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ABSTRACTS

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5: CASE REPORT OF PERMANENT ECTOPIC TESTICULAR REPLANTATION AFTER BILATERAL TRAUMATIC TESTICULAR AMPUTATION

Amy Yoon, Robert Calvisi, Fraser Donaldson

Metro South Health, Queensland, Australia

Background: Traumatic testicular amputations are rare and the literature is limited to a few case reports. Critical considerations in testicular amputations are suitability for replantation and functional consequences. Factors impacting suitability for replantation include critical ischaemia time, mechanism of injury and unilateral or bilateral injury. Two main factors affecting functionality are the endocrine and reproductive roles of the testes. The literature supports immediate replantation of bilateral testicular injuries when feasible.

Case report: We present a case of a 22-year-old male with an avulsion injury from an auger resulting in bilateral testicular amputations and soft tissue loss of bilateral scrotums, perineum, left abdominal wall and penile shaft skin. One testicle was found at the scene and brought in with the patient and appeared viable. However, the other was unsalvageable. The patient's priority was fertility preservation but as it was a weekend, fertility services were unavailable. He was transferred to the operating theatre after initial resuscitation. Post-debridement, there was significant scrotal skin loss and it was deemed not an ideal bed for testicular replantation. The decision was made to replant the testes into the lateral thigh. Testicular and cremasteric arteries were anastomosed onto perforators of the descending branch of the lateral circumflex femoral artery. Vessels were approximately 1 mm and an ideal match. Follow-up Doppler ultrasound of the testes has been reassuring. While there was a previous case report of temporary ectopic replantation in the forearm, there are no reports of permanent ectopic replantation or ectopic replantation in the thigh to date.

35: OUTCOME OF ALAR BASE SUPPORT IN SECONDARY CLEFT LIP AND NASAL DEFORMITY REPAIR WITH DERMAL ROLL FLAP

Afzaal Bashir,[1] Aqasha Mehmood,[2] Sunniya Afzaal,[3] Salman Ali,[2] Sunaina Afzaal[2]

[1] *King Edward Medical University, Lahore, Pakistan;* [2] *Mumtaz Surgical Restoration and Anti-Aging Center, Lahore, Pakistan;* [3] *Shalamar Medical and Dental College, Lahore, Pakistan*

Unilateral secondary cleft lip and nasal deformity is almost always associated with an under-projected cleft side alar base, for which augmentation with autologous grafts or synthetic material has been described. Many such cases with secondary cleft lip and nasal deformity require revision surgery for wide lip scar or vermilion disparities. During lip revision surgery, some vascularised lip tissue can be spared in the area of previous repair and can be used as a dermal roll flap for augmentation of the alar base. This prospective study was conducted on 43 patients requiring lip scar revision with unilateral secondary cleft lip and nasal deformity having difference of alar base projection of 2–5 mm measured on basal view photograph. Dermal roll flap was marked, de-epithelised and incised. Tunnel under the alar base was made, insetting of flap was done and lip repair completed. Measurements were repeated after six months to find out improvement in the projection. Patients presented with a mean age of 23.96 ± 4.56 years, of whom 55% were female. Mean alar base disparity was 3 ± 0.56 and after six months of surgery, 70–80% improvement in the alar base projection was noticed. Ultrasonography also showed 70–80% persistence of the volume of the flap after six months. The dermal roll flap is a very reliable and reproducible option for improving alar base projection in patients with unilateral secondary cleft lip and nasal deformity who require lip revision. It can be employed alone or in combination with other techniques like fat or cartilage graft.

[a] *Includes selected oral abstracts; excludes invited abstracts.*

42: ENHANCING PREOPERATIVE DECISION-MAKING IN TRAPEZIOMETACARPAL JOINT REPLACEMENT: CT HOUNSFIELD UNITS AS A RELIABLE PREDICTOR OF BONE QUALITY

Bryan Lim,[1] Ishith Seth,[1,2] Gianluca Marcaccini,[1,3] Jennifer Novo,[4] Reece Tso,[1] Georga Bruechert,[5] Quentin Fogg,[5] Warren M Rozen[1,2]

[1] Peninsula Health, Frankston, Australia; [2] Monash University, Melbourne, Australia; [3] University of Siena, Siena, Italy; [4] The University of Notre Dame, Sydney, Australia; [5] The University of Melbourne, Melbourne, Australia

Background: Successful trapeziometacarpal (TMC) joint arthroplasty depends on trapezial bone quality, and cup loosening is a leading cause of implant failure.[1] Dual-energy X-ray absorptiometry (DXA) lacks regional specificity. Computed tomography (CT)-derived Hounsfield units (HU) provide quantitative, site-specific density estimates and may assist preoperative planning. This study assessed the relationship between CT-derived HU values and tactilely-perceived trapezial bone hardness.

Methods: Ten embalmed body donor hands were scanned using a Philips Spectral CT 7500 scanner. Trabecular regions of the trapezium and first metacarpal were segmented and analysed using 3D Slicer. Hounsfield unit values were converted to density (g/cm^3) using validated equations. Trapezium hardness was graded as 'soft' or 'hard' using bone forceps by an experienced anatomist. Correlations were analysed using Pearson correlation coefficients.

Results: Mean trapezium HU was 354 (682.9 g/cm^3), with regional trabecular variation. The first metacarpal demonstrated broader density variation (−285.8 to 228.8 HU). Hounsfield unit values correlated significantly with perceived trapezial hardness ($r = 0.71$, $p = 0.02$), while bone volume showed no correlation ($r = 0.08$, $p = 0.82$). Male trapezia demonstrated higher HU values and density than female specimens.

Conclusions: CT-derived HU values correlate with perceived trapezial bone hardness and provide an objective surrogate for bone quality assessment in TMC arthroplasty. Incorporating HU assessment may inform implant selection and fixation strategies, and could reduce trapezial cup loosening and implant failure.

49: CUTANEOUS AMYLOIDOSIS MIMICKING BASAL CELL CARCINOMA: A CASE SERIES AND LITERATURE REVIEW

Bryan Lim,[1] Ishith Seth,[1,2] Roberto Cuomo,[3] Alex Cameron,[2] Warren M Rozen[1]

[1] Department of Plastic Surgery, Peninsula Health, Melbourne, Australia; [2] Department of Plastic Surgery, Bendigo Hospital, Victoria, Australia; [3] Department of Medicine, Plastic Surgery and Neuroscience, University of Siena, Siena, Italy

Background: Amyloidosis is characterised by extracellular amyloid protein deposition. When it intersects with basal cell carcinoma (BCC), it introduces complex diagnostic challenges.

Objectives: This study explores the overlap between primary localised cutaneous amyloidosis (PLCA) and BCC, examining amyloid deposits in BCC, systemic amyloidosis risk in PLCA and various treatment methods.

Methods: Two case studies were discussed, followed by a literature review, where we used databases like PubMed, Web of Science, Embase and the Cochrane Library. The search, covering studies from infinity up to January 2024, focused on 'cutaneous amyloidosis', 'basal cell carcinoma', and related terms. Articles in English detailing clinical presentation, diagnostic methods, treatment and outcomes of cutaneous amyloidosis mimicking BCC were included. Data extraction and synthesis were performed by two independent reviewers.

Findings: The study highlights two cases exemplifying the complexity of diagnosing BCC and PLCA. The first case, a 64-year-old with a nodule on the cheek, and the second, a 67-year-old with a nodular lesion on the nasolabial fold, both initially suspected as BCC, were later identified as PLCA upon histopathological examination. Various diagnostic and therapeutic approaches have been suggested, such as topical creams and phototherapy. However, none have garnered conclusive and consistent evidence to establish reliable clinical application.

Conclusion: This study emphasises the importance of considering alternative pathologies when diagnosing BCCs.

52: ONCOLOGICAL SAFETY AND ECONOMIC EFFICIENCY OF A 'SEE AND TREAT' MODEL FOR SKIN CANCER: AN AUSTRALIAN TERTIARY CENTRE EXPERIENCE

Rishi Kumar, Maxim Devine, Peter Gearing, Angela Webb

Peter MacCallum Cancer Centre, Melbourne, Australia

Background: See and Treat (S&T) services are increasingly adopted over traditional operating theatres (OT) for skin cancer surgery. Cited benefits of this model include streamlined delivery of care, resource-efficient approaches and enhanced patient-satisfaction scores.[1,2] Limited data compare S&T with OT in high-volume plastic surgical cancer centres.[1]

Methods: A retrospective cohort analysis was undertaken for patients undergoing skin cancer excision at Peter MacCallum Cancer Centre (June 2020–October 2022). Patients were categorised into S&T (local anaesthetic, minor procedure rooms) and OT (traditional operating theatre) groups. Primary endpoint: complete excision rate. Secondary outcomes: wait time (from referral to excision and proportion of patients waiting less than 30 days), complications, procedural complexity and cost analysis.

Findings: A total of 432 patients (206 S&T, 226 OT) and 775 lesions (276 S&T, 499 OT) were analysed. The S&T group demonstrated a comparable complete excision rate (92.4% vs 94.6%, $p = 0.289$), despite the OT group managing larger (16.6 mm vs 12.0 mm, $p < 0.001$) and more complex lesions. There was a significant shorter wait time (37.6 vs 42.9 days, $p = 0.090$)—63.6% of patients in the S&T group waited less than 30 days, compared to 56.0% in the OT group ($p = 0.038$). Case complexity (graft/flap/number of lesions excised) differed. Postoperative infection rates

were higher in the S&T group (5.1% vs 2.0%, $p = 0.018$), correlated with significantly lower rates of antibiotic prophylaxis (2.6% vs 55.1%). Wound breakdown was more common in the OT group (6.2% vs 2.2%, $p = 0.012$). Per procedure costs were nearly 4.6 times lower in the S&T group (AU$342.80 vs AU$1588.40) and overall per-patient costs reduced by almost 78% (AU$482.60 vs AU$2125.90).

Conclusions: Our high-volume cancer centre reports comparable oncological outcomes with an S&T model while reducing wait times and healthcare costs. Cost savings were driven primarily by lower theatre and staffing expenditure in the S&T setting. This model in tertiary settings optimises resource allocation, facilitating theatre capacity for complex reconstructions and ongoing sustainability of skin cancer care in Australia.

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55: COMBINING ROBOTIC-ASSISTED DEEP INFERIOR EPIGASTRIC PERFORATOR FLAP SURGERY AND BILATERAL SALPINGO-OOPHORECTOMY IN HIGH-RISK PATIENTS

Monique Dawson,[1] Joseph Dusseldorp,[2] Trevor Tejada-Berges[2]

[1] School of Medicine, University of Sydney, Sydney, Australia; [2] Chris O'Brien Lifehouse, Sydney, Australia

Background: Women with inherited high-risk breast and ovarian cancer genes or a strong family history benefit from risk-reducing surgeries. Combining prophylactic bilateral salpingo-oophorectomy (BSO) with deep inferior epigastric perforator (DIEP) flap harvest for breast reconstruction offers a single-stage approach to reduce cancer risk or treat breast cancer while concurrently reducing ovarian cancer risk. This study systematically evaluates the benefits of this combined approach in high-risk patients and ascertains whether robotic assistance further optimises outcomes.

Methods: This single-institution retrospective observational cohort study included 59 female patients who underwent DIEP flap surgery between June 2019 and May 2025. Patients were grouped by surgical approach and staging. Demographics, intraoperative variables and postoperative outcomes, including patient-reported outcomes (PROs), were analysed using nonparametric tests.

