

Oral Presentation | Free paper (Nerve)

P02

Aligned core-shell fibrous nerve wrap containing Bletilla striata polysaccharide improves functional outcomes of peripheral nerve repair

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Background: Peripheral nerve injuries are commonly encountered in extremity traumas. Their motor and sensory recovery following microsurgical repair is limited by slow regeneration speed (<1 mm/d) and subsequent muscle atrophy, which are consequently correlated with the activity of local Schwann cells and efficacy of axon outgrowth.

Objective: To promote post-surgical nerve regeneration, we synthesized a nerve wrap consisting of an aligned polycaprolactone (PCL) fiber shell with a Bletilla striata polysaccharide (BSP) core (APB).

Methods: Material characterization including electromicroscopy and drug release were evaluated. *In vitro* studies included neurite outgrowth and Schwann cell activity assays. *In vivo* studies included the functional assessment of rat sciatic nerve transection/repair model as well as subsequent histology evaluation.

Results: Cell experiments demonstrated that the APB nerve wrap markedly promoted neurite outgrowth and Schwann cell migration and proliferation. Animal experiments applying a rat sciatic nerve repair model indicated that the APB nerve wrap restored conduction efficacy of the repaired nerve and the compound action potential as well as contraction force of the related leg muscles. Histology of the downstream nerves disclosed significantly higher fascicle diameter and myelin thickness with the APB nerve wrap compared to those without BSP.

Conclusion: The BSP-loaded nerve wrap is potentially beneficial for the functional recovery after peripheral nerve repair and offers sustained targeted release of a natural polysaccharide with good bioactivity.

P05**Evaluating the Impact of Facial Feminization Surgery on Transgender and Gender Non-Conforming Individuals: A Prospective Cohort Study**

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Introduction: Facial feminization surgery (FFS) encompasses a suite of cosmetic and reconstructive procedures aimed at altering masculine facial features to align more closely with societal perceptions of femininity. These procedures can include, but are not limited to, forehead contouring, jaw and chin reshaping, rhinoplasty, and Adam's apple reduction. The significance of FFS extends beyond the realm of aesthetic surgery, as it plays a critical role in the gender transition process for many transgender women and gender non-conforming individuals. The desire for facial feminization stems not only from the pursuit of personal identity alignment but also from the need to be socially recognized in their affirmed gender, which can significantly impact psychological well-being and social integration. Despite the crucial role of FFS in gender-affirming care, there exists a notable gap in the literature regarding quantitative assessments of its outcomes. This study aimed to evaluate the impact of FFS on transgender and gender non-conforming individuals using a novel quantitative metric, the Facial Feminization Outcome Score (FFOS).

Methods: In this prospective cohort study, 19 participants undergoing FFS between January 2023 and December 2023 were enrolled. The FFOS, which includes assessments of psychological well-being, social integration, and satisfaction with facial aesthetics, was calculated preoperatively, and at 6 months postoperatively. Scores ranged from 0 (worst outcome) to 100 (best outcome). Changes in FFOS over time were analyzed using paired t-tests and linear regression models to identify predictors of outcome improvement.

Results: The mean preoperative FFOS was 40 (SD = 15), indicating moderate dissatisfaction with facial aesthetics and its psychosocial impact. At 6 months postoperatively, the mean FFOS increased significantly to 70 (SD = 10) ($p < 0.05$), with further improvement to 75 (SD = 9) by 12 months ($p < 0.05$ compared to preoperative score). Notably, improvements in psychological well-being and social integration contributed most to the increase in FFOS. Younger participants and those with higher preoperative self-esteem experienced more significant improvements. The complication rate was 10%, predominantly consisting of minor complications that did not require surgical revision.

Conclusion: FFS significantly enhances facial aesthetics, psychological well-being, and social integration for transgender and gender non-conforming individuals, as demonstrated by marked improvements in the FFOS. The study highlights the transformative potential of FFS within the spectrum of gender-affirming care and emphasizes the necessity for standardized outcome measures to evaluate and improve surgical practices comprehensively.

Oral Presentation | Free paper (Breast)

P06

Non-invasive visualization of the midline-crossing arterial variation in the deep inferior epigastric artery perforator flap using photoacoustic tomography

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Background: The importance of the subcutaneous arterial network crossing the midline in transverse abdominal flaps has been reported. Photoacoustic tomography can be used to noninvasively visualize subcutaneous vascular networks.

Objective: We applied this novel technology preoperatively in patients undergoing breast reconstruction to detect individual variations in the midline-crossing arteries.

Methods: Six patients scheduled to undergo breast reconstruction using free deep inferior epigastric artery perforator flaps were examined. Each scan of the 12×8-cm region took approximately 8 min. The accuracy of the tentative arteries evaluation defined by photoacoustic tomography was compared with the arterial phase detected by intraoperative indocyanine green angiography. The number of perforator vessels used for the flap, surgical time for flap elevation, and perfusion area ratio were compared with those of the control group.

Results: The average match rate between tentative arteries prediction by photoacoustic tomography and arterial-phase assessment by intraoperative angiography in 5 patients was 81.1%. Each midline crossing artery showed individual variations. The photoacoustic tomography group (PAT-1 to 5) showed 1.8 perforators per flap, 163 minutes for flap elevation, and 93% perfusion area, with no significant differences from the control group (N=5). A 63-year-old woman (PAT-6) with abdominal scars, including a midline abdominal incision, showed a preserved midline crossing artery. The planned single perforator deep inferior epigastric perforator flap was successfully applied.

Conclusion: Photoacoustic tomography noninvasively visualizes the subcutaneous midline-crossing arterial networks. Understanding individual vascular variations can support preoperative planning and surgical indication of abdominal flaps, especially in patients with postsurgical scars.

Oral Presentation | Free paper (Craniofacial/ Others)

P07

Real-time navigation for thinning of anterolateral thigh flap using photoacoustic imaging and projection mapping

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Background: Thinning of anterolateral thigh flaps is challenging. An anatomical study showed variations in arterial branching patterns in the subcutaneous layer, which was suspected to be the reason for the high frequent thinning failures. The microdissection procedure is the only way to make the primary thinning procedure safer; however, its performance is not widespread due to its complexity and the risk of flap necrosis. Photoacoustic tomography noninvasively visualizes the subcutaneous vascular network.

Objective: We report the challenge of fusion with a real-time projection system, which enables real-time surgical navigation using indocyanine green emission signals, to make the flap thinning procedure more applicable.

Methods: A 69-year-old woman underwent half-tongue resection using the pull-through method for right tongue cancer. Preoperative photoacoustic imaging showed tentative arteries and veins using the S-factor, an approximate value correlated with hemoglobin oxygen saturation, by switching pulse-to-pulse wavelengths of 756 and 797 nm. PAT imaging was performed five days before the surgery. A 12×6-cm area took approximately 8 min. We used an indocyanine green test card cut into strips to show tentative artery lines by projection mapping. The transparent vascular map was laminated and sterilized.

Results: Medical imaging projection system captured the ICG fluorescence signals that penetrated the anterolateral thigh flap and continuously projected the purple area, guiding the position of the tentative subcutaneous arteries. Active bleeding was observed when we cut the marginal fat tissue near the projected purple line.

Conclusion: The fusion of photoacoustic tomography and real-time projection mapping is another innovation in navigational flap surgery.

Oral Presentation | Free paper (Skin/Burn/Wound Healing 1)

P09

Chilling in the Tropics: Management and Outcome of a Frostbite injury secondary to Refrigerant Burn, a case report

Lionico_A Marquez, Jeffrey_M Rafael, Karlo Capellan, Alexandra Tan-Gayos
Rizal Medical Center

Background: This case report highlights the course of an injury rarely encountered in a tropical country, attained through unusual means.

Objective: This paper aims to describe the course and management of a frostbite injury that is rarely encountered in the country. This paper also aims to provide information to aid in future management of similar injuries.

Methods: We are presented with a 32-year-old male, air-conditioning technician who came into the ER with a chief complaint of blisters over the left hand, after patient had direct exposure to refrigerant fluid. Patient arrived at our institution 1 hour post injury, where immediate debridement and dressing with silver sulfadiazine and moist to dry dressing was done. Patient was admitted and managed as a case of burn injury, by daily wound monitoring, cleaning and dressing, and provision of adequate pain control.

Results: Patient was sent home well with close follow ups at the out-patient department.

Conclusion: We are presented with a case of a cryogenic refrigerant injury who was seen and managed in a tertiary institution in the Philippines. Patient was treated from time of injury to 35 days post injury, or from time of disability to time of return to full functionality of affected limb.

Oral Presentation | Free paper (Breast)

P10

A RARE ENCOUNTER: BREAST IMPLANT CAPSULAR CONTRACTURE IMMEDIATELY PRECEDED BY HERPES ZOSTER, A CASE REPORT

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Rizal Medical Center

Background: This case report documents a rare occurrence of a patient presenting with a grade IV breast implant capsular contracture which is preceded by a herpes zoster infection affecting the post-operative site.

Objective: This case report investigates a rare case of periprosthetic herpes zoster infection potentially contributing to the development of grade IV capsular contracture in a breast implant recipient.

Methods: We present an 80-year-old female, initially diagnosed with varicella during her teenager years, who was complaining of pain from both postherpetic neuralgia and breast implant capsular contracture. Patient underwent breast implant explantation with partial capsulectomy. Specimens were sent for gram stain, culture studies and for histopathologic assessment to rule out infection and malignancy.

Results: Microbiological analysis of explanted tissues and fluids revealed no bacterial growth. Histopathological examination confirmed benign findings with no evidence of malignancy. The patient's post-operative course was uneventful and was discharged on post-operative day three. At follow-up visits, patient reported complete resolution of pain associated with both capsular contracture and postherpetic neuralgia and a fully epithelialized post-operative site.

Conclusion: Patient was managed promptly by removal of the breast implant and capsule to rule out possible infection and the possibility of an implant associated malignancy. Patient's main concern of pain, caused by the implant and as a sequela of the Herpes Zoster, was addressed and resolved according to the patient. This case report stresses the attention on this rare occurrence between herpes zoster infection and breast implant capsular contracture as management requires early diagnosis and prompt treatment.

Oral Presentation | Free paper (Regenerative medicine)

P11**Clinical study on autologous concentrated growth factors promoting skin regeneration**

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Background: Skin repair and regeneration are important issues in plastic surgery. Autologous Concentrated Growth Factor (CGF), a product containing multiple growth factors, may have the effect of promoting skin regeneration.

Objective: To evaluate the role of CGF in promoting tension-induced skin regeneration and promoting hair growth.

Methods: The authors conducted a serial studies to evaluate the efficiency of autologous concentrated growth factor (CGF) in promoting skin regeneration and hair follicle growth. (1) A single-center randomized controlled trial was conducted from 2016 to 2019. Participants undergoing skin expansion received either CGF or saline by means of intradermal injection on the expanded skin (0.02 mL/cm²), for a total of three treatments at 4-week intervals. The primary endpoint was the expanded skin thickness at 12 weeks, which was measured by ultrasound. (2) A double-blinded within-subjects randomized clinical trial was conducted on 16 male AGA patients who showed limited improvement after MXD treatment. Eligible participants received three CGF injections on half of the scalp and the placebo on the other side at 4-week intervals, and MXD was applied twice daily on both sides throughout the follow-up period. The primary endpoint was the hair growth ratio at V4.

Results: (1) In the RCT study of CGF treating expanded skin, 26 patients were enrolled and assigned to the CGF or control group. Compared with the control group, the CGF group had significantly increased skin thickness at 8 and 12 weeks. Compared with the baseline thickness, skin thickness was sustained in the CGF group at 8 weeks after treatment (−0.1 to 0.3 mm; $P = 0.711$) but decreased in the control group (0.3 to 0.7 mm; $P < 0.001$). At 12 weeks, the CGF group showed greater increases in surface area (control, 77.7 ± 18.5 cm²; CGF, 135.0 ± 15.7 cm²; 7.2 cm² to 107.4 cm²; $P = 0.027$). (2) In the trial of CGF treating AGA, each half of the scalp was randomly assigned to the MXD+CGF or MXD group. The MXD+CGF group had significant improvements in hair density, HG ratio, and T/V ratio compared with the MXD group over the follow-up period. Unexpectedly, the MXD+CGF treatment hastened HG, which was sustained for 3 months after discontinuation.

Conclusion: The findings of these studies indicate that it is practically feasible to improve skin regeneration and hair growth by applying autologous platelet concentrate therapy.

Oral Presentation | IPSRC Best paper session

P12**Development of Automated Assessment and Classification of Open Wound using Deep Learning Approaches**Yi-Syuan Shin¹, Chia-Ling Wu², Yu-Lin Chen², Shyh-Hau Wang², Yuan-Yu Hsueh¹¹ Department of Plastic and Reconstructive Surgery, National Cheng Kung University Hospital² Department of Computer Science and Information Engineering, National Cheng Kung University**Background:**

Wound care has long been a critical issue, with the advanced wound care market expected to exceed \$22 billion by 2024. Chronic wounds in elderly or diabetic patients necessitate prolonged monitoring. However, frequent visits to medical facilities can be burdensome, reducing patients' willingness to seek medical care, especially in the pandemic era. This reluctance can impede timely wound assessments, leading to delayed treatment and potentially worsening conditions. Moreover, effective wound assessment heavily relies on the experience of healthcare professionals, making it challenging and time-consuming to accurately evaluate wound conditions in critical cases.

Objective:

To develop a method for image-based automated wound assessment and tissue type classification.

Methods:

A dataset of 1,608 images was utilized, applying specific preprocessing techniques such as distortion correction, color calibration, color space transformation, denoising, and color space reduction. Four deep learning models were compared for wound and tissue segmentation.

Results:

The Feature Pyramid Network (FPN) model demonstrated superior accuracy in both tasks. In wound segmentation, the Intersection over Union (IoU) and Dice coefficient were 88.13% and 92.72% respectively. While in tissue segmentation, the IoU and Dice coefficient were 76.72% and 82.13% respectively. The analysis of wound images was completed in approximately 4 seconds.

Conclusion:

This system enables efficient real-time wound assessment by automatically calculating the wound area and tissue percentage to determine a healing score. This score evaluates wound healing status and the need for medical intervention.

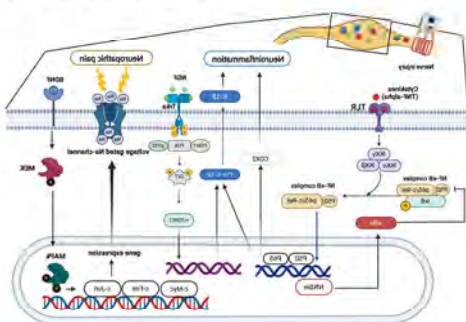


Summary graphic: Our method provides efficient, real-time automated wound assessment and tissue type classification once the images of wound are captured.

Application of ultrahigh frequency transcutaneous electrical nerve stimulation for alleviation of neuropathic pain and neuroinflammation modulation in rat sciatic nerve chronic constriction injury

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Conclusion: UHF-TENS provided a promising outcome for effectively and safely alleviating neuropathic pain. The decreased production of pain-related neuropeptide and inflammatory signals within the DRG neurons provided the therapeutic benefit. Possible molecular mechanisms by UHF-TENS might result from the modulation of the NF- κ B complex, toll-like receptor-7, and phosphoinositide 3-kinase/Akt signaling in sensory neurons.



P14**Research on the Optimization and Evaluation of an Autofluorescence Point-of-Care Device for Bacterial Species Identification**

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Background Rapid identification of bacterial species is essential for effective treatment of infectious diseases. Especially after surgical debridement of soft tissue infections, the species and antimicrobial susceptibilities need to be known as quickly as possible in order to use antimicrobials of the necessary and sufficient spectrum coverage. Conventional methods are accurate but time-consuming and require extensive sample preparation and specialised equipment.

Objective To develop a new point-of-care instrument for bacterial species identification using fluorescence spectroscopy based on autofluorescence, to evaluate the accuracy of bacterial species diagnosis using machine learning, and to discuss the instrument-loading requirements for this purpose.

Materials & Methods Autofluorescence of 10 clinically relevant bacterial strains was analysed using fluorescence spectroscopy. The diagnostic accuracy of varying the number and combination of excitation wavelengths was analysed using a machine-learning classification algorithm, and the optimal wavelengths were investigated using Bayesian optimisation.

Results There was general agreement between the algorithms on the optimal wavelength and number of wavelengths for bacterial species diagnosis. Autofluorescence spectra from approximately three or more wavelengths in the UV region gave diagnostic accuracy of more than 98.5%, which is equivalent to an exhaustive examination of all wavelengths.

Conclusions The results show that bacterial species may be accurately identified by measuring only a few key excitation wavelengths. This may create a rapid and cost-effective test method suitable for clinical diagnosis.

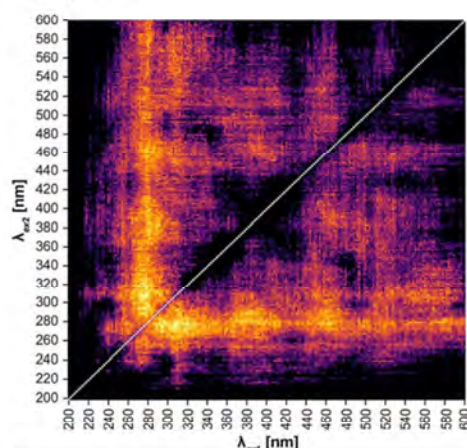


Figure 1 Distribution of diagnostic accuracy for each combination of two excitation wavelengths for each algorithm. The diagnostic accuracy of the bacteria species is pseudo-colored in the range from 0.9 to 0.99.

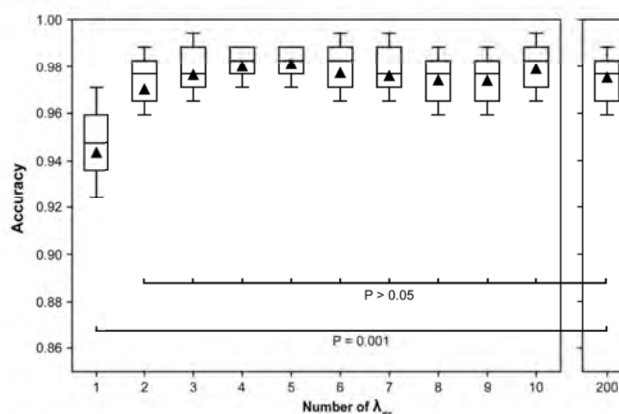


Figure 2 Change in the diagnostic accuracy for each number of excitation wavelengths. The best combination of 1 to 10 excitation wavelengths (left frame) and the use of all 200 excitation wavelengths (right frame) were compared when sample data were randomly cross-validated. The top of the box is 75%, the bottom is 25%, the horizontal line in the box is the median, and the triangle in the box is the mean. The P-values from the Dwass-Steel-Critchlow-Fligner (DSCF) test are listed at the bottom of the graph.

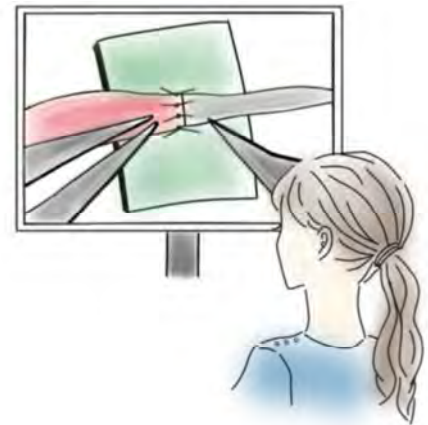
P15**Super Microsurgical Education Using Papers with Online Video Clips**

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Purpose

With the recent development of surgical microscopes and surgical instruments, as well as the widespread use of surgical treatments such as lymphatic venous anastomosis for lymphedema, opportunities for anastomosis of blood vessels and vascular vessels smaller than 1 mm have increased exponentially. In this presentation, the advantages of surgical technique education of super-microsurgery using papers with online video clips are reported.

**Methods**

In super-microsurgery, such as lymphaticovenular anastomosis, the diameter of the target vessel is small and difficult to handle, and the basic surgical technique of microsurgery, such as inserting a forceps into the lumen and applying a counter, is difficult. The most effective way to learn such super microsurgical techniques is for skilled surgeons to teach them to novices.

Results

We reported a paper (*Onoda S et al. J Vasc Surg Venous Lymphat Disord. 2023*) presenting super-micro surgical techniques for LVA in video format and have used it for surgical education. The advantages of viewing surgical procedures on video include being able to view them anywhere, the ability to view them many times, and the ability to zoom in on the detail. Other articles with surgical video clips with various situations of super-microsurgery are already published.

Discussion

Only a few surgeons are familiar with super microsurgical techniques, and in many cases, there are no surgeons in or near their own institutions. Since super-microsurgery is more dependent on the surgeon's senses than on verbal explanations, image training using videos is even more critical.

P16**Mechanical stretching can modify the papillary dermis pattern and papillary fibroblast characteristics during skin regeneration**

Poh-ching Tan, Shuang-bai Zhou, Qing-Feng Li

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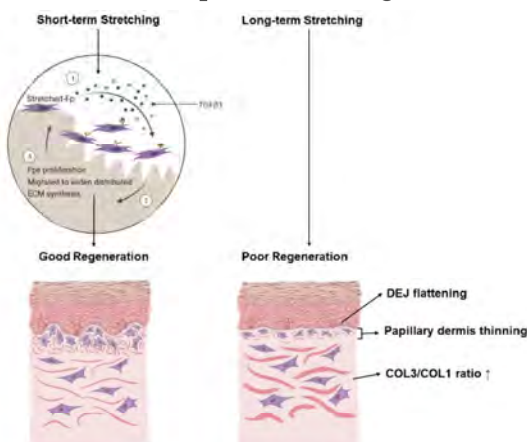
Background: The clinical use of mechanical stretching for skin repair is well-documented, yet its impact on specific fibroblast subpopulations remains unclear.

Objective: This study focused on evaluating changes in dermal structure and papillary fibroblasts (Fp) in regenerated human skin following skin expansion procedures.

Methods: Human regenerated skin samples were categorized into well-regenerated and poorly-regenerated groups based on observations, with histological verification of dermal extracellular matrix (ECM) deposition. Immunohistochemical analysis stained Fp and other lineage markers. By establishing a rat skin expansion model, researchers investigated ECM and Fp alterations in the papillary dermis through histological and molecular evaluations.

Results: Exhausted skin regeneration caused dermal-epidermal junction (DEJ) flattening, papillary dermis thinning, and an increase in the type III collagen (COL3)/type I collagen (COL1) ratio with upregulated hallmarks of aging. Well-regenerated skin displayed a notable increase in the Fp population. These findings aligned with the rat model, where upregulated TGF β 1 notably distinguished well-regenerated skin. Activation of the TGF β 1/Smad2/3 pathway improved exhausted skin regeneration and resulted in increased collagen content and Fp proliferation, while pharmacological inhibition of TGF β 1 action impacted well-regenerated skin. Short-term mechanical stretching that promoted skin regeneration enhanced Fp proliferation, extracellular matrix (ECM) synthesis, and increased TGF β 1 expression, leading to good regeneration.

Conclusion: This work shows the mechanism of mechanical stretching in well skin regeneration that enhances Fp proliferation and ECM synthesis via the TGF β 1/Smad2/3 pathway, and highlights a crucial role of Fps in stretching-induced skin regeneration. (Word count:250)



Oral Presentation | IPSRC APRAS award session 2

P17

Therapeutic Potential of Follicular Epithelial Cells Derived from Different Portions of Hair Follicle for Wound Healing and Epithelization

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Jichi Medical University

Background: Human hair follicle is consistent of epithelial stem cells, progenitor cells and various lineages of keratinocytes. It was presented that the different portions of human hair follicle showed different patterns of biomarker expressions.

Objective: This study investigated the therapeutic potential of follicular epithelial cells (FECs) derived from different portions of hair follicle for wound healing and epithelization.

Methods: A novel method was developed to isolate FECs from different regions of hair follicles: the upper and lower outer root sheath and the bulb epithelial cells, designated as UECs, LECs, and BECs, respectively. Proliferative capacities and biomarker expressions of cultured FECs were assessed, comparing them with epidermal epithelial cells (EECs). *In vivo* wound healing and epithelialization were evaluated using an immunodeficient NOD-SCID mouse model following topical treatment with each cell population. Histological analyses were conducted on the healed skin samples. Additionally, hair regeneration was examined after sacrificing the bulb of rat whiskers to evaluate clinical donor site deficits.

Results: BECs exhibited the highest proliferative capacity and contained the fewest differentiated CK10+ epithelial cells compared to other populations. All cell-treated groups, including FECs and EECs, demonstrated positive effects on wound healing and epithelization *in vivo* compared to the vehicle-treated control group, with the BEC-treated group showing superior outcomes. Histological examination revealed thinner and smaller scar areas and a greater number of surviving human-derived cells localized in the regenerated epidermis in the BEC-treated group. In the rat model, whiskers and follicles regenerated 2 months after bulb removal, albeit thinner and shorter.

Conclusion: Human scalp hair follicle-derived epithelial cells, particularly BECs, hold promise as therapeutic agents for promoting epithelialization due to their high proliferation and engraftment capacities. Minimal donor site damage was observed after sacrificing the follicular bulb, suggesting negligible hair loss.

Oral Presentation | Free paper (Aesthetic/ Gender/ Cancer)

P18

**Subfascial breast augmentation in transfemale patient:
A report of cases**

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Background: Breast augmentation is an important part of gender-affirming surgery. One of the key decision in breast augmentation in trans-female patient is in which plane to insert the implant. A commonly cited disadvantage of subpectoral plane is animation deformity and implant displacement. Because of the relatively larger pectoralis muscle, subglandular augmentation was the most preferred option in transfemale patient throughout the past decade. However, dual-plane subpectoral pocket is also a useful plane, especially in thin patient without adequate soft-tissue. Subglandular plane and dual plane has its own advantages and drawbacks. Subfascial plane offers several advantages over these two techniques.

Objective: Focusing on the selection of pocket, the author sought to develop an ideal approach.

Methods: A retrospective chart review of patients for gender-affirming augmentation mammoplasty between 2020 and 2024 was performed. Seven Cases of gender-affirming breast augmentation surgery were performed. Patients assessments and outcomes were analyzed.

Results: Seven transfemale patients underwent augmentation mammoplasty. Three patients underwent with dual plane subpectoral pocket and four with subfascial pocket. One patient with dual plane pocket developed postoperative discomfort and animation deformity. The remaining six had favorable outcomes with smooth recovery. All patients were generally satisfied with the outcome.

Conclusion: There are significant anatomic differences is between cis-female and trans-female patient. Undoubtedly, selection of proper pocket plane is a key decision in trans-female breast augmentation. Considering all possible disadvantages of subglandular and dual-plane subpectoral technique, subfascial plane can be the primary option in transfemale patient who undergo breast augmentation. As the sample size is small, further investigation is needed.

P19

The m6A-RNA epitranscriptomic pathway-pharmacological targeting of METTL3 to inhibit scarring.

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Background: Scar formation is a significant clinical challenge with negative aesthetic and functional impacts. N6-methyladenosine (m6A) RNA modifications, which are reversible and the most dominant epitranscriptomic modifications on RNA, contribute to the regulation of wound healing and scarring pathways.

Objective: We aim to investigate the role of m6A RNA modification in scar formation by targeting the methyltransferase METTL3 complex with small-molecule inhibitors and activators. Our objective is to identify potential therapeutic interventions for scar management.

Methods: Firstly, we review current literature on m6A and scar formation, focusing on its impact on gene expression, fibroblast activation, inflammation, and angiogenesis. Secondly, we propose a pharmacological approach involving the use of METTL3 inhibitors and activators to modulate m6A levels and assess their effects on scar formation in preclinical models.

Results: By targetedly altering m6A modification levels during scar formation, we anticipate that inhibiting METTL3 may attenuate scar formation by suppressing fibroblast activation, ECM deposition, inflammation. Conversely, activating METTL3 may promote scar resolution by enhancing wound healing.

Conclusion: Our study will elucidate the potential of pharmacologically targeting METTL3 as a novel therapeutic strategy for scar management. Future research should focus on elucidating the specific mechanisms underlying the effects of METTL3 modulation on scar formation, optimizing the pharmacological properties of METTL3 inhibitors and activators, and evaluating their efficacy and safety in preclinical and clinical settings. Overall, targeting METTL3-mediated m6A RNA modification holds promise for the development of innovative therapies for scar treatment.

P20

Therapeutic effects of high fluence light emitting diode-red light on burn hypertrophic scars

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Background:

Hypertrophic scars (HS) pose a significant challenge for burn patients post-healing, affecting around 70% of cases and causing pain, itching, and disfigurement, impacting quality of life. Common self-management methods like scar massage and silicone-based products often fall short in efficacy. Medical interventions such as corticosteroid injections, fat transfer, and laser therapy, while effective, require physician oversight and are invasive. Light emitting diodes, proven effective for acne and photoaging, hold promise for HS treatment. Red light, with a wavelength of 610 to 760 nm, can penetrate the dermal layer, inhibiting fibroblast proliferation in vitro without affecting survival, suggesting potential for HS treatment. However, clinical trials have yielded varied therapeutic outcomes, necessitating further research.

Objective:

To evaluate the therapeutic effects of high fluence light emitting diodes-red light (HF-LED-RL) on rat burn hypertrophic scar model.

Methods:

A rat paw burn wound model was established using a heated metal block. Complete wound healing with hypertrophic scar formation occurred within three weeks. HF-LED-RL therapy, administered for three weeks at varying treatment durations, was implemented. Following treatment completion, scar tissue and the paw of the contralateral hindlimb (as normal skin tissue) were collected for scar assessment, which encompassed histological analysis and protein analysis.

Results:

H&E staining showed a reduced scar elevation index in the HF-LED-RL treatment group. Masson's trichrome staining demonstrated decreased collagen fiber density in the treatment group. Western blot analysis revealed lower levels of both Vimentin and alpha-SMA in the treatment group.

Conclusion:

HF-LED-RL can improve burn hypertrophic scars in rat models.

P21

Characterization of vasospasm in femoral arteries of arteriosclerotic model rats: Induction of vasospasm and negative effect of the vasodilator treatment on the spasm releasing

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Background

Vasospasm characterized by abnormal vasoconstriction is one of the difficult problems and remains a direct cause of flap loss, but the relationship between vasospasm and arteriosclerosis has not been known. The objective of this study was to establish an animal model of arteriosclerosis for assessing vasospasm, and to clarify the relationship between arteriosclerosis and vasospasm.

Methods

Twelve-week-old male Sprague–Dawley rats were fed a diet supplemented with adenine and vitamin D (adenine/vitD). Body weight, blood, and femoral artery histopathology were assessed at 2, 4, and 6 weeks. Change in the femoral artery was examined by transmission electron microscope (TEM). Vasospasm was induced by administering epinephrine extravascularly into the femoral artery and released by the treatment with lidocaine as a vasodilator. During this period, the extravascular diameter and blood flow were measured.

Results

The rats in the adenine/vitD group developed renal dysfunction, uremia, hyperphosphatemia, and elevated serum alkaline phosphatase. Histological and TEM analyses of the femoral arteries in the treated rats revealed the degeneration of elastic fibers and extensive calcification of the tunica media and intima. Vascular smooth muscles were degenerated and osteoblasts were developed, resulting in calcified arteriosclerosis. Vasospasm in arteriosclerotic arteries was detected; however, vasodilation as well as an increase in the blood flow was not observed.

Conclusions

This study revealed the development of vasospasm in the femoral arteries of the arteriosclerotic rats and, a conventional vasodilator did not release the vasospasm.

E-poster

P22**Minimum Number of Sutures for Microvascular Anastomosis during Replantation**

Hyungsuk Yi, Byeong Seok Kim, Yoon Soo Kim, Jin Hyung Kim, Hong Il Kim

Department of Plastic and Reconstructive Surgery, Kosin University College of Medicine

Background: Microvascular anastomosis is crucial for successful replantation, yet it faces challenges with smaller vessels, where increased suture number can impede reperfusion.

Objective: To assess whether a reduced suture number using a 2-point suture technique can enhance reperfusion and survival rates in microvascular anastomoses during replantation.

Methods: We retrospectively reviewed medical records from January 2017 to December 2021 for patients who underwent replantation involving vessels smaller than 0.3 mm in diameter. We compared outcomes between cases utilizing traditional suture techniques (three or four sutures) and those using a 2-point suture technique.

Results: Of the 21 cases reviewed, 19 replantations were successful. The 2-point technique was used in 12 cases, with 11 successful outcomes. Traditional suturing was applied in nine cases, with eight successes. Survival rates were slightly higher in the 2-point group, and fewer conversions to composite grafts were required compared to the traditional suture group.

Conclusion: The 2-point suture technique appears to offer a viable alternative to traditional methods, potentially increasing survival rates and decreasing the need for composite graft conversion in microvascular anastomosis during replantation. Further studies with larger sample sizes could validate these findings.

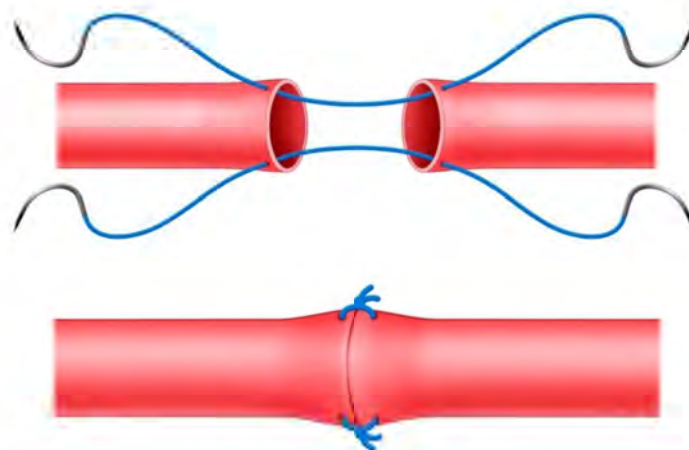


Figure 1. Schematic illustration of the 2-point suture technique.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 1)

P23

Preliminary Elucidation of Generative Artificial Intelligence Chatbots in Interpreting Clinical Images of Pressure Injuries

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Background: Since generative artificial intelligence (AI) has debuted in 2022, it greatly attract attention in many areas including medical fields. ChatGPT, one of the leading chatbots, released the model that can interpret the images in 2023.

Objective: To evaluate the accuracy of AI chatbots in staging pressure injuries through clinical image interpretation, we evaluated the potential usefulness of AI chatbots in staging pressure injuries using clinical images, which may be eventually helpful for early detection, facilitating subsequent treatment, and prevention of pressure injury deterioration.

Methods: A cross-sectional design was conducted to assess 5 leading publicly available AI chatbots. Mock images were downloaded and inputted into AI chatbots 10 times in November 2023. First, the scores in each session, from 0 to 10, were evaluated. Next, the accuracy in staging pressure injuries was compared for the 10 sessions.

Results: Among the 5 leading AI chatbots, only GPT-4 Turbo and BingAI Creative mode proceeded to the following study sessions. GPT-4 Turbo significantly outperformed BingAI in accuracy, especially in staging of pressure injuries. Overall, GPT-4 Turbo showed high accuracy across different stages, whereas, BingAI's performance was markedly lower as shown by t-test (83.0 % vs 24.0%; $P < .001$).

Conclusion: Among AI chatbots, GPT-4 Turbo was found to be highly effective in classifying pressure injuries, suggesting potential benefits in medical applications. Further advancement of AI chatbots along with increased amount of data input may aid in early detection and management of pressure injuries.

Oral Presentation | Free paper (Nerve)

P24

Adipose-derived stem cells via therapeutic modulation of neuroinflammation to recover peripheral compressive neuropathy

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² Institute of Clinical Medicine, National Cheng Kung University.

Background:

Compressive neuropathy is a common type of chronic traumatic injury for peripheral nerves. Clinical patients frequently present variable degrees of sensory and motor function impairments. To date, complete surgical decompression from the local compressive region remains the gold standard procedure. However, the surgical outcomes are unsatisfactory, with 10-25% of patients suffering from a recurrence of symptoms. In addition, sustained immune cells infiltration and overexpression of neuroinflammatory cytokine hinder nerve regeneration and functional recoveries. On the other hand, adipose-derived stem cells (ADSCs) have been shown tons of beneficial effects for neural regeneration, by neurotrophic and anti-inflammatory effects.

Objective

We hypothesize that local delivered ADSCs can promote neural regeneration and functional outcomes on severe compressive neuropathy via modulating local neuroinflammation.

Methods

We investigated the therapeutic outcome of ADSCs local therapy and neuroinflammation in our established animal models of compressive neuropathy. We verified the in vivo therapeutic effect of locally delivered ADSCs on a reproducible chronic constriction injury model, focusing on behavioral function, electrophysiology, and histological improvements.

Results

ADSCs improved the sensory and motor impairment of peripheral compressive neuropathy and promoted the electrophysiological neuromuscular system. Furthermore, in the histological finding, adipose-derived stem cells can facilitate axon remyelination and alleviate neuroinflammation after surgical decompression for the injured nerve.

Conclusion

For intractable compressive neuropathy patients, the immediate local delivery of adipose-derived stem cells might help to reduce symptom recurrence and promote functional recoveries via immunomodulation effect.

