosmesis, presence of fat necrosis, flap or capsular contracture, and implant failure.

**Findings:** Of the 155 patients who had AR following NART, 68 patients had immediate AR and 45 patients had DTI followed by PMRT. Median follow up time is 39 months. No implant failures were seen in patients with AR but occurred in 12 patients with DTI. AR patients had better cosmesis with 96% (NART) and 84% (PMRT) rating their reconstructed breasts as 'good or excellent' compared to only 32% in the DTI group. Capsular contracture was reported in all DTI patients, with eight (19%) and 11 (27%) patients experiencing grade 3 and 4 contractures. In contrast, AR patients had less flap contracture, with 2% (NART) and 49% (PMRT) respectively. Fat necrosis was seen in 13% (NART) and 19% (PMRT) of AR patients.

**Conclusion:** The study suggests that AR is a more favourable option for patients who require RT, as it results in better cosmetic outcomes and fewer complications such as flap or capsular contracture compared to DTI reconstruction.

## 223: OSTEOCHONDRAL AUTOGRAFT FROM THE SECOND TOE FOR COMPLEX PROXIMAL INTERPHALANGEAL JOINT FRACTURE-DISLOCATIONS: A CASE REPORT AND LITERATURE REVIEW

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**Background:** Complex fracture-dislocations of the proximal interphalangeal (PIP) joint present significant challenges in hand surgery, requiring innovative treatment approaches to restore joint stability and function. Traditional surgical techniques, such as hemi-hamate arthroplasty, have limitations, including donor site morbidity and suboptimal joint congruity. The use of osteochondral autografts has emerged as a promising alternative, but its application in PIP joint reconstruction remains under-reported.

**Objective:** This study presents a novel case of using a second toe proximal phalanx osteochondral autograft to reconstruct a severe PIP joint fracture-dislocation. The report aims to evaluate the feasibility, surgical technique and functional outcomes of this approach.

**Methods:** A 46-year-old male carpenter sustained a traumatic laceration and severe fracture-dislocation of the right index finger PIP joint. Due to the complexity of the injury, a second toe proximal phalanx osteochondral autograft was harvested and used for reconstruction. A systematic literature review was conducted up to May 2024 using PubMed, Embase, Cochrane Library, Scopus and Web of Science, focusing on osteochondral autograft use in PIP joint fractures. Inclusion criteria were English-language studies involving human subjects, while studies on animal or cadaveric models were excluded.

**Results:** Postoperative assessments demonstrated successful graft integration, restoration of joint congruity and significant improvement in range of motion. Patient-

reported functional outcomes were highly favourable, with improved hand dexterity and minimal complications.

**Conclusion:** This case highlights the potential of second toe proximal phalanx osteochondral autografts as an effective alternative for PIP joint reconstruction. Further prospective studies are needed to validate its long-term efficacy and safety in clinical practice.

## 226: PREDICTIVE FACTORS FOR UNPLANNED RETURN TO THEATRE IN RECONSTRUCTIVE HEAD AND NECK CANCER PATIENTS: A RETROSPECTIVE RISK FACTOR ANALYSIS

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**Background:** Unplanned return to theatre (URTT) following head and neck cancer reconstruction presents significant clinical and economic challenges. Identifying risk factors for URTT can aid in surgical planning and patient risk stratification. This study evaluates preoperative and intraoperative factors associated with URTT in patients undergoing free flap reconstruction after head and neck tumour resection.

**Methods:** A retrospective cohort study was conducted on patients undergoing head and neck tumour resection with free flap reconstruction between July 2015 and December 2021. Demographic, clinical, and operative data were analysed using univariable and multivariable logistic regression.

**Results:** Of 609 patients included, 199 (32.7%) experienced URTT within 90 days postoperatively. Common indications for URTT included infected collections (33.7%), haematoma (24.6%) and flap dehiscence (16.1%). On univariable analysis, preoperative PEG tube use ( $p = 0.04$ ), higher frailty index scores ( $p = 0.03$ ), longer operative duration ( $p < 0.001$ ), use of bony free flaps ( $p < 0.001$ ), and tracheostomy ( $p = 0.01$ ) were associated with URTT. Yet, on multivariable analysis, only higher frailty index score (OR 1.32, 95% CI 1.03–1.70,  $p = 0.03$ ) and use of bony free flaps (OR 1.92, 95% CI 1.19–3.11,  $p < 0.01$ ) retained statistical significance.

**Conclusions:** The findings of this study suggest that frailty and the use of bony free flaps are key risk factors for URTT among reconstructive head and neck cancer patients. These findings support patient risk stratification preoperatively and targeted interventions to reduce the risk of URTT and improve resource utilisation in head and neck cancer surgery.