Results: Sixty-six per cent of patients had a gene diagnosis, and 46% had a strong family history of either breast cancer, ovarian cancer or both. Patients with a genetic mutation were significantly more likely to undergo risk-reducing surgery ($p < 0.001$). No significant differences were observed between groups in analgesia use, length of hospital stay or complication rates. BREAST-Q scores showed improvements in satisfaction with breasts and psychosocial wellbeing postoperatively. Physical wellbeing scores initially declined but improved over time as patients recovered. Robotic-assisted cases showed technical advantages and generally higher BREAST-Q scores, though not statistically significant.

Conclusion: Combining BSO with DIEP flap breast reconstruction is safe and feasible for high-risk patients. Robotic assistance offers technical and patient satisfaction benefits, particularly in preserving abdominal wall integrity. Further research is needed to validate these findings.

56: RETHINKING POSTOPERATIVE FASTING: EARLY ORAL INTAKE AFTER HEAD AND NECK CANCER FREE FLAP RECONSTRUCTION—A META-ANALYSIS

Brandon He,[1] Jake Chia,[1] Faruque Riffat,[2] Huang-Kai Kao,[3] Frank Hsieh[1]

[1] Department of Plastic and Reconstructive Surgery, Westmead Hospital, Sydney, Australia, [2] Department of Ear, Nose and Throat Surgery, Westmead Hospital, Sydney, Australia, [3] Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, Taiwan

Background: The timing of oral intake following head and neck mucosal free flap reconstruction remains highly variable, largely driven by concern for anastomotic integrity and fistula development. Conventional practice has favoured delaying oral feeding for 6–12 postoperative days. However, contemporary enhanced recovery after surgery principles advocate earlier enteral stimulation to promote physiological recovery, attenuate catabolic stress and improve clinical outcomes. Despite this shift, uncertainty persists regarding the safety of early oral feeding and its impact on postoperative complications and hospital length of stay (LOS).

Objectives/methods: A systematic review was conducted across four major databases for studies comparing outcomes and LOS of early (≤ 5 postoperative days) versus delayed (> 5 days) oral intake following head and neck cancer free flap reconstruction. Fixed and random-effects meta-analyses were used.

Findings: Thirteen studies including 1657 patients were analysed. Early oral feeding significantly reduced fistula formation compared with delayed feeding (3.66% vs 11.35%; RR 0.37, 95% CI 0.22–0.64; $p = 0.0004$) and lowered postoperative pneumonia rates (6.31% vs 12.38%; RR 0.53, 95% CI 0.33–0.87; $p = 0.011$). Early feeding was also associated with shorter LOS (9.85 vs 13.11 days; MD −4.10 days, 95% CI −7.07 to −1.14; $p = 0.0067$). No differences were observed in flap failure, haematoma or dehiscence, and available data did not demonstrate increased fistula risk in patients receiving preoperative radiotherapy.

Conclusions: Early oral intake appears safe and associated with fewer complications and shorter LOS. These findings support earlier feeding in carefully selected patients and the adoption of evidence-based postoperative nutrition pathways.

57: SALVAGED TISSUE IN TRAUMATIC LOWER LIMB AMPUTATION RECONSTRUCTION: A DECISION-BASED ALGORITHM

Brandon He,[1] Hardip Chahal,[2,3] Gehan Karunaratne,[1] Pratik Rastogi,[3] Tim Wang,[2] Varun Harish,[2] Bishoy Soliman[1,2]

[1] Department of Plastic and Reconstructive Surgery, Westmead Hospital, Sydney, Australia; [2] Department of Plastic and Reconstructive Surgery, Royal North Shore Hospital, Sydney, Australia; [3] Department of Plastic and Reconstructive Surgery, St George Hospital, Sydney, Australia

Background/objectives: Despite advances in reconstruction, lower limb amputations remain common after severe lower limb trauma. The aim of amputation is to achieve a durable, functional, sensate and pain-free residual limb, while preserving maximal limb length to optimise prosthetic rehabilitation. In many cases, the foot lies distal to the zone-of-injury and is routinely discarded, despite providing well-vascularised, durable and sensate tissue. Foot-based 'spare-parts' options include the sensate fillet-of-sole (FOS) flap, incorporating glabrous plantar skin and intrinsic musculature, and the complementary dorsal foot fillet (DFF) flap. Although described, these techniques remain underutilised and no standardised framework exists to guide their use. This study presents an illustrative case series and proposes a pragmatic decision-making algorithm for amputation stump reconstruction.

Methods: A retrospective, multicentre review was performed of patients undergoing lower limb amputation reconstruction using salvaged foot tissue between 2022 and 2024.

Findings: Three male patients (aged 20–27 years) underwent reconstruction following high-energy motor-related trauma, including one above-knee amputation (AKA) and two below-knee amputations (BKA). One AKA free FOS flap and three pedicled BKA FOS/DFF flaps were performed. Flaps remained viable and sensate throughout follow-up. Case findings informed development of a practical reconstructive algorithm prioritising limb-length preservation using foot spare-parts, guided by assessment of soft tissue, vascular integrity and injury zone when selecting pedicled or free FOS/DFF flaps versus traditional amputation.

Conclusions: Foot fillet flaps represent a reliable and underutilised option for traumatic lower limb amputation reconstruction. Protocolising their use based on vascular integrity and zone of injury may improve functional outcomes and residual limb quality.

59: EXCHANGE OF SUBCUTANEOUS/PREPECTORAL TISSUE EXPANDERS TO IMPLANTS WITH FAT GRAFTING ONE MONTH AFTER THE COMPLETION OF RADIOTHERAPY IN A PERSONAL SERIES OF 410 BREAST RECONSTRUCTIONS

Bruce Johnstone, Katrina Read

Mayfair Specialist Centre, East Melbourne, Australia

Background: Traditionally stage II alloplastic breast reconstruction is deferred for at least six months following the completion of radiotherapy. We review the early results of a protocol change in our practice.

Methods: Analysis of our prospective breast reconstruction database since 2012. At the time of exchange to a permanent, smooth, round implant, almost universally lipoaspirated fat is transferred into the plane between the dermis and the tissue expander capsule. In our private practice, 259 patients had alloplastic reconstruction from 2012 until 2025, with a mean follow-up of 3.9 years. There were a high percentage of bilateral procedures, accounting for 410 breast reconstructions. Since January 2013, an increasing percentage of patients had subcutaneous/prepectoral reconstruction. There were 30 subcutaneous direct-to-implant reconstructions and 304 two-stage subcutaneous reconstructions.

Results: Of the total 410 reconstructions, 77 of these had been subjected to radiotherapy—26 were irradiated prior to the commencement of reconstruction, 24 had irradiation of the tissue expander prior to exchange to a permanent implant and 26 breasts had irradiation after completion of implantation. Since 2023, five patients have had stage II reconstructions, ranging from one day through to seven weeks (averaging 4.6 weeks) after the completion of radiotherapy. In every case the results with respect to the skin and subcutaneous soft tissue quality and implant encapsulation were surprisingly good and there were no complications.

Conclusion: Expander-to-implant exchange combined with fat grafting within a month of completion of radiotherapy may reduce the perceived risk of complications related to radiotherapy.

61: HEALTH-RELATED QUALITY OF LIFE OUTCOMES OF ABDOMINOPLASTY FOR SYMPTOMATIC ESTABLISHED RECTUS DIASTASIS OF PARITY: A PROSPECTIVE COHORT STUDY IN AUSTRALIAN WOMEN

Siobhan Fitzpatrick,[1,2] Tamara Crittenden,[1,2] David Watson,[1,2] Nicola Dean[1,2]

[1] Flinders Medical Centre, Adelaide, Australia; [2] Flinders University, Adelaide, Australia

Background: Rectus diastasis of parity is the separation of the abdominal muscles that can occur after child-bearing. We hypothesised that a subpopulation of women with rectus diastasis also present with back pain and/or urinary incontinence, a condition referred to as symptomatic established rectus diastasis (SERD), and this results in impaired health-related quality of life (HRQL).

Objective: We aimed to quantify the benefits of surgical correction with abdominoplasty.

Methods: This was a prospective cohort study on adult women with SERD undergoing abdominoplasty (surgical group) and women not having surgery for at least 12 months (controls), compared to women without SERD (reference population). Inter-rectus distance of > 30 mm was confirmed on ultrasound. Patient-reported outcome measures examining HRQL, back pain and urinary incontinence were administered at baseline, three, six, nine and 12 months. Ethical approval was from the Southern Adelaide Clinical Human Research Ethics Committee.

Findings: The analysis included 310 women (117 surgical, 91 controls, 102 reference). Women with SERD had significantly worse HRQL, back pain and

urinary incontinence than those without SERD ($p < 0.001$). These scores significantly improved after abdominoplasty ($p < 0.001$), until these women were at the level of women without SERD at 12 months post-surgery. The control group demonstrated no improvements across all outcome measures over the study period.

Conclusions: This prospective cohort study demonstrates that surgical repair of SERD with abdominoplasty results in clinically meaningful and statistically significant improvements in HRQL, back pain and urinary incontinence, and these effects are maintained for at least 12 months.

65: COMPLEX PERINEAL RECONSTRUCTION FOLLOWING RADICAL PELVIC SURGERY: COMPARATIVE AND RISK-STRATIFIED OUTCOMES USING THE INFERIOR GLUTEAL ARTERY MYOCUTANEOUS FLAP

Tavis Read,[1,2,3] Peter Gearing,[1] Edwin Morrison,[1] Sarah Lonie,[4] Michael Weymouth,[1] Ajay Chauhan,[2] Rizwan Sheikh[1]

[1] Peter MacCallum Cancer Centre, Melbourne, Australia; [2] Princess Alexandra Hospital, Brisbane, Australia; [3] Faculty of Medicine, University of Queensland, Brisbane, Australia; [4] Royal Prince Alfred Hospital, Sydney, Australia

Background: Radical pelvic extirpative surgery, including pelvic exenteration (PE) and abdominoperineal resection (APR), is associated with substantial perioperative morbidity, particularly in irradiated patients. Although the vertical rectus abdominis myocutaneous (VRAM) flap is traditionally considered the reconstructive gold standard, it is associated with significant donor- and recipient-site morbidity. The inferior gluteal artery myocutaneous (IGAM) flap was introduced as a locoregional alternative and has undergone progressive refinement.

Objectives: To evaluate outcomes following IGAM reconstruction, compare perioperative outcomes between IGAM and VRAM flaps, and identify patient-specific and preoperative risk factors, flap-specific complications, donor-site morbidity and overall outcomes associated with IGAM reconstruction.

Methods: Prospectively collected data from adult patients undergoing perineal reconstruction following PE or APR between 2008 and 2025 were retrospectively analysed. A total of 181 patients were included (74 VRAM, 107 IGAM). The primary outcome was partial or total flap failure. Secondary outcomes included unplanned return to theatre, wound dehiscence and surgical site infection. Multivariate logistic regression was used to assess the impact of reconstructive modality and patient-level risk factors.

Findings: Over 97% of patients had received prior radiotherapy. VRAM reconstruction was independently associated with significantly higher rates of flap failure, return to theatre, wound dehiscence and surgical site infection compared with IGAM reconstruction ($p < 0.01$). IGAM flaps demonstrated low donor-site morbidity and consistent outcomes. Male sex, smoking, sarcopenia and recurrent disease were independent predictors of perioperative morbidity, with sarcopenia conferring an almost fivefold increased risk.