P25**Effects of Prophylactic Systemic Administration of Adipose Stem Cells on Late Radiation Skin Injury**

Yoshihiro Toyohara, Yoshihiro Sowa, Natsumi Saito, Takako Shirado,
Wu Yunyan, Zhang Bihang, Kotaro Yoshimura

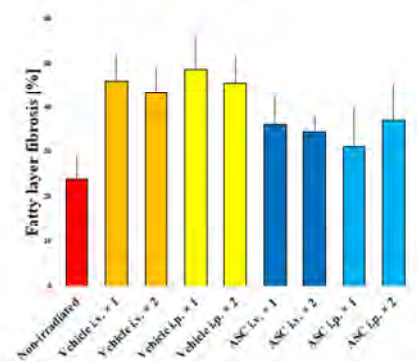
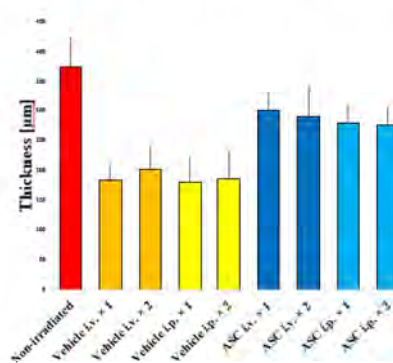
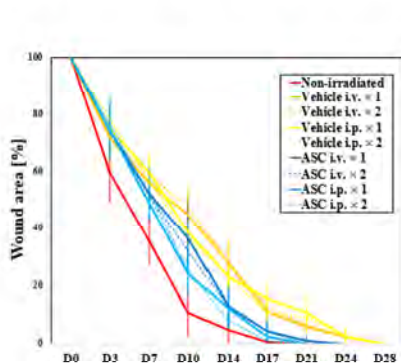
Jichi Medical University

Background: Radiation therapy is effective in inhibiting cancer cell growth, but has detrimental deterministic effects on normal tissue. Late radiation tissue effects that occur several months after irradiation include atrophy, fibrosis, and ischemia, which lead to delayed wound healing and intractable skin ulcers. Our previous studies have shown that prophylactic local administration of adipose-derived stem cells (ASCs) in combination with irradiation reduces late radiation disorders. For future clinical applications, this study investigated the effects of prophylactic systemic administration of ASCs on late radiation skin injury.

Methods: Nude mice were irradiated on the dorsal skin (total 40 Gy) and systemically administered with human ASCs (intravenous or intraperitoneal injection, once or twice). As control groups, a non-irradiated group and vehicle-treated irradiated groups were prepared. After 6 months, full-thickness skin wounds were created on the dorsal skin of the mice and observed for 28 days. Comparison of the wound healing process and immunohistological analysis of the tissues were performed.

Results: ASC-treated groups epithelialized faster than Vehicle-treated groups, although not as fast as Non-irradiated group (Fig.1). Histological analysis showed atrophy and fibrosis in the fat layer in Irradiated groups compared to Non-irradiated group, but these were suppressed in ASC-treated groups compared to Vehicle-treated groups (Fig.2 and 3). Engraftment of the injected ASCs was confirmed in the fat layer of some samples.

Conclusion: These results indicate that prophylactic systemic administration of ASCs in combination with irradiation can prevent delayed wound healing and histological damage.



Oral Presentation | Free paper (Aesthetic/ Gender/ Cancer)

P26

Effects of platelet-rich plasma with basic fibroblast growth factor on human adipose tissue

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Objective: Local injection of platelet-rich plasma (PRP) with basic fibroblast growth factor (bFGF) into subcutaneous fat is used for anti-aging in the cosmetic field. However, complications such as bulging in some patients receiving injections of PRP with bFGF have been reported and represent a serious problem in Japan. In this study, we evaluated the effects of PRP with bFGF on human adipose tissue in a murine model.

Methods: Subcutaneous fat tissue and peripheral blood were obtained from patients who underwent breast reconstruction with autologous tissue transfer and served for the subsequent experiment. 0.3 ml of the fat was injected into the dorsum of the 6-week-old female BALB mice, which mimic human subcutaneous fat. PRP was prepared from patients' peripheral blood followed by cryopreserved prior to use. 4 weeks after fat grafting, PRP, bFGF (1.67 μ g, 5 μ g, and 15 μ g), PRP with bFGF (1.67 μ g, 5 μ g and 15 μ g) and PBS were injected into the transplanted fat (n=9, each). Additional 4 weeks after administration, the specimens were harvested and served for histological and immunohistochemical analyses.

Results: PRP with bFGF (1.67 μ g and 5 μ g) group contributed to greater fat retention compared to other groups ($p < 0.05$). PRP with bFGF (5 μ g) and bFGF (1.67 μ g and 5 μ g) groups increased the expression of PPAR γ , a key transcription factor in adipogenesis ($p < 0.05$). However, fibrosis increased with increasing concentrations of bFGF ($p < 0.05$).

Conclusion: These findings suggest that the injection of PRP with low to moderate concentrations of bFGF may contribute to human adipose tissue maintenance or augmentation.

Oral Presentation | IPSRC Best paper session

P27

Mechano-induced arachidonic acid metabolism promotes keratinocyte proliferation during skin expansion

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Background: Mechanical stretch induces keratinocyte proliferation and epidermal growth during skin expansion. Increased cell proliferation requires active metabolism of nutrients to produce more energy. However, how keratinocytes alter their metabolic profile to meet the energetic requirements in mechanical stretch-mediated skin expansion remains unclear.

Objective: To determine the cellular metabolic changes of keratinocytes during mechanical stretch-mediated skin expansion.

Methods: An in vitro Flexcell Tension system was used to stretch HaCaT cells. After stretching, HaCaT cells were examined by metabolomic analysis and molecular assays. An in vivo mechanical stretch-induced skin expansion model was established, and specimen of human expanded skin were used to verify the results of in vitro experiments.

Results: Here we showed that an enrichment for "Retrograde endocannabinoid signaling", which was the top-ranked signaling pathway in HaCaT cells after mechanical stretch, was observed. Moreover, the accumulation of the metabolic end-product arachidonic acid strongly suggested that mechanical stretch enhanced HaCaT cells proliferation through arachidonic acid anabolism. Supplementation of arachidonic acid could stimulate HaCaT cells proliferation in a dose-dependent manner. Furthermore, the study demonstrated the essential role of cytosolic phospholipase A2 (cPLA2) in arachidonic acid release as well as keratinocyte proliferation in mechanical stretch-mediated skin expansion.

Conclusion: Our data reveal a metabolic regulation mechanism by which mechanical stretch induces keratinocyte proliferation, thereby coupling cellular metabolism to the mechanics of the cellular microenvironment. The combination of mechanical stretch and metabolic regulation may contribute to the optimization of individualized skin expansion with high efficiency.

Oral Presentation | Free paper (Craniofacial/ Others)

P28

**Fat Grafting for the Treatment of Velopharyngeal Insufficiency
Secondary to Isolated and Syndromic Cleft Palate**

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Hospital Angeles Puebla

Background: While severe velopharyngeal insufficiency (VPI) can be treated with pharyngoplasty, retropharyngeal flap and other techniques, mild to moderate VPI cases can be treated with posterior pharyngeal wall augmentation.

Aim: To present the early experience with fat grafting for the treatment of mild to moderate VPI

Methods: Inclusion criteria: Mild to moderate VPI, patients with previous primary palatoplasty performed. All patients underwent videofluoroscopy to confirm diagnosis and classify VPI. Fat was not centrifuged but rather emulsified. Fat was injected into the posterior pharyngeal wall with a blunt canula (19 gauge), into the submucosal plane.

Results: Patients with mild to moderate VPI were considered for posterior pharyngeal wall augmentation by means of fat grafting. 10 patients underwent the procedure. 6 Male and 4 Female. Mean age: 11.9 years old. Mean Volume Injected: 5.2cc (range 3-7cc) Mean Follow up: 10.2 months (range 8-14 months). Post-operative evaluation included: Speech assessment, videofluoroscopy and perceptive evaluation of hypernasality (at 1,3,6,8 and 12months). Patients demonstrated improvement in hypernasality, voice resonance, and speech intelligibility. Improvement was greater in patients with isolated cleft palate sequelae when compared to patients with syndromic cleft palate.

Conclusion: The augmentation of the posterior pharyngeal wall by means of fat grafting, is well tolerated and preliminarily effective in cases of mild to moderate VPI. Long term follow up is further needed in order to evaluate fat graft retention and the need for a secondary fat grafting procedure.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 3)

P29

Self-assembling MSC-sheet promotes wound healing increasing M2 macrophage polarization

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² PharmaBio Corporation, Kawasaki City, Kanagawa, Japan

Background: Mesenchymal stem cell (MSC) therapy holds promise for treating chronic wounds, but low cell density and short retention time limit efficacy.

Objective: This study investigates the therapeutic effects of self-assembling MSC-sheet in a mouse wound model, focusing on wound healing effects and macrophage infiltration.

Methods: MSC-sheets were prepared from human subcutaneous adipose tissue by PharmaBio Corporation, and characteristics were analyzed using histology. In vivo, the α MEM (control), MSC-suspension, and MSC-sheet were applied to full-thickness skin defects of C57BL/6J Jcl mice. Evaluation on days 7, 14, and 21 included the remaining wound area, neoepithelialization, granulation tissue, cell retention time, angiogenesis, and macrophage infiltration using Hematoxylin and Eosin, Azan, anti-human nucleoli (HN), anti-CD31, anti-CD68, and anti-CD163 staining. Macrophage polarization was evaluated using RT-PCR on days 3, 7, and 14.

Results: MSC-sheet had a multilayer structure (6-7 layers) containing ECM. In vivo, both MSC-sheet and MSC-suspension significantly reduced remaining wound area (day7 and day14), increased neoepithelialization (day14), granulation tissue formation (day7), angiogenesis (day7) and macrophage infiltration (day7 and day14) compared to the control group. MSC-sheet maintained MSC presence on day7 and induced greater M2 macrophage infiltration than MSC-suspension. RT-PCR confirmed the superior M2 macrophage-inducing properties of MSC-sheet.

Conclusion: MSC-sheet and MSC-suspension accelerated wound healing and increased M2 macrophage polarization. MSC-sheet, with multilayered structure and ECM, outperform MSC-suspension in promoting M2 macrophage infiltration and prolonging cell retention. Therefore, self-assembling multilayer MSC-sheet is a promising cellular delivery and treatment option for chronic wounds.

Oral Presentation | Free paper (Regenerative medicine)

P30

Systematic analysis of beneficial effects of platelet lysates on human adipose-derived stem cells

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² Department of Plastic and Reconstructive Surgery, Kansai Medical University Medical Center

Purpose: Human adipose-derived stem cells (hASCs) are the family of mesenchymal stem cells with self-renewal and differentiation potential into multiple cell-lineages. hASCs are applied to tissue reconstruction in plastic and aesthetic surgery, such as fat grafting, wound healing and scar remodeling. On the other hand, platelet lysates (PL), which contains various growth factor, is widely used in anti-aging and anti-inflammatory therapy. To clarify the preferential effect of PL on the ability of hASCs, systematic analysis including RNA sequence was performed.

Methods: hASCs were cultured without or with PL and FBS. The cell proliferation was examined by CCK8 assay. RNA-sequence was performed, using RNA from hASCs without or with PL and FBS, and obtained data were analyzed by GO analysis.

Results: The hASCs cultured with PL showed the proliferative activity more than with the standard condition containing FBS. The analysis by RNA-sequence showed that the genes involved in the proliferation and anti-stress were markedly upregulated in the PL group. RT-PCR confirmed that genes involved in the cell growth and cellular stress tolerance were upregulated, and differentiation markers were downregulated. Furthermore, when hASCs were treated with DNA damaging drug, PL group were more survived than FBS group.

Conclusion: PL showed the marked proliferation of hASCs, accompanied by protection against cellular stress.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 2)

P31

The Mechanism Study of ADSC Derived Exosomes LncRNA Promote Skin Closure

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² Affiliated Hospital of Nanjing University of Chinese Medicine

Background: Exosomes are vesicle structures with a diameter of 30-100 nm, and their main components are proteins, miRNAs, mRNA, DNA and lipids. Skin healing is a series of continuous complex interactions between cells and mediator in the body.. It is of great clinical significance to study stem cell-derived exosomes' influence and mechanism and their active components on skin healing.

Objective: To explore the role and potential mechanism of adipose stem cell-derived exosomes (Exos) (ADSCs) in promoting skin wound healing. The effects of Exos on the proliferation and migration of human dermal fibroblasts (HDFs), extracellular matrix (ECM) synthesis, and animal skin wound healing were also evaluated.

Methods: Adipose-derived stem cells (ADSCs) were isolated and cultured from human adipose tissue to induce ADSCs to secrete exosomes (Exos). The characteristics of the isolated Exos were identified using transmission electron microscopy and Western blot. The fluorescence-labelled Exos was co-cultured with human dermal fibroblasts (HDFs) to observe the absorption of Exos by HDFs. Cell models were transfected with different plasmids and long non-coding RNAs (lncRNAs). The effect of APS and Exos on skin healing was evaluated by constructing a rat skin wound model.

Results: In this study, we explored in detail the role of adipose stem cell (ADSC) -derived exosomes (Exos) on human dermal fibroblasts (HDFs) and the regulatory role of lncRNAs in this process, reinforcing our findings through rigorous statistical analysis.

Conclusion: The findings of this study are significant, demonstrating that ADSCs-derived exosomes (Exos) can promote the proliferation, apoptosis and migration of HDFs, and accelerate skin healing in rats. The mechanism is intricately related to lncRNA in Exos. lncRNA acts as a molecular sponge, thereby upregulating the expression of transforming growth factor beta receptor 1 (TGFB1), activating the TGF- β signaling pathway, and ultimately promoting skin healing. Exos promotes skin repair by regulating the lncRNA /TGFB1 axis, a crucial finding that could potentially revolutionize the field of wound healing.

E-poster

P32

Effect of basic fibroblast growth factor in perifascial areolar tissue transplant

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Background: Perifascial areolar tissue (PAT) transplant is a technique in which a sheet of connective tissue on the fascia is harvested and transplanted to the wound bed. PAT engraftment fails when the exposed area of tendons, bones, or artificial materials is large. On the other hand, combination of tissue transplant and basic fibroblast growth factor (bFGF) improves the survival rate of the transplanted tissue.

Objective: A wound model was created in which the artificial material was exposed on rats' backs.

Methods: All the rats underwent PAT transplant, but the rats were divided into 2 groups according to the PAT processing method beforehand. In 1 group, the PAT was immersed in water for injection before transplant (bFGF[-] group), and in the other group, the PAT was immersed in bFGF product (bFGF[+] group). Specimens were collected 7 days after surgery to assess the histologic thickness of the PAT and the gene expression in the PAT.

Results: The thickness of the PAT in the tissue slices was significantly higher in the bFGF(+) group than in the bFGF(-) group. Expressions of CD34 and COL3A1 were significantly higher in the bFGF(+) group than in the bFGF(-) group.

Conclusion: The results of this study indicate that adding bFGF to the PAT transplant may promote PAT engraftment and wound healing by increasing angiogenesis and may increase granulation formation, which may result in a stronger covering that prevents the prosthesis from being exposed.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 2)

P33

Alteration of Inflammatory Response by Subcutaneous Transplantation of Burned and Frostbitten Skin

Rieko Shimizu, Tatsuyuki Ishii, Ayano Shimono, Kazuo Kishi

Keio university

Objective: Burns and frostbite are tissue injuries caused by changes in external heat; however, there are marked differences in the clinical course after injury. This is thought to be due to a change in the inflammatory response of the organism caused by the difference in heat. However, we hypothesized that tissue changes caused by differences in heat may cause changes in the inflammatory response to the surrounding tissue.

Methods: Third-degree burns and frostbite skin were prepared Using ICR mouse skin. The skin was transplanted under allogeneic mice. After various periods, the skin was collected along with the surrounding tissue, and the inflammatory response and structural changes in the tissue were observed under a microscope.

Results: In the burn model, prominent angiogenesis and inflammatory cell infiltration in the surrounding area, prominent destruction of dermal collagen fibers, and fusion of the extracellular matrix were observed. In contrast, the third-degree frostbite model showed little inflammatory reaction in the surrounding area, and the collagen fiber structure was preserved under light microscopy.

Conclusion: Differences in the inflammatory responses of burn and frostbitten skin to the surrounding environment were confirmed. It has been suggested that differences in tissue structure owing to differences in heat may cause differences in the respective clinical courses. The findings of this study indicate that, compared to frostbite, burns often present with hypertrophic scars and keloids. Future analyses of these mechanisms may be useful for preventing these conditions.

Oral Presentation | Free paper (Others)

P34**Development of an AI-Powered System for Automatic Four-Class Classification and Area Measurement of Skin Ulcers**

Kazufumi Tachi, Koichi Gonda, Jyun Takami

Tohoku Medical and Pharmaceutical University

Background: Effective treatment of refractory ulcers relies on assessing tissue property and ulcer size. To overcome evaluation gaps between observers and those resulting from manual measurement, we developed AI-powered system to automate classification of tissue type and area measurement of each ulcer type.

Objective: To evaluate the accuracy and consistency of the AI-powered diagnosis system.

Methods: The system includes the UlcerAnalyzer unit for generating training data and a deep learning application for training neural networks. The UlcerAnalyzer offers user interface for and digitalization of manual classification of ulcer images into six classes: Background, Standard Area Sticker, Healthy Granulation, Marbled Granulation, Slough, and Necrotic. A dataset of 1,095 images, with 80% for training and 20% for evaluation, was created. This dataset trains the neural networks, forming the core of the AI model. The entire software framework and system components were designed and developed by the researchers themselves, all of whom are practicing plastic surgeons.

Results: Precision rates were: Background 99.2%, Sticker 95.5%, Healthy Granulation 0%, Marbled Granulation 79.2%, Slough 83.9%, Necrotic 79.8%. Overall accuracy was 99.3%. The system also automatically measured ulcer areas based on the sticker's area and displayed these measurements graphically (figure 1).

Discussion and Conclusion: The low performance in Healthy Granulation is due to limited data. Other classes showed fairly satisfactory results. Challenges included defining class boundaries, highlighting the need for the functional addition to UlcerAnalyzer that assists users in distinguishing subtle color differences. Features such as visual overlays to emphasize color intensity variations could make classification easier.

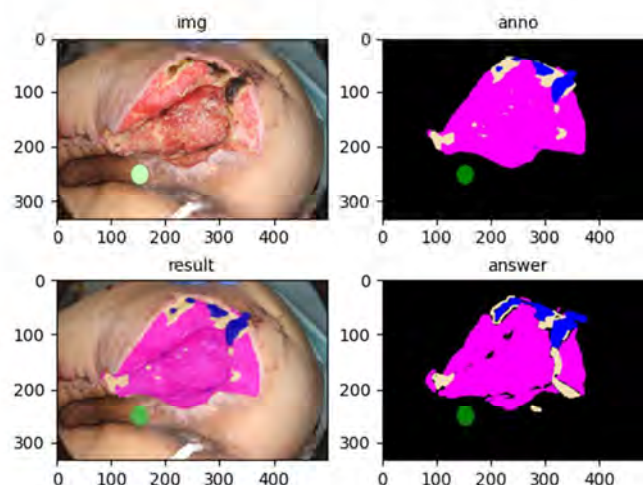
Figure 1. Example outputs from the AI model.

“img” : Original image used for inference.

“anno”: Output image from the trained AI model.

“answer” : Ground truth image.

“result” : Combined image of the original and AI model output.



Oral Presentation | IPSRC APRAS award session 2

P35

Investigation of Lymphatic flow dynamics using photoacoustic imaging system

Yushi Suzuki, Hiroki Kajita, Marika Otaki, Hayato Nagashima, Nobuaki Imanishi, Kazuo Kishi

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Background: Exercise therapy is an optimal treatment for lymphedema. However, lymphatic vessels are tiny and transparent, making visualization and assessment of lymphatic flow difficult during exercise.

Objective: We evaluated the effect of exercise on lymphatic vessels using a photoacoustic imaging (PAI) device, a new modality that three-dimensionally visualizes tiny blood and lymphatic vessels with a high resolution of 0.2 mm.

Methods: PAI was performed on healthy volunteers using a LUB0 (Luxonus Inc.), and indocyanine green was administered subcutaneously to visualize lymphatic vessels. To simulate exercise, the electrical muscle stimulator G-TES (General Therapeutic Electrical Stimulator, Homer ION Laboratory Co., Ltd.) was used. G-TES can stimulate muscles between two belt electrodes and enable stimulation of the entire muscle of the limb as a substitute for voluntary movement.

Lymphatic flow was assessed in three phases: at rest, during G-TES use, and after G-TES use. The medial lower leg lymphatic vessels were observed by video recording for 5 minutes, and the number of lymphatic pumps was evaluated.

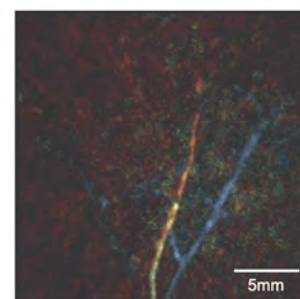
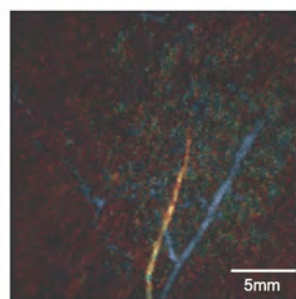
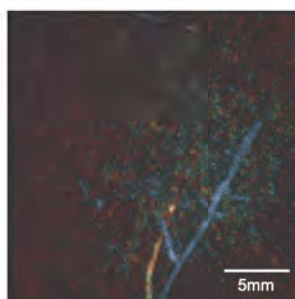
Results: Six healthy volunteers (one man, five women, mean age 51.5 ± 9.8 years) participated. The lymphatic pump frequency was 0.37 ± 0.17 times/min at rest, 0.47 ± 0.22 times/min during G-TES, and 0.80 ± 0.36 times/min after exercise. Significant differences ($p=0.048$) were observed between rest and post-exercise conditions.

Conclusion: This study confirms that exercise significantly enhances lymphatic pump activity, as shown by photoacoustic imaging. These findings reinforce the integral role of exercise therapy in effectively promoting lymphatic flow for lymphedema treatment.

PAI enables observation of lymphatic flow in high resolution. The figure was created by capturing the video.

Yellow: lymphatic vessels

Blue: veins



E-poster

P37

Transforming Aesthetic Surgical Education Using Artificial Intelligence

Austin Chen, Karim Bakri

Mayo Clinic, Rochester

Background: ChatGPT has potential as an educational tool and source of information for surgical education.

Objective: The aim of this study is to assess its usefulness in aesthetic surgery education via evaluation of the accuracy and appropriateness of its information.

Methods: Ten of the most common aesthetic procedures were identified. Two question stems were fed into ChatGPT for each, one requesting general information and the other requesting procedural steps. A medical student, junior plastic surgery resident, senior resident and faculty member reviewed the outputs. Medical student and residents evaluated information on a Likert scale (1-5) for usefulness in case preparation. Faculty graded information on a Likert scale (1-5) for accuracy and adequacy based on training level.

Results: Faculty evaluation of general information resulted in a median Likert of 5 (range of 4 to 5) for accuracy and PGY-2 level for adequacy (range of PGY1 to PGY 2). Faculty evaluation of surgical steps resulted in a median Likert of 4 (range of 2 to 5) and PGY-2 level for adequacy (range of PGY1 to PGY3). Medical students scored usefulness of ChatGPT extracted information with a median Likert of 5 (very useful) for both stems. Junior residents scored usefulness of both stems with a median of 3 (neutral), senior residents scored usefulness of both stems with a median of 2 (minimally useful).

Conclusion: These results suggest that ChatGPT has potential as an surgical educational resource, although at the present time perhaps just for junior level trainees.

E-poster

P39

Three-Dimensional Printing cells laden F127 on Gelatin/Alginate Scaffold Promote Wound Recovery

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Background: Full-thickness skin wounds are a severe clinical issue, leading to increased infection risks, pain, and economic burdens due to prolonged treatment. Recent advancements in 3D printing technology have facilitated the construction of tissue-engineered skin.

Objective: This study aimed to develop and assess a gelatin/alginate (G/A) 3D-printed scaffold using F127 to enhance cell distribution for treating large, full-thickness skin defects.

Methods: We analyzed the physical and biological properties of the cell-laden F127/G/A scaffold and its potential to promote wound healing. Mechanical strength was evaluated using a universal testing machine. Swelling and degradation rates were measured, and biocompatibility was assessed through CCK-8 assays and DAPI/PI staining. Fibroblasts and keratinocytes were layered onto the scaffold to simulate the dermis and epidermis.

Fluorescence microscopy was used to observe cell layering, and animal experiments were conducted to assess wound healing efficacy.

Results: The G/A scaffold demonstrated elasticity, withstanding a tensile force of approximately 1.5 N and a maximum elongation rate of 111.18%. The scaffold's swelling rate increased by 19% post-cross-linking and 43% after water absorption. It degraded by approximately 40% in PBS over 14 days. Fibroblasts proliferated and adhered well within the scaffold. Fluorescence microscopy confirmed successful layering of fibroblasts and keratinocytes, creating a dermis/epidermis structure. Transplantation onto full-thickness skin wounds in mice accelerated healing compared to controls.

Conclusion: These findings suggest that the developed 3D-printed tissue-engineered skin holds promise for future clinical wound healing applications.

Oral Presentation | IPSRC Best paper session

P40

Relationship between epidermal keratinocyte division and Keratin17 in skin texture formation

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³ Keio University Faculty of Pharmacy

Background: The mechanism underlying the formation of skin texture remains unknown. Our previous studies have demonstrated that Keratin17 (K17) plays a role in the formation of skin texture.

Objective: We investigated the relationship between cell proliferation and K17 expression.

Methods: (1) The depth of skin texture of embryonic day 15 (E15) K17KO and WT B6 mice was measured, and paraffin sections of the skin were immunostained with antibodies against PCNA, CyclinD1, and p-STAT3. RNA was extracted from K17KO and WT E18 skin, and separated into epidermis and dermis, and subjected to microarray analysis and real-time PCR. (2) CyclinD1 inhibition was performed using K17 overexpressing cells (K17OE) and non-target cells (NT). Additionally, the EGF Pathway Phospho Antibody Array was employed to examine the changes in signaling activity induced by K17OE.

Results: (1) K17KO displayed a significantly shallower skin depth than the WT, and PCNA staining demonstrated that cell proliferation in the epidermal basal layer was significantly suppressed in K17KO compared to WT. Epidermal microarray analysis and immunostaining results indicated that CyclinD1 expression in the cell proliferation cascade was significantly reduced in K17KO compared to WT. STAT3 phosphorylation was also significantly suppressed by K17KO. The phosphorylation of FAK and GAB2, which are EGF signaling molecules, was significantly reduced in K17OE compared to NT.

Conclusion: These results suggest that in epidermal keratinocytes, cell division is mediated by K17 expression and subsequent enhancement of Cyclin D1 and nuclear migration, which are involved in the formation of skin texture during the embryonic period.

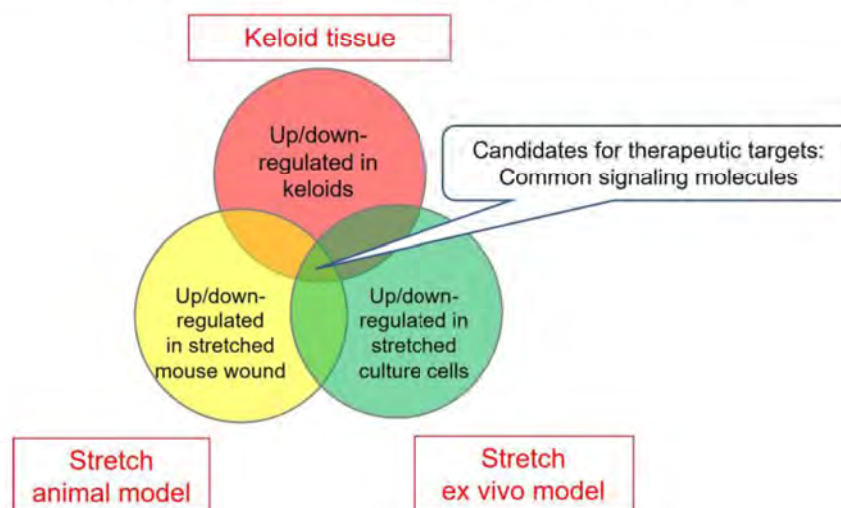
P41**Investigation of keloid pathogenesis focusing on mechanical stress**Keisuke Okabe, Riho Takayanagi, Yukari Nakajima, Tatsuya Kato,
Noriko Aramaki-Hattori, Kazuo Kishi

Department of Plastic and Reconstructive Surgery, Keio University School of Medicine

Background: Keloids are characterized by individual differences in susceptibility, specificity of the body site of predilection, and mechanical stress as an initiating and exacerbating factor. We will report on the current status of our research efforts, which integrate basic and clinical studies, with the aim of developing treatments that focus on mechanical stress.

Materials and Methods: Since there is no animal model that can reproduce the pathophysiology of keloids exactly, we developed a novel animal model and a culture model. Using both models, we attempted to comprehensively analyze and select genes whose expression is altered by mechanical stress loading. We also performed gene expression analysis using surgical specimens obtained from keloid patients and compared the results with those obtained from the models.

Results and Discussion: For the mouse model, the healing results were significantly altered when manual tension was applied daily after back wound creation in order to apply repetitive tension stimulation. For the culture model, fibroblasts derived from keloid patients were seeded into the artificial dermis and cultured while repeated tension stimulation was applied. Cytoskeletal changes and overall changes in gene expression were observed upon mechanical stress. In comparison to the keloid patient-derived tissues, there were genes that overlapped and changed in both cases, while there were genes that showed conflicting results. We believe that by organizing and comparing the similarities and differences between the results of the model and those of the patient tissues, we can get closer to the essence of the mechanism of keloid pathogenesis.



Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 2)

P42

A clinical trial for quantifying wound healing regulatory factors in acute and chronic wounds

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Background: Patients with wounds undergo either acute or chronic healing processes. In the favorable process, wounds are followed by a normal wound-healing process accompanied by different emerging tissues, such as granulation, neovascularization, and epithelization. However, some patients undergo an unfavorable process, resulting in unhealed and chronic wounds. Although many theories have been published, the pathogenesis is still uncertain.

Objective: Using clinically different wound patients in Fukuoka University Hospital with burns, bed sores, etc., exudates absorbed for 24 hours by cotton balls on the wound were collected in the presence of a proteinase inhibitor and stored in a deep freezer until use.

Methods: We focused on major regulatory compounds for wound healing, such as IL10, TGF β , TNF α , VEGF, and HGF. ELISA method was utilized for the quantification. The levels were compared with their clinical courses.

Results: All of the compounds were measurable during the study. IL10, TGF β , TNF, and VEGF showed similar variability during their clinical courses. In acute wounds, TNF and VEGF increased in the initial phase of wound healing, but they declined thereafter. On the other hand, in chronic ulcers, such changes were undetected.

Conclusion: Cytokines and growth factors play an important role in the genesis of inflammation, granulation, and epithelization in wounds. Here, the biologically important factors we selected in the wound exudates could be measured by ELISA methods. The change in the factors may indicate different tissue reactions in the clinical process, which could determine the genesis of acute and chronic wounds.

Oral Presentation | IPSRC Best paper session

P43**Exploration of Regenerative Factors in Murine Fetal Skin Wounds**Yukari Nakajima¹, Ward Nijen Twilhaar², Ikuko Koya², Yoshinari Ando², Akiko Minoda², Kazuo Kishi²¹ Plastic and Reconstructive Surgery of Keio University² RIKEN Center for Integrative Medical Sciences

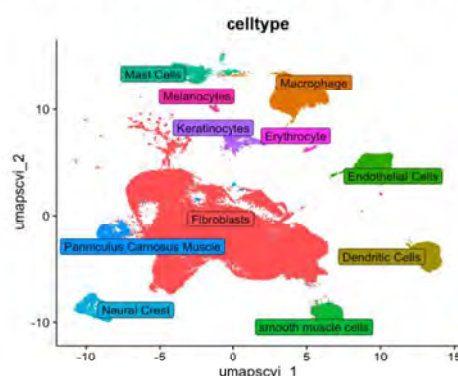
Background: Mammalian skin regenerates without scarring after injury until mid-gestation. We demonstrated that in murine, full-thickness skin incisions before embryonic day (E) 13 completely regenerate, including the skin texture, while from E14 to E16, the dermis regenerates but the texture does not. From E17 onwards, fibrosis occurs, resulting in scar formation.

Objective: To determine these changes, single cell analysis of the wound site was performed at various times after E13, 15, and 17.

Methods: We focused our analysis on the interaction between macrophages and fibroblasts. Among the genes identified, we figured out one gene with increased expression in macrophages on E17. Then we used knockout mice for this gene and observed the progression of its fetal skin wounds. Additionally, we analyzed the factors that induce complete regeneration on E13.

Results: When the recombinant protein of the gene, which had increased expression in macrophages on E17, was administered to the wound site on E13, the skin texture disappeared. Conversely, in embryos where this gene was knocked out, fibrosis was suppressed on both E15 and 17, when normal skin regeneration does not usually occur. Additionally, the cluster analysis revealed that macrophages can be categorized into several clusters, each with distinct gene expressions and roles. Notably, some factors released extracellularly when the skin is damaged on E13 appear to act on macrophages and dermal fibroblasts to promote regeneration.

Conclusion: The analysis at various time points following fetal skin wound allowed us to approach the mechanisms of complete skin regeneration and fibrosis.



Oral Presentation | Free paper (Others)

P45

First Attempt at Assessing the Effects of Animal-Assisted Therapy (AAT) on Plastic Surgery Patients

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【Introduction】

Animal-assisted-therapy (AAT) is a form of complementary medicine that utilizes the power of companion animals to enhance the mental or physical health of patients. Our hospital is a rare institution that conducts acute-phase AAT. We implemented AAT for acute-phase patients in the plastic surgery department. This is the first report assessing the effects of AAT on plastic surgery patients.

【Subjects and Methods】

Patients hospitalized with physical injuries, were included in the study. Patients self-assessed their condition using our own assessment form and the VAS. The assessment form comprised four items—anxiety, stress, adaptation, and communication—each rated on a five-point scale. Assessments were conducted before AAT intervention, after the first and the second intervention.

【Results】

There was a total of two cases. In both cases, self-assessment using the assessment form showed an improvement in psychological state after AAT intervention. Details of each case are outlined below.

Case 1: A 61-year-old female with diabetic foot gangrene requiring emergency admission and first toe amputation surgery.

Case 2: A 60-year-old male with untreated diabetes, admitted urgently for right diabetic foot gangrene, underwent below-knee amputation surgery.

【Discussion】

In our cases, both patients showed improvement in psychological state after AAT, suggesting its effectiveness for hospitalized plastic surgery patients with injuries resulting from trauma or treatment. By increasing the number of cases and further accumulating evidence, we anticipate recognizing the significance of AAT as complementary medicine and contributing to its expansion and improvement in patient care.

P46**A prospective and randomized study comparing ultrasound-guided real time injection to conventional blind injection of botulinum neurotoxin for glabellar wrinkles**

Kuangyun Tang

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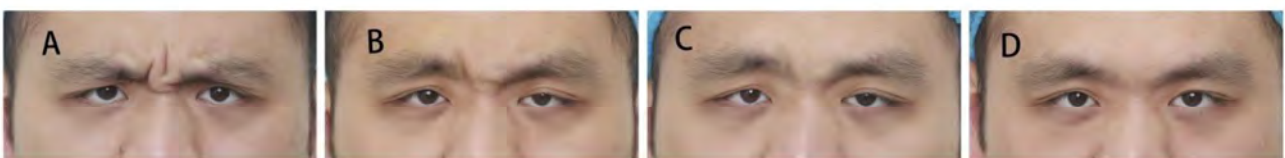
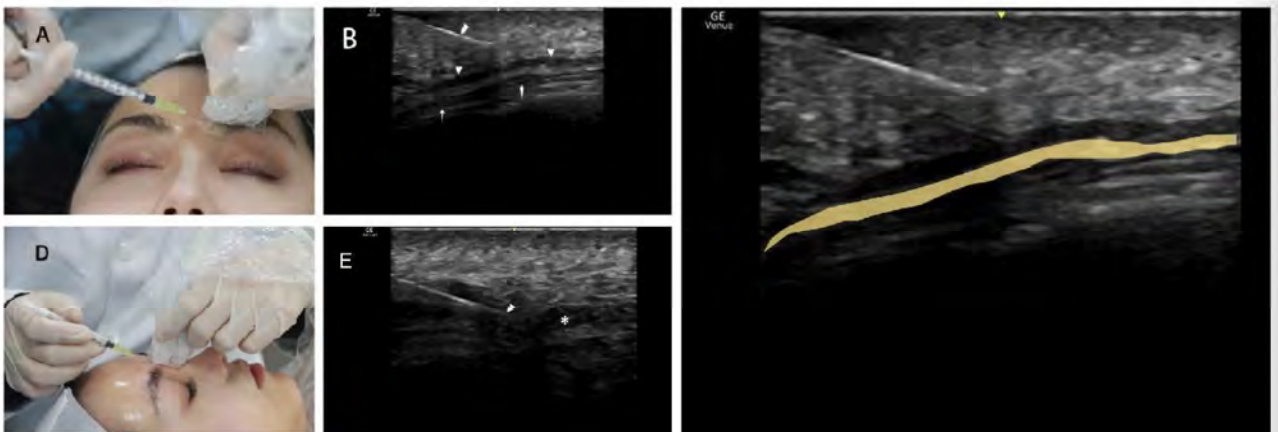
Background: Botulinum neurotoxin injections are the most frequently performed cosmetic procedures, but conventional blind injection for glabellar wrinkles remains to have some limitations.