## 229: DYNAMIC INTERFACE PRINTING: A PARADIGM SHIFT IN 3D BIOPRINTING AND ITS FUTURE PERSPECTIVES

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Three-dimensional (3D) bioprinting has revolutionised tissue engineering and regenerative medicine, yet existing methods—extrusion-based, droplet-based and laser-based techniques—face significant limitations. Current approaches are often slow, have low resolution and struggle to maintain high cell viability, restricting their clinical applications.

In our recent *Nature* publication, we introduce dynamic interface printing, a novel volumetric bioprinting technology that overcomes these challenges. Unlike conventional layer-by-layer methods, this technique projects dynamic light patterns into a photosensitive bioink, enabling the rapid formation of high-resolution structures within minutes. The process is highly cell-friendly, preserving cell viability and function, making it ideal for fabricating living tissue constructs.

This innovation holds vast potential for clinical applications, including tissue engineering and organoid models for drug testing. The ability to print sterily in a controlled environment opens possibilities for intraoperative use and inhouse manufacturing, reducing reliance on external suppliers. A working prototype of the printer has been developed, and collaborations with global institutions are already underway to explore its applications across multiple medical specialties.

Dynamic interface printing represents a paradigm shift in bioprinting, bringing us closer to real-time, patient-specific tissue fabrication. By integrating this technology into medical practice, we can significantly advance personalised medicine and surgical innovation.

## 231: EVOLUTION OF CRANIOFACIAL SURGERIES IN SRI LANKA: THE AUSTRALIA AND NEW ZEALAND CONNECTION

Gayan Ekanayake

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**Background:** Sri Lanka has emerged as a developing nation, offering a wide array of free healthcare services. Before the 2000s, craniofacial surgery in Sri Lanka was in its early stages, with limited expertise and resources, limiting patient access to advanced surgical interventions. Since then, the field has progressed significantly. This article explores the influence of missions by Australian and New Zealand plastic surgeons on the provision of craniofacial surgical care to the Sri Lankan population.

**Methods and findings:** The number of craniofacial surgeries performed at National Hospital of Sri Lanka was analysed to see the trend of annual cases, case complexity and the effect of interventions before and after collaborations with Australia and New Zealand. Number of surgeries showed a steady increase over time. From 2007–2010, there were 15 cases per year, rising to 20 (2010–2012), 25 (2012–2015) and 30 (2015–2019). After 2019, cases surged to 50 per year (2019–2024). This timeline coincides with special missions to Sri Lanka by Interplast teams. The number recorded coincides with the appointment of a craniofacial surgeon at the National Hospital of Sri Lanka.

**Conclusion:** The findings highlight the critical role of international collaboration in advancing craniofacial surgery in Sri Lanka. Each mission by Australian and New Zealand surgeons has contributed to increasing the complexity of cases handled locally. The exponential growth observed post-2018 underscores the importance of training local specialists, which has not only improved access to care but also established a sustainable model for surgical expertise in Sri Lanka.

#### 246: FREE CORTICOPERIOSTEAL BONE FLAPS IN COMPLEX TIBIAL RECONSTRUCTION: A CASE CONTROL ANALYSIS

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**Objectives:** To determine whether using a vascularised corticoperiosteal flap, a free medial femoral condyle (MFC) flap, in the primary reconstruction of complex tibial fractures portends favourable outcomes, primarily bony union, time to weight-bearing, and need for revision procedures.

**Methods:** A single centre retrospective review of six intervention and five control patients was undertaken. Patients were matched for mechanism and AO classification of fracture. Patients with traumatic, non-segmental tibial fractures with less than 50% circumferential bony loss requiring soft tissue coverage that had not already undergone a soft tissue reconstruction were included in the study. The primary outcomes of bony union, time to weight-bearing and need for revision procedures were compared.

**Findings:** Five of six MFC patients achieved bony union by six months and all were weight-bearing by three months. No patients required revision of fixation for non-union. In the control group, only one patient had united at three months. Three patients were non-weight-bearing at three months. Four control patients required revision of fixation for non-union.

**Discussion:** The free MFC provides a vascularised corticoperiosteal flap for the reconstruction of complex distal lower limb fractures. The results of this study suggest that in complex tibial defects without segmental bony loss, the free MFC is superior to soft tissue flaps in achieving bony union, reducing time to weight bearing, and reducing the need for fixation revision.

#### 250: THE USE OF FREE VASCULARISED SURAL NERVE FLAPS IN BRACHIAL PLEXUS RECONSTRUCTION

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**Background:** Brachial plexus injuries (BPI) in adults are challenging to treat, primarily due to delayed presentations and the degeneration of nerve pathways. Conventional nerve grafts and conduits, such as autologous nerve grafts, contain degenerated or compromised neural tissues, which may limit their regenerative potential. However, in facial reanimation, vascularised nerve grafts and flaps have demonstrated superior outcomes.