Conclusions: IGAM flap reconstruction provides reliable outcomes for complex perineal defects following radical pelvic surgery, with fewer complications than VRAM reconstruction. Risk stratification and preoperative optimisation remain essential for patient selection.

66: IMPROVING OUTCOMES IN FLAP DELAY WITH THE USE OF BIODEGRADABLE TEMPORISING MATRIX

Cameron Harrison, Daniel Williams

Gold Coast University Hospital, Queensland, Australia

Background: Surgical flap delay enhances reliability by stimulating axial realignment and 'choke' vessel dilation.[1] Historically, Tagliacozzi described using a cotton lint towel to prevent flap reattachment.[2] However, inert materials offer no significant benefit to improving donor-site morbidity. We propose using biodegradable temporising matrix (BTM) as a modern interface to optimise both the delay process and donor-site outcomes.

Methods: A young male presented with a chronic complex heel defect post-trauma two years prior. Intraoperatively, the intended axial vessel for the medial plantar flap was unreliable due to scarring, necessitating a staged delay of the flap. BTM was placed beneath the elevated flap to prevent re-adhesion. Following a four-week integration period, the flap was transposed. The BTM was delaminated and the vascularised neodermis at the donor site was covered with a split thickness skin graft.

Findings: At four weeks, the flap demonstrated successful adaptation and was transposed without complication. The BTM provided a robust, vascularised bed for grafting. Final follow-up confirmed complete healing with an acceptable functional result—notable given the traditionally poor morbidity of medial plantar donor sites in traumatic fields.

Conclusions: BTM provides a reliable interface for vascular delay while simultaneously priming the donor site. This technique reduces morbidity and improves outcomes in complex reconstructions where staged procedures are necessitated.

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71: OCCULT MALIGNANCY IN CRANIAL OSTEORADIONECROSIS SPECIMENS: A MULTICENTRE STUDY

Parsa Bokharaie,[1] Kieran Rowe,[1] Milap Rughani,[1] Darryl Dunn,[1] Kim Ryan,[1] Archlia Lin,[2] Tavis Read,[2] Luke Watson,[2] Andrew Lewandowski[1]

[1] Royal Brisbane and Women's Hospital, Brisbane, Australia; [2] Princess Alexandra Hospital, Brisbane, Australia

Objective: To determine the proportion of incidental malignancy in craniectomy specimens among patients with osteoradionecrosis.

Methods: As no specific database exists, a retrospective review of medical records was conducted for all craniectomy and bone burring cases performed from January 2015 to December 2025, identifying patients with scalp osteoradionecrosis.

Findings: Forty-three patients with scalp osteoradionecrosis were identified (mean age 75, range 55–91). Forty-four specimens were analysed, with one patient undergoing repeat surgery during the study period. Preoperative biopsy was available in 42 cases: 34 malignant, eight negatives, with three incidental malignancies, yielding an occult malignancy rate of 37.5%. Seventeen malignant specimens demonstrated bone involvement with cancer (50%). Nine of 38 craniectomies had major complications, giving a complication rate of 23.68%. Thirty-five cranioplasties were performed; polymethyl methacrylate was the most used in 12 cases (34.29%), with extrusion in two cases (16.67%). For soft tissue coverage, latissimus dorsi free flap was most used (32/45), with scalp transposition flaps second most used (11/45).

Conclusion: Occult malignancy was identified in a minority of cases despite negative pre-operative biopsy, suggesting that while sampling limitations exist in irradiated tissue, the overall risk of incidental malignancy remains low. A significant proportion of patients with biopsy-proven cancer demonstrated bone involvement, reflecting the underlying ongoing risk of malignancy associated with scalp osteoradionecrosis. The high rate of bone involvement suggests patients presenting with progressive osteoradionecrosis should be counselled to undergo workup and craniectomy, and that biopsy-negative and stable disease has a low rate of occult malignancy.

80: AUSTRALIA'S FIRST ABDOMINAL WALL TRANSPLANT: PLANNING FOR SUCCESS

Derek Neoh, Justin Easton, Kimberley Hughes, Julian Liew, Sally Ng, Natasha Van Zyl, Graham Starkey

Austin Health, Heidelberg, Australia

Plastic surgeons have led the development of vascularised composite tissue allotransplantation (VCA) in Australia, performing the country's first hand transplant in 2011 and driving innovation in complex reconstructive transplantation. Despite this, wider clinical uptake of VCA has remained limited. Abdominal wall transplantation (AWT), the second most commonly performed VCA worldwide since its introduction in 1999, offers a reconstructive solution to one of the most challenging problems in intestinal and multivisceral transplantation—abdominal wall closure in patients with a depleted abdominal domain.

We report Australia's first abdominal wall transplant performed in conjunction with a small bowel transplant in a patient with short gut syndrome. This case highlights the leadership role of plastic surgery in procedure conception, meticulous preoperative planning and surgical execution within a multidisciplinary transplant program. We describe our operative technique, perioperative challenges and successful outcome, demonstrating the feasibility of AWT in Australia and its potential to expand reconstructive options in complex transplant surgery.

81: REVISITING THE GOLDILOCKS RECONSTRUCTION WITH THE LATERAL INTERCOSTAL ARTERY PERFORATOR FLAP TO AUGMENT VOLUME IN BREAST RECONSTRUCTION

Derek Neoh

Austin Health, Heidelberg, Australia

The Goldilocks breast reconstruction repurposes residual mastectomy skin flap tissue to create a breast mound, offering an autologous option for patients who are not candidates for microsurgical reconstruction but who wish to avoid implants. Its primary limitation is occasional inadequate volume, as tissue availability depends on mastectomy resection. The lateral intercostal artery perforator (LICAP) flap has been described separately, but its use has largely been confined to oncoplastic breast-conserving surgery.

Breast reconstruction in severely obese patients remains challenging, as lateral chest wall and axillary adiposity following mastectomy can result in discomfort and suboptimal aesthetic outcomes. The author reports a retrospective case series of seven patients who underwent immediate breast reconstruction using a combined Goldilocks and pedicled LICAP flap approach. The LICAP flap augmented lateral breast mound volume while simultaneously reducing lateral chest wall fullness, improving overall breast contour. All reconstructions were completed successfully without flap loss or major complications and with good aesthetic outcomes. Augmenting the Goldilocks reconstruction with a pedicled LICAP flap is a reliable, reproducible technique that addresses the inherent volume limitations of the traditional Goldilocks procedure while improving lateral chest wall aesthetics. This approach expands autologous reconstructive options for plastic surgeons, particularly in the management of obese patients following mastectomy, offering a safe and effective alternative when microsurgical reconstruction is not feasible.

82: USE OF BIODEGRADABLE TEMPORISING MATRIX TO IMPROVE AESTHETIC OUTCOMES IN AUTOLOGOUS BREAST RECONSTRUCTION FOLLOWING MASTECTOMY SKIN LOSS

Derek Neoh

Austin Health, Heidelberg, Australia

Skin grafting following large mastectomy skin necrosis or after resection in dermal recurrence in immediate autologous breast reconstruction often results in poor aesthetic outcomes. Split thickness skin grafts can reduce tissue compliance, contract over time and compromise breast contour and shape, making subsequent fat grafting less effective. Biodegradable temporising matrix (BTM) provides an alternative to direct skin grafting following debridement or resection. While its use in burns and post-oncologic chest wall reconstruction is well documented, its role in breast reconstruction, where functional and aesthetic outcomes are both equally important, has not been evaluated.

The author presents a series of autologous breast reconstructions complicated by mastectomy skin loss managed with BTM and subsequent skin grafting. The use of BTM allowed salvage of the compromised mastectomy skin envelope with reduced fat necrosis of the underlying free flap. Once vascularised, the dermal substitute layer provided a reliable bed for graft take and enhanced tissue compliance allowing easier subsequent fat grafting. This layered approach preserves the mastectomy skin envelope, maintains breast projection, minimises contracture, and improves overall breast contour and aesthetics.

83: DEFINING THE HEAD AND NECK 'LYMPHOSOME': A SYSTEMATIC REVIEW AND META-ANALYSIS OF SENTINEL LYMPH NODE DRAINAGE OF THE HEAD AND NECK

Rohan Rajaram,[1] Barry Hsieh,[1] Ishith Seth,[1] Omar Shadid,[1] Sally Ng,[1,2] Ying-Sheng Lin[3]

[1] Department of Plastic and Reconstructive Surgery, Austin Health, Heidelberg, Victoria, Australia; [2] Department of Surgery (Austin Precinct), The University of Melbourne, Parkville, Victoria, Australia; [3] Division of Plastic and Reconstructive Surgery, National Taiwan University Hospital Yunlin Branch, Douliu City, Taiwan

Background: An accurate understanding of the intricate lymphatic drainage from the mucosa and skin of the head and neck is integral to oncological and lymphatic surgery in this area. The consistent prevalence of 'unconventional' oncological lymphatic spread raises the possibility that the drainage from the head and neck is perhaps more complex and diverse than classically described. This meta-analysis endeavours to develop a clinically-based lymphatic map of the head and neck by quantitatively amalgamating the available sentinel lymph node data from the oncological literature.

Methods: A PRISMA guideline-adherent systematic review and meta-analysis was undertaken. PubMed, Cochrane and Embase were thoroughly queried using a combination of MeSH terms and keywords for papers providing data on sentinel lymph node drainage of head and neck cancers. Meta-analyses on pooled drainage proportions were performed using the random-effects model, with logit transformed proportions on RStudio.

Results: Forty papers encompassing 3044 cancers and 5052 sentinel lymph nodes were included. Of the cancers, 2170 were skin and 874 were mucosal. Most (1932) cancers were melanoma, followed by squamous cell carcinoma (1028) and rarer subtypes. A lymphatic heatmap was created for the following subsites: upper, mid and lower face, scalp, ear, nose, tongue and floor of mouth, upper and lower alveolar ridge, buccal mucosa, soft palate, oropharynx and larynx. Unconventional and contralateral lymphatic drainage was identified across all subsites to a prevalence as great as 32%.

Conclusions: This study establishes the first empirically derived lymphosome maps of sentinel lymph node drainage across the superficial head and neck. These findings challenge traditional anatomical paradigms and provide a clinically relevant framework to inform oncological resection and lymphatic surgery.

84: FULL PRIMARY INSET OF MEDIAN FOREHEAD FLAP FOR NASAL RECONSTRUCTION—50 CONSECUTIVE CASES

Conor Gleeson, Mark Lee

Department of Plastic Surgery, St John of God Hospital Subiaco, Perth, Australia

Background/objectives: The standard of care for nasal reconstruction following oncologic resections has been the median forehead flap (MFF). The established approach to the MFF requires two stages to be carried out. Ongoing efforts towards refinement have motivated the senior author to implement the use of full primary inset of the MFF during the initial procedure as a potential alternative standard of management for selected cases. We explore patient outcomes and potential service demand implications of implementing this full primary inset approach.

Methods: Retrospective study of a single surgeon practice looking at patients over a 17-year period who underwent nasal reconstruction with the use of an MFF following oncologic resection. Each case was evaluated for histology subtype, number of stages performed, average interval between stages and postoperative complications.