Objective: We intend to directly inject botulinum neurotoxin into the glabella complex guided by real time ultrasound. We aim to propose a more efficient and safer botulinum neurotoxin injection strategy for glabellar wrinkles.

Methods: A total of 40 subjects with moderate to severe glabellar lines were enrolled in this study to receive botulinum neurotoxin injection, either through ultrasound-guided real time injection or conventional blind injection. Facial Wrinkle Scale and inter-brow distance (from 3D scanned face images) were used to evaluate the glabellar wrinkles improvement.

Results: The wrinkle score reduction was significant ($p < 0.0001$) immediately after the injection in ultrasound-guided injection group, but not in blind injection group ($p = 0.163$). Ultrasound-guided injection also showed a higher performance of wrinkle score reduction and more effective inter-brow distance increase over blind injection at Day 0, Day 1, Day 21 and Day 35 after initial treatment.

Conclusion: The results of the study confirmed that botulinum neurotoxin injection for glabellar wrinkles under ultrasound guidance achieves quicker onset of action and better final outcomes compared to conventional blind injection.



Injection effects: A. Glabellar frown lines at maximum frown before injection; B. The immediate improvement effect after injection; C. Effect on Day 21; D. Effect on Day 35.

Oral Presentation | IPSRC Best paper session

P47**The possibility of phagocytes playing a role to control wound healing process in newts**Kento Hosomi¹, Kazuaki Maruyama², Kyoko Imanaka², Isao Tawara³, Makoto Shiraishi⁴, Mitsunaga Narushima¹¹ Department of Plastic and Reconstructive Surgery, Mie university² Department of Pathology and Matrix Biology, Mie university³ Department of Community Hematology, Mie University⁴ Department of Plastic and Reconstructive Surgery, The university of Tokyo

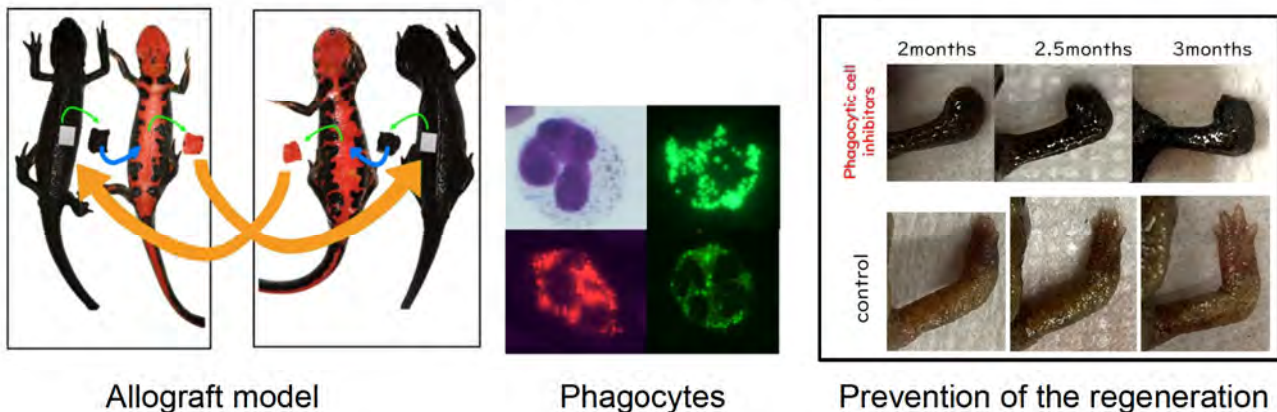
Background: Newts have incredible regenerative abilities. However, they lose the ability to regenerate limbs by phagocytic cell inhibitors. We investigate the immune system, which controls responses during wound healing, focusing on phagocytes. We discovered a unique and surprising response to allograft tissue, and its relationship with newt phagocytes.

Objective: The aim of this research is to detect phagocytes in newts and to elucidate how phagocytes play a role during wound healing process.

Methods: Newts were either allografted or autografted. Red skin from the abdomen was transplanted to the skin defect created on the back, which enabled us to find the border of the grafted red skin. Tissue samples were obtained at each postoperative period. In order to label phagocytes, fluorescent beads, Dil-liposomes were injected intravenously. After administration the phagocytic cells inhibitor, the progress of wound healing was observed.

Results: The allografts were well attached to the host tissue but were gradually replaced by the surrounding skin. Both fluorescent beads and Dil-liposome enabled us detect phagocytes in blood and subcutaneous tissue. Most of them were similar to neutrophils. At certain stages after allografting, large number of immune cells were infiltrated, not seen in autograft. Some of those cells were phagocytes. Phagocytic cell inhibitors prevented the newts from regenerating properly.

Conclusion: The unique response of newts to allografts was considered to be related to phagocytes. Elucidating the characteristics of these cells in detail could lead to uncover how to control unnecessary excessive inflammation and fibrosis.



P48

Mechanisms of Cartilage Degeneration Post Autologous Costal Cartilage Transplantation in Microtia Treatment

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Background: In reconstructive surgery for congenital microtia, autologous costal cartilage transplantation is performed in two stages. While this therapeutic method indicates better postoperative outcomes than use of artificial materials, degeneration occurs in the transplanted tissue over the long-term. The mechanism of tissue degeneration remains unknown, and any methods to effectively suppress the degeneration have yet to be established.

Objective: The aim of this study was to elucidate the phenomena in the cartilage after heterotopic transplantation by histological evaluation and gene expression analyses.

Methods: Cartilage samples were obtained from 10- to 12-year-old patients with microtia. Fresh costal cartilage was obtained at the initial surgery. Heterotopically transplanted cartilage was obtained from subcutaneous adipose tissue at the second surgery, which was performed 6 to 12 months after the initial surgery. The transplanted cartilage was compared with fresh cartilage to analyze the alteration due to transplantation.

Results: The number of cells per unit area and the survival rate of cells were reduced in the transplanted cartilage tissue. There was no significant difference in the size of cells. The amount of proteoglycan in the cartilage tissue was reduced, and the expression of genes involved in matrix component were changed.

Conclusion: Preventing degeneration of cartilage tissue after heterotopic transplantation is important because costal cartilage is physically demanding during harvesting and the amount of harvested tissue is limited. This study provides insights into preventing cartilage degeneration after transplantation.

Oral Presentation | IPSRC APRAS award session 2

P49

iPSC-derived megakaryocytes and platelets accelerate wound healing and angiogenesis.

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Background: Platelet-rich plasma (PRP) shows efficacy in chronic skin wounds via multiple growth factors. However, it exhibits heterogeneity across patients, leading to unstable therapeutic efficacy. Human iPSC-derived megakaryocytes and platelets (iMPs) can provide a stable supply, holding promise as materials for novel platelet concentrate-based therapies. In this context, we evaluated the effect of iMPs on wound healing and validated lyophilization for clinical applications.

Methods: The growth factors released by activated iMPs were measured. The effect of the administration of iMPs on human fibroblasts and HUVECs was investigated in vitro. iMPs were applied to dorsal skin defects of diabetic mice to assess the wound closure rate and quantify collagen deposition and angiogenesis. Following the storage of freeze-dried iMPs (FD-iMPs) for three months, the stability of growth factors and their efficacy in animal models were determined.

Results: iMPs specifically released FGF2 and exhibited superior enhancement on HUVEC proliferation compared to PRP. Animal studies demonstrated that iMPs promoted wound closure and angiogenesis in chronic wounds caused by diabetes. We also confirmed the long-term stability of growth factors in FD-iMPs and their comparable effects to those of original iMPs in the animal model.

Conclusion: Our study demonstrates that iMPs promote angiogenesis and wound healing through the activation of vascular endothelial cells. iMPs exhibited more effectiveness than PRP, an effect attributed to the exclusive presence of specific factors including FGF2. In addition, lyophilization can contribute to their stable supply for clinical application. These findings suggest that iMPs provide a novel treatment for chronic wounds.

P50

Utilizing Virtual Reality for Suture Technique Education: Potential as an Auxiliary Tool for Independent Learning in Medical Students

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Background: Plastic surgery requires precise techniques and advanced skills, making the learning of suturing skills crucial. Direct instruction by medical advisors is essential for medical student education, but time limitations restrict these opportunities. Simulated anatomical experiences like VR offer solutions, yet suture skill education via VR is uncommon. **Objective:** We created a VR movie for suture technique education to evaluate its potential as an auxiliary tool for independent learning.

Methods: Twelve interested medical students participated. After a PowerPoint and VR lecture, subjects performed skin stitches using a practice skin pad, without direct instruction. Post-exercise, students rated their confidence, comprehension, satisfaction, VR three-dimensionality, immersion, and discomfort on a 5-point Likert scale. An open-ended response section was included for overall feedback.

Results: The entire process took about 1.5 hours, with all students completing the skin suturing. Eleven students responded, with most feedback being positive, regardless of prior VR experience or grade level. Only one student reported any discomfort from the VR. Free responses highlighted a sense of realism, three-dimensionality, and the possibility of home study.

Conclusion: VR in teaching plastic surgery procedures offers a realistic learning experience without consuming instructor time. This tool promotes independent learning and could significantly enhance current educational methods.



E-poster

P51

Preliminary Investigation Comparing Intraocular Pressure in Glaucoma Patients Before and After Blepharoptosis Surgery: Potential Impact in Intraocular Pressure Based on Surgical Technique

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⁴ Department of Aesthetic Surgery, Ageo Central General Hospital

Background: Glaucoma and blepharoptosis commonly coexist. In this study, we compared intraocular pressure before and after blepharoptosis surgery in patients with glaucoma, further investigating it by surgical procedure.

Objective and Methods: Glaucoma and blepharoptosis commonly coexist. In this study, we compared intraocular pressure before and after blepharoptosis surgery in patients with glaucoma, further investigating it by surgical procedure.

Results: In total, there were 8 cases (16 eyes), comprising 6 males and 2 females aged between 73 and 84 years. Blepharoptosis surgery techniques included levator muscle tucking in 5 cases (10 eyes), infra - eyebrow skin excision in 3 cases (6 eyes), and frontalis sling technique in 1 eye. Comparing pre- and postoperative IOP, 5 eyes had a decrease of 2 mmHg or more, 4 eyes had a decrease of 1 mmHg, 6 eyes had no change, and 1 eye had an increase of 1 mmHg. Of the patients whose IOP decreased by more than 2 mmHg, 3 cases (4 eyes) underwent levator muscle tucking, and 1 case (1 eye) underwent infra - eyebrow skin excision.

Discussion: In our cases, Blepharoplasty for glaucoma patients resulted in IOP reduction in about half of the eyes. By surgical procedure, levator muscle tucking suggested a greater potential for reducing intraocular pressure. Choosing levator muscle tucking seemed beneficial in cases of coexisting glaucoma and blepharoptosis. Our study results suggest the possibility of providing more meaningful surgeries tailored to patients' comorbidities.

Oral Presentation | Free paper (Aesthetic/ Gender/ Cancer)

P52

Fat Grafting for Facial Rejuvenation: A Systematic Review of Validated Patient-Reported Outcomes

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¹ Mayo Clinic, Rochester

² University of Chicago

Background: Fat grafting as an adjuvant procedure in facial rejuvenation has been increasing in use over time.

Objective: The aim of this study is to perform a systematic review of aesthetic facial fat grafting as an adjunct procedure in facial aesthetics and quantify validated patient reported outcomes measures (PROMs).

Methods: A systematic literature review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) search strategy guidelines across 3 databases (MEDLINE, Embase, and PubMed) in December of 2022 identifying all articles describing facial fat grafting for aesthetic indications with validated PROMs.

Results: A literature database search revealed 909 articles. Review of these article abstracts revealed 138 articles. These 138 articles received a full article review, which lead to capturing 32 articles detailing some level of PROMs using our inclusion and exclusion criteria. A total of 9 of these studies were remaining after screening for articles only with validated PROMs. A total of 6 studies utilized the FACE-Q, 2 studies utilized the ROE-Q and one study utilized both the FACE-Q and ROE-Q. All single arm and double arm comparative studies reported improvement in FACE-Q or ROE-Q with fat grafting.

Conclusion: The use of fat grafting as an adjunct in facial rejuvenation showed promising patient reported outcomes to correct secondary rhinoplasty defects, as well as when used concomitantly in rhinoplasty and facelift surgery. However, one study showed no improvement in the perioral region.

P53

Nipple-Sparing Mastectomy in Patients with Prior Breast Surgery: The Role of Autonomization in Preserving NAC Viability

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² Division of Plastic, Reconstructive and Hand Surgery, Legnano Hospital, Legnano (Mi), Italy

Background: Breast reduction surgery alters the vascularization pattern of the nipple areolar complex (NAC), leading to a higher incidence of NAC compromise post-surgery. When patients with a history of breast reduction undergo nipple-sparing mastectomy, ensuring NAC viability becomes critical. The risk of vascular compromise is especially high in patients with surgery less than 12 months prior. The detection of a neoplasm at the histological evaluation of a breast reduction often requires prompt intervention, making autonomization techniques essential to enhance NAC survival rates.

Objective: This study presents our approach, implemented at our center, and compares it with data available in the literature.

Methods: We conducted a systematic literature review in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We utilized specific keywords and predefined MeSH terms across various search engines (Medline, Pubmed, Google Scholar databases). Concurrently, we assessed our own case series, reporting on complications and outcomes.

Results: Eight studies were identified, encompassing a total of 56 patients from the literature. The most commonly reported concern was the viability of the NAC. In our patient series, we did not encounter complications, except for one case of seroma.

Conclusion: The proposed autonomization technique for patients with previous breast reduction surgery helps reduce the risk of NAC compromise following nipple-sparing mastectomy, even with a short interval since the prior reduction. A larger case series is needed to confirm these findings.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 3)

P54

Embryonic macrophages involved in skin regeneration

Shigeki Sakai, Keisuke Okabe, Noriko Aramaki, Yukari Nakajima,
Riho Takayanagi, Kazuo Kishi

Department of plastic and reconstructive surgery Keio university school of medicine

【Objective】 Mice regenerate their skin completely when they receive a wound by embryonic day 13. We have observed and studied that scar repair occurs without regeneration after the 14th day of gestation. Previous studies have confirmed that macrophages, which are F4/80 positive cells, accumulate prominently in the wounds of mice on day 13 of gestation. In this study, macrophages derived from fetal skin on gestational days 13 and 18 were isolated and transplanted to investigate the role of macrophages in skin regeneration in fetal mice.

【Methods】 The back skin of embryonic day 13 and 18 ICR mice was harvested and cells were separated by enzyme treatment. F4/80-positive macrophages were then collected by magnetic bead cell separation. They were transplanted into the back skin of embryonic day 14 mice to form a 1 mm full-layer skin defect and the wound was observed at 72 hours.

【Results】 In the transplantation experiments to the mouse dorsal whole skin defect on embryonic day 14, wounds transplanted with skin macrophages on embryonic day 13 showed less scarring grossly, whereas wounds transplanted with skin macrophages on embryonic day 18 showed scarring and edematous changes.

【Discussion】 We hypothesized that embryonic 13 skin macrophages have immature inflammatory pathways. Therefore, it is suggested that the inflammation-induced scar repair process does not function in embryonic 13 mice, while the inflammation-induced scar repair does in embryonic 18 mice.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 2)

P55

Generation of self-assembled 3D human dermal tissue from fibroblasts

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² Department of Clinical Engineering, Faculty of Health Sciences, Komatsu University, Komatsu, Japan

³ Tissue By Net Corporation, Saitama, Japan

Background:

Chronic wounds and large skin defects are major clinical challenges that urgently require effective strategies. Autologous cultured epidermis (CE) has been clinically used for wound healing. However, methods for dermis regeneration have not yet been established. Xenogeneic collagen has been used as many dermal substitutes, but it has limitations such as low vascularization, poor mechanical integrity, and poor compatibility with CE. Based on self-assembly, the creation of tissues or organs in vitro has become possible, which holds promise for creating dermal tissue.

Objective:

This study aims to develop a scaffold-free 3D dermal tissue composed entirely of fibroblasts and their extracellular matrix as a skin graft to promote skin wound healing.

Methods:

Fibroblast spheroids were fabricated on a non-adhesive surface and seeded into a 3D culture platform. A scaffold-free 3D dermal tissue was created through long-term culture and self-assembly of spheroids. We characterized its mechanical properties and biological characteristics in vitro and evaluated the wound healing effects compared to conventional artificial dermis in vivo.

Results:

The 3D dermal tissue demonstrated superior mechanical properties and higher collagen and glycosaminoglycan contents compared to the artificial dermis. In a murine model of full-thickness skin defects, the 3D dermal tissue promoted wound closure, re-epithelialization, and angiogenesis on days 7 and 14.

Conclusion:

We present a novel and reproducible method for creating scaffold-free 3D dermal tissue that effectively promotes skin wound healing. Our results demonstrate that the 3D dermal tissue will provide a transplantation strategy for future treatment of chronic wounds and large skin defects.

P56

Calcification of Achilles tendon in Werner syndrome

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² Department of Pathology, Graduate School of Medicine, Chiba University, Chiba, Japan.

Background: Werner's syndrome is a hereditary premature aging disease in which chronic wounds with characteristic calcification are extremely painful and difficult to treat. Chronic ulcers with calcification in the Achilles tendon area are particularly difficult to treat and cause amputation, but the cause of calcification has not been clarified.

Objective: The purpose of this study was to analyze the cause and course of calcification in Werner's syndrome.

Methods: Histological analysis of subcutaneous tissue deposits around chronic wounds in patients with Werner's syndrome was performed and compared to patients with peripheral arterial disease. Changes in calcium deposits in the Achilles tendon area on plain radiographs were observed and recorded over time in clinical cases. Lymphatic channels in the Achilles tendon area were also analyzed.

Results: The component of subcutaneous soft tissue calcification in Werner's syndrome was calcium phosphate, which was deposited in the lumen of the lymphatic vessels. There was a strong correlation between the amount of calcium deposition in the Achilles tendon area on the left and right sides, and in all 17 cases, the area of deposition increased over time, and according to the increase, the patients developed severe, difficult-to-heal ulcers in the Achilles tendon area that required surgical intervention. It was suggested that abnormalities in lymphatic flow in the Achilles tendon region exist in werner's syndrome.

Conclusion: Achilles tendon calcinosis in Werner's syndrome is always progressive, probably due to impaired lymphatic flow. Development of therapeutic approaches to calcification is required.

Oral Presentation | Free paper (Regenerative medicine)

P57**Preliminary Outcome of Herbal Extract Promotes Hair Regeneration by Enhancing M1/M2 Macrophage**Audry-Yun-Xuan Chan³, Chang-Cheng Chang^{1,2,3,4}, Tzong-Yuan Juang², Yi-Hsuan Su²¹ Division of plastic and reconstructive surgery, China Medical University Hospital, Taiwan² Department of Cosmeceutics, China Medical University, Taiwan³ Department of Medicine, China Medical University, Taiwan⁴ Aesthetic Medical Center, China Medical University Hospital, Taiwan

Background: Hair loss has become a concern. Recent studies suggest that M2 macrophage play a vital role in tissue repair and hair regeneration. Yet there is still lack of research to provide evidence for the role of M2 macrophage in hair regeneration. ON 101 ointment has been mentioned in previous studies to induce M1/M2 macrophage polarization and increase M2 macrophages. Therefore, we are using ON 101 in experiments to achieve an increase in M2 macrophages to promote hair regeneration.

Objective: To explore herbal extract promotes hair regeneration by increasing M2 macrophage and investigate mechanism of M2 macrophage in hair regeneration.

Methods: C57BL/6 were divided into 3 groups randomly including (1) control group, (2) 0.3g ON101, (3) 0.6g ON101. Utilizing hair loss model by shaving and chemical depilation. Apply different two dosages of ON101 on mice back as the M2 macrophage-inducing agents and monitor hair growth in 2 weeks. H&E staining, Image J and dermatoscope were conducted to evaluate the effectiveness in hair regeneration.

Results: Compare to control group, treatment with the two different dosages of ON101 group has increased the hair growth significantly. H&E stain revealed that the higher dose of ON 101 showed stronger hair and the hair density was increased between two groups with different doses of ON 101.

Conclusion: In the preliminary experimental results, We find out that increase M2 macrophages by the mechanism of ON101 will enhance hair regeneration, which offers a therapeutic approach for hair loss conditions. Further research is needed to explore the underlying mechanisms. This has potentially leading to new clinical applications for hair loss patients.

Conditions of hair growth during 2 weeks



Oral Presentation | IPSRC Best paper session

P58

Single cell analysis toward further investigation of the pathogenesis of keloids.

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Department of Plastic and Reconstructive Surgery, Keio University School of Medicine

Background: Keloids are fibrotic diseases that are triggered by skin damage and are characterized by the expansion of keloids beyond the area of skin damage into the surrounding normal skin. Although the cause of keloids is unclear, it is experimentally known that mechanical stress is involved. In this study, we performed single cell RNA sequencing (scRNA-seq) to investigate the pathogenesis of keloids, including mechanical stress and inflammation.

Methods: Keloid tissue and adjacent normal skin were collected with consent from four patients who underwent surgery at Keio University Hospital from July 2022 to September 2023. The samples were isolated into single cells and subjected to scRNA-seq.

Result: The keloid and normal skin cells were divided into 13 cell groups. Keloid tissue contained more vascular endothelial cells, mast cells, and Schwann cells than normal skin. Fibroblasts could be classified into four subclusters, characterized by an increase in mesenchymal fibroblasts in keloids. Regulatory T cells, which have been implicated in keloids in previous studies, were increased in keloids.

Discussion: These results may reflect angiogenesis and increased inflammation in keloids. The results for fibroblast subtypes are also consistent with previous studies and may contribute to fibrosis. Regulatory T cells suppress inflammation and are reported to be decreased in keloids, but their increase in keloids compared to adjacent skin may be related to the spread of keloids to surrounding normal skin.

Oral Presentation | Free paper (Breast)

P59

The Investigation of Therapeutic or Preventive Effects of Adipose Derived Stem Cells on Radiation Induced Capsular Contraction Around Implant in Mouse Model

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Jichi medical university

Background: Capsular contracture is a common and severe complication of breast reconstruction with breast implant, particularly in patients undergoing radiotherapy. Adipose derived stem cell (ADSC) has been reported to mitigate the capsular contracture around the implant.

Objective: This study aims to explore the effect of ADSCs on radiation-induced capsular contracture and its potential mechanisms.

Methods: 24 custom-made mini-implants were inserted into the dorsal side of 24 C57Bl/6 mice. All mice were divided into four groups, except control group, the rest 18 mice received fractionated radiation with a total dose of 40Gy to induce capsular contracture. 1-week post-radiation, group A received periprosthetic ADSCs injection, Group B received intraperitoneal ADSCs injection, Group C received periprosthetic solvent injection, and Group D served as the control with no injections. 180 Day after Radiation, all mice were sacrificed and examined grossly, histology and immunochemistry of periprosthetic tissue were also analyzed.

Results: The ADSCs injection groups showed less visible implant contour changes and a significant reduction in capsular thickness compared to the control group, which is confirmed by capsular histology. Furthermore, the expression levels of α -SMA and Collagen-I in the periprosthetic tissue of the ADSC injection groups were significantly lower than those in the control group.

Conclusion: Our research suggests that treatment with ADSCs can alleviate severe radiation-induced fibrosis and capsular contracture surrounding implants and the expression of α -SMA and Collagen-I in the periprosthetic tissue. This indicates the potential role of ADSCs for breast reconstruction using implants following breast cancer surgery, particularly for patients requiring radiotherapy.

Oral Presentation | IPSRC Best paper session

P60

A Novel Diagnostic Approach for Keloids Using Proton Nuclear Magnetic Resonance with Time-frequency Analysis of Serum

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Background:

Keloid is a fibroproliferative skin disorder typically diagnosed through clinical features, lacking a specific diagnostic laboratory test.

Objective:

To evaluate the effectiveness of proton nuclear magnetic resonance (NMR) measurement of serum followed by time-frequency analysis in differentiating keloid cases from control subjects and identifying different stages/forms of keloids.

Methods:

Consecutive keloid patients were recruited prior to planned resection surgery and classified into character like Hypertrophic scars (HSs), character like Keloids (moderate and severe subgroups) based on the Japan Scar Workshop Scar Scale. Controls were recruited through convenience sampling. Serum samples underwent proton NMR and time-frequency analysis, followed by partial least-squares discriminant analysis (PLS-DA).

Results:

Seventy-four individuals (54 keloids and 20 controls) were enrolled. The PLS-DA score plots clearly demonstrated that the NMR-based approach could differentiate cases from controls, hypertrophic scar-like cases from keloid cases, and moderate-keloid cases from severe-keloid cases. Marked separation was observed between keloid and control groups, explaining 85% and 13% of the variance, respectively ($R^2=0.997$, $Q^2=0.958$). Fifty-four patients with character like HSs and character like keloids accounted for 68% and 30% of the variance, respectively, ($R^2=0.998$, $Q^2=0.970$). Twenty-four patients with moderate and severe keloids accounted for 98% and 2% of the variance, respectively, with notable separation ($R^2=0.979$, $Q^2=0.949$).

Conclusion:

Proton NMR measurement of serum followed by time-frequency analysis may serve as a diagnostic and prognostic tool for keloid cases. Further studies with larger samples and longitudinal design are needed to validate this approach.

Oral Presentation | Free paper (Nerve)

P61

Early Results of Optimized Nerve Management with Electrical Stimulation for Lower Extremity Neuroma

Jesse Chou, Janice Choi, Minton Cooper, Joseph Park, Bobby Chhabra, Brent DeGeorge

University of Virginia

Background: Nerve injury is the most common complication following foot and ankle surgery, with painful neuroma reported in up to 10% of procedures. Current treatment often yields varying degrees of pain relief. Electrical stimulation (ES) through peripheral neuromodulation is an emerging technology associated with improvement in nerve-related pain and acceleration of neural regeneration.

Objective: To assess the short-term outcomes of combining nerve reconstruction techniques with ES in providing early pain relief for patients with symptomatic lower extremity neuromas.

Methods: We describe a single-institution, prospective, cohort study including adult patients with lower extremity neuroma subjected to a nerve management procedure (neurolysis, targeted muscle reinnervation, or nerve allograft reconstruction) with concomitant peripheral nerve stimulator placement. Patients were treated postoperatively with ES (phase duration: 100uSec, pulse rate: 80 Hz) for 4 hours daily. Patient demographics, surgical details, and outcomes data were evaluated.

Results: Eight female patients (mean age: 49 ± 13 years) were included. Peripheral nerve injuries were identified at the following locations: sural nerve ($n=5$), medial plantar nerve ($n=1$), tibial nerve ($n=1$), superficial peroneal nerve ($n=2$), and saphenous nerve ($n=1$). Mean Brief Resilience Scale (BRS) was 3.11 ± 0.61 . At 3 months post-intervention, NRS Pain scores decreased from a mean of 8.5 ± 1.2 to 1.5 ± 1.2 , PROMIS Pain Interference scores decreased from 61.5 ± 3.4 to 53.7 ± 4.9 , and PROMIS Pain Behavior scores decreased from 65.8 ± 3.5 to 56.1 ± 4.2 .

Conclusion: Early results of optimized neurotherapy with electrical stimulation demonstrates improved short-term pain relief for patients with symptomatic lower extremity neuromas.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 1)

P62

Social Determinants of Health Associated with Prolonged Time to Treatment for Non-Traumatic Upper Extremity Conditions

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University of Virginia

Background: Social determinants of health (SDH) are defined by the World Health Organization (WHO) as conditions in which people are born, grow, live, work and age. The aim of this study is to examine the association of SDH on time to treatment for common non-traumatic upper extremity conditions.

Objective: To examine whether social determinants of health (SDH) factors are associated with time to treatment in common non-traumatic upper extremity conditions.

Methods: A national insurance claims-based database with patient records from the Centers for Medicare and Medicaid Services was used for data collection. Patients with diagnoses of wrist arthritis, carpal tunnel syndrome, cubital tunnel syndrome, stenosing tenosynovitis, Dupuytren's contracture, De Quervain's Tenosynovitis, medial epicondylitis, lateral epicondylitis, and thumb basal joint arthritis between 2005 and 2014 were identified. Primary outcomes included average time to treatment. Secondary outcomes included demographic variables and social determinants including education, employment, and other social factors.

Results: We identified 7,535,621 patients with non-traumatic upper extremity conditions. 437, 093 patients had associated social determinants of health (SDH). SDH patients had higher rates of COPD, obesity, substance use, and depression. Patients with non-traumatic upper extremity conditions and social determinants of health were more likely to experience increased average time to treatment.

Conclusion: In patients with non-traumatic upper extremity conditions, social determinants of health are associated with higher times to treatment.

Oral Presentation | Free paper (Patient Safety/ Education/ Leadership)
P63
Handcrafted Artificial Vessels for Supermicrosurgical Training

Toko Miyazaki, Maya Kanasaki, Reiko Tsukuura, Takumi Yamamoto

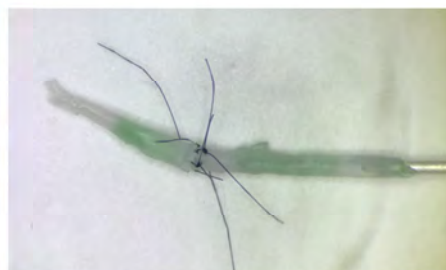
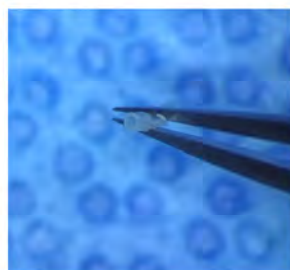
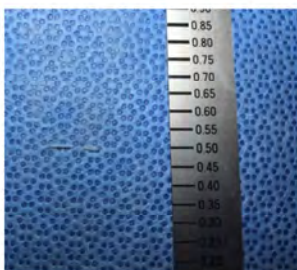
Department of Plastic and Reconstructive Surgery, National Center for Global Health and Medicine

Objective: In the field of reconstructive surgery, the technique of supermicrosurgery has enabled various kind of reconstruction, for example fingertip reconstructions and tissue transplantations using perforator flaps. However, a sophisticated supermicrosurgical skill is difficult to master especially for young surgeon before they experience many operations. Various living and non-living training models have been reported for supermicrosurgery, but none of them are perfect in terms of infectious risk and cost. We aimed to develop a new training material for supermicrosurgery.

Materials and Methods: Luminal structures or tubes were created using various materials including polyvinyl alcohol (PVA), polyvinyl acetate resin (PAR) and hydrocolloid (HC). Then we anastomosed the tubes and assessed patency with indocyanine green (ICG) injection. The characteristics of created tubes were recorded, and their feasibilities were evaluated by microsurgeons regarding anastomotic similarities to the real vessels and suitability for supermicrosurgical training.

Results: Average time and cost to create a 15-mm-long tube were 20.0 minutes (range, 50 seconds to 41 minutes) and 0.15 USD (range, 0.02 to 0.40 USD). Diameter of created tubes ranged from 0.35 to 2.00 mm (average, 0.71 mm). All the tubes could be anastomosed using 11-0 nylon with 15-micron needle. Anastomotic patency could be assessed in PVL tube and PAR tube (PART), whereas not in HC tube. Feeling of anastomosis in PART was most similar to that in the real vessels.

Conclusion: PART can be a training model alternative to previously reported training models, which allows supermicrosurgery practice with reduced infection risk and cost.



P64**Realization of XR technology applications in plastic and reconstructive surgery**

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【Objective】

The development of the XR (cross reality), multifunctional microscope and exoscope have led to reports of its application in surgery. The combination of the exoscope and smart glasses will provide an advantage in terms of education and surgical skill improvement. Simulations are also important in the fields of reconstructive and cosmetic surgery, and XR will play an important role here as well. We report on the research we are conducting to realize the clinical use of XR.

【Method and Results】

Microsurgery requires binocular vision of the projected image without blocking the field of view. We have already been able to perform vascular anastomosis using the exoscope (Orbeye®, Olympus, Japan) and smart glasses (MOVERIO BT-35E®, Epson, Japan) with a chicken wing in a face-to-face setting. The assistant could perform by projecting an image of the surgeon's field of view rotated 180 degrees. We also used exoscope and smart glasses during lymph venous anastomosis (LVA). The use of smart glasses would increase that variation compared to using monitors. In the simulation, the researchers are using a hologram software (Holoeyes®, Holoeyes, Japan) to simulate the reconstructed breast in patients undergoing breast reconstruction, with the goal of providing patients with a more realistic image of their reconstructed breast.

【Discussion】

However, there are still many issues to be solved to replace smart glasses alone, such as weight reduction, battery life, transmission speed, and price. After overcoming these challenges, the future of "one smart glass per person" following smartphones and wireless earphones will become a reality. After overcoming these challenges, the future of "one smart glass per person" following smartphones and wireless earphones will come true.

P65

Observation the skin at the site of pressure ulcers predilection using the sheet-type sensor

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Background: Pressure ulcers significantly reduce the QOL of patients and their families. Although various methods are currently being taken, pressure sore occurs in 20,000 patients every day in Japan. Preventive measure of their occurrence and worsening is vital.

Pressure sores are caused by a decrease in tissue blood flow due to prolonged external force. A combination of various risk factors such as reperfusion injury, displacement stress, friction, and skin infiltration is also important. To date, various studies have been conducted on pressure ulcers, but no reports have examined in detail the extent to which each risk factor affects the skin and how the skin reacts to each risk factor. This is because the monitor itself has a thickness and volume that interfere with the external force. The sheet-type sensor developed by Yokota et al. can be used for monitoring without interfering with external forces. We have observed mouse skin under pressure using the sheet-type sensor.

Objective: We investigated whether it is possible to observe the site of pressure sores in humans.

Methods: We applied a sheet-type image sensor to the preferred site of a pressure ulcers and observed changes in the skin in the sitting and lying positions. We also observed changes in the skin during the use of pressure-dispersing mattresses and cushions. We observed how the skin changed with pressure reduction and body movement.

Results: It was possible to observe the skin at the site of pressure ulcers predilection. The results suggest that the sheet-type sensor may be used to prevent pressure ulcers.

Conclusion: Currently, pressure ulcers is largely dependent on positional changes by nurses and caregivers, and complete prevention has not yet been achieved. The sheet-type sensor has shown the possibility of detecting risk by observing the skin under pressure, which has been difficult to do so far.

P66**Visualization of Chromosome-Specific Epigenetic Modifications for Fat Transplantation**

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Chiba University

Introduction: Analyzing the properties of the cell groups within subcutaneous adipose tissue, which serves as the material for fat transplantation therapy, is crucial for maximizing therapeutic efficacy. However, epigenetic analysis, which is fundamental to cell function, has rarely been conducted. Using a platform capable of chromosome-specific analysis, we visualized the epigenetic state of subcutaneous adipose cells.

Methods: Human abdominal subcutaneous tissue was treated with collagenase and centrifuged. Ceiling culture cells (ccdPAs) were cultured for 7 weeks from the floating layer, and adipose-derived stem cells (ASCs) from the sediment layer. Among the epigenetic modifications, CpG methylation 450K assay and H3K4me3 ChIP-seq assay were performed. BigWig data were imported and analyzed using Subio Platform®.

Results: Of the RefSeq Genes in hg19, 64.9% had regions (Intervals) where H3K4me3 accumulated, indicating transcriptional regulation by H3K4me3. Additionally, 65.6% of these Intervals were located within 400 bp upstream or downstream of the transcription start site (TSS), suggesting transcription promotion. The peak values near the PPARG TSS were 16.2 for ASCs and 24.2 for ccdPAs. Similarly, the peak values near the RUNX2 P1 TSS were 21.5 for ASCs and 33.1 for ccdPAs, which corresponded with observations of cell differentiation capacity.

Among the H3K4me3 Intervals, 72.6% overlapped with CpG Islands. From the perspective of CpG Islands, 51.8% overlapped with H3K4me3. CpG Islands were more broadly distributed and were thought to regulate transcription independently or in combination with other histone modifications. Most CpG Islands overlapping with H3K4me3 had very low methylation rates, but occasionally, there were high methylation rates. This suggests an interesting coexistence of epigenetic modifications that act like transcriptional accelerators and brakes. Such unique overlaps were concentrated near chromosome ends, specifically near telomeres, and were rarely found near centromeres. Additionally, they were sparsely present on chromosome 1 but densely on chromosome 19.

Discussion: The era of large-scale data has also arrived for the analysis of cells in subcutaneous adipose tissue, but grasping the overall picture from the obtained large data is not necessarily easy. In this study, we were able to understand the epigenetic state of each chromosome. These results serve as a foundation for optimizing fat transplantation according to different objectives.

Oral Presentation | Free paper (Regenerative medicine)

P67

Regenerative effects of adipose-derived stem and its-extracellular vesicles on skin injury models

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Background:

Radiotherapy (RT) is one of three major treatments for malignant tumors. More than 50% of patients with malignant tumors undergo RT. Over 95% of patients undergoing RT may develop some form of radiation dermatitis or radiation-induced skin injury. This condition can affect the patient's quality of life during and after treatment. If severe, there is a risk of limiting the radiation dose or interrupting the treatment plan, which may negatively affect the treatment outcome.