**Objectives:** Building on this principle, our unit has explored the use of vascularised sural nerve flaps to improve nerve recovery in BPI. This study presents an initial case series analysing the modifications, outcomes, and effectiveness of these flaps in various reconstructive scenarios.

**Methods:** A total of 10 patients underwent free sural nerve flap procedures from 2021 to 2024, with 16 flaps used in total. Three distinct variations of the sural nerve flap were identified and four different donor site variations. In addition, flaps were used for reconstruction at four different recipient site targets, highlighting the versatility of the technique.

**Findings and conclusion:** Our preliminary findings indicate that vascularised sural nerve flaps show promising potential in restoring hand function following brachial plexus injuries. The modifications and refinements in flap design have contributed to improved outcomes, warranting further research and larger studies to validate their efficacy in nerve reconstruction.

#### 259: A REGISTRY-BASED COHORT STUDY INVESTIGATING REVISION BREAST IMPLANT PROCEDURES AMONGST PATIENTS RETURNING FROM OVERSEAS

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**Background:** Medical tourism is a growing industry, where patients seek cosmetic and reconstructive surgical procedures overseas. Australians are among the most common medical tourists, often travelling to countries like Indonesia or Thailand for cosmetic procedures.<sup>1</sup> Upon returning to Australia, any complications that arise or the need for revision procedures are often managed within our health care system, incurring significant cost.<sup>2</sup>

**Objectives:** To characterise the revision procedures of breast devices inserted overseas for cosmetic or reconstructive purposes, identify complications and indications for revision.

**Methods:** A registry-based cohort study was conducted using data from the Australian Breast Device Registry (ABDR) between 2016 to 2023. Participants included individuals who underwent breast device procedures overseas, as recorded in the ABDR. Descriptive analyses were performed examining patient demographics, procedures, reason for revision, and complications. Additional statistical analysis including logistic regression will be presented at the conference.

**Findings and conclusions:** Within the study period, 5357 breast device explant procedures were conducted involving devices that were inserted overseas. Indications for revisions from overseas implants were 70% (3743) cosmetic, 5% (270) reconstructive and 25% (1344) not stated. Since 2019, approximately 800 revisions per annum on implants inserted overseas were recorded. During this period, revisions due to overseas surgeries comprised at least 8% of total ABDR revisions, and at least 10% of total cosmetic surgery revisions. This data has implications on healthcare resource utilisation and patient safety, and may also guide surgeons in counselling patients who consider travelling overseas for breast-related procedures.

#### References

- 1 Jobson D, Freckelton I. The changing face of cosmetic surgery regulation: a review of controversies and potential reforms. *ANZ J Surg.* 2022;92(5):964–969. <https://doi.org/10.1111/ans.17648>
- 2 Livingston R, Berlund P, Eccles-Smith J, Sawhney R. The real cost of ‘cosmetic tourism’ cost analysis study of ‘cosmetic tourism’ complications presenting to a public hospital. *Eplasty.* 2015;15:e34.

#### 260: THE CURRENT SURGICAL ARMAMENTARIUM FOR FACIAL REANIMATION: INSTITUTIONAL EXPERIENCE AT A SPECIALISED HEAD AND NECK CANCER CENTRE

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**Background:** While advancements in surgical techniques have broadened the armamentarium for facial reanimation, the selection of reconstructive strategies remains complex. This study discusses current surgical approaches for facial reanimation at a tertiary head and neck referral centre, and aims to propose a surgical algorithm to simplify the selection of reconstructive strategies for facial reanimation.

**Methods:** A retrospective analysis of consecutive patients who underwent surgical procedure(s) for facial reanimation at Chris O'Brien Lifecare between January 2017 to December 2023 was performed. Patient demographics, indication for reconstruction, type of facial reanimation procedure, surgical complications, length of follow-up, and recorded clinicians' and patients' satisfactions were reviewed.

**Results:** 122 patients were included in the study (median age 69 years, range 11–88 years). The median follow-up was 22 months (range 1–93 months). The most common indication for facial reanimation was iatrogenic following tumour resection. The institutional approach to reconstruction was a combination of oculoprotective procedures, static reanimation (fascial slings ± delayed brow lift), dynamic reanimation (including cross-facial and interpositional sural nerve grafts, partial hypoglossal and masseteric nerve transfers, and neurotised gracilis muscle/chimeric neurotised vastus lateralis—anterolateral thigh free flap transfer depending on the level of facial nerve defect), and contour restoration. Both immediate and delayed approaches to facial reanimation are discussed.

**Conclusions:** The authors evaluate contemporary facial reanimation approaches and specific technical refinements. Our institutional experience highlights the need for integrated reconstructive techniques to optimise form and function in facial reanimation.



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