Findings: Fifty unique patients within this period were included in this case series. Division of MFF pedicle was warranted in 34 cases, with a mean interval of 15 weeks between the primary procedure and subsequent division. Only four of 50 patients within this case series experienced partial flap necrosis and all cases were treated conservatively with good aesthetic outcome.

Conclusions: The MFF offers the best outcome for patients requiring nasal reconstruction for repair of full thickness defects. However, despite continuous technical evolution this approach still carries limitations. Application of full primary inset of MFF at initial stage may offer dependable surgical outcomes while affording greater flexibility to patients who have previously experienced very specific demands regarding timing.

90: THE ROLE OF *FRMD4A* IN CRANIOFACIAL DEVELOPMENT

Maya Salama,[1] Sebastian Dworkin,[1] Stephen J Goldie[2,3]

[1] La Trobe University, Melbourne, Australia; [2] Monash University, Melbourne, Australia; [3] Eastern Health, Melbourne, Australia

Background: Birth defects affect approximately 3% of all births worldwide, representing a significant cause of infant morbidity and mortality. Beyond the physical consequences, they also impose substantial psychosocial burdens on affected individuals and their families. In many cases, the aetiology is unknown, though it is often attributed to genetic factors, making it challenging to develop targeted prevention or intervention strategies to reduce disease burden. *FRMD4A*, a FERM domain-containing protein, has been implicated in neurodevelopmental disorders and craniofacial abnormalities, such as hemifacial microsomia/Goldenhar syndrome, yet its precise developmental role remains unclear.

Objectives: In this study, the functional consequences of *FRMD4A* disruption were investigated using zebrafish and mouse models.

Methods: Morpholino-mediated gene knockdown was performed in zebrafish embryos to assess the early developmental effects of *FRMD4A* disruption. A stable *FRMD4A* knockout zebrafish line was generated using CRISPR/Cas9 genome editing to enable further phenotypic characterisation. Additionally, an *FRMD4A* knockout mouse model was characterised to assess the effects of complete gene loss on embryonic development and postnatal viability.

Findings: Morpholino-mediated knockdown in zebrafish embryos led to defects in head and eye morphology, craniofacial cartilage, vascular development and neurodevelopment, and these phenotypes will ultimately be further confirmed by CRISPR/Cas9 *FRMD4A* mutants also generated in this study. This study also characterised an *FRMD4A* knockout mouse model, finding that complete loss of *FRMD4A* led to neonatal lethality as post-natal day one.

Conclusions: These findings underscore the critical role of *FRMD4A* in early development, with the vertebrate models providing critical resources to investigate the mechanisms driving *FRMD4A*-dependent birth defects.

95: PETALS IN BLOOM: A NOVEL APPLICATION OF SPY-PHI IN LOTUS PETAL FLAP RECONSTRUCTION

Nicola Zelow, Karl Walsh, Shiv Chopra

Royal Brisbane and Women's Hospital, Brisbane, Australia

Background: Vulvoperineal reconstruction following oncological resection or infection presents a challenge, particularly with respect to reliable flap perfusion and viability. Partial flap necrosis occurs in 8–15% of cases, causing morbidity and potential delays to adjuvant treatment.[1] Traditional clinical assessment in flap design remains subjective and may fail to appreciate marginal perfusion deficits that lead to complications.

Objective: To evaluate intraoperative fluorescence imaging in improving perfusion assessment and outcomes in lotus petal flap reconstruction.

Methods: Patients undergoing vulvoperineal reconstruction between June and December 2025 received intraoperative indocyanine green (ICG) angiography using the SPY-PHI system. Preoperative imaging guided flap design and ICG was repeated after flap elevation to assess tip perfusion. Standard closure and dressings were applied, with a uniform postoperative protocol.

Findings: Seven patients were included. Wound dehiscence occurred in one patient, with no reported flap tip necrosis.

Discussion: The lotus petal flap is a fasciocutaneous perforator flap based on pudenal branches and it is widely described in the reconstruction of vulvoperineal defects. Despite reliable overall flap survival, partial flap necrosis and wound complications remain common, underscoring the importance of accurate perfusion assessment.[1] Imaging with ICG has been associated with reduced flap necrosis and reoperation rates compared to clinical assessment alone.[2] Unlike previous studies that applied ICG only after flap elevation, this study is the first to employ preoperative vascular mapping to guide flap design.

Conclusion: Integration of SPY-PHI imaging into lotus petal flap reconstruction allows precise intraoperative tissue perfusion assessment, refinement of flap design and reduction in postoperative complications.

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103: AN ALGORITHM FOR BONY FREE FLAP LATERALITY IN MANDIBULAR AND MAXILLARY DEFECTS

Meg Anderson, Richard Barton, Anand Ramakrishnan

Royal Melbourne Hospital, Melbourne, Australia

Background: There has been some debate in the literature over the importance of laterality when choosing a fibula side for mandible reconstruction, but laterality in deep circumflex iliac artery (DCIA) and scapula reconstruction has not been widely addressed. The main point of discussion for fibula reconstruction remains whether an increased risk of paddle necrosis arises from stretching septum over bone, with additional considerations being the importance of plating surface and pedicle orientation. There is little published on DCIA orientation, but its short pedicle and the potential use of muscle for palatal reconstruction makes geometry of inset important. Chimeric scapula flaps offer versatility when soft tissue is required in addition to bone; although the subscapular axis has no septum, the bony anatomy of the scapula requires consideration of laterality.

Objective: We present our flexible algorithmic approach for osseous free flaps in mandibular and maxillary reconstruction.

Methods: We illustrate both common and rare challenges in planning the orientation of bony free flaps with complex cases from a unit with a strong history and significant caseload. We synthesise this extensive experience into an algorithm with robust anatomical basis.

Findings: There are many instances where deviating from this framework may be necessary, and we propose a logical approach to practical considerations in difficult cases. We present techniques for minimising the impact of suboptimal designs where the surgeon's first choice of flap is not possible.

Conclusion: Bony reconstruction of the maxilla and mandible can be guided, even in very challenging circumstances, by a flexible algorithm.

104: LIPOSUCTION SUPERFICIALISATION OF DEEP BUT PATENT ARTERIOVENOUS FISTULAE: A COLLABORATIVE, MINIMALLY INVASIVE APPROACH

Hugo Loveday,[1] Diana Siriwardena,[1] Frank Hsieh,[2] Ching Cheng[3]

[1] Bankstown-Lidcombe Hospital, Sydney, Australia; [2] Westmead Hospital, Sydney, Australia; [3] Liverpool Hospital, Sydney, Australia

Background: Autogenous arteriovenous fistulae (AVF) remain the preferred vascular access for haemodialysis. Despite adequate maturation and patency, some AVF remain unsuitable for cannulation due to excessive depth, resulting in prolonged reliance on tunnelled vascular catheters. Traditional open superficialisation techniques, such as lipectomy or transposition, are associated with increased morbidity and operative risk. Minimally invasive alternatives may reduce these burdens while preserving access function.

Objectives: To describe a collaborative, minimally invasive approach to AVF superficialisation using liposuction and to evaluate early outcomes following this technique.

Methods: A case series of three patients with mature, patent AVF deemed too deep for safe cannulation was performed. All procedures were undertaken collaboratively by plastic surgery and vascular surgery teams. Liposuction superficialisation was performed with meticulous technique to avoid fistula injury, using regional anaesthesia with sedation and lipoinfiltration. Outcomes assessed included fistula patency, complications, volume of lipoaspiration and time to clearance for haemodialysis use.

Findings: All three AVF remained patent following liposuction superficialisation, with no access-related, vascular or wound complications. Lipoaspiration volumes ranged from 50–190 mL. Vascular surgery review cleared all fistulae for use within one month of the procedure. All AVF have since been successfully cannulated and used for haemodialysis.

Conclusions: Liposuction superficialisation is a safe and effective minimally invasive option for patients with deep but otherwise functional AVF. This technique enables rapid access utilisation while avoiding the morbidity of open surgery and highlights the value of plastic–vascular surgical collaboration. Further study is warranted to assess long-term outcomes and refine patient selection.

106: ULTRASOUND ANALYSIS OF THE STRUCTURAL COMPONENTS OF COMMON SKIN FLAP DONOR SITES USED IN FREE TISSUE TRANSFER

Edwin Morrison,[1,2] Jeremy Wilson,[3] Elizabeth Bartetzko,[1] Hamish McKay[1]

[1] St Vincent's Hospital, Melbourne, Australia; [2] Peter MacCallum Cancer Centre, Melbourne Australia; [3] Royal Melbourne Hospital, Melbourne, Australia

Background/objectives: In skin and subcutaneous tissues, function follows form. Dermal thickness, fat layer distribution and fascial density and orientation, influence durability, pliability and mobility. Despite routine use of skin flaps in free tissue transfer, quantitative comparisons of these structural components across common donor sites are limited. This study characterises and compares the structural anatomy of commonly used skin flap donor sites using high-frequency ultrasound.

Methods: A prospective ultrasound study was performed in 30 healthy volunteers across five donor sites: radial forearm (RAF), anterolateral thigh (ALT), superficial circumflex iliac perforator (SCIP), thoracodorsal artery perforator (TDAP) and fibula (Fib). Standardised high-frequency ultrasound imaging was performed by trained sonographers. Identified components included dermis, superficial and deep fat, and horizontal and vertical fascial elements. Measurements included thickness and proportional contribution to total flap thickness.

Findings: All components were consistently identifiable and measurable. The RAF demonstrated the thinnest dermis (1.14 mm), overall flap thickness (5.31 mm) and total fascial thickness (1.3 mm). The ALT (8.75 mm) and SCIP (8.20 mm) were thicker overall. The Fib demonstrated relatively thin overall thickness (6.21 mm) but the highest fascia-to-flap thickness ratio (0.48). The ALT demonstrated the thickest superficial fat layer (3.83 mm) and highest superficial fat-to-flap thickness ratio (0.36).

Conclusion: This study provides the first quantitative ultrasound characterisation of common skin flap donor sites. These data inform flap selection, refine assumptions of donor site interchangeability and establish a framework for correlating flap structure with functional outcomes. Quantitative structural differences should be considered alongside traditional clinical factors when selecting flaps where mobility and pliability are important.

107: BUILDING COMPETENCIES IN GENDER-AFFIRMING SURGERY FOR AUSTRALIAN PLASTIC AND RECONSTRUCTIVE SURGERY TRAINEES—DESIGN AND ELEMENTS FOR SUCCESS

Hester Lacey,[1,2] Laura Sourdin,[2] Phillipa Van Essen,[2] Zac Cannell,[3,4] Tamsin Anspach,[3] Varo,[2] Tracy Smart,[2] Phoebe Ingram,[1] Rosie Roberts,[1] William Moore,[1] Jia Miin Yip,[1,2] Courtney Ryder,[1,5] Nicola Dean[1,2]

[1] Flinders University, College of Medicine and Public Health, Bedford Park, SA, Australia; [2] Flinders Medical Centre, Bedford Park, Australia; [3] Thorne Harbour Health SA, Adelaide, Australia; [4] Trans Health South Australia, Adelaide, Australia; [5] Flinders Health and Medical Research Institute, Flinders University, South Australia, Australia

Background: Australian demand for gender-affirming surgery (GAS) is increasing, yet access to surgery remains limited by lack of public funding, workforce capacity and variable training exposure. Gender-affirming surgery is becoming a formal section of the plastic and reconstructive surgeons (PRS) curriculum and developing core competencies requires further information.