Objective:

We established an *in vitro* and *in vivo* model of radiation-induced skin injury using human dermal fibroblasts (HDFs) and mouse, and examined and analyzed extracellular vesicles of adipose-derived stem cells (ADSC-EVs). We observed and evaluated the effects of ADSC-EVs on irradiated HDFs and murine wounds.

Methods:

Collagen gene expression was compared by qPCR to evaluate the *in vitro* models of radiation-induced skin injury established with HDFs and mice. Wound healing in the radiation-induced skin injury models by ADSC-EVs treatment was analyzed by gene expression, collagen synthesis and histological evaluation.

Results:

ADSC-EVs promoted wound healing *in vitro* and *in vivo* and collagen gene expressions were upregulated significantly.

Conclusion:

We established *in vitro* and *in vivo* model of radiation-induced skin injury and showed that ADSC-EVs play a beneficial role in the healing process; ADSC-EVs may be a promising therapeutic modality in the treatment of radiation-induced skin injury.

Oral Presentation | Free paper (Regenerative medicine)

P68

Regenerative effects of hiPSC-derived peripheral neuron/nerve progenitor on a nerve injury model

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Background:

Research on peripheral nerve regeneration is lagging behind that of the central nervous system, but there are many patients and much progress is desired. Recently, human iPSC/ASC-derived induced peripheral neuron/nerve progenitor cells were developed by the National Institute of Advanced Industrial Science and Technology (AIST), Japan (Y Takayama, et al. Sci Rep. 2020 / Y Takayama, Y Shibuya, et al. PLoS ONE 2020). On the other hand, we have developed a murine model of facial nerve palsy which is advantageous, for example, for analysis using genetically engineered mice, modifying previously reported rat facial palsy.

Objective:

Using these cells and model, we launched an experimental system and project in collaboration with AIST to transplant iPSC-derived induced peripheral neuron/nerve progenitor (hiPSC-PN) into the mouse model of facial nerve palsy and evaluate their effect on peripheral nerve regeneration.

Methods:

In this pilot study, we evaluated the recovery of nerve function after transplantation of the iPSC-derived peripheral neuron/nerve progenitor cells into the mouse model of facial nerve palsy by evaluating nerve function which was facial palsy scale score evaluation modified by a previous paper and histological findings.

Results:

Weekly facial palsy scores were significantly improved in hiPSC-PN transplanted group than the control group after postoperative week 10. Facial nerve nuclei stained by a retrograde neuronal tracer dye Dil injected at whisker pad were detected more than the control group at postoperative week 14.

Conclusion:

Our results suggested that hiPSC-PN can be a therapeutic modality for peripheral nerve injury.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 2)

P69

Gelsolin released from macrophages is required for fibroblast migration during skin wound healing

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² Department of Microbiology and Immunology, Nippon Medical School, Tokyo, Japan

Background: When skin is damaged, various kinds of cells migrate to the lesion and initiate wound healing process. In the inflammatory phase, neutrophils and macrophages infiltrate into the wound site to eliminate pathogens and prevent infection. In the proliferation and remodeling phases, fibroblasts and endothelial cells are activated and new granulation tissue is formed to fill the wound, which lead to re-epithelialization. Recently, we have identified that gelsolin, which is known as an actin-binding protein, as a novel negative regulator of NLRP3 inflammasome. Interestingly, gelsolin is abundantly secreted from macrophages along with NLRP3 inflammasome activation.

Objective: We aimed to clarify the role of macrophage-secreted gelsolin in wound healing.

Methods: We created macrophage-specific gelsolin conditional knockout (*Gsn*-cKO) mice and generated full-thickness excisional wound model. Re-epithelialization was observed every other day and we assessed the wounds with immuno-fluorescent staining. We also performed scratch assays using WT mice primary fibroblasts and recombinant gelsolin or *Gsn*-cKO mice bone marrow derived macrophages (BMDMs).

Results: *Gsn*-cKO mice showed reduced infiltration of α SMA or vimentin-expressing fibroblasts in the wound area, compared to control mice. Gelsolin-treated fibroblasts migrated faster than vehicle-treated fibroblasts. We also observed that co-culture of fibroblasts with LPS + nigericin-stimulated *Gsn*-cKO BMDMs led to faster migration than control BMDMs.

Conclusion: Macrophage-derived gelsolin is required for fibroblast migration during wound healing. Further investigation is required to clarify whether gelsolin has its receptor and what factors are involved in its signaling pathway.

P70

Pathological Analysis of Unstained Mouse Skin Tissue

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Background: Skin aging is characterized by fragmented and less dense collagen fibers in the dermis, along with disorganized fiber bundles. While there is currently extensive research on aging, skin thickness in the dermis is typically used as an evaluation of aging.

Objective: The objective of this study is to observe collagen fibers with a high degree of detail and elucidate the morphological alterations associated with aging. This investigation utilizes a proprietary high-frequency illumination microscopy analysis system to achieve precise observations and analyses.

Methods: Skin tissue was collected from the dorsal regions of young to aged mice, and observations were conducted using optical microscopy with Hematoxylin and Eosin staining, and electron microscopy. Unstained paraffin sections and TEM-fixed samples were examined with our system and compared with other images.

Results: Using a high-frequency illumination microscopy analysis system revealed distinct collagen bundles even in unstained conditions. Finer fibrous structures, presumed to correspond to collagen fibrils, were also observed. Comparison with SEM images showed similarities, indicating the potential to extract three-dimensional structural information from collagen bundles through this method.

Conclusion: While staining is typically performed to enhance structural clarity when observing paraffin sections under an optical microscope, our device allows observation without staining, eliminating the need for such procedures. Moreover, the potential to acquire structures previously masked by conventional staining suggests the possibility of conducting detailed morphological evaluations without electron microscopy. This method may contribute to establishing a technique for observing changes in collagen morphology in aging and scar.

Oral Presentation | Free paper (Regenerative medicine)

P71

Recent evaluation of cell assisted lipotransfer for soft tissue augmentation in our institution

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Background:

Cell-assisted lipotransfer (CAL) has emerged as a promising technique in aesthetic reconstruction, leveraging adipose-derived stem cells to enhance graft viability and contour restoration. This presentation aims to broaden understanding and utilization of CAL across diverse applications in aesthetic reconstruction. We present a case series showcasing the utility of CAL in various aesthetic deformities beyond breast reconstruction.

Objective:

Five patients underwent CAL for reconstruction. Cases included breast augmentation for congenital hypoplasia and concavity deformation after mastectomy and reconstruction using autologous tissue (3 cases), augmentation of congenital lower leg concavity (1 case), and post-tumor resection facial concavity (1 case).

Methods:

One CAL per patient was performed. Liposuction, stem cell isolation, and CAL were performed as per our protocol. Cell viability of transplanted SVF was evaluated using cell counter. Postoperative monitoring assessed outcomes and complications.

Results:

Cell viability of SVF was $90.74 \pm 5.5\%$. Across all cases, CAL demonstrated efficacy in enhancing volume and contour. Breast cases achieved improvements in size and shape with improved symmetry. In lower leg concavity correction, CAL resulted in relatively limited improvement in limb contour and symmetry due to its skin tension. Facial concavity correction exhibited remarkable aesthetic improvement post-CAL intervention. Complication was not appeared except pain.

Conclusion:

Our case series underscores the versatility and efficacy of CAL beyond breast reconstruction, showcasing its utility in addressing various deformities. CAL can offer reliable outcomes with minimal complications, natural-looking results and enhanced patient satisfaction.

E-poster

P72

Adipose-derived stem/stromal cells from young mice promote wound healing in aged mice through the regulation of ROS homeostasis by extracellular superoxide dismutase.

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¹ Hyogo Medical University

² The University of Arizona

Background:

Excessive stress from reactive oxygen species (ROS) can impair the wound healing process. It has been reported that antioxidative ability decreases with age.

Objective:

Extracellular Superoxide Dismutase (SOD3) is a scavenger enzyme that regulates the degradation of superoxide, one of the ROS. We hypothesized that reduced expression of SOD3 in aged individuals may impair the efficacy of wound healing.

Methods:

Young wild-type, aged wild-type, and young SOD3 KO mice were used for all experiments. In the excisional wound healing model, wound closure time and levels of ROS stress in tissue samples were evaluated. Dermal fibroblasts and adipose-derived stem/stromal cells (ASC) were isolated and used to evaluate the potency of producing SOD3. Finally, in the excisional wound model of aged mice with ASC transplantation from young mice or SOD3 KO mice using collagen gel, the effect on wound healing was evaluated.

Results:

A decrease in the wound healing rate and an accumulation of ROS stress were observed in the in-vivo models of SOD3 KO and aged mice compared to young mice. Furthermore, extracellular ROS stress induced SOD3 protein expression in ASC of the young mice group more than in dermal fibroblasts. Finally, ASC transplantation from young mice, but not from SOD3 KO mice, reduced ROS stress levels in wound tissue and increased the wound healing rate in aged mice.

Conclusion:

We show that SOD3 may be a critical regulator of ROS stress in the wound healing process, especially in aging, and may contribute to the development of new therapeutic strategies.

E-poster

P73

A Report of Complications Associated with Cyanoacrylate Closure for Varicose Veins

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Background:

The treatment of varicose veins began with stripping and high ligation. Endovenous thermal ablation (ETA) requires tumescent local anesthesia (TLA) and is associated with complications such as pain and subcutaneous bleeding. Cyanoacrylate closure (CAC) is a less invasive treatment that does not need TLA.

Objective:

VenaSeal Closure System (Medtronic, Minneapolis, USA), a new technique using CAC, was first approved by the US Food and Drug Administration (FDA) in 2015 and covered by health insurance in Japan since December 2019. The indication is for symptomatic primary varicose veins. Contraindications include a history of allergy to cyanoacrylate adhesives. Complications of CAC have not yet been widely reported, as clinical experience and data are accumulating.

Methods:

We have been performing stripping surgery for varicose veins since April 2014, ETA since July 2018, and CAC since July 2021. We conducted a retrospective study of CAC in 94 patients with 137 legs (116 great saphenous veins, 39 small saphenous veins) treated at our hospital from July 2021 to March 2024.

Results:

Postoperative complications such as phlebitis, allergy, and endovenous glue-induced thrombosis (EGIT) were observed. However, no serious adverse events such as deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE) were observed. Ultrasound examinations were performed at 1 day, 1 month, and 3 months postoperatively.

Conclusion:

CAC is one of the treatments for varicose veins. We report a discussion of some relevant literature.

Oral Presentation | Free paper (Regenerative medicine)

P74

Using adipose-derived stem cells and its derivatives to promote regenerative medicine

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Background:

Treatment options in various wounds and tissue defects include conventional reconstructive techniques as well as stem cell-based therapies, which have been increasingly studied in recent years. In order to increase therapeutic options, we have been developing stem cell-based therapies from the basic to the clinical level.

Objective:

In this presentation, we will describe our efforts to date to develop stem cell-based therapies to accelerate healing of hard-to-heal tissue at our institution.

Methods:

Adipose derived stem cell (ASC), its conditioned medium and extracellular vesicles (EV) were isolated and evaluated. *In vitro* and *in vivo* models of tendon, refractory skin ulcers and collagen lattice model of scar contraction were established. ASC and ASC-EV were applied to evaluate its regenerative effects.

Results:

Significantly accelerated tendon healing was observed in ASC -transplanted murine Achilles tendon model. Radiation ulcer models healed significantly faster and in better quality in ASC-EV treated group than in controls. ASC conditioned medium suppressed scar contractures in the *in vitro* collagen lattice model of scar contraction.

Conclusion:

ASC and its derivatives can be a promising treatment option when difficult treatments are anticipated.

Oral Presentation | Free paper (Craniofacial/ Others)

P76

The Sweat Secretion in the Pedicled Volar Skin Flaps in Rats

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Background: Eccrine sweat glands, one of the skin appendages, have some important roles to maintain homeostasis: keeping body temperature stable, providing the skin with moisture, preventing bacterial infections, etc. Free tissue transfers often involve moving skin paddles, but there are few reports on the function of skin appendages in transferred tissue.

Objective: The purpose of this study is to investigate how the eccrine sweat glands function in transferred tissue and whether the factors, such as ischemic stress or reinnervation, influence the recovery of their function.

Methods: We established the method to elevate the volar skin as a pedicled flap and transplant it to the abdominal wall in Sprague-Dawley (SD) rats, because eccrine sweat glands exist only in the volar skin in rats. The sweat secretion in the flaps were assessed by iodine-starch sweat test.

Results: The sweat secretion were observed in innervated volar flaps (with tibial nerve), but not at all in denervated volar flaps (without tibial nerve). The innervated volar flaps which had suffered ischemic stress by the clamp of the perfusing vessels for three hours secreted almost the same amount of sweat as the innervated volar flaps without ischemic stress. The re-innervated volar flaps (with tibial nerve cut and sutured) began to sweat latter than the innervated flaps.

Conclusion: The flaps transferred into the recipient sites without cholinergic nerves don't seem to sweat. Ischemic stress doesn't seem to affect the flap sweating. Reinnervation makes flaps sweat even in recipient sites without cholinergic nerves.

Oral Presentation | Free paper (Regenerative medicine)

P77

Mechanical isolation of adipose derived stem cells from fresh and cryopreserved: A Comparative analysis

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Background: Adipose-derived stem cells (ADSCs) have gained prominence as an ideal stem cell source. While enzymatic and mechanical techniques exist for ADSC isolation, mechanical methods are preferred for their cost-effectiveness, speed, and preservation of cell phenotypes despite yielding fewer cells. Developing efficient non-enzymatic techniques is crucial for clinical applications.

Objective: A comparative analysis of the yield quality of hADSCs, cell viability, and phenotypic preservation from fresh and cryopreserved tissue will be discussed in this presentation.

Methods: Adipose tissue samples were obtained from tissue blocks and lipoaspirates, with portions cryopreserved at varying temperatures and durations. The tissue was finely minced using scalpel blades and centrifuged to isolate the stromal vascular fraction (SVF). Cell viability was assessed using trypan blue exclusion and a hemocytometer. Flow cytometry was employed to verify and quantify hADSCs based on surface antigens CD29, CD34, CD73, CD90, and CD105. Differentiation assays into adipocytes, chondrocytes, and osteocytes were validated with Oil Red O, Toluidine Blue, and Alizarin Red staining, respectively.

Results: The mechanical isolation method successfully produced a substantial number of viable ADSCs from fresh adipose tissue and an adequate number from cryopreserved samples. The cells maintained their phenotypic characteristics and differentiation potential.

Conclusion: Mechanical isolation is an effective method for obtaining SVF and hADSCs from both fresh and cryopreserved adipose tissue, demonstrating its potential for autograft treatments. The ability to cryopreserve adipose tissue before isolating hADSCs allows for flexibility in timing, enhancing the practicality of delayed therapeutic interventions.

P78**Cytokine analysis of secondary lymphedema in patient with gynecologic cancer. A case-control study**

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Background:

Lymphedema is most frequently caused secondary to cancer-related lymphadenectomy, radiotherapy and chemotherapy in developing countries. Secondary lymphedema accounts for 25~70% gynecological cancers patients. This condition is linked with chronic inflammation, tissue fibrosis, and adipose deposition. Due to the local inflammation observed as disease progression, we hypothesis that inflammatory cytokines profile may be different between lymphedema and non-lymphedema patients after cancer treatment. These cytokines may assist to identify development of secondary lymphedema in the future.

Objective:

To identify the cytokine profile in patients underwent gynecologic oncology surgery with and without secondary lymphedema over lower extremities.

Methods:

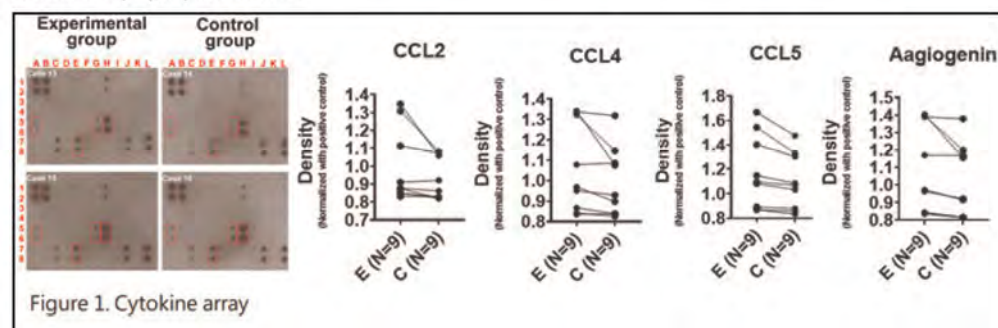
We enrolled 18 gynecological patients whom received gynecologic cancer surgery from 2018 to 2021 at National Cheng Kung University Hospital (NCKUH) for this case-control study. Nine patients with lower limb lymphedema after surgery are experimental group, whereas the other 9 patients without lower limb lymphedema after surgery are labeled as control group. Blood serum were collected and cytokine array analysis was done with semiquantitative protein profiling. Cytokine array images were analyzed using ImageJ software.

Results:

In cytokine array, 4 cytokines(CCL2, CCL4, CCL5 and angiogenin) were highly expressed in serum of all 18 secondary lymphedema patients as compared with the case group.

Conclusion:

The results suggest that CCL2, CCL4, CCL5 and angiogenin are the potential markers for developing secondary lymphedema.



P79

Eyelid in Morbihan disease is pathologically chronic lymphedema and super-microsurgical treatment can reduce the risk of the recurrence after skin excision

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² Shiseido Co., Ltd., MIRAI Technology Institute, Yokohama, Japan

Background: Morbihan disease is an eyelid edema associated with histological abnormalities in the lymphatic vessels. We hypothesized that the pathogenesis of Morbihan's disease may be similar to that of secondary chronic lymphedema of the extremities.

Objective: The purpose of this study was to explore the clinical and histological similarities between Morbihan's disease and chronic lymphedema, and to examine the efficacy of the super-microsurgical lymphaticovenular anastomosis (LVA) to Morbihan's disease.

Methods: The histological differences including three-dimensional microstructures were examined in 5 patients diagnosed with Morbihan's disease by indocyanine green (ICG) lymphography and 5 patients with acquired ptosis of the eyelid as a control group. Postoperative recurrence rates were compared between the patients who underwent debulking surgery plus LVA (study group, n =7) and the patients who underwent debulking surgery (control group, n = 6) for Morbihan disease.

Result: The eyelid skin of the patients with Morbihan disease showed signs of changes in the microstructure of capillary lymphatic in the dermis, which is characteristic of chronic lymphedema in advanced stage. The recurrence rate within 1 year after surgery was significantly lower in the study group than in the control group (1/7 vs 5/6, respectfully, p = 0,03).

Conclusion: The Morbihan disease may be treated as a lymphedema of the eyelids in both pathologically and clinically.

P80**Risk of Congestive Heart Failure and Mortality Following Lymphovenous Anastomosis: A Nationwide Population-based Retrospective Cohort Study**

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Background: Lymphovenous anastomosis (LVA) enables lymphatic fluid to drain into the venous system. However, no study has investigated the association between LVA and heart failure (HF) caused by fluid overload in blood circulating system.

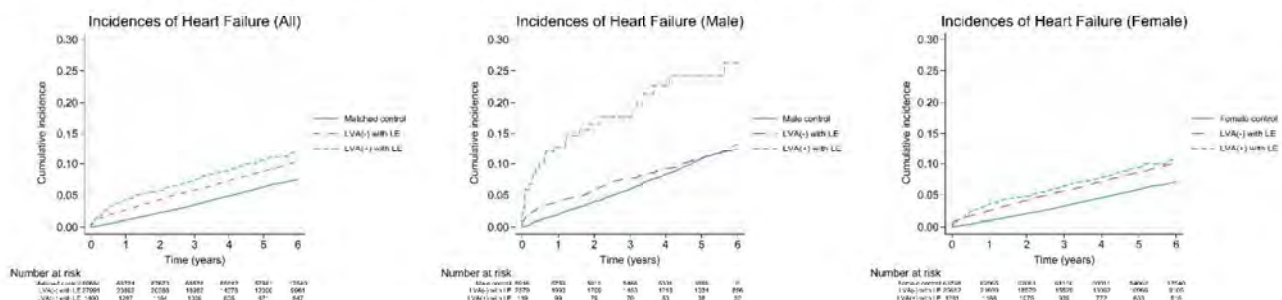
Objective: Purpose of our study was to determine whether LVA increases the risk of HF and mortality.

Methods: This nationwide study evaluated total of 1,400 lymphedema patients who underwent LVA and two control cohorts with 28,000 lymphedema who did not undergo LVA and 70,000 age- and sex-matched participants from the Korean National Health Insurance database were included. Other cardiovascular risk profiles and comorbidities were obtained during National Health Insurance Service – Health Screening. The incidence, adjusted risk for HF, and mortality were evaluated.

Results: Adjusted HRs for HF were 1.20 (confidence interval [CI], 1.03–1.40) and 1.30 (CI, 1.12–1.50) referenced by the general population control cohort and patients with lymphedema without LVA, respectively. In stratified analyses, the risk was notably greater in males compared to females, higher in younger individuals as opposed to older ones, and further elevated within the BMI range of 18.5 to 25.

Conclusion: LVA is associated with an increased HF risk, independent of cardiovascular risk factors and of associated comorbidities. This association is prominent in participants aged <50 years, in males, and in the normal-to-obese (BMI ≥ 18.5 kg/m²) group. Among patients with lymphedema, LVA did not significantly affect mortality.

Figure. Kaplan–Meier curves for the incidence of heart failure events in patients with lymphedema who underwent lymphovenous anastomosis and control cohorts. (A) all, (B) male, and (C) female.



P81

Macro-, Micro-, and Nano-Fat Grafting: Art, Philosophy, and Clinical Decision-Making

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Background: Human autologous fat grafting has a robust 131-year history of clinical applications, extensively used in aesthetic, reconstructive, and regenerative surgeries. Its advantages include ready availability, biocompatibility, and an inherent lack of allergenicity, making it a preferred choice among surgeons.

Objective: This study aims to clarify and standardize the terminology related to macro-, micro-, and nano-fat grafting for clinical applications, enhancing understanding and consistency in clinical practice.

Methods: Utilizing principles of evidence-based medicine, this research involved an extensive review of literature spanning the past two decades, supplemented by a comprehensive meta-analysis, to accurately define the classifications of macro-, micro-, and nano-fat grafting.

Results: Our findings underscore that regardless of terminology, the success of fat grafting procedures hinges critically on meticulous attention to detail during the harvesting, processing, and transplantation phases. Effective manipulation of these stages is paramount for optimizing clinical outcomes.

Conclusion: Considering the dual demands of volumetric enhancement and tissue rejuvenation in fat transplantation, we advocate for micro-fat grafting, defined by graft parcel sizes between 1/60 and 1/240 mL. This approach significantly reduces potential morbidity and maximizes long-term outcomes in volume restoration and rejuvenation, eliminating the use of impractical terms and focusing on clinically actionable results.

Oral Presentation | Free paper (Regenerative medicine)

P82

Achieving the Balance in Autologous Fat Transplantation: Harmonizing Volumization and Rejuvenation

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Background: Autologous fat transplantation is a pivotal technique aimed at restoring volume deficits and achieving simultaneous tissue rejuvenation. These dual objectives are crucial for long-term maintenance and minimization of post-procedural complications.

Objective: This research assesses the long-term efficacy of the Micro-Autologous Fat Transplantation (MAFT) technique in facial fat grafting, specifically evaluating its capacity for volumetric enhancement and tissue rejuvenation.

Methods: We conducted a longitudinal study involving a cohort of patients over 50 years old, followed for a period of five to ten years. This study focused on the periorbital area and included a total of 350 cases to evaluate the enduring outcomes of fat transplantation.

Results: The findings revealed substantial improvements in periorbital hollows, crow's feet, prominent eye bags with/without lower eyelid laxity, and moderate baggy eyes with tear trough deformity/infra-orbital dark circle. Notably, these areas showed desirable long-term effects, contrasting with other regions affected by skin laxity, tear troughs, and dark circles, which did not exhibit similar improvements.

Conclusion: The MAFT technique has established itself as an effective, straightforward, and durable method in fat grafting. It not only ensures significant volume restoration but also enhances skin quality, evident in the marked reduction of wrinkles and dyspigmentation. These benefits underline the reliability and clinical value of MAFT, making it a commendable surgical approach for achieving lasting rejuvenation and volumetric results.

Oral Presentation | IPSRC APRAS award session 2

P84**Efficacy of treating diabetic chronic ulcers using adipose-derived stem cell-conditioned medium**

Sangchul Hyun, Yoshihiro Toyohara, Shino Higai, Saito Natsumi, Yoshihiro Sowa, Kotaro Yoshimura

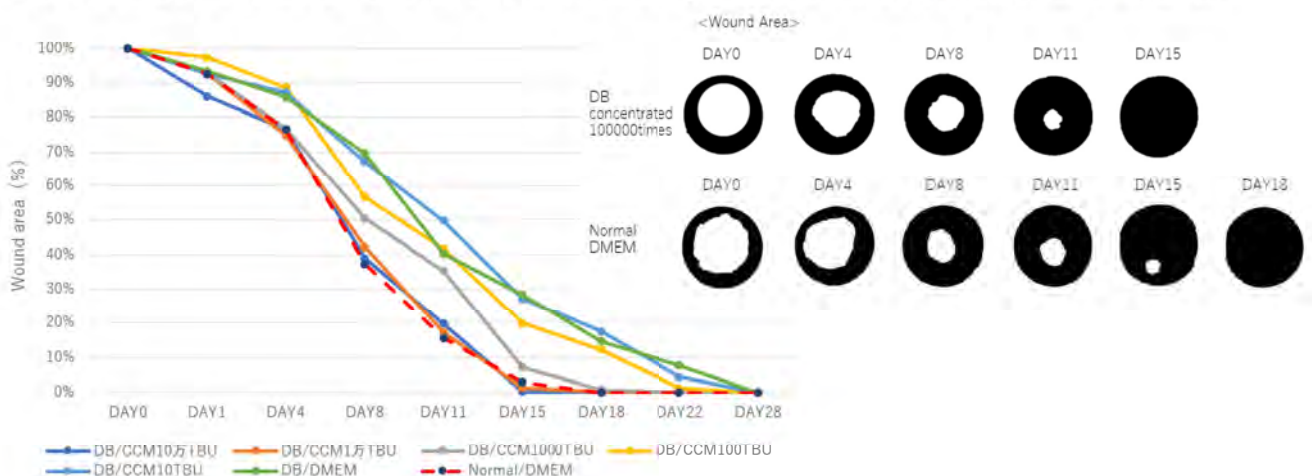
Department of Plastic Surgery, Jichi Medical University, Japan

【Background】 The number of patients with diabetic refractory ulcers is increasing in Japan. However, it is resistant to conservative treatment, such as traditional ointment application. Conditioned medium (CM) from adipose derived stem cells (ASCs) may have therapeutic effects on it.

【Methods】 A novel xeno-free medium was adopted to culture ASCs and get its CM. The ASC-CM's components of cytokines and growth factors were quantified. Then, wound was made by using biopsy punch on the dorsal skin of diabetic mice and ASC-CM with different concentrations was applied Locally (the group with ASC-CM concentrated 100,000 times, 10,000 times, 1,000 times, 100 times, 10 times, and DMEM group without ASC-CM, 6 groups) , while another group of healthy control was applied with DMEM during 14days. Skin samples harvested at day 28 were analyzed with histologic examinations.

【Results】 Comparing the groups applied with ASC-CM concentrated 100,000 times, 10,000 times, 1,000 times, 100 times, 10 times, and DMEM over 14 days (It was observed for 28 days), the higher the concentration of ASC-CM, the faster the wound healing rate in diabetic mice. In particular, the diabetic mice treated with the 100,000 times concentrated solution showed a wound healing rate almost identical to that of the healthy control mice.

【Conclusions】 The ASC-CM contained growth factors and cytokines and stimulate fibroblast proliferation. ASC-CM assist in wound healing and tissue regeneration in diabetic mice, and it was found that the higher the concentration, the more effective it is. This suggests that ASC-CM could be used as an effective tool for healing diabetic refractory ulcer and wound.



Oral Presentation | Free paper (Nerve)

P85**Micronized cellular adipose matrix (MCAM) promotes the therapeutic effect of an artificial nerve conduit in peripheral nerve gap injury**Seiji Sawai¹, Yoshihiro Sowa², Tsunao Kishida³, Shinji Tsuchida⁴, Ryo Oda⁴, Osam Mazda³, Kotaro Yoshimura², Kenji Takahashi⁴¹ Department of Orthopedic Surgery, Jyujo Takeda Rehabilitation Hospital² Department of Plastic and Reconstructive Surgery, Jichi Medical University³ Department of Immunology, Kyoto Prefectural University of medicine⁴ Department of Orthopedic Surgery, Kyoto Prefectural Univ of medicine

Background: The stromal vascular fraction (SVF) isolated from adipose tissue has been shown to be beneficial for treating peripheral nerve injuries. Micronized cellular adipose matrix (MCAM) is an SVF-rich micronized fat tissue obtained by a series of simple mechanical processes.

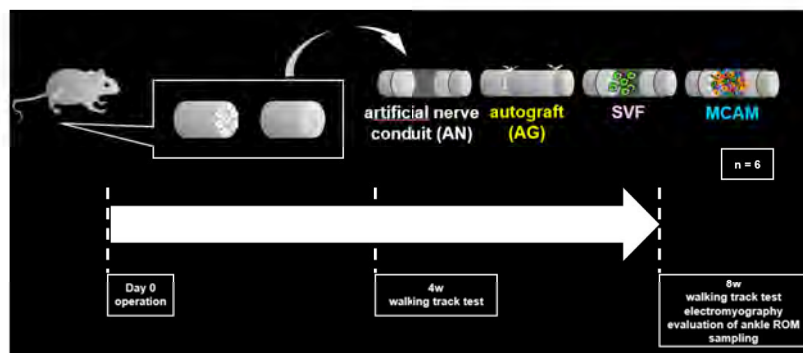
Objective: To assess the therapeutic effect of MCAM for peripheral nerve injury.

Methods: Microscopic evaluation of the cell phenotype was performed to determine the adipose-derived stem cell (ADSC) content of the MCAM. An artificial nerve conduit (ANC) filled with MCAM was implanted into a sciatic nerve defect in immunodeficient mice.

Comparisons of this treatment with an autograft, an ANC filled with SVF cells, and an ANC alone were made based on electrophysiologic characteristics, sciatic function index, histological analyses of regenerated nerve fiber and myelination using electron microscopy, and the preventive effect on innervated muscle atrophy.

Results: MCAM contained many cells with a phenotype and differentiation potency similar to ADSCs. The implantation experiment indicated that MCAM enhanced the efficiency of functional and structural recovery, while preventing atrophy of the innervated muscle. These effects were significantly improved than in the ANC alone group and comparable to those in the SVF group, whereas the improvement did not reach the same level of autograft group.

Conclusion: Injection of MCAM into an ANC accelerated nerve regeneration compared with use of an ANC alone and this effect, which indicate that MCAM is a promising transplant material for treatment of peripheral nerve injury and an alternative to use of SVF cells.



Oral Presentation | Free paper (Craniofacial/ Others)

P86**Comparative study of fetal facial shape between Japanese and North American populations**Motoki Katsube¹, Siddharth Vora³, Yutaka Yamagichi², Natsuko Utsunomiya^{1,2}, Joy Richman³, Virginia Diewert³, Naoki Morimoto³, Shigehito Yamada²¹ Plastic and Reconstructive Surgery, Kyoto University Graduate School of Medicine² Congenital Anomaly Research Center, Kyoto University Graduate School of Medicine³ Oral Health Sciences, University of British Columbia

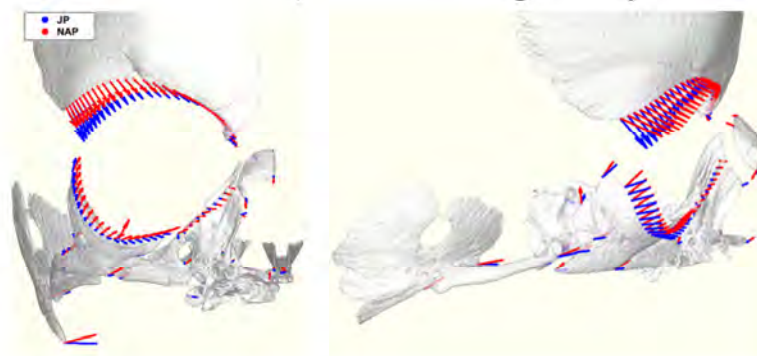
Background: Understanding population differences in human facial skeleton and the time during ontogeny when they arise, is of great interest. The facial shape may be determined during fetal development hence, population differences are presumed to occur in that period.

Objective: The aim of this study was to investigate the morphological population differences in shape and growth trajectories of the midface and the mandible during the middle trimester using 3D μ CT scans of human fetal specimens from Japan and Canada.

Methods: Twenty-two preserved conceptuses from the Congenital Anomaly Research Center at Kyoto University and 20 from University of British Columbia, with a CRL ranging from 99 to 198 mm, were imaged using μ CT scans. The midfacial skeletons and the mandible were digitally segmented. Landmarks and semi-landmarks on the surfaces were digitized. A generalized Procrustes analysis and a principal component (PC) analysis were performed. To evaluate the shape difference between Japanese (JP) and North American populations (NAP), multivariate analysis of variance and linear discriminant (LD) analysis were utilized. Growth trajectories for each population were calculated from the multivariate regression and drawn in PC space. The shape changes along LD axis and allometric vector were visualized.

Results: Statistically significant shape differences were noted in the midfacial skeleton ($p < 0.01$) between JP and NAP. The LD axis demonstrated that the area with the most difference was the upper orbit. Notably, the distinct orbital growth trajectories for the Kyoto and UBC specimens were already established in the smallest specimens and gradually increased with growth during the period investigated here (figure). The mandible did not show significant shape differences between JP and NAP.

Conclusion: A significant shape difference in midfacial skeleton already exists at the second trimester between JP and NAP. Furthermore, this difference gradually increases with growth.



P87

Different Timing of Nanofibrillar Collagen Scaffold Implantation Affects the Lymphangiogenesis in Splinted Hindlimb Lymphedema Mouse Model

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Background: Secondary lymphedema is a common disorder associated with acquired functional impairment of the lymphatic system. BioBridge™ is a highly aligned nanofibrillar collagen scaffold with promising results in various preclinical and pilot clinical studies. It induces both angiogenesis and lymphangiogenesis in rat and pig lymphedema models. However, different implantation timing of BioBridge™ and the effect on the lymphedema progression in a splinted hindlimb lymphedema mouse model have not been observed.

Objective: to investigate the effect of different implantation timing of BioBridge™ from the affected hindlimb to the unaffected contralateral side in a splinted hindlimb lymphedema mouse model.

Methods: Splinted hindlimb lymphedema was created by removing inguinal and popliteal lymph nodes and closing the incision with silicon splinting. A 3,5 cm length BioBridge™ was implanted 1 day (early implantation) and 7 days (late implantation) after the lymph node resection surgery. Hindlimb circumference (6 mm from the heel) was measured every 3-4 days and ICG lymphography was performed weekly. After 28 days, mice hindlimbs were sacrificed for histological analysis.

Results: Compared to late implantation, early implantation of BioBridge™ showed better results in reducing the hindlimb circumference of the affected side. After 28 days, BioBridge™ was still observed in the same position, and regeneration of new lymphatic vessels was observed inside it which was confirmed by anti-LYVE-1 immunohistochemistry staining.

Conclusion: Early implantation of BioBridge™ prevented lymphedema from reaching a severe stage. Therefore, early implantation of BioBridge™ in the clinical setting should be considered.

Oral Presentation | Free paper (Patient Safety/ Education/ Leadership)

P88

Weekday Timing and Surgical Outcomes: The Impact of Surgery Day on DIEP Flap Success

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Mayo Clinic

Background

The timing of surgical procedures is known to influence clinical outcomes in various procedures, but its impact on Deep Inferior Epigastric Perforator (DIEP) flap surgeries remains uncertain.

Objective

This study aims to investigate whether the day of surgery affects the clinical outcomes of DIEP flap surgeries.

Methods

This retrospective chart review included patients aged 18 years and above who underwent DIEP flap surgery. Patients were divided into two groups: Group 1 had surgery on Monday and Thursday, while Group 2 had surgery on Wednesday, Thursday, and Friday. Statistical analyses included the Shapiro-Wilk test, Independent Student's t-test, and Chi-square test, with a p-value of less than 0.05 considered statistically significant.

Results

A total of 183 DIEP flap cases were included. Group 1 had 114 patients, and Group 2 had 69 patients. The mean lengths of surgery and anesthesia in Group 1 were 8.78 hours and 9.78 hours, respectively, compared to 8.13 hours and 9.10 hours in Group 2. The average lengths of stay were 3.74 days for Group 1 and 3.68 days for Group 2. Complications occurred in 36.84% of Group 1 and 27.53% of Group 2. Eight flap losses were reported, with Group 2 experiencing more flap losses ($p < 0.001$).

Conclusion

Our study demonstrates that the day of surgery is related to worse outcomes. Undergoing DIEP flap surgery closer to the weekend is associated with a higher risk of flap loss. Further prospective studies with larger sample sizes are required to confirm our findings.