Objectives: To design effective study methodology assessing perceptions, knowledge and willingness to engage in GAS, to inform the design of effective, equitable GAS healthcare services, training programs and core competency frameworks, and to guide career pathways.

Methods: Transgender people were engaged with via a multimodal, iterative approach, with dedicated GAS research meetings, conference discussions and engagement of lived experience researchers, who co-designed study outcomes, instruments and methodologies. Medical students were invited to PRS departmental meetings and one-on-one discussions (HL and WM). Specialist plastic surgeons and SET trainees were engaged with in person and through virtual feedback on study methodologies and instruments.

Findings: The co-design process found targeted qualitative approaches most effective, with face-to-face and virtual interviews and focus groups preferred for studying transgender people, and asynchronous electronic questionnaire-based survey methodology preferred for surgeons and students, following face-to-face and virtual conference recruitment.

Conclusions: A purposeful co-design process was found to yield customised approaches for different participating groups. It is likely the approaches employed will result in a higher participation rate and more valid findings in definitive studies, which will provide invaluable information informing design of competency-based frameworks for GAS training in the Australian PRS curriculum, and understanding modifiable educational and system-level factors to support more equitable access to GAS nationwide.

108: INVASIVE MELANOMA OF THE SCALP: 20 YEARS OF EXPERIENCE

Lachlan Yaksich,[1,2] Brandon Leggett,[3] David Sparks,[4] Samuel Yang,[1,5] Gerard Bayley[1,5]

[1] Greenslopes Hospital, Brisbane, Australia; [2] University of Queensland, Brisbane, Australia; [3] Fiona Stanley Hospital, Perth, Australia; [4] Gold Coast University Hospital, Gold Coast, Australia; [5] Princess Alexandra Hospital, Brisbane, Australia

Background: Invasive melanoma of the scalp is associated with aggressive behaviour and poorer outcomes compared with other cutaneous sites. The optimal depth of surgical resection remains controversial, particularly with respect to disease recurrence and survival.

Objective: This study examines recurrence patterns and evaluates the association between deep resection margin and oncologic outcomes.

Methods: A retrospective cohort study was conducted of patients undergoing surgical excision for invasive scalp melanoma from 2004 to 2024 from two hospitals in Brisbane, Queensland. Demographic data, depth of resection, recurrence patterns and survival outcomes were analysed. Recurrence was defined as the first episode of disease progression and categorised as local, regional nodal or systemic.

Findings: A total of 158 patients were included, with a mean age of 68.4 years. The overall recurrence rate was 32.91%, with a mean time to recurrence of 13.9 months. First episodes of disease progression comprised 19 local recurrences, 16 cervical nodal recurrences and 17 systemic recurrences. Subgaleal resection was performed in 86 patients and was associated with a recurrence rate of 32.18%, compared with 25% in patients undergoing subperiosteal resection (n = 36). Kaplan–Meier analysis demonstrated a statistically significant difference in disease recurrence across deep margin plane selection, with improved probability of five-year disease-free survival for subperiosteal resection (71%) compared with subgaleal resection (53%).

Conclusions: Invasive scalp melanoma demonstrates high early recurrence rates with substantial regional and systemic progression. Deeper resection to the subperiosteal plane is associated with reduced recurrence, supporting consideration of resection depth in surgical planning.

114: TRENDS IN MICROVASCULAR FREE FLAP RECONSTRUCTION AT A SINGLE TERTIARY CENTRE: A 12-YEAR RETROSPECTIVE REVIEW

Lachlan Yaksich,[1] Lachlan McMillan,[2] Amy Yoon,[3] Michael Wagels,[3] David Theile[3]

[1] Greenslopes Hospital, Brisbane, Australia; [2] Sunshine Coast University Hospital, Sunshine Coast, Australia; [3] Princess Alexandra Hospital, Brisbane, Australia

Background: Microvascular free flap surgery is a cornerstone of modern reconstructive surgery, providing robust coverage for complex defects. While studies have examined outcomes in specific anatomical sites, few have evaluated long-term institutional trends across all indications.

Objective: This study aimed to assess temporal changes in microvascular free flap reconstructive surgery at a tertiary plastic surgery unit over 12 years.

Methods: A retrospective review was conducted of free and locoregional flap reconstructions performed between 2012 and 2023 at a single tertiary centre. Data collected included patient demographics, flap type, anatomical region, surgical indication and complication rates.

Findings: A total of 912 free flaps and 628 locoregional flaps were performed during the study period. The volume of free flaps increased by 2.6-fold, from 4.7 procedures per month in 2012 to 12.2 in 2023 ($p < 0.0001$), whereas locoregional flap rates remained stable. Head and neck reconstruction accounted for the majority of cases (58%), followed by lower limb (29%) and breast (6.3%), with breast and lower limb demonstrating the greatest proportional growth. Malignancy was the most frequent indication, although trauma and infection-related reconstructions increased in later years. Takeback rates declined from 25.6% in 2012 to 17.1% in 2023, with flap loss rates consistently below 5%.

Conclusion: This 12-year review demonstrates a significant rise in free tissue reconstructions without a corresponding decline in locoregional procedures, indicating a genuine growth in microsurgical activity. These findings highlight increasing demand, improved outcomes and the ongoing need for investment in microsurgical services, training and infrastructure.

115: A TARGETED PERIPHERAL NERVE APPROACH TO OCCIPITAL AND TRIGEMINAL NEURALGIA-RELATED HEADACHE DISORDERS: AN UPDATED CLINICAL SERIES

Lipi Shukla

East Melbourne Plastic Surgery, Melbourne, Australia; Brighton Plastic Surgery, Melbourne, Australia; Alfred Hospital, Melbourne, Australia; St Vincent's Hospital, Melbourne, Australia

Background: Neuralgia-related headache disorders, including occipital and trigeminal neuralgia, are frequently underdiagnosed and inadequately treated. Many patients undergo prolonged multimodal management involving neurology, pain medicine and specialised physiotherapy with limited sustained benefit. To address this gap, a dedicated, subspecialised neuralgia-related headache practice was established, incorporating targeted diagnostic and surgical interventions.

Objectives: To present updated demographic, clinical and outcome data following expansion of a focused peripheral nerve-based headache service, building on work presented at this meeting in the previous year.

Methods: Over 50 patients with suspected neuralgia-related headache disorders underwent structured assessment. Targeted, anatomically-guided local anaesthetic and botulinum toxin injections were used as diagnostic and therapeutic tools, and selected patients proceeded to surgical decompression of implicated nerves, including the greater, lesser and third occipital nerves and peripheral branches of the trigeminal nerve. To date, over 15 patients have undergone surgical decompression with follow-up ranging from five months to two years. A further 23 patients were treated with targeted botulinum toxin injections. Outcomes assessed included headache frequency, intensity and severity, medication use, functional status and patient-reported quality of life.

Findings: Early and mid-term follow-up demonstrates clinically meaningful improvement in a substantial proportion of patients, with reductions in headache frequency and intensity, decreased medication dependence, and improved functional and psychological wellbeing. Botulinum toxin response varied and assisted with patient selection for surgery.

Conclusions: This update highlights the clinical utility of a highly targeted, subspecialised approach to neuralgia-related headache disorders. Structured assessment combined with selective nerve decompression offers a valuable treatment pathway for an under-recognised patient cohort and supports further prospective evaluation.

118: COMPARISON OF ONE VERSUS TWO VEIN ANASTOMOSES FOR LOWER LIMB FREE FLAP RECONSTRUCTION—A SYSTEMATIC REVIEW AND META-ANALYSIS

Anish Rastogi,[1] Lucas Guimaraes Carelli,[2,3] Damian Marucci,[2] Bishoy Soliman,[3,4] Pratik Rastogi[2,3]

[1] *John Hunter Hospital, Newcastle, Australia;* [2] *St George Hospital, Sydney, Australia;* [3] *Royal Prince Alfred Hospital, Sydney, Australia;* [4] *Royal North Shore Hospital, Sydney, Australia*

Background: Free tissue reconstruction of the lower limb remains challenging, with high rates of flap failure and reoperation. These outcomes are driven by complex defect architecture, compromised perfusion and the haemodynamic burden of venous stasis. Venous congestion is the predominant cause of flap compromise, underscoring the debate surrounding optimal venous outflow strategies. This systematic review presents a contemporary analysis of single versus dual venous anastomoses in lower limb microsurgical reconstruction, with the aim to clarify their impact on flap outcomes.

Methods: In accordance with PRISMA guidelines, a systematic literature review was conducted across PubMed Central, MEDLINE, Embase, Cochrane, Web of Science and Scopus from inception to April 2025. Outcomes included total and partial flap loss, flap takeback, and venous and arterial insufficiency. Meta-analysis was performed to compare the odds ratio of these outcomes between single and dual venous anastomoses for lower limb free flaps.

Results: Analysis included 12 articles, involving 1899 lower limb free flaps—1124 with single and 775 with dual venous anastomoses. Pooled analysis demonstrated that two venous anastomoses was associated with reduced risk of partial flap loss (OR = 0.47, 95% CI = 0.27–0.83, $p = 0.01$) and venous insufficiency (OR = 0.56, 95% CI = 0.33–0.96, $p = 0.04$). There was no statistical difference between the two approaches for total flap loss (OR= 0.89, 95% CI= 0.47–1.69, $p = 0.73$), flap takeback (OR = 0.62, 95% CI = 0.36–1.09, $p = 0.10$) and arterial insufficiency (OR = 0.56, 95% CI = 0.24–1.31, $p = 0.18$).

Conclusion: Dual venous anastomosis confers a protective advantage against partial flap loss and venous insufficiency in lower limb reconstruction.

121: STRATEGIES TO ELIMINATE ABDOMINAL BULGE AFTER DIEP FLAP HARVEST: A TECHNICAL AND OUTCOMES ANALYSIS

Johnathan Lu,[1] Max Gerber,[1] Joseph Dusseldorp[1,2]

[1] *University of Sydney, Sydney, Australia;* [2] *Chris O'Brien Lifehouse, Sydney, Australia*

Background: Abdominal-based autologous breast reconstruction using deep inferior epigastric perforator artery (DIEP) flaps provides durable outcomes but remains associated with donor-site morbidity. Abdominal bulge and hernia are clinically significant complications influenced by operative technique, patient factors and abdominal wall anatomy. Current evidence focuses on mesh use in isolation, with limited guidance on protocol-based donor-site management.

Objective: To evaluate donor-site morbidity outcomes following implementation of resorbable mesh in bilateral DIEP flap reconstruction.

Methods: A retrospective cohort study of 275 bilateral DIEP flap reconstructions was performed. Patients were stratified by management with a donor-site protocol incorporating preoperative assessment, intraoperative dissection strategy and tailored abdominal wall closure with selective resorbable mesh, or non-protocol management. The primary outcome was abdominal bulge or hernia requiring surgical revision, with secondary outcomes including mesh-related complications and patient-reported outcome measures.

Findings: Abdominal bulge requiring surgical revision occurred in 5% of non-protocol cases (n = 12); no cases were observed in the protocol-managed cohort. Implementation of the donor-site protocol was not associated with an increase in mesh-related complications, including seroma or infection. The resorbable mesh cohort showed limited improvements in BREASTQ domains over primary closure in six-week, three-month and 12-month follow-ups.

Conclusions: Implementation of a structured, risk- and anatomy-informed donor-site protocol incorporating resorbable mesh was associated with the elimination of clinically significant abdominal bulge following bilateral DIEP reconstruction, without increased mesh-related complications. These findings support incorporating resorbable mesh, especially as an adjunct within a protocol-based approach to donor-site management.

132: INEQUITIES IN ACUTE PETROL BURN OUTCOMES FOR ABORIGINAL AND TORRES STRAIT ISLANDER ADULTS IN AUSTRALIA: A 10-YEAR NATIONAL STUDY

Nandini Karthikeyan,[1,4] Zakary Doherty,[1] Nicholas Savage,[1] Courtney Ryder,[3] Stephen Goldie[1,2,3]

[1] Victorian Adult Burns Service, Melbourne, Australia; [2] The Alfred Health Department of Surgery, Melbourne, Australia; [3] Flinders University College of Medicine and Public Health, South Australia, Australia; [4] Monash University School of Medicine, Melbourne, Australia

Background: Petrol burns are a preventable cause of morbidity and mortality, comprising 20% of adult burn admissions in Victoria. In Australia, Aboriginal and Torres Strait Islander communities are disproportionately affected by petrol burns. Despite this, no studies have investigated the incidence of petrol burns or inequities in outcomes for these communities.

Objectives: To characterise the epidemiology, injury characteristics, management and acute outcomes for petrol burns among Aboriginal and Torres Strait Islander adults in Australia.

Methods: This was a multicentre retrospective cohort study of all adults admitted to an Australian Burns Centre with a petrol burn between 2010 and 2020, using data from the Burns Registry of Australia and New Zealand.

Findings: A total of 2023 patients were included in this study, of whom 4.8% (n = 97) identified as Aboriginal or Torres Strait Islander. Despite no differences in age or burn severity, Indigenous people experienced a 170% higher in-hospital mortality risk and 14% lower rates of basic first aid treatment. Significant delays to treatment (61 hours vs 27 hours) were also reported alongside, and intentional injury reporting was over threefold higher among Indigenous communities. Indigenous status was associated with a 16-fold higher risk of mortality, even after adjustment for age, gender, total body surface area, surgical intervention, ICU admission and intent of burn.

Conclusions: This study identified significant inequities in acute petrol burn outcomes impacting Aboriginal and Torres Strait Islander communities. Improving access to burn care in regional areas, co-designing community-based burns education and delivering culturally responsive healthcare are critical steps towards closing the gap in health outcomes for these communities.

141: NERVE TRANSFERS FOLLOWING RADICAL PAROTIDECTOMY: A 10-YEAR RETROSPECTIVE REVIEW

Jasmine Zhang, Kieran Rowe, Darryl Dunn

Royal Brisbane and Women's Hospital, Brisbane, Australia

Background: Facial paralysis presents a challenging problem and often results in significant impact on quality of life. A wide range of static and dynamic techniques have been described for facial reanimation. The nerve to masseter transfer and descendens hypoglossi nerve transfer are techniques that are explored further in this study.

Method: This is a single-centre retrospective case series of patients who have had facial nerve sacrifice and underwent nerve transfers at the Royal Brisbane and Women's Hospital between 2015 and 2025.

Findings: Two hundred and two patients underwent radical parotidectomy for tumours, most commonly metastatic squamous cell carcinoma. Sixty (30%) patients underwent nerve to masseter transfers to the buccal branch: 33 (55%) of these patients did not require any further surgery; 15 (25%) required one subsequent reanimation procedure; six (10%) required two subsequent procedures; four (7%) required three further procedures; and two (3%) required four or more further procedures. Twenty-one (10%) of the 202 patients underwent descendens hypoglossi nerve transfer to the marginal mandibular nerve: 19 (90%) of these patients did not require any further revisionary surgery on the lip; one patient (0.5%) required two subsequent procedures on the lip; and one patient (0.5%) required ongoing botox injections for lip asymmetry.

Conclusion: The majority of patients undergoing nerve transfers did not require any further revisionary surgery for the reconstructed facial nerve branch. The study is limited by the retrospective nature of it. To our knowledge, this study represents the largest case series of nerve to masseter transfers and descendens hypoglossi nerve transfers.

149: CREATING A DATABASE FOR BIODEGRADABLE TEMPORISING MATRIX IN THE CLINICAL SETTING

Lawson Seddon,[1] Edmond Chang,[1] Sally Ng[1,2]

[1] *Department of Plastic and Reconstructive Surgery, Austin Health, Heidelberg, Australia;* [2] *The University of Melbourne (Austin Precinct), Parkville, Australia*

Background: NovoSorb biodegradable temporising matrix (BTM) is a full synthetic dermal matrix with growing usage over recent years. While multiple studies on BTM have been conducted, their heterogeneity makes large scale data analysis difficult. This study pilots a BTM database for standardised research on clinical BTM usage.

Objectives: The aim of this study is to establish a database to collect and analyse the use and outcomes of BTM in the clinical setting with the objectives of evaluating feasibility, identifying challenges and demonstrating utility.

Methods: Patients above the age of 18 years old who had surgical treatment with BTM for a variety of tissue defects in a single tertiary institute between March 2024 and December 2025 were recruited into this study. The medical history, BTM surgical details and follow-ups were entered into the BTM database. Follow-up consisted of EQ-5D-5L questionnaires and Patient and Observer Scar Assessment Scale (POSAS) scores.

Findings: Twenty-four patients were entered into the BTM database, with 19 patients completing six-month and nine completing 12-month follow-up. At six months postoperatively, mean EQ-5D-5L index score was 0.905 (SD 0.188), mean POSAS patient-score was 3.36 (SD 1.67), and mean POSAS observer-score was 3.26 (SD 0.991). Scores did not change significantly at 12 months postoperatively.

Conclusion: The BTM database was clinically convenient to use and efficient for data analysis, with data taking no more than 10 minutes to input and questionnaires easily completed during standard clinic appointments. Results from this pilot study reflected favourable patient satisfaction and clinician ratings of BTM performance.

151: INTERPRETATION OF 2D COMPUTER TOMOGRAPHY AND 3D RECONSTRUCTION AND ITS ROLE IN THE DIAGNOSIS OF FACIAL FRACTURES

Debanjan Ghosh,[1] Jeeth Jacob[2]

[1] *Department of Plastic and Reconstructive Surgery, NSW Health, Australia;* [2] *Department of Plastic and Reconstructive Surgery, CMC, Vellore, India*

Background: Facial fractures are clinically significant and accurate diagnosis is paramount, given the significant functional and cosmetic sequalae. Multi-slice 2D CT can give accurate interposition of defects and bony landmarks, while 3D reconstruction can assist in presurgical planning due to advanced spatial recognition. However, it comes at an increased cost burden.

Objectives: The aim was to compare the efficacy of 3D CT over 2D, and determine whether additional information would have bearing on the overall management plan.

Methods: Prospective study of 34 cases of facial fracture presenting between August 2006 and August 2008 across 374 different fracture sites were statistically analysed. Patients were diagnosed to have Le Fort fractures clinically and subjected to 2D and 3D reformatting.

Findings: 2D CT reformatting had been able to provide valuable information on the extent of facial fractures and displacement. 2D CT had sufficient specificity that no fractures were missed that were identified on 3D CT.

Conclusions: The study shows facial fractures and displacements were able to be identified by 2D CT and, as such, 3D reformatting did not change the overall management plan, though it can help with spatial orientation and presurgical planning. Considering the vast difference in cost and surgical repair of Le Fort fractures being governed by principles of reduction of facial pillars, 2D CT was still the ideal modality for interpreting simple facial fractures and driving its management. Moving forward, a literature review will be undertaken to further assess the cost-benefit analysis between the two modalities.

154: EVALUATION OF VAPOCOOLANT SPRAY BEFORE LOCAL ANAESTHETIC INFILTRATION DURING PERCUTANEOUS NEEDLE APONEUROTOMY: A RANDOMISED CONTROLLED TRIAL

Ishith Seth,[1] Brett K Sacks,[1] Omar Shadid,[1] Richard J Ross,[1] Warren M Rozen[1,2]

[1] *Monash University, Melbourne, Australia;* [2] *Peninsula University Hospital, Melbourne, Australia*

Background: Percutaneous needle aponeurotomy (PNA) is an effective minimally invasive treatment for Dupuytren's disease; however, infiltration of local anaesthetic into the densely innervated palm is frequently painful. Vapocoolant sprays produce rapid cutaneous cooling and may attenuate nociceptive transmission, but evidence in hand surgery remains limited.

Objective: To determine whether pre-infiltration vapocoolant spray reduces injection pain during PNA.

Methods: This single-centre, single-blind randomised controlled trial allocated adults undergoing PNA (1:1) to vapocoolant spray (5 s at 10 cm) immediately before infiltration with 1% plain lignocaine, or lignocaine alone. The primary outcome was pain during the first injection measured using a 10-point visual analogue scale (VAS). Secondary outcomes included immediate adverse events.

Findings: Ninety-four patients were analysed (47 per group). Mean injection pain was significantly lower in the vapocoolant group, with a mean difference of −2.70 VAS units (95% CI −3.70 to −1.79; $p < 0.001$), exceeding the minimal clinically important difference for acute procedural pain. The vapocoolant group was younger (65.8 ± 9.2 vs 70.8 ± 8.5 years; $p = 0.0097$), while sex distribution and baseline disease severity were comparable (Tubiana grade, $p = 0.40$). Age demonstrated a moderate positive correlation with pain scores (Spearman $\rho = 0.29$). No adverse events occurred ($p = 1.00$).

Conclusions: Pre-infiltration vapocoolant spray significantly and clinically reduced injection pain during PNA without compromising safety. Given its immediacy, negligible cost and ease of use, vapocoolant spray represents a pragmatic analgesic adjunct in hand surgery.

156: IMMEDIATE VERSUS DELAYED FREE FLAP BREAST RECONSTRUCTION: A NATIONAL IPTW ANALYSIS OF 20,415 PATIENTS

Armin Catic,[1] Georgios Karamitros,[2,4] Franklin Gergoudis,[2] Carrie Kubiak,[2] Wesley Thayer,[2] Sebastiano Barbieri,[1,3] Louisa Jorm,[1] William Lineaweaver,[2] Galen Perdikis,[2] Gregory Lamaris[4]

[1] Centre for Big Data Research in Health, University of New South Wales, Sydney, Australia; [2] Department of Plastic Surgery, Vanderbilt University Medical Center, Nashville, Tennessee, USA; [3] Queensland Digital Health Centre, University of Queensland, Brisbane, Queensland, Australia; [4] Division of Plastic and Reconstructive Surgery, R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore, Maryland, USA

Background: The optimal timing of microsurgical breast reconstruction remains debated. Immediate reconstruction offers psychosocial benefits but may increase early postoperative morbidity. Prior studies have been limited by selection bias and inconsistent risk adjustment, leaving the comparative safety of immediate versus delayed reconstruction unresolved at a national level.

Methods: We performed a retrospective cross-sectional cohort study of adult women undergoing free flap breast reconstruction (CPT 19364) in the ACS–NSQIP registry (2012–2022). Covariate balance between immediate and delayed cohorts was achieved using inverse probability of treatment weighting (IPTW) with pre-specified standardised mean difference thresholds < 0.1. Weighted logistic regression estimated adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for 30-day complications.