Oral Presentation | Free paper (Regenerative medicine)

P89**The role of versikine/versican in dermal papilla**Noriko Aramaki-Hattori¹, Suneel Apte², Keisuke Okabe¹, Shigeki Sakai¹, Kazuo Kishi¹¹ Keio University School of Medicine² Department of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic

Background and Objective: Extracellular matrix versican was reported to play an important role in mesenchymal condensation in mice hair and hair induction, and thereafter, similar results were reported in humans. We investigated versican degradation in the hair cycle of C57BL/6 mice, studying the effects of versikine, a versican degradation product, on dermal papilla cells. **Methods:** C57BL/6 mice whiskers and pelage were collected, and frozen sections prepared. Versikine was immunostained. The ADAMTS (a disintegrin and metalloproteinase with thrombospondin motifs) family comprises proteases that can degrade versican. Skin from 1-day-old ADAMTS1 and ADAMTS9 knockout mice was used to investigate ADAMTS expression in papilla cells using LacZ staining. Dermal papilla cells were isolated from the whiskers of C57BL/6 mice, and expression of *Adamts*-1,4,5,9 was investigated by RT-PCR assay. In addition, to study its effect on hair papilla, versikine was added to isolated papilla cells and the proliferative ability of the dermal papilla cell was investigated. **Results:** The dermal papilla cells in mice skin during anagen phase were positive for versikine immunostaining, but not during the catagen phase. LacZ immunostaining showed ADAMTS1 and ADAMTS9 expression at the dermal papilla cells suggesting that versican degradation had occurred. Isolation-cultured dermal papilla cells revealed *Adamts* expression by RT-PCR. In cell proliferation assay, the versikine-added dermal papilla cells group, a significant increase in proliferative ability was compared to control group. **Conclusions:** Our findings suggest that versican is degraded by ADAMTS molecules in the dermal papilla cell, and produces versikine, thus affecting the proliferation of dermal papilla cells.

Oral Presentation | IPSRC Best paper session

P90

Potential benefit of vascularized lymph node transfer on cancer progression

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Background: Lymphedema is considered to increase the risk of cancer progression. Recent reports have indicated that vascularized lymph node transfer (VLNT) may improve the impaired immunity in lymphedema but there has been limited number of reports concerning anti-cancer immunity.

Objective: This study aims to explore the effects of VLNT on the dynamics of early tumor immune response in mouse models.

Methods: Forty-seven 8-week-old C57BL/6N male mice were divided into three surgical groups: VLNT involving transferring a vascularized inguinal lymph node flap post-popliteal lymph node removal, popliteal lymph node dissection model, and control. Postoperative lymphatic flow was monitored with indocyanine green lymphography, and B16-F10-luc2 melanoma cells were implanted in the ipsilateral footpad. The proportion of dendritic cells in the transplanted nodes was assessed by CD11c immunohistochemistry, and metastases to the lungs and lymph nodes were evaluated quantitatively by luciferase assay.

Results: After VLNT, lymphatic reconnection was observed in 59.2% of mice. The proportion of dendritic cells was significantly higher in the VLNT group with lymphatic reconnection than in the naïve lymph node. The tumor burden of lung metastases was significantly less in the VLNT group with lymphatic reconnection compared with the lymph node dissection group.

Conclusion: Metastasis decreased in mice with reconnected lymphatics after VLNT. A possible explanation was that lymphatic restoration may have contributed to the tumor immune response by allowing dendritic cells migration to lymph nodes.

P91

Unveiling the three-dimensional vascular architecture of keloids using tissue-clearing techniques

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Background: Tissue opacity is primarily attributable to the absorption and scattering of light, which prevents our awareness of the actual 3-dimensional structure. Tissue-clearing techniques have advanced in recent years in various medical fields, using both human and animal samples. In this study, we applied tissue-clearing techniques for the first time on scar tissue to detect the atypical structure of keloid, especially focusing on its vascular structures.

Methods: During the clearing process, chemical treatments were used to eliminate light-blocking and light-scattering components; then, antibodies were employed to detect structural abnormalities in keloid vessels. Finally, the samples were immersed in a clearing liquid to obtain a uniform refractive index and acquire transparency.

Results: Skin and scar samples were successfully rendered optically transparent. Changes in the histological morphology of keloid blood vessels, such as density, diameter, number of branches, and branching points, were verified using highly accurate 3-dimensional images. The values were as follows: density ($19.7 \pm 9.3\%$), diameter ($12.3 \pm 3.5 \mu\text{m}$), number of branches/ μm (1.4×10^{-2}), and branching points/ μm (0.7×10^{-2}). The vascular characteristics and associated factors in different structural regions of normal skin and keloid scars also showed substantial variations.

Conclusion: This study investigated keloid vascular characteristics using tissue-clearing techniques, revealing the distinctive vascular structure in keloids. The findings suggest that the development of these characteristic blood vessels plays a crucial role in keloid formation and may be associated with its pathogenesis.

P92

Optimizing scarless double chin treatment: Systematic plan through combining surgical, energy based, and manual techniques

Dina M Badawi

Cairo university

Background: The importance of a tightened sculptured neck and submental region is highlighted nowadays in the trending selfie photos. Surgical liposuction of submental fat may address one component of the double chin problem, other components like loose skin and sluggish lymphatic circulation need attention.

Objective: Evaluating the impact of applying manual lymphatic massage and radiofrequency energy to the submental area following surgical liposuction on aesthetic outcome, patient's satisfaction, and safety.

Methods: A prospective study included patients seeking scarless treatment for double chin deformity. Our plan involved three subsequent steps: PAL of submental fat, manual lymphatic massage, and radiofrequency energy. Follow up continued for 6 months. At each visit, photos were taken, complications were recorded, and visual analogue scales were used to evaluate the pain and patient satisfaction.

Results: 42 patients were included, mean age 38.1. Complications reported were edema, pain and transient marginal mandibular nerve paralysis. The pain scores were highest on the first visit. The mean satisfaction score on the final visit was 8.76 (Fig.1). None of the patients asked for further surgical neck lift.

Conclusion: Adding manual lymphatic massage and radiofrequency energy to the submental area in the early post-liposuction period may be considered a satisfactory, simple, reproducible, rapid, and safe plan for scarless neck rejuvenation.

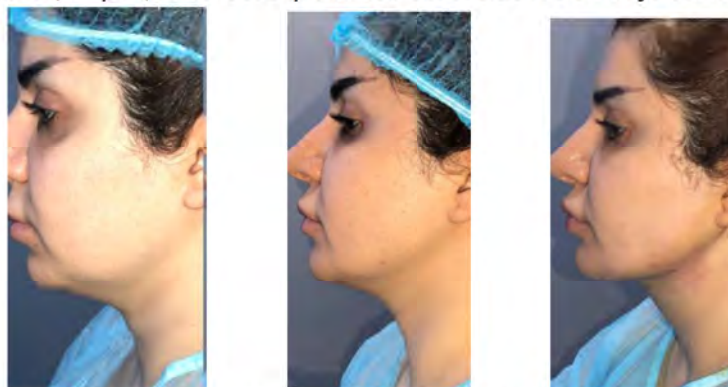


Fig. (1): A: Before liposuction of double chin. B: after performing PAL of submental fat. C: After completion of manual massage and radiofrequency

Oral Presentation | Free paper (Nerve)

P93

Electrical stimulation and its effects on sympathetic regeneration after peripheral nerve injury

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Background: Peripheral nerve injuries (PNIs) are common, and the current standard of care relies on the slow and inefficient process of spontaneous regeneration. Electrical stimulation (ES) enhances motor and sensory regeneration; however, its effects on sympathetic regeneration is unknown.

Objective: Understand the acute and long-term effects of ES on sympathetic regeneration.

Methods: To study acute ES effects, 1 hour, 20 Hz stimulation was applied to transected and repaired mouse sciatic nerves. ES was compared to a conditioning lesion (CL) and sham. Axonal regeneration was evaluated after 2 weeks via immunohistochemistry.

To study long-term ES effects, sweating recovery was tracked with a pilocarpine assay for 12 weeks after sciatic nerve transection, with and without ES. Reinnervation of the most distal sweat glands was assessed via immunohistochemistry, and neurons reinnervating the foot and tibialis anterior (TA) were fluorescently labeled. Purines in the gastrocnemius were quantified using high-performance liquid chromatography to evaluate mitochondrial metabolism.

Results: ES and CL do **not** enhance sympathetic regeneration but do enhance motor/sensory regeneration acutely. ES does not improve long-term sweating recovery and may decrease reinnervation of the most distal sweat glands. ES improves motor/sensory reinnervation, but **not** sympathetic reinnervation, of the foot. Motor/sensory reinnervation of the TA is nearly complete by 12 weeks, but sympathetic reinnervation remains **incomplete**. Finally, ES does not improve injury-related mitochondrial metabolism deficits.

Conclusion: ES does not enhance sympathetic regeneration. Despite the return of motor reinnervation of more proximal muscles 12 weeks post-PNI, alterations in mitochondrial metabolism persist, likely due to decreased sympathetic reinnervation.

P94

Sustained BMP-2 Release by Peptide Amphiphilic Nanofibers Enhances Craniomaxillofacial Bone Regeneration by Mitigating Early Inflammatory Response

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Background: Bone morphogenic proteins (BMPs) are pivotal in craniomaxillofacial surgery for bone reconstruction. However, their side effects, such as severe edema and local inflammation, limit their use. Nanoscale peptide amphiphiles (PAs) self-assemble into nanofibers and can act as sustained-release carriers for biological molecules, supporting tissue regeneration.

Objective: This study investigates the impact of PA gels on the osteogenic differentiation of bone marrow stromal cells (BMSCs) in vitro and bone repair and inflammation in craniomaxillofacial bone defect models in vivo.

Methods: BMP2 release from PA gels was analyzed. Human BMSCs were treated with growth medium or medium containing BMP-2 and PAs. Osteogenic differentiation was assessed using quantitative RT-PCR for osteogenesis-specific genes. Bone defects were created in rabbit calvaria and rat maxilla and treated with collagen material containing BMP2 with or without PA gels. Control groups included collagen material only. Bone tissue and surrounding soft tissue were harvested for radiographic and histologic analyses and inflammation-related gene expression. Immunohistochemical (IHC) staining was performed for inflammatory responses.

Results: BMP2 was released from PA gels in a sustained manner, significantly increasing osteogenic activity in BMSCs compared to controls. In bone defect models, collagen with low-dose BMP2 incorporating PA gels showed robust bone regeneration, comparable to high-dose BMP2 without PAs. Inflammatory markers were elevated in high-dose BMP2 groups but normalized in groups treated with BMP2 incorporating PAs, consistent with IHC findings.

Conclusions: PAs with low-dose BMP2 may be a viable alternative to high-dose BMP2 in craniofacial surgery, offering reduced inflammation and effective bone regeneration.

Oral Presentation | Free paper (Patient Safety/ Education/ Leadership)

P95**Artificial Intelligence and Patient Information: Assessing Utility of ChatGPT for Patient Information on Lymphedema and Lipedema**Luis Antezana MD¹, Anab Mohammed BS², Austin Chen MD¹, Cole Holan MD, MBA¹, Jorys Jorge Martinez¹, Karim Bakri MBBS¹¹ Division of Plastic and Reconstructive Surgery, Mayo Clinic, Rochester, MN, 55902² Mayo Clinic Alix School of Medicine, Rochester, MN, 55902**Background**

Artificial intelligence (AI) chatbots like ChatGPT have potential as search engines and sources of patient information.

Objective

To evaluate readability and accuracy of lymphedema and lipedema information from ChatGPT compared to the Lymphatic Education and Research Network (LERN).

Methods

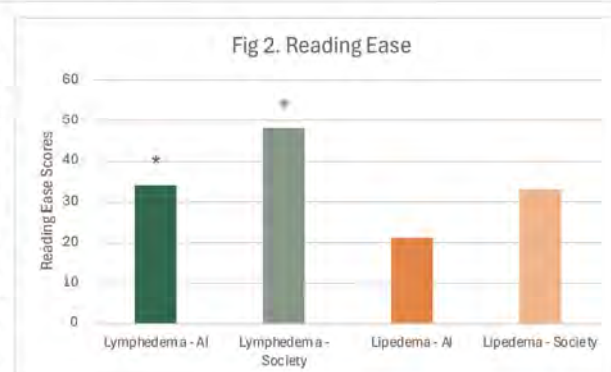
Answers to 28 FAQs from LERN and ChatGPT outputs were analyzed using 10 readability tests. Readability & Ease scores were compared using independent t-tests. Fig 1. & 2. Accuracy was assessed by subjective comparison to LERN information.

Results

The mean reading grade level for lymphedema and lipedema patient information extracted from the LERN website was 11.7 at the high school junior grade level and 13.2 at the entry college level respectively. The mean reading ease score was 48 and 33 at the difficult level respectively. The mean reading grade level for lymphedema and lipedema information extracted from ChatGPT was 12.86 at high school senior grade level and 13.85 at the entry college level. The mean ChatGPT reading ease scores was 34 (lymphedema) and 21 (lipedema), falling in the difficult/very difficult categories. There was a significant difference in both reading grade level and reading ease ($p < 0.05$) between LERN and ChatGPT extracted lymphedema information, but no difference in lipedema patient information. The ChatGPT text was accurate although shorter in length and scope. Further queries yielded more comprehensive information.

Conclusion

While above average reading levels, ChatGPT lymphedema information was significantly more difficult than LERN's. Integrating readability measures and verification into AI outputs may improve their usefulness for patient queries as these technologies are adopted.



Oral Presentation | Free paper (Aesthetic/ Gender/ Cancer)

P96**Institutional Experience of Female Perineal Reconstruction Post-EMPD - A Rare Entity's Reconstructive Challenge**

Luis Antezana, Nicole Sanchez Figueroa, Kelly Bruce, Cilby Williams, Christin Harless, Nho Tran, Aparna Vijaysekaran, Jorys Jorge Martinez

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Background

Female perineal extramammary Paget's disease (EMPD) is a rare condition requiring multidisciplinary management. Previous research showed margin-controlled surgery improved outcomes for female genital Paget's disease compared to traditional excision.

Objective

This study aims to analyze demographics, surgical interventions, and complications in vulvo-perineal EMPD patients undergoing wide local excision (WLE) or Mohs resection followed by reconstruction.

Methods

This observational trial enrolled adult patients with histologically confirmed female genital EMPD. Relevant data were collected and analyzed.

Results

62 patients were identified (mean age 66, 97% Caucasian). Vulvar lesions were most common (76%), followed by perianal (33%), periclitoral (17%), and vaginal (6%). 56% had lesions in only one area.

Partial vulvectomy/WLE was the predominant excision (79%). Advancement flaps were the most used reconstruction (48%), followed by rotational flaps, skin grafts, and primary closure. Mean lesion size for flap reconstructions was 15x12cm. 85.7% involved radical vulvectomy and 73% had multifocal lesions.

Reconstructions were typically performed simultaneously with excision. One case deferred reconstruction using Integra® for later skin grafting due to indeterminate biopsy borders. Complications included wound separation (43%), surgical site infection (14%), and hematoma (2%).

**Conclusion**

This study provides valuable data on demographics, surgical approaches, and outcomes for vulvo-perineal EMPD reconstruction, guiding optimal technique selection for this challenging condition.

Oral Presentation | Free paper (Skin/ Burn/ Wound Healing 1)

P97

Effects of Plasma-activated Lactate Ringer's Solution (PAL) on Mice Skin

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Background:

It has been demonstrated that nonequilibrium atmospheric pressure plasma (NEAPP) irradiated lactate ringer's solution (plasma activated lactate ringer's solution: PAL) has potential role on medical applications. But, there is no study concerning to PAL application in human.

Objective:

We investigated that effects of PAL for healthy skin and wound on mice.

Methods:

We made excisional wound-splinting model using diabetic mice, and divided into three groups: control group, lactate Ringer's solution (Lactec) group, and PAL group. We evaluated wound healing with wound photos, and histological examination. And, we also evaluated local effects of PAL administration on normal skin and the systemic effects on organs through histological examination.

Results:

Diluted PAL group promoted wound healing and epithelialization compared to control and Lactec groups. On the other hand, non-diluted PAL group had a tendency to decrease both. We found no adverse events in either cases.

Conclusion:

We demonstrated that PAL topical application was safe and PAL enhanced wound healing on mice skin defect model. In future, we will try PAL application on human skin.

E-poster

P98

Comparative response to VEGF between normal and arteriovenous malformations endothelial cells

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Background: Arteriovenous malformations (AVMs) that result from abnormal connections between artery and vein are rare but potentially life-threatening condition.

Objective: This research aimed to explore and assess the impact of vascular endothelial growth factor (VEGF) on the pathophysiological processing of AVMs. Additionally, the findings are being used to formulate an innovative strategy for treating AVMs.

Methods: Endothelial cells (ECs) were cultured from normal and AVM tissues and treated with VEGF. Immunofluorescence imaging and tube formation assay were performed to evaluate EC proliferation and angiogenesis. Real-time PCR was used to analyze gene expression.

Results: Immunoreactivity of CD31 was found in $82.00 \pm 0.52\%$ of the AVM ECs area, which was significantly higher than normal ECs ($78.23 \pm 0.84\%$). In the tube formation assay, the number of junctions and total vessel length in each condition were significantly greater in AVM ECs group than normal ECs group. In analysis of angiogenesis-related genes using real-time PCR, FSTL1, MARKS, and CSPG4 showed significantly higher expression in AVM ECs group than normal ECs group under all conditions. Among them, the expressions of MARCKS and CSPG4 significantly were increased in AVM ECs group under VEGF treatment condition. Therefore, the angiogenic effect of VEGF in AVM ECs was increased compared to normal ECs.

Conclusion: Through this study, it is demonstrated that the higher degree of response to VEGF in AVM ECs than normal ECs could be an important factor for stimulating downstream angiogenesis in AVMs. These results are expected to help understand the pathophysiology of AVMs and provide basic knowledge for new treatment strategies.

E-poster

P99

MicroRNA-135b-5p as a potential biomarker in the endothelial cells of arteriovenous malformations

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Background: Arteriovenous malformations (AVMs) are the congenital vascular anomalies with a poor prognosis. AVMs are considered intractable diseases, as there is no established approach for early diagnosis and treatment.

Objective: This study aims to provide new evidence by analyzing microRNAs (miRNAs) associated with AVM. We present fundamental evidence for early diagnosis and treatment of AVM by analyzing miRNAs in the endothelial cells of AVM.

Methods: Endothelial cells (ECs) isolated from AVMs and normal tissues and cultured. Both ECs were used for profiling and validation of miRNAs. Comparative analysis of miRNAs expression differences between normal and AVM tissues was performed. Selected miRNAs were subsequently analyzed under hypoxia and VEGF treatment.

Results: Fourteen up-regulated and seven down-regulated miRNAs were detected in profiling assay. Among them, miR-496, miR-135b-5p, miR-132-3p, miR-193a-5p and miR-193b-5p in up-regulated group and miR-137 and miR-30a-3p in down-regulated group were selected based on a literature review related to angiogenesis. miR-135b-5p, miR-193a-5p and miR-137 identified as candidate miRNAs with statistically significant differences in validation assay. Under hypoxic conditions, a comparison revealed a marked upregulation of miR-135b-5p in AVM compared to normal, correlating with increased endothelial activity. VEGF treatment demonstrated no significant increase in miR-135b-5p in normal, however, a surge in AVM. Under both hypoxia and VEGF treatment, comparison indicated a down-regulation of miR-135b-5p in AVM, although not reaching statistical significance.

Conclusion: Through this study, it was determined that miR-135b-5p is implicated in the pathophysiology of AVM and might play an important role as a potential biomarker on AVMs.

Oral Presentation | Free paper (Nerve)

PA0

Pain surgery using nerve flaps: ultra-micromorphological changes and clinical applications

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Background: So far, we have conducted basic searches such as free nerve transfer and vascularized nerve transfer, and based on the results, we have attempted several pedicled/free nerve valve transfer techniques. We will provide an overview of the basic work we have done so far and report on the application of nerve graft nerve flaps with blood circulation in clinical cases.

Methods: [Basic search] We performed vascularized and free sciatic nerve transfer for rats, and used electron microscopy specimens to quantify the tissue of regenerated axons 1 to 6 months after surgery, and found that nerve regeneration in the vascularized group was superior in the distal lower limb region.

[Breakdown of clinical cases] We have performed total 173 vascularized nerve transfer out of 226 cases with nerve injuries (133 cases of males, 93 cases of females, aged 5-79 years). The reconstructed nerves were in 88 cases of upper extremities, 26 cases of lower extremities, 87 cases of facial nerves, and 19 cases of trigeminal nerves. The main pedicled nerve transfer technique was nerve bundle transfer 37, nerve bundle turn-over 17, free grafts included simple nerve flap 71, nerve flaps (ALT 4, SCIP 2, TAP flap 5, deep peroneal nerve-extensor toe tendon (joint) 3), 29 lateral femoral cutaneous nerves, 28 deep peroneal nerves, and 7 sural nerves.

Results & conclusion: There were 4 cases of emergency vascular pedicle reanastomosis, 1 case of total flap necrosis, and 2 cases of partial necrosis. Long-term results varied between cases. Nerve bundle transfer and nerve flap transplantation have made effective nerve bypass possible, opening the possibility of new nerve reconstruction techniques such as prevention of various nerve paralysis.

Oral Presentation | Free paper (Vascular/ Lymphatic Biology and Diseases)

PA1

Smooth Muscle Cell Regeneration within Human Lymphatics and Long-Term Follow-up After LVA

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Background: In 1996, we first introduce autonomic contraction of lymphatics in the clinical field and described smooth muscle regeneration within lymphatics of human lymphedema. The present investigation was series carried out to study the relation between ultrastructural findings of lymphatics and long-term results after mLVAs.

Objective and Methods: A series of 11 patients with upper or lower limb lymphedema were treated with single or mLVAs. As for upper limb, The average number of LVA was 4.8, and followed up for average of 7.3 years after surgery. A total of 12 biopsied lymphatic channels were obtained from various levels of limbs and the specimens were observed ultrastructural changes.

Results: Evaluation of surgical effects was made mainly by photos and criteria of judgement was decided as 5 categories: 1. Functional recovery, 2. Excellent, 3. Improved, 4. Constant, 5. Worse. Regarding the operative effect in the arms, 4 cases showed excellent and one with constant. As for the legs, 3 cases showed improvement or more, and 2 were constant. There was no correlation between preoperative severity and results of mLVAs. It was found that remaining function of lymphatics could be estimated by ultrastructural observation, especially for smooth muscle cells, endothelial cells, and proliferation of collagen fibrils.

Conclusion: mLVAs are essential for treatment of lymphedema. The postoperative prognosis can be estimated not by the preoperative history and symptoms, but ultrastructural pathology of lymphatics, which seems to be the most reliable evaluation.

Oral Presentation | Free paper (Craniofacial/ Others)

PA4

Correlation Between Microtia Ear Deformity and Middle Ear Development in 3D CT Scans.

Takashi Kurabayashi, Hirotaka Asato, Kohei Umekawa, Takuya Iida

Dokkyo Medical University

Background: There is a correlation between the auricle deformity in microtia and the degree of middle ear development. However, middle ear development is often good, even in the lobule type, which is considered to have experienced developmental disturbances at an early stage of auricular formation.

Objective: To investigate which auricular shapes are associated with poor middle ear development using 3D CT scans.

Methods: 3D CT scans of 221 auricles from 189 microtia patients, which show the relative relationships of the skin, auricular cartilage, and skull, evaluated the position and shape of the auricle in lateral views and compared with the Jahrsdoerfer scores, indicators of middle ear development.

Results: It was found that the concave part between the upper and lower auricle components, referred to as position X, is closely related to middle ear development. Thus, the auricles were divided into two groups: the upper position group, where position X is at or above the temporal line, and the lower position group, where position X is below the temporal line. A comparison of the Jahrsdoerfer scores between the two groups was conducted using an unpaired t-test. It was found that the Jahrsdoerfer score in the lower position group was significantly lower than in the upper position group by 4.0 ± 0.8 (0.95 CI) (one-sided p-value $< 4.0e-16$, $df = 72.2$).

Conclusion: It was found that the positional relationship between position X and the temporal line is closely related to the development of the middle ear.

Oral Presentation | Free paper (Patient Safety/ Education/ Leadership)

PA5

Live-Streaming Using Modified Head-Mounted Smartphone as An Assisting Learning Tools For Fisher Unilateral Cleft Lip Repair.

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Background: The Covid-19 pandemic has significantly impacted healthcare services, including surgical education, due to restrictions in the operating room (OR) and cancellation of elective surgeries. Institutions have implemented various strategies, such as simulation and virtual learning, to mitigate these effects.

Objective: This study evaluates the effectiveness of learning surgical operations through live-streaming using cost-effective technologies.

Methods: Twenty-six residents were randomly assigned to a control group, observing Fisher unilateral cleft lip design in the OR, and a treatment group, learning through live streaming with operator's point of view. Residents recreated the design on anatomical models. The designs were evaluated by two attendings.

Results: Assessors' reliability was satisfactory (Cronbach's alpha = 0.637), with no significant inter-assessor differences (ANOVA $p = 0.519$). The treatment group scored lower ($M=12.23$) than the control ($M=13.57$, $p = 0.03$), but visualization significantly predicted scores ($\beta = 0.721$, $p < 0.001$). Surveys showed 73% satisfaction with live-streaming, but 63% felt additional in-person learning was necessary. In contrast, 62% of the control were very satisfied with direct observation, but noted limitations due to the sterile environment.

Conclusion: The use of live-streaming with a head-mounted smartphone offers an effective alternative for surgical education, particularly in situations with limited OR personnel. Implementing live-streaming or video-assisted technology could enhance learning opportunities, but considerations such as a stable internet connection and debriefing sessions are essential to improve interaction between students and attendings.

PA6

Development and Evaluation of Novel Interlocking Three-Dimensional Plate 2.0 System for Managing Mandibular Fractures

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Background: Mandibular fractures are the most common craniomaxillofacial fractures, often causing mastication disturbances. Management typically involves 2.0 system plates and screws, such as three-dimensional (3D) plates, but conventional 3D plates have limitations. Their fixed shape makes it difficult to avoid fracture lines or vital anatomical structures. To address this, an interlocking 3D plate was developed with adjustable components to avoid critical structures and maintain stability.

Objective: This study aims to analyze the biomechanics, biocompatibility, bone healing, and usability of the novel interlocking 3D plate.

Methods: Finite element analysis established the feasibility of the interlocking 3D plate design. Biomechanical evaluation used ten goat mandibles to assess mechanical strength and stability. Biocompatibility and bone healing were evaluated in an animal study with 28 goats. Biocompatibility was assessed through radiological and histopathological (Hematoxylin-Eosin staining) evaluations of inflammatory responses. Bone healing was assessed through bone density and Mason Trichome staining. Usability was tested by nine plastic surgeons who assessed comfort and application time on a synthetic mandibular model.

Results: The biomechanical evaluation showed that the interlocking 3D plate better-maintained fracture stability while allowing controlled micro-movement. Biocompatibility results indicated lower tissue reaction and inflammatory response compared to the standard plate. The interlocking 3D plate facilitated faster bone healing, with significant improvements in bone formation and density. The usability study demonstrated that the interlocking 3D plate was as easy to use as the standard plate, with no significant differences in application time.

Conclusion: The interlocking 3D plate shows significant potential as a viable alternative for managing mandibular fractures.

PA7

An Analysis of Independent Risk Factors Related to Burn Mortality in Adults. Is There a Correlation Between Patient Volume and Mortality?

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² Department of Surgery, Section of Plastic Surgery, University of Michigan Health System, Ann Arbor, Michigan

Background:

There are many critical factors that impact the outcomes following burn injuries in adults. Understanding these factors in the most severely burned patients, could help to reduce mortality and improve their care. In particular, our goal was to determine the independent risk factors associated with mortality in burn patients.

Methods:

A retrospective analysis of all adults burn patients (>18 years old) admitted to ICU in the single Burn Unit, from 2005-2022, was performed.

Results:

1192 adult burn patients met the inclusion criteria. 113 patients died of their burn injuries with 60% being male. The average extent of burn was 47% in all cases. Majority of fatal burn victims (66.1 %) were from an urban region. Most fatal burn occurred in patients over the age of 60 years. Burn injuries leading to in-hospital mortality occur more often in the home environment (59.3%). In both, women and men, the predominant etiological agent was the flame. Most patients (90.2%) had an abbreviated burn severity index (ABSI) score of more than 8. We observed a decrease in the mortality of adult burn victims during the Covid-19 pandemic period. On the average, patients were hospitalized longer during the covid-19 period (9.8 days vs. 11.8 days) and underwent more surgeries (3.0 vs 5.2).

Conclusion:

Male gender, older age, presence of full thickness burns, greater extent of burn injury, flame as the etiological agent, and an ABSI score of more than 8 are among the most important factors associated with high mortality in burn patients admitted to the ICU.

PA8

**Age-Based Epidemiological Insights into Burn Injuries:
Distinguishing Patterns in Pediatric and Adult Cohorts**

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Background:

Burn injuries manifest differently across age groups, warranting a nuanced examination of their epidemiological dynamics. This study endeavors to discern age-specific patterns of burn injuries, focusing on pediatric and adult cohorts, while also considering the influence of rural and urban environments.

Methods:

A retrospective study was conducted on all pediatric burn patients (<18 years old) admitted to a single Burn Unit from 2005 to 2022, and on all adult burn patients (>18 years old) admitted from 2016 to 2022. The study analyzed demographic data, burn severity, and treatment methods for both pediatric and adult groups, with a comparison of burn injuries occurring in rural versus urban settings.

Results: A total of 2,604 children who met the study criteria were identified, with 34.3% coming from rural areas. In the adult cohort, 1,378 individuals met the study criteria, with 37.3% originating from rural areas. Specifically, in patients from rural regions transportation to the burn center on the day of injury occurred in 82% of pediatric patients and 58% of adult patients. Generally, treatment in the OR on the day of admission happened 8.14% of the time in pediatric patients and 13.4% in adults. There were differences in these outcomes for adults patients coming from rural (13.86%) and urban environments (8.98%). Burns were more prevalent in males across both pediatric and adult populations. **Conclusion:** By comparing burn injuries sustained in different settings, we aim to unveil distinct epidemiological insights that inform targeted interventions and enhance clinical management strategies tailored to specific age groups.

Oral Presentation | IPSRC Best paper session

PA9

AI-Driven Age Estimation for Evaluating Non-Surgical Facial Rejuvenation Techniques

Khaled Alameddine, Karim Bakri

Mayo Clinic, Division of Plastic Surgery, Rochester, MN. USA

Background: Our study introduces an innovative AI model designed to estimate perceived age from facial characteristics, aiming to enhance the evaluation of non-invasive procedures.

Objective: To accurately assess the impact of non-surgical facial rejuvenation techniques on perceived age, facilitating the customization of treatments to each patient's unique facial aging profile.

Methods: Employing a deep convolutional neural network (DCNN), we initially trained the model on the extensive ImageNet dataset and further refined with 523,051 pre-annotated facial images. The Xception architecture was selected for its superior feature extraction capabilities. This model was further refined and tested on a set of 10,000 patient faces from the Mayo Clinic's database. Regression analysis and softmax probability were utilized for precise age estimation (Agbo-Ajala et al., 2022).

Results: The AI model demonstrated a high accuracy rate of 91.8% in estimating the perceived age of patients prior to non-surgical treatments, with a standard deviation of 4.3 years. Post-treatment, the AI model identified an average perceived age reduction of 6.8 years across all patients, with significant variation among different non-surgical techniques. Treatments such as dermal fillers and Botox showed the most pronounced age-reduction effects. Heat maps were utilized to identify specific facial regions that contributed most to the AI's age predictions, showing a strong correlation between these regions and the areas targeted by non-surgical treatments.

Conclusion: By leveraging advanced AI technology to refine aesthetic treatment evaluation, this study underscores the potential for personalized non-surgical interventions, contributing to the advancement of patient-specific rejuvenation strategies in the field of aesthetic medicine

References

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<https://pubmed.ncbi.nlm.nih.gov/36387012/>.



Oral Presentation | Free paper (Innovation/ Commercialization/ Technology)

PBO**Development of a 3D-Printed Chest Wall for DIEP Flap Anastomoses: Integrating Radiology Imaging, 3D Printing, and Special Effects Artistry for Hyper-Realistic Medical Simulation**

Nicole Sanchez Figueros, Anita Mohan, Christian Hanson, Scott Odorico, Christin Harless, Jorys Martinez, Jonathan Morris, Aparna Vijayasekaran

Mayo Clinic Rochester, MN

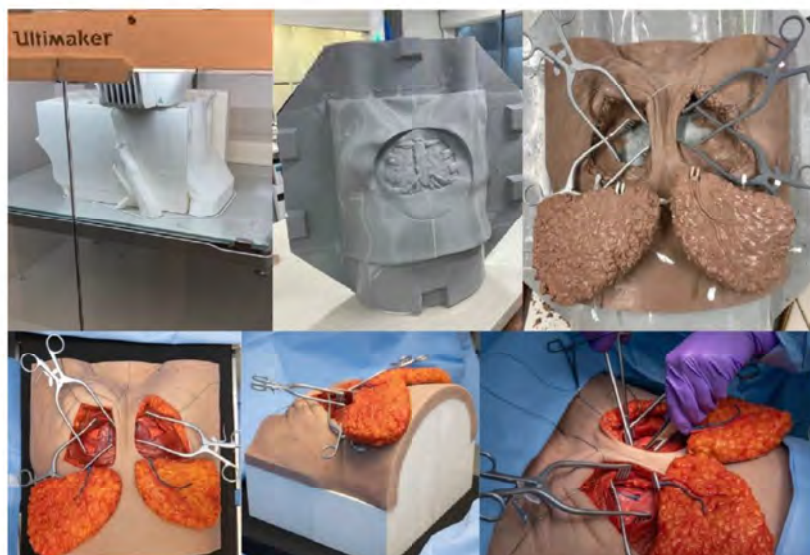
Background: High-fidelity simulation in surgical training has significantly enhanced precise skill development, especially in complex procedures like micro-anastomosis. This project introduces a hyper-realistic DIEP Flap Chest Reconstruction Micro-Anastomosis Trainer that replicates real-life surgical settings. By integrating radiology imaging, 3D printing technologies, and traditional special effects artistry, we aimed to create an anatomically accurate and tactilely realistic training model to improve training and outcomes.

Objective: To develop an anatomically accurate and tactilely realistic training model for micro-anastomosis practice, enhancing surgical training effectiveness.

Methods: The project began by selecting patient data from radiology images, ensuring the inclusion of relevant anatomical details. Digital modeling of these features was conducted using advanced software tools, allowing for precise manipulation and refinement. Various 3D printing technologies were employed to fabricate different components of the trainer, including FDM, SLA, and SLS methods. Additionally, traditional sculpting techniques using oil-based clay were utilized to craft the intricate details of the skin surface. Silicone molding techniques were employed to replicate the texture and elasticity of human skin, ensuring tactile realism.

Results: The phase I of this project successfully achieved a hyper-realistic trainer, meticulously replicating the intricate chest wall and DIEP flap anatomy. Clinician feedback highlighted its exceptional ability to simulate real surgical conditions, affirming its efficacy in enhancing surgical skill acquisition. Phase II will include validation in mastery lab to assess trainees improvement.

Conclusion: This project underscores the potential of merging advanced technologies to enhance surgical training. Future refinement will broaden the model's applicability to various training scenarios, ultimately improving patient outcomes.



Oral Presentation | Free paper (Breast)

PB1

Effect of Inframammary Fold Skin Dome on Dehiscence Rates in Breast Reduction Surgery

Nicole Sanchez, Tony Huang, Aparna Vijayasekaran, Christin Harless, Jorys Martinez-Jorge

Mayo Clinic, Rochester MN

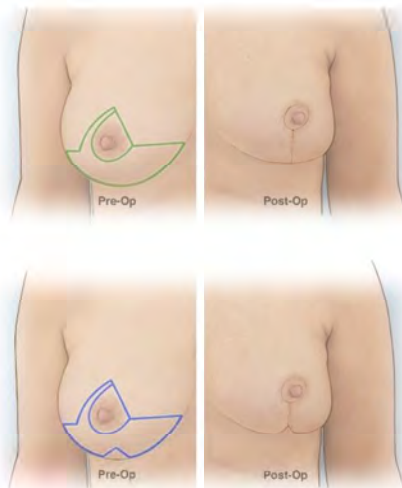
Background: Breast reduction surgery aims to alleviate symptoms of macromastia through various techniques, including the superomedial pedicle and wise-pattern. The inframammary fold (IMF) plays a crucial role in breast aesthetics and postoperative complications. Variations in IMF skin dome incision may impact outcomes, with potential implications for patient satisfaction and surgical success.

Objective: to investigate the influence of inframammary fold (IMF) Dome incision on surgical outcomes in wise-pattern breast reduction surgery. Specifically, it seeks to assess the association between IMF Dome incision and dehiscence rates

Methods: A retrospective chart review was conducted on patients who underwent wise-pattern breast reduction surgery between 2014 and 2023 at a single institution. Patients were categorized based on the presence or absence of IMF Dome incision. Data on demographics, comorbidities, surgical details, and complications were collected. Statistical analyses, including Pearson Chi Square and logistic regression.