Results: A total of 20,415 patients were included (10,362 immediate; 10,053 delayed). After IPTW adjustment, immediate reconstruction demonstrated higher odds of readmission (6.4% vs 5.1%; OR 1.35, 95% CI 1.18–1.54), perioperative transfusion (11.2% vs 8.5%; OR 1.43, 95% CI 1.28–1.59), and organ/space surgical-site infection (9.6% vs 9.3%; OR 1.41, 95% CI 1.01–1.97). Reoperation within 30 days was modestly elevated (OR 1.28, 95% CI 1.16–1.41). Major systemic events, including sepsis, stroke, myocardial infarction and cardiac arrest, were rare (< 2%) and comparable between groups.

Conclusions: In the largest weighted national analysis to date, immediate free flap breast reconstruction was associated with modest increases in early healthcare utilisation-related complications but no excess in life-threatening events. These findings refine a long-standing clinical debate, supporting balanced patient counselling and value-oriented pathway development in microsurgical breast reconstruction.

157: IMPROVEMENT IN GRIP STRENGTH FOLLOWING PERCUTANEOUS NEEDLE APONEUROTOMY FOR DUPUYTREN'S DISEASE: A PROSPECTIVE STUDY

Ishith Seth,[1] Brett K Sacks,[1] Omar Shadid,[1] Richard J Ross,[1] Warren M Rozen[1,2]

[1] Monash University, Melbourne, Australia; [2] Peninsula University Hospital, Melbourne, Australia

Background: Dupuytren's disease causes progressive flexion contractures and functional impairment. Percutaneous needle aponeurotomy (PNA) enables rapid correction with low morbidity, but its effect on grip strength—a key surrogate of hand function and overall health—remains inconsistently reported.

Objectives: To quantify change in grip strength following PNA and describe early functional recovery and safety.

Methods: A prospective single-centre study included 104 adults (140 digits) undergoing PNA between February 2024 and December 2025. Outcomes were assessed pre-procedure and at two months, including grip strength (Jamar dynamometer; American Society of Hand Therapists protocol), joint extension deficits, patient-reported outcomes (URAM, Southampton), return to work and complications. Pre–post comparisons used paired *t*-tests/Wilcoxon signed-rank tests (two-sided; $p < 0.05$).

Findings: Mean grip strength improved from 24.9 kg to 29.0 kg (mean change + 4.1 kg; $p < 0.001$). Extension deficits decreased significantly at the metacarpophalangeal and proximal interphalangeal joints (mean correction 25.5° and 29.3°, respectively; both $p < 0.001$); distal interphalangeal joint correction in a small subset approached significance (mean change 20.0°; $p = 0.05$). At two months, patient-reported function was excellent (median URAM 4/45; median Southampton 3/20). Forty-four employed participants returned to work within one week. Complications were minor (skin tears n = 11; transient hypersensitivity n = 3) with no major adverse events.

Conclusions: PNA not only corrects digital contracture but also yields clinically meaningful early improvements in grip strength, with rapid return to work and a low complication profile, supporting grip strength as a useful functional outcome measure in Dupuytren's disease.

158: REVEALING THE TRUE MORBIDITY OF FACIAL FRACTURE REPAIR: A NATIONAL BIG-DATA ANALYSIS OF 4805 CASES

Armin Catic,[1] Georgios Karamitros,[2] Izabela Galdyn,[2] Michael Golinko,[2] Matthew Pontell,[2] Stephane Braun,[2] William Lineaweaver,[2] Galen Perdikis,[2] Richard Redett,[3] Judy Pan,[4] Sebastiano Barbieri,[5] Gregory Lamaris[4]

[1] Centre for Big Data Research in Health, University of New South Wales, Sydney, Australia; [2] Department of Plastic Surgery, Vanderbilt University Medical Center, Nashville, USA; [3] Johns Hopkins School of Medicine, Baltimore, USA; [4] University of Maryland Medical Center, Baltimore, USA; [5] Queensland Digital Health Centre, University of Queensland, Brisbane, Australia

Background: National data defining short-term morbidity following operative facial fracture repair remain limited, particularly amid increasing patient complexity.

Methods: Using ACS–NSQIP registry data (2007–2022), 4805 adults undergoing operative repair of mandibular, zygomaticomaxillary complex (ZMC), orbital, Le Fort or multifocal fractures were analysed. Thirty-day outcomes included superficial, deep and organ-space surgical site infections (SSIs), wound dehiscence and unplanned return to the operating room. Multivariable logistic regression identified independent predictors and assessed temporal trends.

Findings: Among 4805 patients undergoing operative facial fracture repair, the overall unadjusted 30-day complication rate was 6.7%. Complications were most frequent following mandibular fractures and least frequent after ZMC and orbital repairs ($p < 0.001$). In multivariable analysis, active smoking (adjusted odds ratio [aOR], 1.43; 95% CI, 1.09–1.89), higher ASA class (ASA II: aOR, 1.94; ASA III: aOR, 2.78; ASA IV: aOR, 3.67; all $p < 0.05$), longer operative time (per hour: aOR, 1.20; 95% CI, 1.17–1.24), and increasing wound contamination were independently associated with higher odds of postoperative morbidity. After risk adjustment, procedures performed by plastic surgeons were associated with lower odds of postoperative complications compared with otolaryngology (aOR, 0.74; 95% CI, 0.55–0.98; $p = 0.034$).

Conclusions: Early morbidity following facial fracture repair is driven primarily by infection-related complications, with mandibular injuries representing a high-risk phenotype. Stable outcomes, despite increasing complexity, suggest effective perioperative optimisation. These findings establish contemporary national benchmarks and support targeted risk-reduction strategies, including smoking cessation, wound management and operative efficiency.

159: MOLDABLE MICROCHANNELED POLYHIPE SCAFFOLDS: A NOVEL BIOMIMETIC APPROACH TO CRANIAL DEFECT RECONSTRUCTION

Romana Nasrin,[1] Stephen J Goldie,[1,2] Mikäel Martino,[1] Jessica E Frith,[1] Neil Cameron[1,3,4]

[1] Monash University, Melbourne, Australia; [2] Eastern Health, Melbourne, Australia; [3] University of Warwick, Coventry, United Kingdom; [4] Nanotechnology and Catalysis Research Centre (NANOCAT), Universiti Malaya, Kuala Lumpur, Malaysia

Background: Traditional bone grafting and rigid implants are often limited by donor-site morbidity, poor contour integration and mechanical failure in complex segmental defects. There is a critical need for an 'off-the-shelf', injectable solution that provides both immediate structural support and long-term osteoinduction.

Objective: This study evaluates a novel, 3D printed, microchanneled polymerised high internal phase emulsion (polyHIPE) scaffold designed to facilitate rapid bone regeneration in critical-sized cranial defects.

Methods: Microchanneled dipentaerythritol penta/hexa-acrylate polyHIPE scaffolds were engineered with interconnected open-cell porosity. These scaffolds were processed into mouldable particles and suspended in a fibrin gel carrier. In vitro performance was assessed via mesenchymal stromal cell (MSC) proliferation and differentiation. In vivo efficacy was validated using a murine critical-sized cranial defect model.

Findings: In vitro analysis demonstrated superior MSC viability and deep cellular infiltration. Notably, MSCs showed a spatial preference for differentiation along the microchannel curvatures, confirmed by alkaline phosphatase staining and mineralisation assays. Quantitative gene expression profiles confirmed robust osteogenic lineage commitment. In vivo application of the injectable polyHIPE-fibrin composite resulted in significant bone volume recovery within the host cranium.

Conclusions: These mouldable polyHIPE scaffolds represent a versatile advancement in craniofacial and orthoplastic reconstructive surgery. By combining the precision of 3D printing with the ease of a mouldable delivery system, this technology offers a promising, minimally invasive alternative for reconstructing complex bone voids and non-union fractures.

161: WELLINGTON REGIONAL FACIAL PALSY CLINIC—DEVELOPMENT OF NEW ZEALAND'S FIRST MULTIDISCIPLINARY, PATIENT CENTRED, FACIAL PALSY SERVICE

Kate Hippolite,[1] Emily Yassaie[2]

[1] Hutt Hospital, Wellington, New Zealand; [2] Hutt and Wellington Hospitals, Wellington, New Zealand

Background: For patients with facial palsy, every symptom is at the forefront of daily life and impacts identity, communication and quality of life. Management is complex, yet care has historically been managed by independent specialties. To address this gap, the craniofacial surgery team at Hutt Hospital, Wellington, New Zealand, established the country's first multidisciplinary facial palsy clinic (MDT clinic) in 2022. This integrates plastic surgery, ophthalmology, physiotherapy, ENT and neurology, providing early and comprehensive access to physiotherapy, a clear investigative and diagnostic pathway, and access to early nerve grafting and nerve transfer surgery.

Objectives: The MDT clinic aims to deliver high quality care and patient-centred care. To do this, the clinic developed and implemented ongoing service evaluation using patient feedback and validated questionnaires.

Methods: Evaluation commenced in 2022 and patients were assessed before and after therapy. Improvements in facial function was objectively assessed using the Sunnybrook Facial Grading Scale, while subjective patient-reported progress was evaluated using key aspects of the FACE-Q questionnaire. An online questionnaire captured patient experience and service improvement recommendations.

Findings and conclusions: Facial function objectively improved significantly after physiotherapy, with the magnitude of improvement highest at 89% in the 12-month follow-up cohort. Patients reported an up to 40% subjective improvement in function and appearance. Patients commented that the clinic should be widely advertised and accessible to all. Overall, early data suggests that the MDT clinic model was associated with positive patient experience and measurable functional benefit.

180: FEASIBILITY OF LOW-COST 3D PRINTED MANDIBULAR MODELS FOR PRE-PLATING IN FIBULA FREE FLAP RECONSTRUCTION IN A REGIONAL TASMANIAN CENTRE

Rachna Ram,[1] Cameron Scott,[2] Michael Thomson[1]

[1] *Department of Plastic and Reconstructive Surgery, Launceston General Hospital, Launceston, Australia;* [2] *Department of Maxillofacial Surgery, Launceston General Hospital, Launceston, Australia*

Background: 3D printed patient-specific guides and plated or virtual surgical planning (VSP) have aided accuracy in mandibular reconstruction, but remain costly and inaccessible for many regional units. Low-cost inhouse 3D printing could offer an alternative to support surgical planning and reduce ischaemia time during fibula free flap reconstruction in head and neck surgery.

Objectives: To describe the feasibility and clinical utility of low-cost 3D printed mandibular models used for preoperative plate contouring in mandibular reconstruction and head and neck surgery.

Methods: Patients undergoing segmental mandibulectomy with free fibula flap reconstruction between June 2024 and December 2025 at a regional plastic surgery unit were included. Preoperative CT data were used to generate 3D reconstructions of the mandible and 3D printed in polylactic acid (PLA) using a desktop 3D printer, then transported interstate to the operating centre. A sterile carrier allowed mandibular reconstruction plates to be precontoured on the model prior to completion of tumour resection, enabling fibula plating in situ before pedicle division and transfer.

Findings: Low-cost printed models enabled satisfactory pre-bending of reconstruction plates prior to completion of tumour resection, facilitating earlier flap inset and reducing intraoperative contouring during the ischaemic phase. When the tumour was also eroding into bone, these models further served as adjuncts to aid resection margin planning. The workflow was reproducible and inexpensive, with a material cost of under AU$100 per model.

Conclusions: Desktop 3D printing provides an accessible adjunct for mandibular reconstruction in regional settings. This approach may improve operative efficiency while avoiding the cost of commercial VSP systems.

187: MESENCHYMAL STEM CELLS BASED CRAFT WORK FOR FACIAL SCARS AND AESTHETICS

Afzaal Bashir

Jinnah Hospital, Lahore, Pakistan; King Edward Medical University, Lahore, Pakistan

Background: Post-traumatic scars and contour defects are of very much concern in facial aesthetics. Similarly, acquired defects through infection are also associated with pigmentation, as well as scarring and contour issues, making them of complex nature. Scars of surgery or trauma on the face make it really challenging to treat or even hide, particularly in the central face. Likewise, scars of acne are multiple, pigmented and of varied depth. Many remedies are under practice, like surgical excision, fillers, resurfacing, tattoo and camouflage, but none of these is successful in obliviating them satisfactorily.

Objective: To highlight a reliable and reproducible solution using mesenchymal stem cells (MSCs) for facial scarring and aesthetics.

Methodology: Lecture comprises a compiled presentation of our own studies published at different times for scarring, pigmentation and contour issues of face for the understanding of physicians to apply in their practice to have appealing aesthetic outcome. Three hundred patients of both genders treated for facial issues like scarring, pigmentation and contour defects on the face.

Findings: Mean age of patients was 29.42 (1.37) and 81% of patients were females. Cheeks were involved in 39% of cases, lateral forehead in 28% of cases, nose in 23% of cases and chin in 10% of cases. Significant improvement in Vancouver Scale score of scars, marked decrease in pigmentation and tremendous settlement in contour defect was noticed. The majority of our patients were highly satisfied.

Conclusion: Mesenchymal stem cells are an exquisite tool in the management armamentarium of facial scars and aesthetics.

188: A 10-YEAR RETROSPECTIVE REVIEW OF HAND TRAUMAS IN THE TOP END: AN INDIGENOUS PERSPECTIVE

Debanjan Ghosh, Shiby Ninan

The Royal Darwin Hospital, Darwin, Australia

Background: The Northern Territory (NT) presents unique healthcare challenges due to its remote geography, high rates of injuries and distinct and sizeable Indigenous population. Hand traumas, including fractures and human bite-related infections, are common causes of hospitalisation and are frequently associated with alcohol use, interpersonal violence, delayed presentation and poor treatment compliance. There is a paucity of Australian data comparing these injuries between the Indigenous and non-Indigenous populations.

Objectives: To review the epidemiology, risk factors, injury patterns, presentation and treatment compliance of hand fractures and human bite-related hand infections in the Indigenous and non-Indigenous populations in the NT.

Methods: A retrospective review was conducted using Royal Darwin Hospital databases. Hand fractures and fight bite infections presenting between January 2007 and December 2017 were analysed. Data collected included age, sex, Indigenous status, injury type, anatomical location, presentation patterns, associated risk factors, and treatment completion. Ethics approval was obtained through the Menzies School of Health Research (HREC 2019-3380).

Findings: A total of 996 hand fractures were identified, with Indigenous patients accounting for 40% of presentations despite comprising only 29% of the local population. The mean age was 26 years, with a predominance of males. Metacarpal fractures were the most common injuries, followed by phalangeal fractures. Human bites notably accounted for 48% of Indigenous hand infections, substantially higher than rates reported in

the general population. The upper limb was the most commonly affected region (91.3%). Common pathogens were cutaneous and oropharyngeal flora. Alcohol use (90%), drug use (30%), interpersonal violence, young age, male sex, Indigenous status and remote residence were major associated risk factors for both types of injuries. Delayed presentation and abscondment were significantly higher in Indigenous patients, with treatment completion rates of 73% for fractures and 47.5% for antibiotic therapy in bite injuries.

Conclusions: Hand trauma and human bite-related infections are disproportionately high in the Indigenous population of the NT and are associated with delayed presentation, treatment non-compliance, and increased complication risk. Social determinants, including alcohol misuse, drug use, remoteness and cultural barriers, contribute significantly to injury burden and poorer health outcomes. Improved prevention strategies, culturally appropriate healthcare delivery, Indigenous health worker engagement and greater resource allocation to remote communities are the need of the hour to improve outcomes in this unique setting.

189: OCCULT NODAL METASTASIS IN LIP SQUAMOUS CELL CARCINOMA: IMPLICATIONS FOR ELECTIVE NECK DISSECTION IN A FIVE-YEAR TERTIARY CENTRE REVIEW OF SURGICAL OUTCOMES AND RECURRENCE

Moshin Khan, Darryl Dunn

Royal Brisbane and Women's Hospital, Brisbane, Australia

Purpose: The role of elective neck dissection (END) in clinically node-negative cutaneous squamous cell carcinoma (cSCC) of the lip remains controversial. This study evaluates nodal outcomes, recurrence patterns and predictors of nodal metastasis following surgical excision in a tertiary head and neck unit over five years.

Methodology: A retrospective review was conducted of all patients undergoing surgical excision for primary lip cSCC between January 2018 and December 2022. Data collected included tumour stage, depth of invasion, perineural invasion (PNI), histological grade, clinical nodal status, neck dissection (ND), postoperative radiotherapy and recurrence. Multivariate logistic regression identified independent predictors of nodal metastasis.

Results: Two hundred and three patients were included with a mean follow-up of 28.2 months. Tumours were staged T1 (108), T2 (9), T3 (81) and T4 (5). Thirty-eight neck dissections were performed for confirmed/suspicious nodes. Eighteen patients had clinically positive necks, with nodal metastases confirmed in nine (47.4%). Occult disease was detected in eight of 22 clinically node-negative necks (36.4%). Univariate analysis demonstrated nodal recurrence in 22.2% of patients with clinically positive neck disease confirmed by END, 0% of patients with clinically negative neck disease confirmed on END and 8.7% of T2–T3 patients managed without END. Nodal metastases were primarily identified in T3 patients (12). There were 17 local recurrences and 13 nodal recurrences after primary treatment. Multivariate analysis (n = 203) demonstrated T stage was the predominant independent predictor of nodal metastasis: T2 (OR 22.1, 95% CI 3.5–138.2, $p = 0.001$), T3 (OR 13.4, 95% CI 5.0–36.1, $p < 0.001$), and T4 (OR 39.7, 95% CI 3.1–506.2, $p = 0.005$).

Discussion: Occult nodal disease exceeded published rates of 11–23%.[1] Advancing T stage was the dominant predictor of metastasis, supporting selective END in higher-stage disease while underscoring the need for clearer selection criteria and prospective validation.

Reference

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190: HUMAN AND PORCINE MODELS FOR THE EX VIVO PERFUSION OF FREE FLAPS USING EXTRACORPOREAL MEMBRANE OXYGENATION

Serag Saleh,[1,2,3] Andrew Dinale,[4] Claudio Soto,[4] Soloman Saleh,[2,5] Diana Barez,[6] James Southwell-Keely,[1] Elias Moisidis,[1,2] Rebecca Deans,[3,7] James Yeates,[3,8] Vlad Illie[1]

[1] Department of Plastic and Reconstructive Surgery, St Vincent's Hospital, Sydney, Australia; [2] St Vincent's Centre for Applied Medical Research, Sydney, Australia; [3] University of New South Wales, Sydney, Australia; [4] Department of Cardiac Perfusion, St Vincent's Hospital, Sydney, Australia; [5] University of Sydney, Sydney, Australia; [6] University of Notre Dame, Sydney, Australia; [7] Royal Hospital for Women, Sydney, Australia; [8] Department of Anaesthetics, St Vincent's Hospital, Sydney, Australia

Background: Ex vivo normothermic perfusion offers a promising platform for maintaining viable human tissue for reconstructive and tissue engineering research. Current literature remains heterogeneous regarding optimal perfusion systems and without robust validation in human tissue models.

Objectives: To validate a clinically relevant ex vivo tissue perfusion platform using extracorporeal membrane oxygenation (ECMO) through systematic literature review, technical in-vitro studies, and translational porcine and human studies.

Methods: A systematic review evaluated current ex vivo free flap perfusion modalities. Technical in vitro studies compared whole blood and packed red blood cell (pRBC)-based perfusates with variable plasma components. Consecutive porcine free flaps (n = 15) and human abdominal free flaps (n = 9) underwent normothermic ECMO perfusion until tissue demise. Viability was assessed clinically and biochemically, while iterative optimisation of circuit design and perfusion parameters was performed.

Findings: Literature review demonstrated superior preservation with normothermic machine perfusion compared with alternative techniques. In vitro testing identified pRBC-plasma as the optimal perfusate, demonstrating improved biochemical performance without increased thrombogenicity. Human tissue achieved a mean survival of 3.8 days (maximum eight days), exceeding most published reports, while porcine tissue survived a mean of 24 hours (maximum 39 hours). Venous congestion secondary to macro- and microvascular compromise remained the principal cause of tissue failure in both models.

Conclusions: Normothermic ECMO perfusion of free tissue is feasible and provides a reproducible translational platform for prolonged ex vivo tissue preservation. Optimised pRBC-plasma perfusates and iterative circuit refinement substantially improves tissue longevity and may establish a foundation for future applications in reconstructive microsurgery, amputated limb retrieval, and tissue engineering and biofabrication.

191: DEVELOPMENT OF A LOW-COST FLUORESCENT IMAGING TECHNIQUE TO MONITOR VASCULAR PERFUSION IN HUMAN TISSUE OR ENGINEERED MATERIALS

Serag Saleh,[1,2,3] Soloman Saleh,[2,4] Thao Nhu Anne Marie Vuong,[2,3] Sai-Kishan Paladee,[2,3] Elias Moisidis,[1,2] Rebecca Deans,[3,5] James Yeates[3,6]

[1] Department of Plastic and Reconstructive Surgery, St Vincent's Hospital, Sydney, Australia; [2] St Vincent's Centre for Applied Medical Research, Sydney, Australia; [3] University of New South Wales, Sydney, Australia; [4] University of Sydney, Sydney, Australia; [5] Royal Hospital for Women, Sydney, Australia; [6] Department of Anaesthetics, St Vincent's Hospital, Sydney, Australia

Background: Reliable monitoring of microvascular perfusion is critical to the success of free tissue transfer, with early detection of vascular compromise central to flap salvage. Existing perfusion monitoring technologies, including commercial near-infrared fluorescence systems, are limited by high cost, restricted availability, and limited adaptability to diverse clinical and research settings. There is a clear need for accessible, low-cost alternatives that provide objective and reproducible assessment of flap perfusion without compromising diagnostic utility.

Objectives: This project aims to develop and validate a low-cost and accessible fluorescent imaging technique to monitor vascular perfusion in tissue, suitable for both clinical applications and experimental applications in tissue engineering.

Method: A customised imaging system was developed using commercially available low-cost optical camera components and an indocyanine-green contrast agent. Perfusion detection was assessed in vitro in a synthetic substrate and ex vivo in a porcine free flap model.

Findings: The imaging system enabled real-time visualisation of perfusion patterns within artificial and biological substrates to a level of accuracy sufficient to detect vascular compromise. In both the synthetic and porcine models, blood flow in macro- and microvasculature was demonstrated in real time, with compromise detected qualitatively with serial imaging to assess changes in perfusion characteristics over time.

Conclusions: This study demonstrates the feasibility of a low-cost fluorescent imaging technique for monitoring vascular perfusion in free flaps. By substantially reducing financial and technical barriers, this approach has the potential to expand access to objective perfusion monitoring and improve flap surveillance in both resource-limited and research settings.

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