Results: Of the 133 participants (245 breasts), 42 had surgery without IMF Dome incision, while 91 did. Significant BMI differences were noted ($p = 0.003$), with all radiotherapy patients undergoing IMF Dome incision. The overall dehiscence rate was 19.5%, showing a trend towards lower rates with IMF Dome incision. Logistic regression revealed excised breast weight significantly affected dehiscence ($p = 0.0059$). Other factors, including adjuvant therapies and comorbidities, did not predict dehiscence.

Conclusion: IMF Dome incision in wise-pattern breast reduction surgery shows promise in reducing dehiscence rates. Excised breast weight significantly influences dehiscence occurrence. These findings highlight the importance of meticulous surgical technique and careful patient selection to optimize outcomes in breast reduction surgery.



Oral Presentation | Free paper (Innovation/ Commercialization/ Technology)

PB3

Evolution of eyelid surgery with innovative AI tools

Seung Han Song

Department of Plastic and Reconstructive Surgery, Chungnam National University

Background: The integration of AI technology in plastic surgery presents significant advancements in patient outcomes and surgical precision.

Objective: This presentation highlights an AI-driven tool specifically designed for eyelid surgery consultations and planning. By analyzing eye morphology, this tool aids surgeons in making precise, data-informed decisions that align with the patient's unique anatomical features and aesthetic preferences.

Methods: Key functionalities of the AI tool include automatic diagnosis of ptosis severity and eyelid skin laxity, comparison with the patient's ideal appearance, and simulation of post-surgery outcomes. These features enable the creation of accurate surgical plans, enhancing symmetry and natural appearance. The tool improves the efficiency of pre-operative consultations and elevates patient satisfaction through clear visual representations of expected results.

Results: Clinical trials have shown a 30% reduction in consultation times and a 20% increase in patient satisfaction. The AI tool's ability to tailor surgical plans to individual needs ensures personalized patient care and optimal results.

Conclusion: This presentation will explore the AI tool's technical framework, provide case study examples, and discuss future applications of AI in aesthetic surgery. Attendees will learn how to implement this technology to improve surgical planning and patient communication, setting new standards in the field of plastic surgery.

Harnessing AI for eyelid surgery marks a new era of precision and personalization, driving forward the capabilities of plastic surgeons and enhancing overall patient care.



Oral Presentation | Free paper (Others)

PB4

Carcinogenesis within free Latissimus-Dorsi flap donor site. A case report and literature review.

James Moore, Abby Young, Duncan Taylor

Sir Charles Gairdner Hospital, Nedlands, Perth, 6009 WA

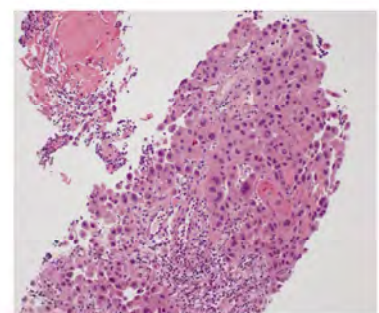
Cutaneous squamous cell carcinoma (SCC) represents a prevalent and devastating disease in areas with high UV exposure and fair-skinned individuals. It may spread locally or distantly via lymphatic and hematogenous routes. Management involves oncological control followed by reconstruction by plastic surgical teams. Free tissue-transfer represents the pinnacle of described surgical solutions. (1)

A 64-year-old gentleman underwent a Latissimus-Dorsi free muscle flap to reconstruct a large full-thickness deficit left by resection of invasive scalp SCC. At one year follow-up, SCC was found present in fluid analysis from a persistent seroma at the donor site. After surgical deliberation, a palliative route was pursued.

Free-flaps in head and neck oncological reconstruction are fraught with morbidity, both at the donor and defect site. (2) Commonly reported are surgical site infections (SSI), flap complications. Carcinogenesis within free flap donor sites is a rare occurrence consigned to case reports within scientific literature. The theory of iatrogenic implantation of malignant cells has been mooted. (3)

Biography:

1. Hallock, G. G. (2023). The Reconstructive Toolbox. *Archives of Plastic Surgery*, 50(4), 331–334. <https://doi.org/10.1055/S-0043-1769619>
2. Lutz, B. S., Wei, F. C., Chen, H. C., Lin, C. H., & Wei, C. Y. (1998). Reconstruction of scalp defects with free flaps in 30 cases. *British Journal of Plastic Surgery*, 51(3), 186–190. <https://doi.org/10.1054/BJPS.1997.0182>
3. Pichardo, P., Purdy, N., & Haugen, T. (2020). Implantation of Squamous Cell Carcinoma in a Free Flap Donor Site. *The Annals of Otology, Rhinology, and Laryngology*, 129(9), 935–940. <https://doi.org/10.1177/0003489420917418>



Oral Presentation | Free paper (Fat for the breast 1)

R01

The stability of the inframammary fold formed by loop suture during breast augmentation/reconstruction with fat grafting

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² South Ural State Medical University

Background: Implementation of the loops described by R. Khoury into clinical routine have helped a lot to control the shape and symmetry during aesthetic and reconstructive breast augmentation with fat grafting. However, there are a number of complications that go along with this method. Inframammary fold (IMF) instability is one the most common adverse effects that we observed while using such technique.

Objective: To evaluate factors that influence the stability of the inframammary fold formed by loop suture.

Methods: Since 2016 sixty-seven patients underwent IMF reconstruction with loops during breast augmentation with fat grafting (53 reconstructive and 14 aesthetic cases). The thread (Capron or PDS) was set up from the puncture at subclavian region along the breast contour according to the technique described by R. Khoury. Internal tissue expansion was applied in 19 cases reconstructive cases prior to IMF reconstruction. Results were evaluated with standard anthropometric measurements and photography at 1, 3, 6 and 12 months postoperatively.

Results: Caudal IMF displacement was observed in 12 patients (18%) and was associated with limited soft tissue mobility. In 10 cases such complication was registered in patients without internal preexpansion. Thread rupture was observed in one case while PDS is used.

Conclusion: Limited abdominal skin mobility is the most important factor that affects the stability of IMF formed with loop suture and fat grafting. In such cases internal tissue preexpansion should be performed in order to achieve sufficient skin surface area.

Oral Presentation | Sydney Coleman award session

R02

Management of radiation injury of the rectum with adipose-derived biomaterials injection. 10-year experience.

Zhanna Teriushkova¹, Viacheslav Vasilyev², Igor Vasilyev^{1,2}, Sergey Vasilyev^{1,2}, Malika Gurba²

¹ South Ural State Medical University

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Background: The use of fat grafting and adipose-derived stromal vascular fraction injections have changed the paradigm of radiation-induced soft tissue damage management and radiation rectum injury in particular. Although initial clinical experience in this field showed encouraging results, evaluation of long-term outcomes is gaining relevance.

Objective: To analyze long-term outcomes of rectum radiation injury treatment with autologous fat and stromal vascular fraction (SVF) injections.

Methods: Since 2012 fat grafting in combination with SVF injections was used in 111 patients with rectum radiation injury: rectovaginal fistula (n=59; 53,2%), rectum ulcers (38; 34,2%) and proctitis (14; 12,6%). To achieve complete healing from 1 to 6 repeated procedures per patient were performed (362 surgeries in total). To assess outcomes physical examination, photography, ultrasound, MRI and histology were used.

Results: Complete healing was achieved in 109 cases (98,2%). The lack of effect was observed in two patients with rectovaginal fistula (1,8%) who had concomitant autoimmune disease. Fistula relapse was observed in four (6,8%) out of 59 patients and has been solved with additional procedures. Rectal stricture after healing of large fistula has developed in three (5,1%) out of 59 cases. Two (1,8%) fatal complications not directly connected to the researched method have been registered: cancer relapse in one case (0,9%) and insolvency of intestinal anastomosis after reverse colostomy procedure in the other case (0,9%).

Conclusion: Autologous fat and stromal-vascular fraction injection is relatively safe and highly effective method for treatment of radiation injury of the rectum.

R03

Targeting SIRT4/TET2 Signaling Alleviates Human Keratinocyte Senescence by Reducing 5-hmC Loss

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Abstract

Skin aging is characterized by wrinkle formation and increased frailty and laxity, leading to the risk of age-related skin diseases. Keratinocyte is an important component of the epidermis in skin structure, and keratinocyte senescence has been identified as a pivotal factor in skin aging development. Because epigenetic pathways play a vital role in the regulation of skin aging, we evaluated human skin samples for DNA hydroxymethylation (5-hydroxymethylcytosine; 5-hmC) and SIRT4 expressions. Results found that both 5-hmC and SIRT4 showed a significant decrease in aged human skin samples. To test the results in vitro, human keratinocytes were cultured in H₂O₂, which modulates skin aging in vivo. However, H₂O₂-induced keratinocytes showed senescence-associated protein expression and significant downregulation of 5-hmC and SIRT4 expressions. Moreover, 5-hmC-converting enzymes ten-eleven translocation 2 (TET2) showed a decrease and enhanced TET2 acetylation level in H₂O₂-induced keratinocytes. However, the overexpression of SIRT4 in keratinocytes alleviates the senescence phenotype, such as senescence-associated protein expression, decreases the TET2 acetylation, but increases TET2 and 5-hmC expressions. Our results provide a novel relevant mechanism whereby the epigenetic regulation of keratinocytes in skin aging may be correlated with SIRT4 expression and TET2 acetylation in 5-hmC alteration. Our study may provide a potential strategy for anti-skin aging, which targets the SIRT4/TET2 axis involving epigenetic modification in keratinocyte senescence.

Figure 1

Figure 1. Aged human skin keratinocyte show loss of 5-hmC

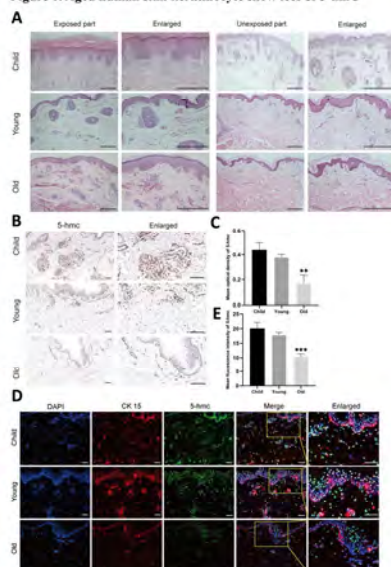


Figure 2

Figure 2. Aged human skin keratinocyte show loss of SIRT4

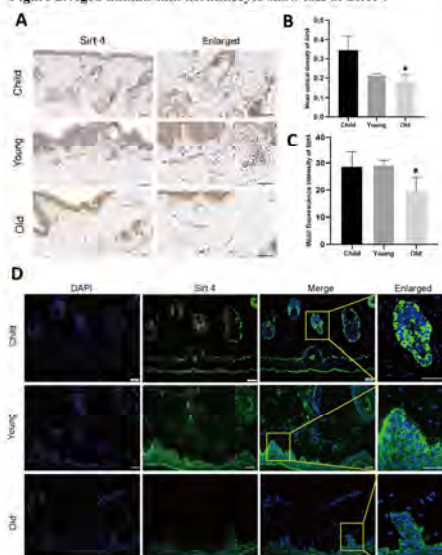


Figure 3

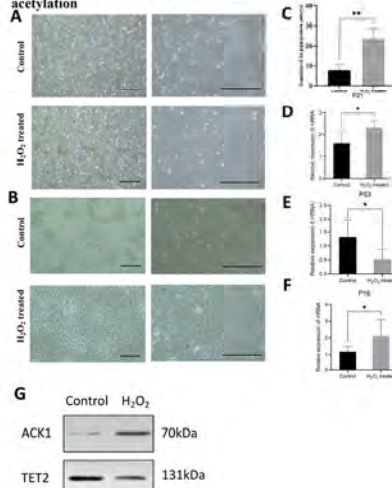
Figure 3. Effect of H₂O₂ on keratinocyte senescence and TET2 acetylation

Figure 4

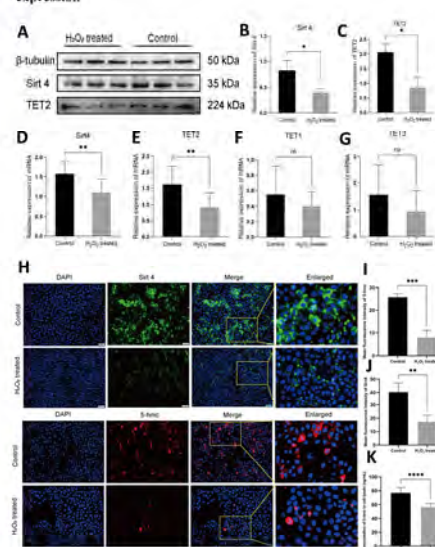
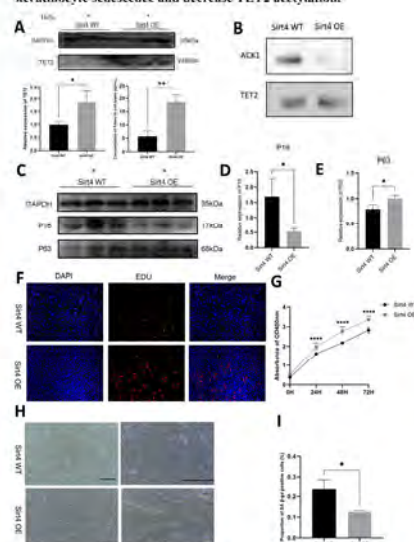
Figure 4. H₂O₂ after keratinocyte TET2, 5-hmC and SIRT4 expression

Figure 5

Figure 5. Overexpression of SIRT4 alleviate H₂O₂ induced keratinocyte senescence and decrease TET2 acetylation.

Oral Presentation | Free paper (Stem cells/ Tissue engineering)

R04**Examining Long-Term Responses of Diverse Human Body Systems and Disorders to Mechanically Obtained Fat-Derived Stromal Cells**

Hasim Eray Copcu

G-CAT (Gene, Cell and Tissue) Academy

Background:

Adipose tissue is an excellent source of stromal cells, which play a crucial role in regenerative therapies.

Objective:

Mechanical methods, particularly those involving ultra-sharp blade systems, have shown exceptional success in efficiently obtaining stromal cells from adipose tissue. However, the response of different body systems and organs to regenerative applications can vary significantly.

Methods:

Regenerative treatments were administered in 668 cases across various indications, and their long-term outcomes were assessed over a minimum of 2 years and a maximum of 8 years. After centrifugation and removal of blood and tumescent fluid, the resulting condensed fat was sectioned using ultra-sharp blades with diameters of from 2400 to 120 microns to separate stromal cells. The isolated stromal cells were then applied according to specific protocols for each indication.

Results:

Regenerative treatments utilizing stromal cells were successfully employed for both aesthetic and therapeutic purposes in various anatomical regions, including skin and subcutaneous tissues (aging, burns, cancer, radiation injury, diabetic foot), urogenital region (erectile dysfunction, Peyronie's disease, ovarian insufficiency, endometrial and testicular rejuvenation, bladder reconstruction, urinary incontinence), scalp, vocal cord, bone tissue (aseptic necrosis), joints (osteoarthritis), adipose tissue (lipodystrophy, necrosis), plantar fascia, and lung (regenerative rehabilitation).

Conclusion:

The acquisition of stromal cells from adipose tissue can be categorized into two approaches: direct and indirect methods targeting the connections between parenchymal and stromal-cells. Among these approaches, ultra-sharp blade systems have demonstrated the most successful outcomes.

Figure 1: Ultra-sharp blades

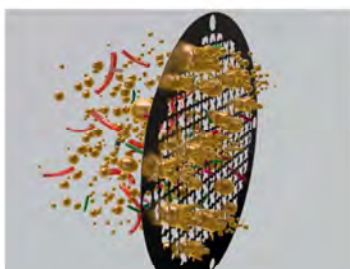
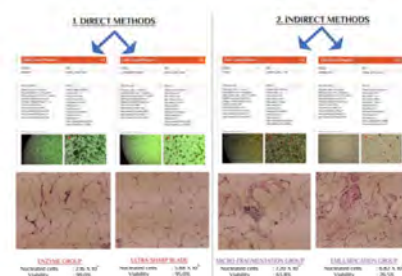


Figure 2: Comparison of techniques



Oral Presentation | Free paper (Fat for reconstruction/ regeneration 1)

R05

Activated Fat Grafting: A Novel Approach for Enhanced Fat Graft Retention and Natural Long-Term Results

Hasim Eray Copcu

G-CAT (Gene, Cell and Tissue) Academy

Background:

Fat grafting is a commonly performed procedure in plastic surgery with a long history of application. Despite numerous studies on the pathophysiology of fat grafting, many aspects remain unclear. The survival of fat grafts is influenced significantly by the presence of stromal-cells.

Objective:

This study introduces a novel technique called “activated fat grafting”, which involves releasing stromal cells using ultra-sharp blades without damaging the fat tissue parenchyma, followed by the application of fat grafting.

Methods:

Different sizes of fat grafts (2400 - 100 microns) were prepared using ultra-sharp blades specific to each anatomical area and depth. The process involved releasing stromal cells within the adipose tissue. A total of 248 patients underwent fat grafting on various body areas, including the face, breast, extremities, genital areas, and others.

Results:

Laboratory studies demonstrated that the use of sharp blades allowed the desired diameter of adipose tissue to be achieved without completely disrupting the parenchyma, while also releasing stromal cells and determining their presence and quantity. Clinicians and patients reported satisfactory long-term results in all cases.

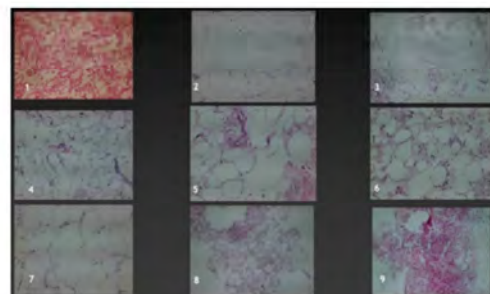
Conclusion:

Adipose tissue contains parenchymal cells, predominantly adipocytes, interconnected with stromal cells through bonds and bridges. By separating these bonds using sharp blades, the stromal cells can be released without compromising the viability of adipocytes. This technique facilitates the attainment of natural, long-term results while minimizing complications such as graft visibility.

Figure 1: Protocol



Figure 2: Histopathological analysis



Oral Presentation | Sydney Coleman award session

R06

Autologization of Exosome Therapies using De-Parenchymized Adipose Tissue Extracellular Matrix: A Novel Approach for Controlled Regenerative Medicine

Hasim Eray Copcu

G-CAT (Gene, Cell and Tissue) Academy

Background:

Exosome products from allogeneic and xenogeneic sources are available on the market. A key challenge is controlling the effects of non-autologous exosomes.

Objective:

We hypothesized that combining exosomes with a patient's own extracellular matrix (ECM) can create "autologization," enabling better control over their effects. This study aimed to provide the rationale and a guide for future research exploring the autologization of exosome applications using de-parenchymized adipose tissue (DPAT).

Methods:

DPAT adipose tissue was achieved using 1200-, 400-, and 35-micron blades in an ultra-sharp blade system (Adinizer), and then "autologization" was achieved by combining the obtained DPAT with allogeneic exosomes. DPAT was evaluated histochemically, and exosomes were counted and analyzed with the Nanosight device.

Results:

The DPAT process using ultra-sharp blades is easily performed. DPAT obtained from adipose tissue was then combined with allogenic exosomes. It has been demonstrated histopathologically that adipocytes are eliminated in de-parenchymized fat tissue, and only ECM and stromal cells remain. It has also been proven that the number of exosomes is not affected by the combination.

Conclusion:

This study introduces two novel concepts previously unknown in the literature, "de-parenchymization" and "autologization," representing an innovative approach in plastic surgery and regenerative medicine. Our novel approach enriches regenerative cells while preserving critical ECM signals, overcoming the limitations of existing isolation methods. Extensive research is still needed, but autologization using DPAT-ECM holds great promise for translating exosome-based treatments into clinical practice.

Figure 1: DPAT analysis

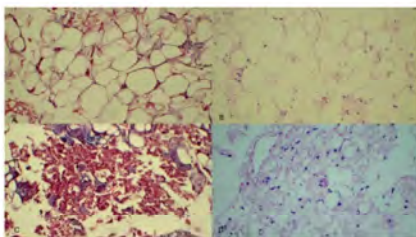
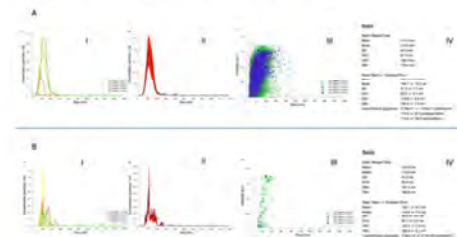


Figure 2: Exosome analysis



Oral Presentation | Free paper (Research)

R07

Mechanical stretch promotes hypertrophic scar formation by stimulating Schwann cells cholesterol biosynthesis

Jiahao He, Shengzhou Shan, Bin Fang

Department of Plastic and Reconstructive Surgery Shanghai Ninth People's Hospital Shanghai Jiao Tong University School of Medicine

Background: Hypertrophic scar (HS) is a fibroproliferative skin disorder which could lead to severe functional impairment. Mechanical stretch has been identified as a critical regulator of HS formation, but the underlying mechanism is not fully understood. Recently, activated Schwann cells (SCs) have been shown to be involved in wound healing and keloid formation. However, it is unknown whether SCs respond to mechanical stretch, leading to activation and ultimately HS formation.

Objective: We aim to investigate the influence of mechanical stretch on SCs activation and subsequent HS formation to explore a potential anti-HS formation therapy.

Methods: Human HS tissues and adjacent normal skin tissues were collected to detect activated SCs by immunofluorescence co-staining of SCs marker (SOX10) and SCs activated markers (p75, c-JUN and p-ERK). Cyclic mechanical stretch (10%, 24 hours, 0.5 Hz) was applied to SCs to mimic mechanical stretch during HS formation. Western blot was performed to assess the expression of p75, c-JUN and p-ERK. RNA sequencing was performed to characterize the molecular mechanism involved in stretch-induced activation of SCs. Selective inhibitors and conditional RNAi transfection were used to confirm the molecular mechanism of mechanical stretch in SCs activation. A stretch-induced rat tail hypertrophic scar model was established and then treated with selective inhibitors and conditional RNAi transfection to investigate the role of SCs in HS formation. Scar hypertrophy was assessed by H&E and trichrome staining. α -SMA expression was confirmed by immunohistochemistry.

Results: First, immunofluorescence confirmed that there is an increasing number of activated SCs distributed in HS samples. Mechanical stretch could promote the activation of SCs *in vitro*, as assessed by upregulation of p75, c-JUN and p-ERK. In mechanism, RNA sequencing analysis revealed a strong enrichment for genes involved in cholesterol biosynthetic processes in stretch-treated SCs. Importantly, the expression of 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGCR), a key enzyme in cholesterol biosynthesis, was upregulated in stretch-treated SCs. Application of simvastatin (an HMGCR inhibitor; 1 μ M) and HMGCR-RNAi effectively reduces mechanical stretch-induced activation of SCs *in vitro*. Finally, intradermal injection of simvastatin and HMGCR-RNAi could inhibit stretch-induced HS formation *in vivo*, as assessed by reduced scar cross-sectional area, collagen deposition and α -SMA expression.

Conclusion: Our study suggests that mechanical stretch could drive SCs activation by stimulating the key cholesterol biosynthesis enzyme HMGCR, thereby leading to HS formation. Therefore, targeting Schwann cells cholesterol biosynthesis may be a novel treatment option for HS.

Oral Presentation | Free paper (Face)

R08

DEEP PLASMA SKIN RESURFACING: ACCELERATED HEALING WITH HUMAN MSC EXOSOMES

Melinda Lacerna

LA Plastic Surgery

Background: Deep facial skin resurfacing with plasma technology results in better correction of superficial and deep rhytids, photo-damage and more tissue contraction resulting in improved skin and soft tissue tightening, yet safe to perform at the same time as a face and necklift. While the outcome can be quite impressive, the recovery can be daunting. Re-epithelialization can take as long 21 days.

Objective: This study describes how topical application of MSC exosomes immediately after deep plasma resurfacing procedures have decreased the rate to re-epithelialization, decreased pain scores, improved the rate of healing and improved the overall outcomes.

Methods: A retrospective review of one surgeon's experience performing deep plasma skin resurfacing from 2017-current is presented. A total of 100 consecutive patients were treated with full face deep plasma skin resurfacing, 55 of these patients underwent a concurrent facelift and necklift. In 48 patients, MSC exosome application was performed immediately after the procedure. The amount of days to full re-epithelialization were compared between the Exosome treated group (48) and the non-treated group (52).

Results: Range of re-epithelialization for the exosome treated group was 6-14 days, compared to 10-21 days in the non-exosome treated group. Longest follow up is 7 years.

There were four complications, all with the non-exosome treated group. One patient was hospitalized due to severe constipation from post-op opiate use. Three patients developed hypertrophic scarring on the chin that were treated with triamcinolone.

Conclusion: This series over the course of 7 years compares the course of healing of Exosome treated patients versus the non-exosome treated patients following deep plasma skin resurfacing procedures. The use of topical exosomes immediately after the procedure was shown to decrease the days to re-epithelialization from 10-21 days to 6-14 days. In addition, post-operative pain and narcotic use were significantly decreased in the exosome treated group. This is most likely due to down regulation of inflammatory pathways associated with exosome use. The more rapid rate to healing, re-epithelialization and re-establishment of the skin's protective phospholipid bi-layer also decreased other complications such as infections, prolonged erythema, hypo or hyper pigmentation, and hypertrophic scarring.

R09

Research and Clinical Application Prospects of Crt Autologous Collagen Technology

JIN BAI

Crt Autologous Collagen Clinical Research Center

Background:In the field of medical plastic surgery, filling is an indispensable part. At present, most of the popular filling technology is non-self-material, and the safer self-fat filling has some disadvantages. Therefore, the new technology of self-filling is a great power to promote the development of medical plastic surgery.

Objective:Discussion on the Research and Clinical Application Prospect of Crt Autologous Collagen Technology Through Technical Analysis and Technical Demonstration.

Methods:By preparing a self-healing hydrogel carrying a living cell composition of autologous collagen, It has achieved good biocompatibility, biodegradability and antibacterial effect.

Results:In the past 10 years, more than 170,000 cases of chest, buttocks, private and face were treated by Crt autogenous collagen technique. There were no other complications except more than one thousand cases of hard hand feeling, more than one hundred cases of poor shape and more than ten cases of postoperative infection.

Conclusion:Good biocompatibility, biodegradability and antibacterial effect, so as to achieve the technical effect of reducing adverse tissue reactions, At the same time, hydrogel provides a suitable microenvironment to improve the cell survival rate after transplantation, so as to achieve better filling effect and longer maintenance time.

Oral Presentation | Free paper (Face)

R10

A Clinical Study of Platelet-rich Fibrin Combined with Autologous High-Density Fat Transplantation in Augmentation Rhinoplasty

DAN YAN

Department of Plastic and Cosmetic Surgery, Chenzhou First People's Hospital, Chenzhou, Hunan

Background: Augmentation rhinoplasty is one of the most common plastic surgeries in Asia. Experts have conducted much research on augmentation rhinoplasty by injection. Autologous fat transplantation is the most advantageous method due to the abundant source, no rejection reaction and easy to operation. However, The high absorption rate limits the application of autologous fat transplantation in rhinoplasty. Therefore, improving the survival rate of fat after transplantation is the key to promoting this technology.

Objective: This study was designed to analyze the clinical effect of autologous fat-granule transplantation in augmentation rhinoplasty and explore a method to improve the fat retention rate.

Methods: 70 patients were randomly divided into platelet-rich fibrin (PRF) combined with high-density fat transplantation group (combined group) and conventional fat-granule transplantation group (control group). All patients were followed up for more than one year to observe the clinical effects, complications, safety, and satisfaction.

Results: At six months after the operation, the nasal shape was stable, the contour was higher and more stereoscopic than before. No complications such as fat embolism, infection, or necrosis occurred during the one-year follow-up. The satisfactory rate between the two groups have statistical significance($P < 0.05$).

Conclusion: PRF combined with autologous high-density fat transplantation is simple to operate, has a significantly increased fat-retention rate compared with the control group, and has stable long-term effects without obvious adverse reactions. This method can be widely used in clinical augmentation rhinoplasty.

Oral Presentation | Free paper (Stem cells/ Tissue engineering)

R11

The Role of Adipose-Derived Stem Cells in Creating a Youthful Lower Eyelid in Facial Rejuvenation

QING HE

Shenzhen AKM Aesthetic Surgery Clinic

Background: In daily work, the lower eyelid has a variety of appearances, such as wrinkles, dark eye circles, bulges and a hollow eye, etc. According to different situations, we will take fat graft, fat removal techniques or septal reset, etc., then is there a method that is suitable for all lower eyelid formation, and can make the lower eyelid youthful?

Objective: This study was conducted to use adipose-derived stem cells to creating a youthful lower eyelid in facial rejuvenation

Methods: From January 2019 to January 2022, 48 patients underwent this procedure.

Classification of lower eyelid: I the lower eyelid was flat, with wrinkles or dark eye circles (11 cases)(A+B); II patients with periorbital aging

(17cases:transconjunctival-lower-lepharoplasty7&transcutaneous lower lid blepharoplasty 8) (D+A+B); III, lower eyelid introcession, (9 cases)(A+B+C) ; IV

Surgical repair(12cases,injections4,surgical-procedure8) (D+A+B+C).Compound

rejuvenation mode: A ADSC B Nano fat grafts C Micro fat grafts D traditional surgery

Results: The mean follow-up was 18 months and the mean operations was 2.5. The lower eyelid had a natural and flat appearance, the skin condition and the elasticity were enhanced. 4 patients complained of swelling and bruising.

Conclusion: The application of ADSCs can lead to full regeneration of dermal elastic matrix components. make up for the simplicity of the traditional treatment of the lower eyelid , reduce the potential relative risk of using chemical products. It is a natural, safe and effective method.

Oral Presentation | Free paper (Face)

R12

High Double Eyelid Fold Correction Composite Using Fat Strip Transplantation and Pretarsal Orbicularis Oculi Flap

Haihua Chen

Hangzhou First people's Hospital

Background: As the growing amount of unnatural-appearing upper eyelid after blepharoplasty, it's necessary to find suitable methods for secondary revision.

Objective: This study aimed to evaluate aesthetic outcomes of surgical correction of the high fold using a pretarsal orbicularis oculi flap with fat strip transplantation.

Methods: From January 2018 to September 2023, 50 patients with high and deep double eyelid folds underwent our fold-lowering procedure. All of these patients underwent surgical correction of high folds composite using fat strip transplantation and pretarsal orbicularis oculi flap, with postoperative follow-up ranging from 6 months to 2 years. All the Postoperative outcomes were recorded and reviewed.

Results: Using the composite technique, unnatural, high, and deep double eyelid folds were converted to lower and relative natural folds. Although prior high fold incision scars could be seen postoperatively on close examination, they were not easily visible. Complications included fold height asymmetry in 5 cases, persistence of the prior fold in 6 cases, and redundant upper flap skin that needed further excision in 3 cases.

Conclusion: Secondary blepharoplasty revision to correct the high fold is a challenging procedure for plastic surgeons. Using fat strip transplantation and pretarsal orbicularis oculi flap for correction of the high fold is relatively safe and effective. This provides a new treatment option in secondary revision techniques.

Oral Presentation | ISPRES APRAS award session 2

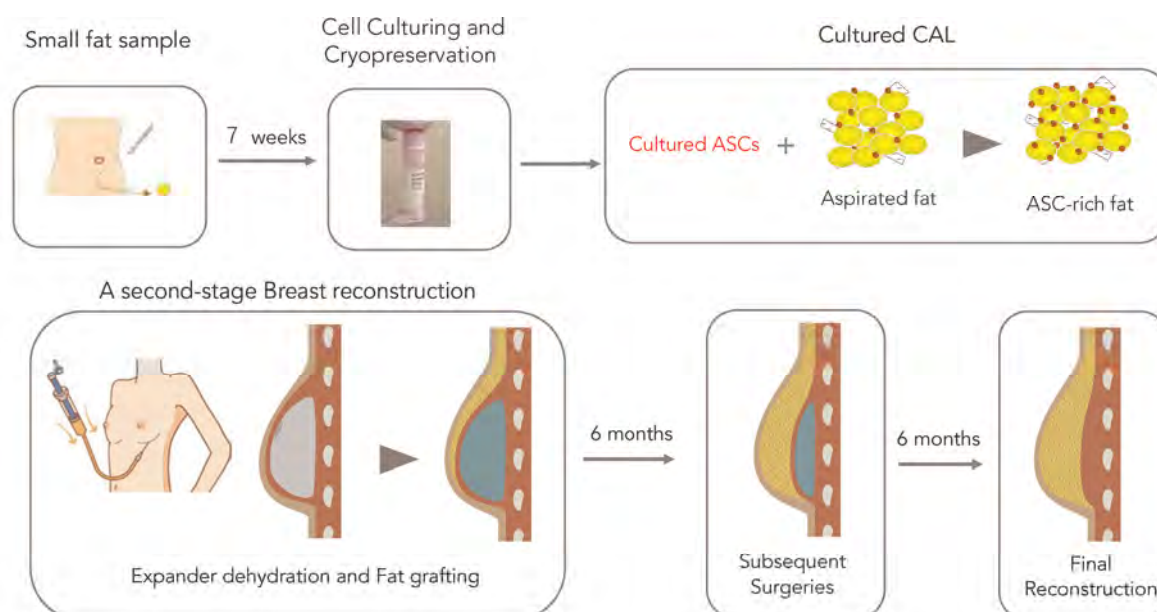
R13**Innovative Cultured Cell-Assisted Lipotransfer for Breast Reconstruction**Yuko Asano¹, Saori Unno², Naoko Tsuji²¹ Kameda Medical Hospital² Cellport Clinic Yokohama

Objective: Since 2008, we have been performing Cell-assisted lipotransfer (CAL) for cosmetic and reconstructive breast surgery at the Cellport Clinic Yokohama. CAL involves the isolation of adipose stem cells from additional fat harvested during surgery. However, CAL techniques prolonged operation time and required excessive fat harvesting. To address these issues, cultured CAL was developed, wherein stem cells are cultured and expanded from a minimal fat volume prior to surgery. This study presents our experiences with cultured CAL for breast reconstruction.

Methods: This retrospective study includes fourteen patients who underwent whole breast reconstruction with cultured CAL. After six months of the tissue expander (TE) dilation, a second-stage breast reconstruction was performed. Seven weeks before surgery, a small fat sample was excised for stem cell culturing and cryopreservation. During reconstructive surgery, following TE dehydration and temporary removal, aspirated fat combined with cultured stem cells was grafted into the subcutaneous layer, and the TE was returned to the pocket. Subsequent surgeries were conducted every six months until TE removal and final reconstruction. Data on operative frequencies, aspiration and injection volumes, and reconstructed breast volume were collected.

Results: The average number of operations was 3.6, with a total fat harvest volume averaging 979.4 cc. The ratio of the final reconstructed breast volume to the healthy breast was 94%. No major complications were observed.

Discussions: Cultured CAL addresses the limitations of conventional CAL. Future discussions will focus on the potential of cultured CAL and the measures required to ensure its safety and efficacy.



Oral Presentation | Free paper (Body contouring)

R14

Safety of Brazilian Butt Lift Surgery (BBL): Insights from the UK Ban and National Guidelines

Omar Tillo

Creo Clinic, London

Background:

The Brazilian Butt Lift (BBL) procedure has gained popularity worldwide for its ability to enhance hips and buttock shape and size. However, concerns regarding its safety, particularly the risk of fat embolism, prompted the British Association of Aesthetic Plastic Surgeon (BAAPS) to impose a moratorium on performing this procedure in 2018.

Objective:

This presentation aims to explore the events leading to the UK ban on BBL surgery, assess its impact on surgeons and patients, and discuss the efforts made to analyse the safety of the procedure. Additionally, it examines the development and publication of new national guidelines and safety recommendations for BBL surgery.

Methods:

The presentation reviews the timeline of events leading to the UK ban on BBL surgery. It analyses the challenges faced by surgeons following the ban and the risks faced by patients seeking this procedure. Furthermore, it discusses the collaborative efforts undertaken to evaluate the safety of BBL surgery, incorporating both old and new evidence.

Results:

The presentation highlights the comprehensive review of scientific evidence on BBL surgery safety, leading to the formulation of updated national guidelines and safety recommendations. It discusses the key findings from this analysis and the implications for both surgeons and patients considering BBL procedures.

Conclusion:

In conclusion, the presentation emphasizes the importance of evidence-based practice in plastic surgery and the necessity of adhering to strict safety guidelines. It underscores the ongoing efforts to ensure the safety of BBL surgery and provides insights into the future direction of this evolving procedure.

Oral Presentation | Free paper (Face)

R15**755-nm picosecond laser combined with bioactive polymer dots to reverse photo-damage on nude mouse model**Chang Cheng Chang^{1,2}, Tzong Yuan Juang², Jia Chee Siew³, Yi Hsuan Tu³, Hoi Man Iao², Sian Cian Fan²¹ Division of plastic and reconstructive surgery, China medical university hospital² Institute of cosmeceutics, China medical university³ school of medicine, college of medicine, Chinamedical university

Background: Picosecond laser could produce laser-induced optical breakdown. In addition, polymer dots (PDs) can promote vascular proliferation, achieving skin repair and inhibiting inflammation via epithelial mesenchymal transformation.

Objective: Our research explores a novel approach that combines a 755-nm picosecond laser with bioactive PDs to reverse photo- damage in a nude mouse model.

Methods: Twelve 6-week-old BALB/c nude mice with UVB irradiation, divided into (1) UVB group, and various treatment groups including (2) UVB + PEG1000, (3)UVB + PDs + PEG1000, and (4)UVB + Laser + PDs + PEG1000. All mice are subjected to UVB irradiation over the course of 10 weeks Assessments were conducted using immunohistochemistry (IHC), enzyme-linked immunosorbent assay (ELISA), and Masson's trichrome (MT) staining to gauge collagen content, epidermal thickness, and expression levels of proteins related to photo-damage repair.

Results: MT staining revealed a notable 30% increase in collagen retention within the UVB + Laser+ PD group by day 11. The reduction of MMP-9 levels in UVB+PD+PEG1000 group on day 11 achieving 4.2%, compared to 9.3% in UVB group on day 1 ($p=0.03$). Furthermore, IL-6 levels experienced a substantial decrease across all treatment groups versus the UVB group on day 1, signaling a notable reduction in inflammation ($p < 0.001$). The analysis of Smad2/3 signaling in the UVB+PD+PEG1000 group on day 11 achieving 2.8%, compared to 1.3% in the UVB group on day 1, revealed an enhanced activation of skin repair.

Conclusion: The combination of the 755-nm picosecond laser with bioactive polymer dots provides a therapeutic strategy for reversing photo-damage. This technique not only bolsters collagen production but also promotes a novel pathway for skin repair and aging reversal, meriting further exploration for clinical application.

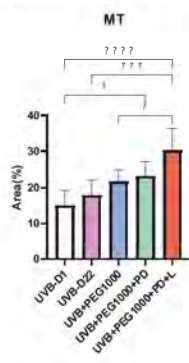


Figure 1.

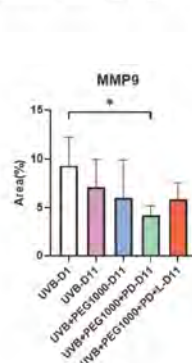


Figure 2.

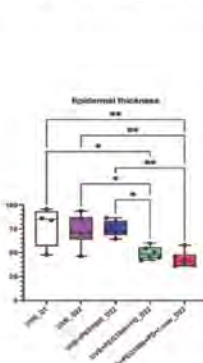


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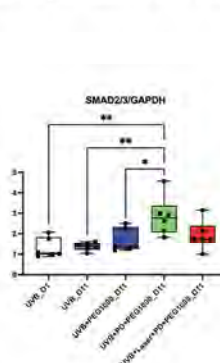


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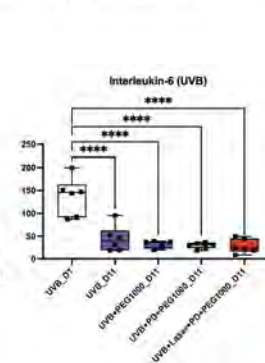


Figure 5.

Oral Presentation | Sydney Coleman award session

R16

Exosomes Combined with Polymer Dots Dressings and 755 nm picosecond laser accelerate wound Healing in Nude Mice

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¹ China medical university hospital

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³ school of medicine, college of medicine, Chinammedical university

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Background: Exosomes are extracellular nanovesicles mediating intercellular communication. Porcine fallopian tube stem cells (PFTSC)-derived exosomes and polymer dots (PDs) dressings have been proved to promote cells proliferation and migration.

Objective: To investigate whether PFTSC-derived exosomes, exosomes combined with PDs dressings and/or pretreated with a 755 nm picosecond laser with a diffractive lens array accelerate wound healing in nude mice.

Methods: . Fifteen nude mice were randomly divided into five groups: (1) Controls (2) Exosomes (3) Exosomes + PDs (4) Laser + Exosomes (5) Laser + Exosomes + PDs. Full-thickness wounds were created on the back of each mouse. The wound area was evaluated by Image-J. ERK1/2, pro-collagen1/3, collagen1/3, CD31, VEGF, EGF, E-cadherin, Vimentin, Filaggrin, and Aquaporin 3 were examined by the wound tissues with ELISA, immunostaining, and masson trichrome (MT) staining.

Results: Level of VEGF, EGF and CD31 were significantly higher than the control group on day 3 (VEGF, 18% in Laser+Exosomes+PD vs 4% in controls, $p<0.0001$; EGF, 1.6% in Exosomes+PD vs 0.5% in controls, $p<0.01$; CD31, 17% in Laser+Exosomes+PD vs 5% in controls, $p<0.05$). Expression of filaggrin was stronger in Laser+Exosomes+PD group than Exosomes alone (11% vs 6%, $p<0.05$). Wound area was reduced to 13% in Laser+Exosomes+PD group vs 33% in controls($p<0.0001$). MT staining revealed significant increase of collagen (39% in Laser+Exosomes+PD vs 19% in Controls, $p<0.0001$).

Conclusion: The group of exosomes combined with PDs dressings and picosecond laser had demonstrated faster re-epithelization with more collagen deposition and. The combination is potential for further investigation on human chronic wound.

Oral Presentation | Sydney Coleman award session

R17**Using Bilateral Pedicled Transverse Rectus Musculocutaneous Flap and Fat Grafting for Autologous Breast Augmentation**

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Emcas Plastic Surgery Hospital

Background: The silicone gel implant is currently the most popular method of breast augmentation, but its use is associated with a number of risks, including capsular contracture, seroma, implant malposition, visibility of the implant, and anaplastic large cell lymphoma (ALCL). Breast augmentation by fat grafting can avoid the complications of implant breast augmentation, however, the degree of reabsorption of the injected adipose tissue is unpredictable. Fat resorption has been reported by multiple authors, it has been associated with increased fat resorption, which varies between 25-75%, primarily due to fat apoptosis, necrosis, and liquefaction. In the last 20 years, autologous flaps have been used in several studies for breast augmentation to limit complications.

Objectives : To evaluate the effectiveness and safety of using bilateral pedicled TRAM flap combination with fat grafting for autologous breast augmentation.

Method : Selection criteria of patients: Patients who desire body-contouring surgery with abdominoplasty, no planned pregnancies, do not desire implants, in cases:

- Small breast with or without ptosis, abdominal scar.
- Implant removal due to different reasons: capsular contracture, seroma, implant malposition, visibility of the implant...
- Complication of free liquid silicone injection due to breast augmentation.

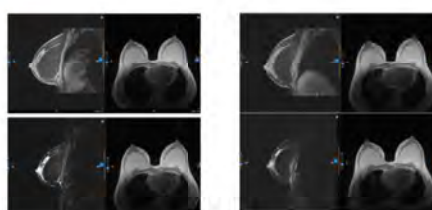
Surgical technique : Pocket was made in subglandular position of breast. The transverse rectus abdominis (TRAM) flap with deepithelialized was divided into 2 parts and mobilized off the abdominal wall with its vascular pedicle intact. A tunnel is created in the medial inframammary fold. Flap is positioned in the breast pocket, it is tacked in place and further shaped. The abdominal wall defect is closed. An interposition piece of mesh is necessary inserted to prevent future hernias. Liposuction was performed in the hip waist, fat was grafted at the fat layer around both breasts.

Results : A total of 32 cases met the inclusion criteria. The reason for operation mainly is implant capsular contracture (40.6%), the horizontal scar of the low abdominal area is popular (56.3%), the awaited volume of an autologous lateral TRAM flap is 225.78cc, the average amount of fat grafting is 56.87cc for each breast. Following surgery, no cases of complete or partial flap loss were clinically detected. There were no hernia or bulging issues, and 01 case was an infection. Patients were followed from 6 to 12 months. MRI 3Tesla was used to assess the survival of fat grafting and TRAM flap. Using BREAST -Q to assess the satisfaction of all patients, 68.8% somewhat agree and 31.3% definitely agree with their expectation, 0 % disagree, sum score is 18- 19 (78.2%) equivalent score is 60-64.

Conclusions: The initial success suggested the effectiveness and safety of autologous breast augmentation by using pedicled TRAM flap and fat grafting in the selective patients.



Follow up in MRI



Oral Presentation | Sydney Coleman award session

R18

Innovative approach to total skin substitute with 4th generation biomaterials

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Background:

Over the past several decades, there have been dramatic advantages in the quality of care provided to patients with burns. The basic limitation for the 21st century remains the issue of local care. Thanks to the modern possibilities of biomaterial and cell engineering, we can offer these patients effective options for improving the quality of subsequent life.

Objective:

In our current research strategy, we are trying to focus on a dermal regeneration strategy using an innovative stable form of Fibroblast growth factor 2 (FGF2-STAB[®]) and Fibroblast growth factor 7 (FGF7-STAB[®]) targeting to 4th generation biomaterials development for total skin substitute.

Methods:

In the first stage, we developed and successfully evaluated the 2nd generation of biomaterials as part of dermal substitute (unique porous biopolymer collagen chitosan foam enriched with FGF2-STAB[®]). We are now in the second phase of development and evaluation of 4th generation biomaterials containing FGFs and differentiated MSCs.

Results: In the first phase, full biocompatibility of our resorbable dermal substitutes was demonstrated in a swine model within 3 and 6 months of follow-up. Increased neovascularization and fibroproliferation were proved by Chick Chorioallantoic Membrane (CAM) assay and animal model experiment. In the second phase, we successfully seeded cell populations into our biomaterials with growth factors and began to evaluate within *in vitro* and animal models.

Conclusion: Bilayer skin substitute with FGFs demonstrated superior biological activity by neovascularization. Our current ambition is to use tissue engineering methodology for the development of 4th generation biomaterials in total skin substitution.

Acknowledgements: This study was supported by the Ministry of Health of the Czech Republic, grant No. NU22-08-00454 and funds from the Faculty of Medicine number MUNI/A/1598/2023. All rights reserved.

Oral Presentation | ISPRES APRAS award session 2

R19

Latissimus Dorsi and Immediate Fat Transfer (LIFT) for Breast Reconstruction after Mastectomy: A Case Series

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Background: Although the latissimus dorsi (LD) flap is a common option for breast reconstruction, its use is limited by the volume of transferred tissue. The extended LD flap is used to ensure sufficient breast volume, but increases the risk of donor site deformity and seroma formation. Latissimus dorsi and immediate fat transfer (LIFT), first reported in 2014 by Santanelli et al., may help prevent these complications while providing sufficient breast volume.

Objective: The purpose of this study was to report our experience with LIFT in breast reconstruction and evaluate complications and additional operations.

Methods: A retrospective study was performed of 10 patients who underwent unilateral breast reconstruction post-mastectomy using LIFT from November 2019 to May 2024.

Demographic and operative data, complications, and the number of additional operations were analyzed.

Results: The mean patient age was 49.6 years, and the mean body mass index was 22.5 kg/m². The average total fat grafting volume was 228.1 mL. The average duration of dorsal drain placement was 11.3 days. Complications were observed within a mean follow-up period of 25.2 months. Two patients (20.0%) developed a seroma at the donor site. No cases of flap or fat necrosis were noted. Additional fat grafting was performed on one patient to enhance the volume of the reconstructed breast.

Conclusion: LIFT for breast reconstruction is a safe and effective technique to enhance flap volume and prevent seroma formation at the donor site. This approach may expand the indications for the LD flap to more patients desiring autologous reconstruction.



Fig. 1. Intraoperative clinical image demonstrating fat injection into the LD flap.

Oral Presentation | Free paper (Fat for reconstruction/ regeneration 1)

R20

Fat tissue: a decisive treatment for the management of complicated wounds in a high morbidity patient.

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ANTONY JAMES JACKSON⁴, RAUL A VALLARTA RODRIGUEZ^{1,3}

¹ AMCPER

² ISPRES

³ ISAPS

⁴ BAPRAS

Background: Fat tissue over the years has been recognised as a treatment in the cosmetic and reconstructive fields for restoration of volumen, also for its endocrine properties of the tissue that allow cell regeneration, stem cells derived from fat tissue are promising and realistic choice in patients where reconstructive treatment alternatives are not an option.

Objective: We wanted to demonstrate with this case that the fat transfer was a decisive option for covering and saving a patient's leg.

Method: In a 76 y/o female patient with chronic renal failure, diabetes mellitus type 2 and systemic arterial hypertension. Two months before she was treated for a reduction of a right tibia fracture, this was performed with complications of bone exposure, tissue loss and a failed soleus flap with necrosis & substantial tissue loss. We performed a fat transfer from the inner thigh to the tibia using the Dr Marco A. Pellon "sandwich" technique three times every 7 days which led to improving tissue coverage and growth, after three weeks we successfully proceeded with a skin graft to the area.

Conclusion: A fat transfer with its exosomes and endocrine functions is a considerable option for patients who require coverage after the loss of tissue in complicated wounds & that also have multiple comorbidities. In this complex case we demonstrated that the fat transfer was an effectiveness option to cover and save the patient's leg.



Oral Presentation | Sydney Coleman award session

R21

Advanced adipose-derived stem cell protein extracts (AAPE) as an alternative regenerative treatment option for bedridden patients.

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¹ AMCPER

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Background: Advanced adipose-derived stem cell protein extracts (AAPE) have been used instead of live stem cells for their effectiveness in oxidative stress and matrix metalloproteinases (MMPs) related to tissue repair in human dermal fibroblasts (HDFs). In particular, it has been demonstrated that adipocyte-derived agents can be effective in tissue regeneration. Bedridden patients who are susceptible to developing bedsores treatment options are scarce which leads us to look for other non-surgical alternatives to reduce morbidity.

Objective: To demonstrate the effectiveness of the AAPE treatment in a heel pressure ulcer of a bedridden 91 y/o woman with senile dementia.

Methods: We proposed to start the treatment with the AAPE, after one month the patient was treated with wound healing and synthetic dressings without showing any improvement and with increased extension. The AAPE treatment was performed every 30 days, administration was both intradermal and topical with an amount of 2ml of the AAPE all around the wound over a period of six months. AAPE applications were performed simulataneuosly with wound healing techniques such as an antiseptic spray (Microdacyn) and Ketanserin applied gel daily. At the end of the treatment the wound had recovered completely and after 5 years it has not recurred.

Conclusion: AAPE is an excellent alternative in patients where surgical treaments are unavailable and can be performed at home due to being constitutionally well suited to the promotion of dermal wound healing and secretory factors.



Oral Presentation | ISPRES APRAS award session 2

R22

Use of resected fatty tissues and SMAS tissues auto-grafting in facial rejuvenation

Jinho Lee

AB Plastic Surgery Clinic, Seoul, Korea

Background: Fat grafting is an essential method in facial rejuvenation. When performed with facelift, it could yield a synergistic effect in the aspects of natural appearance and improved skin quality by integrating with facial tissues. Combining with rejuvenation surgery, traditional fat harvest from “far-away” donor site is not mandatory for the facial volumization. During the necklift procedures, supra-plastysmal fat could be delicately resected and reserved. Lateral SMAS tissue after sub-SMAS dissection, as well, could be a useful graft source. These tissues can be finely diced and reutilized as a decent graft source for the facial volume restoration.

Objective: Aim of this study is to investigate the use of obtained fatty and SMAS tissues as autologous graft material during the facelift.

Methods: Retrospective chart review of patients for Sub-SMAS facelift and necklift in conjunction with fat grafting between 2020 and 2023 was performed. Patient assessments were obtained; group 1 (48 patients) with autografting technique and group 2 (31 patients) with conventional fat harvest and grafting.

Results: Group 1 showed similar fat retention and overall result with group 2. (Table 1) Apart from some cases with fat reabsorption, no major complications were observed in both groups.

Conclusion: The use of SMAS tissue as an autograft material has been previously reported. “Neck-to-face” auto-grafted fat was also successfully transited with high predictability and viability. Many primary cases are applicable for this technique with the exception of cachectic patient. Without donor site morbidity, auto-grafting can be another reliable option for simultaneous facial rejuvenation surgery and fat grafting.

Oral Presentation | Free paper (Research)

R25

Optimization of an adeno-associated viral vector for keratinocytes *in vivo*

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¹ Department of Plastic and Reconstructive Surgery, The University of Tokyo Hospital

² Department of Chemistry and Biotechnology, School of Engineering, The University of Tokyo

Purpose:

The adeno-associated virus vector (AAV) is a powerful gene therapy vector for *in vivo* gene transduction. We have developed a new AAV capsid, named AAVDJK2, which has higher efficiency and specificity to cultured keratinocytes than other AAVs used for keratinocytes in the previous reports. *In vivo* efficacy of AAVDJK2 was tested using mice skin.

Methods:

To test the efficacy of AAVDJK2 to AAVDJ (one of the most efficient AAV in the existing AAVs), we generated GFP-expressing AAVDJK2 and mCherry-expressing AAVDJ. Mixtures of two virus solution were prepared and injected intradermally into mice back skin. The expression of GFP and mCherry in each skin layer (epidermis, dermis, hypodermis, and panniculus carnosus) was quantified by automated and unbiased analysis.

Results:

The number of AAVDJK2-delivered, GFP-positive cells was higher than that of AAVDJ-delivered, mCherry-positive cells in the epidermis, and the opposite trend was observed in deeper layers. Thus, the higher epidermal specificity of AAVDJK2 suggested was confirmed in mouse skin *in vivo*.

Conclusions:

The AAVDJK2 capsid improves gene delivery to the epidermal keratinocytes *in vivo*. The novel AAV system may benefit experimental research and the development of new epidermis-targeted gene therapies.

Oral Presentation | Free paper (Research)

R26

Challenges to Complete Skin Regeneration; Regulation of AMPK and Rac1 Activity Promotes Wound Healing via Induction of Actin Cable Formation

Kento Takaya¹, Yuka Imbe², Qi Wang², Shigeki Sakai¹, Keisuke Okabe¹, Noriko Aramaki-Hattori¹, Kazuo Kishi¹

¹ Department of Plastic and Reconstructive Surgery, Keio University School of Medicine

² Faculty of Pharmacy, Keio University

Background: Unlike adults, early developing fetuses can completely regenerate tissue. Particularly, mice epidermal structures, including texture patterns, are regenerated until embryonic day (E) 13, leaving visible scars thereafter. Although the changes in actin dynamics are known to be involved in this transition, the detailed mechanism remains unclear.

Objective: We investigated the effects of AMP-activated protein kinase (AMPK) and Rac1, factors involved in regulating cell migration and actin dynamics using mice wound model.

Methods: (1) Regulation of Rac1 activity: PAM212 cell was treated with Rac1 inhibitor NSC23766 and the effect on migration ability was evaluated. We generated epidermis-specific Rac1 knockout mice (K14-CreERT2;Rac1^{flox/flox}) and observed the wound healing process and actin dynamics in fetuses and adults. (2) Regulation of AMPK activity: Fetuses of ICR mice were wounded and AMPK activator salicylate was administered. Wound morphology was analyzed by 3D reconstruction of the wound images, and the presence of actin cable formation and the behavior of related molecules were observed.

Results: Epidermal cell migration was inhibited by NSC23766 and salicylate administration. In epidermis-specific Rac1 knockout fetal wounds and salicylate treated wounds on E14, actin cable formation, which normally disappears, was induced and the wounds regenerated completely.

Conclusion: Actin cables are involved in complete skin regeneration, and we observed that activation of AMPK and induction of actin cable formation through Rac1 regulation induced skin regeneration and accelerated healing. This finding suggests that regulation of AMPK and Rac1 may be a candidate therapeutic approach to improve the wound healing process.

Oral Presentation | Sydney Coleman award session

R27

Gene Therapy Using Adipocytes

Yoshitaka Kubota, Kentarou Kosaka, Yoshihisa Yamaji, Shinsuke Akita, Yoshiro Maezawa, Masayuki Kuroda, Kotaro Yokote, Nobuyuki Mitsukawa

Chiba University

Introduction: Subcutaneous adipose tissue is familiar to plastic surgeons and can be harvested minimally invasively, making it a promising material for regenerative medicine. We report the world's first gene therapy using patient-derived subcutaneous adipose tissue for a patient with lecithin-cholesterol acyltransferase (LCAT) deficiency.

Case & Methods: A male in his 20s was diagnosed with LCAT deficiency after presenting with corneal opacity and low HDL cholesterol levels. Subcutaneous adipose tissue was aspirated from the patient's abdomen, treated with collagenase, and centrifuged. Floating fractions were cultured using the ceiling culture method to isolate ccdPAs. LCAT genes were introduced using a retroviral vector. The cells were cultured and, three weeks post-harvest, 1×10^9 cells were injected subcutaneously into the abdomen with fibrin glue.

Results: After 240 weeks, there were no significant adverse events, and we observed sustained beneficial effects such as increased LCAT activity, normalization of lipid profiles, and reduced proteinuria.

Discussion: The average lifespan of adipocytes is approximately ten years, allowing for long-term survival post-transplantation. For plastic surgeons, subcutaneous adipose tissue is easy to harvest with minimal invasiveness. Adipose tissue is the largest endocrine organ in the human body and inherently has high secretory capabilities, making it suitable as a vehicle for gene therapy. This study represents the first use of adipocytes in human gene therapy, with maintained effects observed over four years. Future applications may include hemophilia and diabetes. It is crucial for plastic surgeons to lead the research on adipocyte-based therapies.

Oral Presentation | Free paper (Stem cells/ Tissue engineering)

R28

Frozen Assets: A Comprehensive Review of Adipose Tissue Cryopreservation Techniques and Our Personal Experience

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² FMH Plastic, Reconstructive and Aesthetic Surgery, Lugano, Switzerland

Background: Autologous fat transplantation (AFT) is a common procedure in plastic and reconstructive surgery, with growing applications. Despite its benefits, the literature reveals a highly variable and unpredictable absorption rate of transplanted fat, posing significant limitations. Multiple sessions are often required, increasing patient discomfort and potential complications. Adipose tissue cryopreservation has recently emerged as a promising solution to these challenges, although no ideal protocol exists yet.

Objective: We aim to present our research in the field, review the current clinical applications documented in the literature, and explore exciting future prospects for using preserved lipoaspirates in repeated fat grafting procedures or as cell-based therapies for reconstructive purposes.

Methods: We conducted a systematic literature review in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We utilized specific keywords and predefined MeSH terms across various search engines. Concurrently, we present our method and compare it with the findings of the literature.

Results: A total of 24 studies have been included in the review. Dimethyl sulfoxide (DMSO) is the most commonly used cryopreservative agent. Several parameters including cell viability, cell morphology, toxicity and methods of freezing and thawing have been investigated.

Conclusion: Determining the most effective and straightforward method for adipose tissue cryopreservation is a complex and debated issue with multiple approaches available. However, promising new techniques are emerging in the literature, suggesting a bright future for this field.

Oral Presentation | Free paper (Fat for the breast 1)

R29

Nano fat grafting improves radiation skin changes in breast cancer patients

Paulo Piccolo

National Center for Plastic Surgery

Background:

Regenerative properties of fat grafting have been widely confirmed. More recently nanofat has been shown to carry the same growth factors and mesenchymal cells in a more concentrated way, confirming its valuable regenerative properties in a wide range of cases.

Objective:

This study focuses on the use of nanofat deposit in breast cancer patients to improve radiation changes.

Methods:

This is a retrospective review of the author's experience using nanofat grafting deposited via a microneedling device over radiated skin of breast cancer patients. Three patient cases were reviewed. Surgeries were performed under general anesthesia. The fat was harvested from the flanks using suction assisted lipectomy with the Tulip system and a 50cc syringe. The fat was decanted and the excess fluid/oil was removed. The remainder of the fat was emulsified using the Single-use nanofat transfer kit from Tulip (Tulip Medical Products, San Diego, USA). The nanofat was delivered directly on the affected skin using a microneedling device at 2.5mm depth, until punctate bleeding was noted. The amount of volume deposited was between 30-35cc.

Results:

The procedure was performed once in each patient. The patients were all female. The age range was 37-62 years old. All three had unilateral invasive cancer diagnosis. Two had radiation after lumpectomies (one of which had a skin-sparing mastectomy – SSM - to follow) and one had radiation following a SSM. The timing from radiation before the nano fat procedure ranged from 6 months to 3 years. Two patients had a previous abdominally based free flap 6-8 months prior and one patient had an oncoplasty reconstruction following a lumpectomy prior to the nanofat procedure. They all had one session of nanofat grafting. Follow-up ranged from 2 - 17 months. All patients experienced an improvement in the quality of the skin in the way of improved elasticity, improved hyperchromia, and increased skin softness. There were no complications.

Conclusion:

Nanofat grafting is a good adjunct procedure in improving the overall skin elasticity, softness and color following radiation for breast cancer.

Oral Presentation | Free paper (Stem cells/ Tissue engineering)

R30

THE “EMPANADA” REGENERATIVE IMPLANT FOR DIRECT TO IMPLANT BREAST RECONSTRUCTION

Andrew Salzberg

Cleveland Clinic

Background: A 5 year experience of novel tissue construction for outpatient prepectoral immediate breast reconstruction will be discussed with outcomes and complication data in more than 100 patients in the United States.

Objective: To enhance the immediate direct to implant breast reconstructive long and short term outcomes in implant based breast reconstruction

Methods: Description of the novel technique with patient cohort data and outcomes will be presented

Results: In over 100 patients and 168 breasts in prepectoral postmastectomy reconstruction the short and term evaluated results show lower than expected incidence of hematoma, infection and capsular contracture over 5 years.

Conclusion: This novel regenerative construct is applicable to immediate implant based breast reconstruction worldwide with low complication rates done as an outpatient procedure.

Oral Presentation | Sydney Coleman award session

R31

Exploring Strategies to Enhance Fat Retention Rates-A Case Study on Breast Fat Grafting

JIANBO SANG

Shanghai Beaucare Clinics

Background: Breast fat grafting is a common method of autologous fat transfer in cosmetic and reconstructive surgeries, with outcomes often limited by fat retention rates. Traditional fat processing methods (such as settling, centrifugation, and filtration) have their limitations. Addressing these issues, the adoption of improved fat processing techniques could significantly impact fat retention rates.

Research Objective: This study aims to evaluate the impact of a novel fat processing method—gauze filtration combined with rinsing and cotton pad dehydration—on the retention rate of breast fat grafts and to analyze its effects on postoperative breast size stability.

Methods: The study included 195 patients who underwent breast fat grafting from August 2017 to May 2024. All patients underwent fat preparation using gauze filtration, rinsing, and cotton pad dehydration to produce ultrapure fat, carefully selecting fat without fascia for transplantation. Patient breast circumference, under-breast circumference, and weight were measured regularly to track long-term postoperative outcomes, especially the changes in breast circumference under relatively stable weight conditions.

Results: During the postoperative follow-up period, most patients showed a minimal range of changes in breast circumference, indicating high fat retention rates and good stability of breast morphology. Additionally, among the 15 patients who underwent a second fat grafting, those treated with the repeated use of the improved fat processing method demonstrated better retention outcomes than those from the single surgery.

Conclusion: The fat processing method using gauze filtration and cotton pad dehydration significantly enhanced the retention rate of breast fat grafts and the stability of postoperative breast size. This method provides an effective technical strategy to improve the outcomes of fat grafting and warrants further research and clinical application.

Keywords: Breast fat grafting, fat retention rate, fat processing techniques, long-term follow-up, breast morphology stability

Oral Presentation | ISPRES APRAS award session 2

R32

Strategy for Treating Gummy Smile: A Simple and Powerful Resolution with Fat Grafting

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Background: A gummy smile, characterized by excessive gingival display, can significantly affect aesthetic appeal and self-confidence. Traditional treatments, including botulinum toxin injections and various surgical interventions, offer inconsistent results and have their limitations. This study investigates the use of Micro-Autologous Fat Transplantation (MAFT) as a novel and effective approach for treating gummy smiles.

Objective: To evaluate the long-term efficacy, patient satisfaction, and safety of the MAFT technique in correcting gummy smiles.

Methods: A retrospective analysis was conducted on 50 patients treated for gummy smiles using the MAFT technique. The procedure involved harvesting fat from donor sites, centrifuging it, and micro-transplanting it into the nasolabial groove, ergotrid, and upper lip areas under local anesthesia. Patients were followed up over an average of three years to assess the reduction in gingival display, patient satisfaction, and the occurrence of any complications.

Results: The MAFT technique significantly improved the appearance of gummy smiles in all patients, with an average reduction in gingival display of 3-5 mm. Enhanced volume and thickness of the upper lip and nasolabial areas contributed to the aesthetic improvement. The procedure had a high patient satisfaction rate, with over 95% of patients reporting favorable outcomes. The results were well-maintained over the three-year follow-up period, and minimal complications were observed.

Conclusion: MAFT provides a reliable, minimally invasive, and effective solution for treating gummy smiles, offering long-term results and high patient satisfaction. This technique improves aesthetic outcomes by enhancing lip volume and reducing gingival display, making it a valuable tool in aesthetic and reconstructive surgery. Future advancements in this technique are anticipated to further refine its precision and efficacy, ensuring optimal clinical outcomes.

Oral Presentation | Free paper (Stem cells/ Tissue engineering)

R34

Innovative Solutions in Scalp Wound Reconstruction: Experience with NovoSorb® BTM

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² ASST Ovest Milanese, U.O.C. Chirurgia Plastica e della Mano

Background: NovoSorb® Biodegradable Temporising Matrix (BTM) is a fully synthetic dermal matrix used for reconstructing complex wounds. Comprising a 2mm-thick biodegradable polyurethane foam covered by a non-biodegradable membrane, NovoSorb facilitates cellular infiltration and neodermis formation, making it a vital tool in wound management. Many wounds, especially those on the scalp, pose significant reconstruction challenges due to their complexity and location.

Objective: This study aims to present our personal experience with NovoSorb BTM, a recent innovation in wound care technology that is still underutilized in Italy. We focus on its application in scalp lesions, highlighting the potential benefits and effectiveness of this synthetic dermal matrix in complex wound reconstruction.

Methods: We conducted a retrospective observational study involving patients treated with NovoSorb BTM for scalp lesions. Data on patient demographics, wound etiology, treatment timeline, integration period, and complications were collected and analyzed. The primary outcome was the successful integration of BTM, followed by a full-thickness skin graft (FTSG) application. Secondary outcomes included the time to BTM integration and the rate of complications during the treatment process.

Conclusion: Our findings indicate that NovoSorb BTM is a robust and effective option for managing complex scalp wounds, even in patients with comorbid conditions. Successful BTM integration allowed for subsequent FTSG in the majority of cases, demonstrating its potential as a valuable reconstructive tool. Further research is recommended to optimize its use and to better understand the factors influencing integration and overall treatment success.

E-poster

R33

**Overcoming the three-dimensional complexity of vulvar defects:
a stepwise, multi-flap approach**

Chuan Han Ang, Bien Keem Tan, Kok Chai Tan, Chee Liam Foo

Singapore General Hospital

Background:

Complex vulvar defects are challenging owing to their three-dimensional nature and proximity to the vaginal, urethral and anal orifices.

Objective:

The purpose of this paper is to introduce the concept of a multi-flap reconstructive approach to these defects based on anatomical subunits.

Methods:

Four female patients with complex vulvar defects characterized by involvement of the vaginal wall, the anal canal and the perineum, secondary to extra-mammary paget's disease or squamous cell carcinoma resection, were studied. Defect size ranged from 108 to 157cm². The outcomes were analyzed clinically and by a 4-point questionnaire regarding micturition, defecation, coital function, introitus opening and aesthetics.

Results:

The anatomical subunits of the vulva were covered primarily by the gluteal fold flap, with additional flaps including the mons pubis rotation flap, the gracilis muscle flap, and the medial thigh VY advancement flap. The associated perianal skin and anal canal defects were covered by the buttock VY advancement flap and the gluteal fold flap. There were no flap complications. The average follow-up duration was 7 years. Patients' satisfaction with their aesthetic and functional outcomes was favorable.

Conclusion:

Gluteal fold flaps were the workhorse flaps for perineal reconstruction of defects involving the vulva and anus. Additional local flaps were employed strategically in a staged manner, with the aim of preserving native anatomical features and minimizing functional impairments.

Oral Presentation | Sydney Coleman award session

R35

Superior retention of aged fat graft by supplementing young adipose-derived stromal cells in a murine model

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Background: In general, unpredictable graft retention (26% to 83%) is a critical disadvantage, especially for aged recipients. The supplementation of adipose-derived stromal cells can improve residual volume in young recipients; however, its efficacy on aged recipients remains unclear.

Objective: This study used the aged murine model to examine the effects of supplemented aged and young adipose-derived stromal cells in graft retention.

Methods: Adipose-derived stromal cells from aged and young donors were characterized by detecting the β -galactosidase activity and p16/INK4A marker. Aged, young, and no adipose-derived stromal cell (ASC) groups (n = 6/group) received 150 μ L of green fluorescent protein fat mixed with 3×10^5 aged, young, or none DsRed adipose-derived stromal cells on the scalp, respectively. Graft volumes were evaluated using micro-computed tomography. The vessel density and fates of stromal cells and fat were tracked using immunofluorescent staining.

Results: The young ASC group showed higher cell proliferation ($p = 0.03$) and lower β -galactosidase activity than the aged ($p = 0.002$). The volume retention of grafted fat in the young ASC group was significantly higher than that in the 'no ASC' and 'aged ASC' groups ($p < 0.001$, $p = 0.002$, respectively; median: no ASC group = 41.03%, aged ASC group = 52.15%, young ASC group = 65.21%). Aged and young ASC groups showed significantly higher vascular density than that of the no ASC group ($p = 0.006$ and $p < 0.001$, respectively).

Conclusion: Regardless of the donor age of stromal cells, compared with conventional fat grafts, improved fat graft retention was observed in fat grafts enriched with adipose-derived stromal cells in aged mice. Better graft retention was achieved when supplementation was performed using young adipose-derived stromal cells. However, further validation using larger animal models is required.

Oral Presentation | Free paper (Face)

R36

Adipose-Derived Stem Cell Injections to Improve Outcomes of Facial Fat Grafting: A Retrospective Study of 100 Patients

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⁵ Emirates Plastic Surgery Society

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Background: Facial aging is a multifaceted process involving changes to the facial skeleton, soft tissue atrophy, sunken eyes, and long-standing skin alterations. Aging, being dynamic, can be modeled, and fat grafting offers a method to rejuvenate and transform tissues. Initial attempts at facial fat grafting aimed not only to restore fullness but also to enhance tissue quality, including scar improvements. Introducing stem cell injections post-fat grafting presents a potential advancement for optimal results.

Method: Since 2017, a retrospective review of 100 cases (77 females and 23 males) over four years was conducted to evaluate a novel approach combining standard fat grafting with adipose-derived stem cell (ASC) injections. Fifty patients received individualized ASC corrections following the fat grafting procedure. These corrections were administered at 1, 3, 6, and 9 months post-surgery, with the dosage tailored to the recipient site and desired effect.

Results: Follow-up durations ranged from 12 to 48 months. Satisfactory outcomes were noted in 96% of cases. Typical cases were reviewed, showcasing significant improvements in facial volume and skin quality.

Conclusion:

The present study provides the anatomical and clinical basis for the concept of compartmentally based fat grafting. It allows for the restoration of facial fat volume close to the physiologic state. ASC is the best guaranty to get the result that you need. With this procedure, a non-surgical face lift with natural and youthful facial contour could be rebuilt with a high satisfaction rate.

Keywords: Fat grafting, adipose-derived stem cells, face rejuvenation, stem cell injections, facial aging, soft tissue atrophy, facial volume restoration, non-surgical facelift, skin improvement.

Oral Presentation | Free paper (Fat for the breast 1)

R37

Transformative Role of Autologous Fat Grafting in Breast Reconstruction: A Case Report

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Purpose: To illustrate the significant impact of autologous fat grafting in breast reconstruction through a detailed case report, demonstrating how this technique can overcome complications and enhance patient outcomes in complex surgical scenarios.

Case Presentation: This report examines the case of a 53-year-old female with a history of high-grade ductal carcinoma (T3 N0 M0) in the left breast. She underwent a skin-sparing mastectomy with areola preservation and a prophylactic mastectomy of the right breast, followed by bilateral implant-based reconstruction. Post-surgery, the patient received chemotherapy and radiotherapy at Cologne University Hospital. In March 2020, she experienced bilateral implant rupture. Implant replacement in June 2020 led to complications, including infection and exposure of the left implant.

Challenges: By November 2020, the patient presented with chronic infection, fistula formation, radiodermis, nipple deformity, and multiple retracted scars. Given her history of radiotherapy and infection, she was considered a poor candidate for traditional reconstructive techniques. Additionally, she refused to undergo any free flap surgeries.

Intervention and Outcome: Autologous fat grafting was employed to address these complications. This technique improved tissue quality and volume, revitalizing irradiated tissues and enhancing aesthetic outcomes. The intervention successfully resolved chronic infections, reduced scarring, and corrected deformities. The patient's satisfaction with the aesthetic results was significantly improved, demonstrating the efficacy of fat grafting in complex cases.

Conclusion: This case highlights the transformative role of autologous fat grafting in breast reconstruction, particularly for patients with challenging surgical and oncological histories. Fat grafting not only offers a less invasive alternative but also addresses complications effectively, improving tissue health and aesthetic outcomes. This case underscores the importance of considering fat grafting in reconstructive surgery to enhance patient satisfaction and quality of life.

Keywords: Fat grafting, Breast reconstruction, Irradiated breast, Autologous reconstruction, Case report, Chronic infection, Aesthetic outcomes

This abstract demonstrates how a specific case can illustrate the broader importance of autologous fat grafting in breast reconstruction, emphasizing its benefits in resolving complications and enhancing patient outcomes.

Oral Presentation | Sydney Coleman award session

R38

Metabolic Control in Adipose-Derived Stem Cell Modulation of Dendritic Cell Maturation via Notch Activation Pathway

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Background:

Adipose-derived stem cells (ASCs) are considered as potential immunomodulators and could prolong the survival of vascularized composite allotransplantation (VCA). Matured dendritic cells (DCs) present the alloantigen to effector T cells and induce the immune rejection or inflammation. Studies showed that Notch pathway and metabolic control are crucial in modulating DC maturation and function.

Objective:

To investigate the roles of Notch and metabolic control in ASC-modulated and tolerogenic DCs, respectively, to develop strategies for improving VCA survival.

Methods:

ASCs, myeloid DCs, and CD4⁺ T cells were isolated from Lewis rats. DCs were co-cultured with ASCs to assess suppressive effects, and Notch signaling was blocked using DAPT. DC maturation markers, Notch1, Jagged1, IDO expression, PI3K/Akt/mTOR pathway, and cytokine levels were analyzed via flow cytometry, PCR, Western blotting, immunofluorescence, and ELISA. Myeloid DCs were treated with LPS, Vit.D3, dexamethasone, 2-DG, and metformin. Metabolic status was assessed using Mito stress tests on a Seahorse XFe Analyzer.

Results:

ASC-treated DCs showed high Notch1 and Jagged1 expression, reduced maturation markers, increased TGF- β , IL10 levels, and suppressed IFN- γ . Notch inhibition by DAPT reversed these effects. ASC-pretreated DCs induced Treg cell expansion, reversed by DAPT. Tolerogenic DCs and 2-DG-treated DCs had high ATP content and respiration activity. PI3K, p-AKT, and mTOR expressions were upregulated in tolerogenic DCs and 2-DG-treated DCs but suppressed in metformin-treated DCs.

Conclusion:

ASC modulation of DC maturation via Notch1 pathway and metabolic control through PI3K/Akt/mTOR signaling represent potential strategies for immune modulation to enhance VCA survival. These findings could inform future therapeutic approaches in transplantation immunology.

Oral Presentation | Free paper (Research)

R39

Possibility of using AI deep learning to assist in the diagnosis of vascular and pigmentary disorders

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[Objective] Build a diagnostic AI for bruises, age spots, etc.

[Method] Images taken at our hospital between 2013 and 2023 that were diagnosed as vascular diseases (red bruises) and pigmentary diseases (blue bruises) were extracted. Images were randomly extracted and trained using the names of diagnoses given by doctors in the past as training data.

As a model for distinguishing and recognizing bruises, (1) a cropping model for object recognition and (2) a long-distance image model for object detection were constructed, and a model for distinguishing and detecting bruise types was processed.

(1) Images were manually cropped to create images limited to the affected area, and each image was labeled, and the images and symptom name labels were combined and trained using Microsoft Azure. (2) The long-distance image model was also trained in the same way as .

[Result] We confirmed whether AI can perform image diagnosis and consider the number of treatments for vascular diseases (infantile hemangiomas).

In addition, we found that AI can classify melanin-related diseases (spots such as ectopic Mongolian spots and senile lentigo).

Oral Presentation | Free paper (Face)

R40

Synergy of facial aesthetic surgery with fat transfer maximizing facial beauty

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Background: Synergy of facial fat transfer with eyelid surgery, cheiloplasty, chin, rhinoplasty, harmoniously aligned facial symmetry and beauty. This innovative method involves own fat to enhance facial volume, long lasting effects and diminish the appearance of wrinkles, natural and enduring approach.

Objectives:

Deflation of the faces associated with aging can be restore with fat cells – lipofilling to the mallar, nasojugal and tear trough deformity reestablished attractiveness of the face.

Methods:

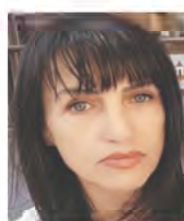
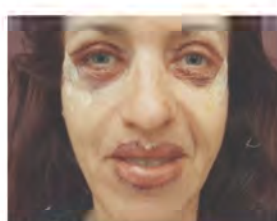
Some of classic aesthetic surgical procedure of the face: blepharoplasty, rhinoplasty, cheiloplasty, chin fullness were combined with lipofilling procedure. Key areas for facial fat transfer are: hollows under the eyes, cheeks, jawline, lips, chin, and cleavage.

Results: From May 2022-May 2024, we performed 134 aesthetic face procedure: 51(38,1%) rhinoplasty, 73(54,5%) blepharoplasty, 10(7,5%) cheiloplasty, Face-neck lipofilling: 16(11,9%) chin lipofilling, 114(85,1%) cheeks, nasolabial, under eye hollow and jawline lipofilling, 4(2,9%) cleavage lipofilling.

Overcorrection was performed with awareness that will be some volume loss over a period of time. Post –operatively, patients were followed-up, 2 weeks and 6 month. They were asked to rate their level of satisfaction using “Five-point” score (1-poor, 2-fair, 3-good, 4-very good, and 5-exellent).

Conclusion:

The benefits of combined approach are amplified results, extended longevity, natural appearance, enhanced skin texture. Facial fat transfer is highly regarded procedure in cosmetic surgery, significant benefits that contribute to its popularity and effectiveness.



Oral Presentation | Free paper (Research)

R41

AI-Driven Age Estimation for Evaluating Non-Surgical Facial Rejuvenation Techniques

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Background: Our study introduces an innovative AI model designed to estimate perceived age from facial characteristics, aiming to enhance the evaluation of non-invasive procedures.

Objective: To accurately assess the impact of non-surgical facial rejuvenation techniques on perceived age, facilitating the customization of treatments to each patient's unique facial aging profile.

Methods: Employing a deep convolutional neural network (DCNN), we initially trained the model on the extensive ImageNet dataset and further refined with 523,051 pre-annotated facial images. The Xception architecture was selected for its superior feature extraction capabilities. This model was further refined and tested on a set of 10,000 patient faces from the Mayo Clinic's database. Regression analysis and softmax probability were utilized for precise age estimation (Agbo-Ajala et al., 2022).

Results: The AI model demonstrated a high accuracy rate of 91.8% in estimating the perceived age of patients prior to non-surgical treatments, with a standard deviation of 4.3 years. Post-treatment, the AI model identified an average perceived age reduction of 6.8 years across all patients, with significant variation among different non-surgical techniques. Treatments such as dermal fillers and Botox showed the most pronounced age-reduction effects. Heat maps were utilized to identify specific facial regions that contributed most to the AI's age predictions, showing a strong correlation between these regions and the areas targeted by non-surgical treatments.

Conclusion: By leveraging advanced AI technology to refine aesthetic treatment evaluation, this study underscores the potential for personalized non-surgical interventions, contributing to the advancement of patient-specific rejuvenation strategies in the field of aesthetic medicine

References

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<https://pubmed.ncbi.nlm.nih.gov/36387012/>.



Oral Presentation | Free paper (Face)

R44

Facial liposuction and contouring with CT scan

HANJEONG LEE

ATOP Plastic Surgery Clinic

Background: Recently, there is an increasing number of procedures that facial contouring surgery to improve shape of the face. It is difficult to apply a bone surgery for the contour of the face line because return to daily life is delayed by long lasting swelling and hematoma. Therefore, I think that the satisfaction of the result can be improved by considering minimal invasive facial liposuction and fat graft with aspirated fat in same operation field. In addition, checking the thickness of soft tissue using CT scan is helpful in producing good results.

Methods: To create a V-shaped facial line, the front and side effects are important. In front view, to reduce the facial width, the volume of the subcutaneous fat layer and buccal fat must be reduced, and the volume of the masseter muscle in the mandibular angle area must be reduced. In side view, the volume of the submental area called the double chin must be reduced and the subcutaneous fat layer below the mandible borderline must be reduced to sharpen the jaw line and make the face look smaller.

Results: The facial width was reduced by suctioning of fat from the cheek area and reducing the masseter volume through Botulinum toxin, and the neck line was improved by suctioning of fat from the submental area.

Conclusion: Facial liposuction helps with facial contouring. In addition, by performing a CT scan before surgery, the results and satisfaction can be improved by accurately identifying the area to be suctioned.

Oral Presentation | Free paper (Fat for reconstruction/ regeneration 1)

R45

Cryopreservation of Adipose tissue: Changing the paradigm of regenerative medicine

Olivier Amar, Ahsan Khan

Uvence and private practice

Adipose tissue cryopreservation has gained interest since the discovery of mesenchymal stem cells in 2001. In 2013, a new method for processing and injecting adipose tissue was introduced by Alexis Verpaele & co, involving emulsification and filtration to obtain Nanofat, a regenerative cell-rich fluid product compatible with small needles for injection.

Through a fruitful collaboration with the Uvence team, we have developed a process to harvest, purify, and cryopreserve adipose tissue from patients. This has resulted in a remarkably high recovery rate of viable nucleated cells per cc of emulsified fat, containing a majority of regenerative cells and a high viability.

Our team has meticulously validated a cutting-edge cryopreservation and thawing method for adipose tissue. After rigorous testing of various cryoprotective agents, the most suitable one is carefully selected for the cooling process. Different storage temperatures are compared, and the thawing method is thoroughly validated to safely remove any potentially toxic cryoprotective agents.

We have leveraged cryopreservation of adipose tissue to make regenerative medicine accessible to all doctors. Studies on our cryopreservation process indicate that the adipose tissue's volume recovery post-thawing was an impressive 99.8%, and post-emulsification was 91.8%. The recovery of regenerative cells was 91.8%, with cell viability of 85%, and these will be presented at the congress.

Oral Presentation | ISPRES APRAS award session 2

R46

Extensive scar reconstruction with fat grafting and microcoring technology.

Ki tae Kim

TAE plastic surgery clinic

Reconstructing large scars from various causes takes a lot of work. Different methods have been tried, including subcision, rigotomy, and other methods for large depressed scars. To repair depressed scars, sophisticated fat grafting is an essential surgical procedure and can give good results. I want to introduce you to a new technique called microcoring, which can be used with traditional surgical methods to achieve good results with a quick recovery period.

Unlike many lasers and energy-based devices, microcoring devices can mechanically remove scar tissue without thermal energy. Unlike other methods of scar treatment, microcoring technology can mechanically remove hard scar tissue to achieve much faster scar improvement and soften the subcutaneous tissues mechanically held in place by the scar tissue. This process can be used as an alternative or complement to conventional ablative procedures. This vertical removal process, in combination with the usual horizontal subcision process, can result in a much smoother scar. Therefore, it can facilitate simultaneous fat grafting and increase the fat survival rate. It is expected that the scar removal procedure using these microcores and the simultaneous fat grafting procedure will be able to treat large depressed scars effectively.

Oral Presentation | Free paper (Body contouring)

R47

Autologous Fat Transfer with PRP for Penile Augmentation: A Safe and Effective Procedure Performed Under Local Anesthesia

Timothy Neavin

Beverly Hills

Background: Historically, there have not been many safe, effective, and predictable methods to enlarge the penis. Fat transfer to the penis with platelet rich plasma has been performed by this author under local anesthesia in over 40 men since 2016. The technique, after care, and complications are addressed.

Objective: The goal of this presentation is to describe the technique of fat transfer with PRP, identify suitable candidates, how to deal with patient expectations, and how to address potential complications.

Methods: The last 40 patients have been evaluated for subjective, photo documented for penile size increases, and complications related to the surgery, as well as aesthetic changes.

Results: Over 90 percent of men (92.5%) were satisfied with respect to their size increase. The revision rate was 27.5 percent, there were 2 infections, and 4 cases of visible nodularity that required intervention.

Conclusion: Fat transfer to the penis is a safe, effective, and predictable method to enlarge the penis. However, post operative care can be time consuming in patients when complications arise.

Oral Presentation | Free paper (Fat for the breast 1)

R48

Exploration of Injection Levels for Autologous Fat Transplantation Breast Augmentation Surgery

Chengsheng Liu

Beijing JingmeiMedical Beauty Clinic, China

Background: To ensure the effectiveness of over 5000 cases of autologous fat grafting breast augmentation, a very important factor is the detailed control of fat particles at the injection level in the breast.

Objective: To achieve better results and fewer complications in autologous fat grafting breast augmentation surgery.

Method: Precise injection and filling of fat particles in the subcutaneous layer, superficial fascia layer, deep superficial fascia layer, muscle layer, and lower muscle layer of the breast, in order to maximize the survival of injected and , transplanted fat particles, prevent the accumulation of fat particles, avoid fat necrosis, and reduce the occurrence of complications such as fat lumps.

Results: Nearly 4800 cases showed good results, with no visible or palpable nodules or masses, and a small number of cases had nodules with an average diameter of less than 5 mm visible on ultrasound.

Conclusion: Accurate and detailed control of autologous fat injection at the breast injection level is a key factor for the success of fat transplantation breast augmentation.

Oral Presentation | Free paper (Aesthetic surgical procedures)

A03

How to treat the ipsilateral sunken chest in augmentation mammoplasty

Jinho Lee

AB Plastic Surgery Clinic, Seoul, Korea

Background: Breast asymmetry is a common concern for many women and augmentation mammoplasty is a useful option. One important thing in fixing uneven breast is the consideration of underlying chest wall contour. Anterior thoracic hypoplasia (ATH) refers to ipsilateral sunken chest with breast hypoplasia and subsequent asymmetry. Since there is no pectoralis muscle involvement, it is speculated as a separate entity from Poland syndrome by Spear. It is also different from pectus excavatum in its chest wall shape. ATH is not a rare condition and various degree of ATH patients undergo augmentation mammoplasty.

Objective: The purpose of this presentation is to share clinical experiences and set-up some guidelines.

Methods: A retrospective chart review of patients between 2020 and 2024 was performed.

Results: Twelve patients underwent augmentation mammoplasty with correction of breast asymmetry, which condition assessed as ATH. In all cases, ATH occurred in the right side of the chest. Dual-plane breast augmentation technique using smooth round implant was performed in all cases. One patient developed postoperative implant malposition and had revisional mammoplasty with implant exchange, capsulotomy and capsulorrhaphy. The remaining 11 patients had favorable outcomes with smooth recovery.

Conclusion: Considering my unfavorable case, the author recommend to practice as follows: 1) to analyze the chest CT preoperatively 2) to consider microtexture implant rather than pure smooth implant 3) Extremely conservative medial dissection of Rt. Breast with at least 2.5cm safety margin from the midline 4) postoperative surgical bra up to 6 months 5) to consider wider diameter implant on Rt. Breast for lateral breast balancing.

Oral Presentation | TAAT APRAS award session 2

A04

**Challenges in primary rhinoplasty with autologous dorsal grafts:
Comparison of homogenous grafts and hybrid autologous grafts**

Jinho Lee

AB Plastic Surgery Clinic, Seoul, Korea

Background: Dorsal augmentation is important in Asian rhinoplasty. Apart from secondary cases, silicone implant is most preferred option in Asian rhinoplasty. It is generally regarded as superior to dorsal autologous grafts in aspects of aesthetic results such as longevity of dorsal height and lateral profile. Convenience in shaping and high predictability are definite advantages.

However, in certain indications, autologous materials are literally enough to make balanced and aesthetically-pleasing nose. Patient perspective has changed that increasing numbers are seeking for autologous costal cartilage in primary cases recently. Via the incision for costal cartilage, soft tissues including fascia, dermis, fat, perichondrium can be harvested and used simultaneously. With more autologous graft sources, hybrid dorsal augmentation is globally tried these days.

Objective: Gains in safety and psychologic well-being after using solely autologous grafts are obvious. This study aimed to access the effect of heterogeneity in autologous dorsal grafts, focusing on minimizing the drawbacks.

Methods: Retrospective chart review of patients underwent primary rhinoplasty with autologous tissues between Jun 2019 and Apr 2024 was performed. Overall outcomes including revision rates were analyzed.

Results: 298 patients presenting to a single surgeon were analyzed. (Table 1) With homogenous autologous grafts, 25 out of 178 patients underwent revision. (14.0%) With hybrid autologous grafts, 11 out of 120 patients underwent revision. (9.2%), showing lower than the former.

Conclusion: Surgical indication is a crucial step and it's necessary to align the expectations of patients with doctor's preoperatively. Recruiting proper graft sources are required for the aesthetic balance between hard and soft tissue and minimizing complications.

Oral Presentation | TAAT Best paper session

A06

Plasma Radiofrequency-assisted Microliposuction for the Treatment of Facial Overfilled Syndrome Induced by Various Causes in Asians

MING NI

Jiangshu SIRRIM Plastic Surgery and Beauty Hospital

Background: In Asia, facial overfilled syndrome (FOS) can arise from iatrogenic causes involving excessive use of filling materials , as well as physiological causes such as fat hypertrophy, cavity type, and aging.

Objective: This study aimed to demonstrate the safety and effectiveness of Plasma Radiofrequency-assisted Microliposuction (PRFAML) in improving the appearance of FOS induced by various causes.

Methods: PRFAML was performed on 84 anatomic regions of 37 female patients (including 12 with physiological causes, 6 with HA causes, and 19 with fat causes) , aged between 20 to 50 years (mean 35.9 years), who had FOS. Demographic and surgical data were collected retrospectively. Preoperative and postoperative photographs were taken, and satisfaction interviews were conducted at least six months after surgery.

Results: All patients underwent the operation successfully under local or intravenous anesthesia. Only four anatomic regions showed noticeable asymmetry post-surgery requiring a secondary operation. Postoperative skin numbness, muscle paralysis, bruising, and minor contouring irregularities significantly improved within two to three weeks of recovery. Additionally, five patients with longer edema periods demonstrated substantial improvement after more than five weeks. No cases of skin necrosis ,thermal injury or other serious complications related to the study device or procedure were reported. Ultimately, all patients expressed satisfaction with their outcomes.

Conclusion: The PRFAML technique is a safe and effective method for treating FOS induced by various causes while minimizing complications and ensuring high patient satisfaction.

Oral Presentation | Free paper (Aesthetic surgical procedures)

A07

Abdominoplasty in the Low BMI Asian Patients

XIN CUI

Xi'an International Medical Center Hospital

Background: Patients with low body mass index (BMI) are always accompanied with thin abdominal subcutaneous fat and flat or protrude umbilical stem.

Objective: The purpose of this study is twofold: Expanding the dissection range of the skin flap to enhance its plasticity and mobility, meanwhile creating a new umbilicoplasty to get a deep esthetically shaped navel.

Methods: 168 patients ($16.66\text{kg/m}^2 \leq \text{BMI} \leq 20\text{kg/m}^2$) were performed abdominoplasty.

Liposuction is performed, especially on bilateral waist and the upper lateral region of the buttocks. The level of flap dissection extends to the external borders of the bilateral rectus abdominis muscles. "8" approach and corium fat junction suture (CFJ) was performed in umbilicoplasty after repairing the diastasis recti. Finally, modified fully buried progressive tension reduction suture was performed on the wound.

Results: The average excised skin size of 168 patients was $30.88 \pm 7.82\text{cm} \times 27.59 \pm 6.39\text{cm}$.

Complications occurred in 19 patients: One case of local skin flap infection, two umbilical skin necrosis, three cases of wound healing problem, six cases of unilateral or bilateral dog ear formation, three hypertrophic scars, four cases of small seroma and one case of subcutaneous hematoma. There were no severe complications, such as deep-vein thrombosis, fat embolism, skin flap necrosis, large hematoma or seroma.

Conclusion: Abdominoplasty based on personal improvements is more suitable for low BMI Asian patients which can retain intense abdomen, smooth waist-hip curveline and deep vertical navel with fewer complications.

Oral Presentation | Free paper (Aesthetic surgical procedures)

A08

Exploration of Visual Sculpture-Abdominal Sculpture of Chinese People

CHAO XIE

Hunan Prevention and Treatment Institute for Occupational Diseases

Background: More and more abdominal liposculpture surgeries are being performed in China, and conventional liposculpture methods under blind vision for shaping the abdominal muscles may lead to unevenness, stiff abdominal muscles lines that do not conform to the contour of the human body's own muscles, excessive bleeding, and serum swelling, resulting in many secondary repairs operation. In order to avoid or exercise the above-mentioned problems, ultrasound guided visual liposculpture technology can be used to shape Chinese abdominal muscles.

Objective: To propose the concept of visualized liposculpture and explore the effect of applying ultrasound guided technology to shape the abdominal muscles.

Methods: Preoperative ultrasound measurement of abdominal fat thickness, marking of muscle boundaries in the abdominal liposuction area, ultrasound guided visualization of injection of swelling fluid, ultrasound assisted emulsification of fat, and dynamic assisted liposuction, clearly demonstrating the anatomical shape of the abdominal muscles.

Results: Ultrasound-guided visualization technique was used to perform abdominal liposculpture on 124 patients, and postoperative exposure of the abdominal muscle was satisfactory. No serious complications such as burns, skin necrosis occurred. And under ultrasound guidance, two postoperative complication of seroma was treated.

Conclusion: The application of ultrasound guided visual liposculpture is safer, more accurate, and has a higher satisfaction rate compared to traditional blind liposculpture applied to the shaping of abdominal muscles in Chinese.

Oral Presentation | Free paper (Aesthetic surgical procedures)

A09

Safe and Effective Injection for Treating Pouches

YANLING WEN

Dr.Cui Boshi Li Medical Aesthetic Clinic, Yinchuan

Background: The current treatment for eye bags is mainly surgical, with bruising, swelling and a recovery period. With the change in modern lifestyles, candidates prefer minimally or non-invasive treatment, and being able to wash their face and put on make-up in 6 hours is what candidates are looking for. In the past, it was widely believed that pouches under the eyes formed due to herniation of orbital fat and surgery was the treatment of choice. After literature tracing and cadaveric dissection, it was found that there is almost no ligamentous laxity in the deeper parts. The superficial dermal ligaments show significant laxity and sagging due to factors such as compression of facial expression and age, and the ligamentous laxity in the deeper parts originates from loss of bony structural volume. The simultaneous modification of tiny anatomical subunits and tightening of the skin through injections can be effective in treating under-eye bags as well as depressions and unevenness in the infraorbital region.

Objective: Exploring the clinical application of injections in the treatment of pouches.

Methods: All patients were treated with injections to address the bags under the eyes.

Results: The combined injection method of hyaluronic acid and nutrient solution was used to treat pouches in 1000 patients, with no complications except for severe local redness and swelling in two cases.

Conclusion: The injection method of treating pouches is a safe and ideal method of rejuvenating the infraorbital region.

A10

Treatment Strategies for Post-Facial Fat Grafting Deformities

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Background: Facial fat grafting solves issues like facial depressions and aging, but it can also introduce new complications such as various post-procedure deformities.

Objective: This study explores different treatment strategies for these post-facial fat grafting deformities.

Methods: Post-facial fat grafting deformities can be broadly categorized into four types: 1. Overfilled facial regions; 2. Irregularities and unevenness post-filling; 3. Increased sagging and slackness post-filling; 4. Deformities in specific areas post-filling. Treatment strategies are tailored to each deformity: 1. Overfilling is generally corrected by liposuction; 2. Unevenness is improved through liposuction and localized fat transplantation; 3. Sagging and slackness are addressed with a combination of suction and radiofrequency, or suction coupled with thread lifting; 4. Specific areas like the tear trough or chin overfilled are managed with suction combined with fiber laser lipolysis.

Results: Follow-ups from 3 to 12 months post-surgery showed that patients experiencing deformities post-filling observed varying degrees of improvement in facial contours through the aforementioned treatments, with high satisfaction rates regarding the outcomes.

Conclusion: Different surgical strategies tailored to specific post-facial fat grafting deformities can effectively improve outcomes.

A12

The Application of Light-Shadow Aesthetics in Cosmetic Injections

YINAN ZHOU

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Background: There are some limitations in the traditional methods of facial assessment when it comes to cosmetic injections. Therefore, light-shadow detection is an useful complement for facial aesthetic problems that cannot be found by traditional examination methods. Moreover, light-shadow aesthetics is a tool to simulate the aesthetic expression of patients under various light sources in their daily work and life. Through the evaluation of light and shadow in the process of face consultation, a better communication and consensus can be achieved with doctors and patients. The level of satisfaction was considerably high in either postoperatively or long-term follow-up in patients concern.

Objective: To explore the application of light-shadow aesthetics in cosmetic injections, especially in Asian facial rejuvenation and facial contour remodeling.

Methods: Multiple light sources were used to detect the facial defects of patients, which later were adjusted by cosmetic injections. After adjustment, the results were scored by GAIS scale.

Results: The application of light-shadow aesthetics in the cosmetic injection operation can comprehensively improve the satisfaction of all patients after operation, and no obvious complication was discovered.

Conclusion: The application of light-shadow aesthetics is an efficient method in cosmetic injections.

Keywords: light-shadow, injection, facial rejuvenation.

Oral Presentation | Free paper (Non-surgery)

A13

Application of Collagen Combined with Botulinum Toxin in the Treatment of Periorbital Aging

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Background: Periorbital aging in the face is a common problem in older women. Procedures using collagen or botulinum toxin has some benefits in the treatment of periorbital aging.

However, there are few reports on the combination of the two treatments.

Objective: To investigate the efficacy, safety and tolerability of the combination of collagen and botulinum toxin in the treatment of periorbital aging.

Methods: 21 patients with periorbital aging and relaxation were treated with collagen injection and botulinum toxin type A injection in a single-center, self-controlled before and after study method. The efficacy and safety of collagen combined with botulinum toxin in the treatment of periorbital aging were compared based on the Grading assessment of periorbital aging and detection results of VISIA.

Results: All patients were followed up for 1 month, 3 months and 6 months, the effect of filling and slightly lifting was achieved immediately after injection, and the effect of tightening and lifting was obviously achieved after 1 month, the effect maintained after 3 months, the effect weakened after 6 months.

Conclusion: The combination of collagen injection and botulinum toxin A injection is effective in treating the patients with periorbital aging and relaxation, without obvious swelling and bruising, which is worth popularizing.

Oral Presentation | TAAT APRAS award session 2

A14

Efficacy of early intervention using pulsed dye laser (PDL) for traumatic or postoperative scars improvement in Asian patients

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Background: Post-injury or -treatment is usually sought for symptom relief and alleviating cosmetic concerns. A pulsed dye laser (PDL, 585–595 nm) is commonly applied to such treatments alone or combined with ablative fractional CO₂ laser. However, laser initiation has no consensus.

Objective: This study was to evaluate the efficacy of early intervention using PDL for traumatic or postoperative scars improvement.

Methods: This retrospective study enrolled 70 patients in Asia with traumatic or post-operative scars who had received PDL treatment only or combination with an ablative fractional laser. The Vancouver scar scale (VSS) and the Manchester scar scale (MSS) were used before and after laser treatment with photo evaluation by two independent dermatologists. The patient and observer scar assessment scale and customer satisfaction index were collected.

Results: Among the 70 patients, 43 were successfully treated for at least 3 sessions with good outcomes. The correlation coefficients between week-to-treatment initiation and post-treatment MSS and VSS were 0.50 ($p < 0.001$) and 0.46 ($p = 0.002$), respectively. Using ≤ 10 weeks as the definition of early treatment, 22 and 21 patients were included in the early and late treatment groups, respectively. The early treatment group showed borderline significantly lower post-treatment MSS and VSS scores than the late treatment group (MSS: 7.5 ± 2.1 vs. 9.3 ± 2.5 , $p=0.011$; VSS: 2.8 ± 2.0 vs. 4.5 ± 2.3 , $p=0.011$). Furthermore, the early treatment group showed significantly greater improvement in both MSS and VSS post treatment (4.4 ± 1.6 vs. 3.2 ± 1.9 ; $p = 0.03$, and 3.8 ± 1.8 vs. 2.8 ± 1.4 ; $p=0.04$).

Conclusion: Early intervention using a PDL within 10 weeks of the injury achieved better outcomes in treating traumatic and postoperative scars based on both clinical and patient opinions.

A15

Factors Influencing Early Postoperative Swelling After Ptosis Surgery

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Background: Postoperative eyelid swelling is a primary concern for patients after ptosis surgery, significantly affecting their quality of life.

Objective: To identify the main factors influencing early postoperative swelling in patients undergoing bilateral ptosis surgery.

Methods: The study included 105 patients who underwent bilateral ptosis surgery between April 2020 and December 2022. Eyelid photos before surgery and on day 7 post-operation were analyzed by two non-operating plastic surgeons to evaluate swelling. Factors such as age, gender, underlying diseases, surgery duration, amount of skin removed, anterior displacement, intraoperative blood pressure, and antithrombotic medication intake were examined.

Results: The sample comprised 30 males and 75 females, with an average age of 72.9 years. Significant swelling was mainly influenced by extensive skin removal, followed by factors like diabetes and aging. Although antithrombotic medication was identified as a risk factor, its impact was not substantial. Factors like the amount of anterior displacement of the tendon and changes in marginal reflex distance (MRD) were not found to affect swelling.

Conclusion: Postoperative swelling is primarily exacerbated by increased vascular permeability due to inflammation, enhanced local blood flow, and microvascular damage, particularly in patients with extensive skin removal or underlying conditions like diabetes and arteriosclerosis. Cooling and compression were not effective in preventing swelling. Guidelines suggest continuing antithrombotic medication during superficial surgeries without needing to stop due to swelling risk. The relationship between the control of underlying diseases, postoperative management, and the extent of swelling requires further investigation.

Oral Presentation | TAAT Best paper session

A17

High Double Eyelid Fold Correction Composite Using Fat Strip Transplantation and Pretarsal Orbicularis Oculi Flap

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Background: As the growing amount of unnatural-appearing upper eyelid after blepharoplasty, it's necessary to find suitable methods for secondary revision.

Objective: This study aimed to evaluate aesthetic outcomes of surgical correction of the high fold using a pretarsal orbicularis oculi flap with fat strip transplantation.

Methods: From January 2018 to September 2023, 50 patients with high and deep double eyelid folds underwent our fold-lowering procedure. All of these patients underwent surgical correction of high folds composite using fat strip transplantation and pretarsal orbicularis oculi flap, with postoperative follow-up ranging from 6 months to 2 years. All the Postoperative outcomes were recorded and reviewed.

Results: Using the composite technique, unnatural, high, and deep double eyelid folds were converted to lower and relative natural folds. Although prior high fold incision scars could be seen postoperatively on close examination, they were not easily visible. Complications included fold height asymmetry in 5 cases, persistence of the prior fold in 6 cases, and redundant upper flap skin that needed further excision in 3 cases.

Conclusion: Secondary blepharoplasty revision to correct the high fold is a challenging procedure for plastic surgeons. Using fat strip transplantation and pretarsal orbicularis oculi flap for correction of the high fold is relatively safe and effective. This provides a new treatment option in secondary revision techniques.

E-poster

A18

Global Interest in Glucagon-like Peptide-1 Agonists for Weight Loss and its Impact on Aesthetic Surgery

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Background: Glucagon-like peptide-1 (GLP-1) agonists Ozempic (Novo Nordisk, Bagsværd, Denmark), Wegovy (Novo Nordisk), and Mounjaro (Eli Lilly and Company, Indianapolis IN) have become popularized for weight loss in recent years.

Objective: The aim of this study is to assess with Google Trends (Alphabet Inc., Mountain View, CA) the popularity of these weight loss medications worldwide and its impact on public interest in related cosmetic weight loss procedures.

Methods: “Ozempic”, “Wegovy” and “Mounjaro”, along with terms for related aesthetic interventions such as “ozempic face”, “body lift” and “skin tightening” were analyzed with Google Trends across North America, South America, Europe, Asia and Africa, as represented by the most populated countries of each. Changes in relative search volume (RSV) over a 5-year period between the different medications and interventions were analyzed, across the different regions.

Results: There was a statistically significant RSV over time for GLP-1 searches worldwide, with R^2 0.902 and regression coefficient 0.938 ($p < 0.001$). This held true across all geographical locations. Ozempic was significantly more searched than Wegovy and Mounjaro ($p < 0.001$). In regards to weight loss related aesthetic or cosmetic procedures, there was not a statistically significant trend noticed in any across any of the geographic locations, apart from “ozempic face” with R^2 0.897 and regression coefficient 0.922 ($p < 0.001$).

Conclusion: The impact of ozempic is a global phenomenon, and plastic surgeons worldwide need to be prepared to address the subsequent effects. Although searches in weight loss related aesthetic interventions have not yet translated, there may be a time delay effect.

Oral Presentation | Free paper (Aesthetic surgical procedures)

A19

The Experience of Nasal Injection Therapy in 1981 Patients with Combination Materials about HA,PCL,CaHA and Thread

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Background: Nasal aesthetics always is the commonest facial changes, and nasal plastic surgery is a way to solve the any problems.

Objective: However, due to the progress of biotechnology materials, many materials can be applied, such as HA, PCL, CaHA, collagen, thread, etc.

Methods: Among the combined formulas are HA, PCL, HA + PCL, HA + CaHA, HA + CaHA + thread, HA + PCL + thread. The results and complications are reported about the stratified injection of the combined application materials and the improved injection methods were shared.

Results: Summary of the injection experience of 1981 patients in 2022 to 2023. The common secondary injection problems will be reported and recommended injection methods.

Conclusion: Studies have proved that the combined therapy has less trauma and fewer complications, which is worthy of further clinical promotion and application.

Oral Presentation | TAAT Best paper session

A21

Improvement of visual acuity impairment in Poly-D,L-lactic acid injections by hyperbaric oxygen therapy

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Background:

Poly-D,L-lactic acid (PDLLA) is a highly regarded dermal filler known for its biocompatibility, biodegradability, and enduring effects. Severe complications after PDLLA injections are rare.

Objective:

A healthy 38-year-old woman received PDLLA injection in the forehead experienced sudden right eye blurred vision and ptosis. Fluorescein angiography (FAG)/ indocyanine green angiography (ICGA), Optical Coherence Tomography (OCT) confirmed choroid ischemia and disc edema. Contrast brain MRI indicated ocular artery occlusion. MR angiography confirmed the diagnosis of posterior ciliary artery occlusion.

Methods:

Intraocular pressure lowering agents, aspirin, and a 14-session regimen of hyperbaric oxygen therapy (HBOT) was initiated within 24 hours.

A review of cases within 10 years involving visual impairment after facial filler injections treated with HBOT was done. Initial symptoms, injection site, initial visual acuity, treatments, best corrected visual acuity were compared.

Results:

At the two-month follow-up, the patient's ptosis and visual acuity improved from Snellen VA 0.03 to 0.9.

Among reviewed cases, treatments included intraocular pressure-lowering agents, globe massage, antithrombotic alongside HBOT. Only three cases showed improvement, with the best one achieving baseline vision after nine 90-minute daily HBOT sessions.

Conclusion:

Our case emphasized the possible severe adverse effect of PDLLA injection, highlights variable effectiveness of HBOT, and underscores its potential in restoring visual acuity post-PDLLA injection, offering important insights into managing such complications.

Oral Presentation | Free paper (Non-surgery)

A22

Efficacy of 730nm Picosecond Laser on Acquired Dermal Melanocytosis in Asian Women

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Background: Acquired dermal melanocytosis (ADM) is a pigmented lesion that occurs frequently in young to middle-aged women. It has been treated with Q-switch ruby laser and 1064 nm picosecond laser, but it is refractory and there is no certain consensus on treatment. We have introduced treatment with the more melanin-selective 730 nm wavelength.

Objective: To compare the efficacy of 730 nm and 1064 nm picosecond lasers.

Methods: Patients treated with picosecond laser (PicoWay, Cineron Candela) for ADM from April 2021 to May 2024 were studied: 730 nm (3 mm spot, 1.7-1.8 J/cm² or 2 mm spot, 2.5-3.25 J/cm²) and 1064 nm (3 mm spot, 3.1-4.0 J/cm²) picosecond laser spot irradiation. Two months after each treatment, patients were evaluated on a 4-point scale using a medical interview, gross findings, and skin analysis software (VISIA, Canfield Scientific). The results of the univariate and multivariate analysis of the factors involved in ADM treatment outcome were analyzed.

Results: 83 patients in the 730 nm group and 78 in the 1064 nm group were treated; after treatments, subjective symptoms, gross findings, and improvement on software analysis were all significantly higher in the 730 nm group, with no difference in the occurrence of pigmentation. The presence or absence of melasma was a factor related to treatment outcome.

Conclusion: The use of the 730 nm picosecond laser, which is highly melanin-selective and reaches relatively deep into the skin, suggests the possibility of effective treatment without increased complications compared to the conventional treatment.

Oral Presentation | Free paper (Non-surgery)

A23

A Cutting-Edge Strategy for Prevention the Severe Complications in Filler Injection and Fat Grafting

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Background: The use of fillers and fat grafting has become increasingly popular in aesthetic and reconstructive surgery. However, these procedures carry risks of severe complications, including intra-vascular injection-induced skin necrosis, blindness, and cerebral vascular accidents. Advanced techniques, such as Micro-Autologous Fat Transplantation (MAFT), have been developed to enhance safety and outcomes.

Objective: To evaluate the effectiveness of MAFT and other advanced strategies in preventing severe complications associated with filler injection and fat grafting.

Methods: A comprehensive review of over 6000 cases using the MAFT technique for fat grafting was conducted. The techniques involved precise control of fat injection, systematic patient evaluation, and meticulous surgical planning. Follow-up evaluations were performed over an average period of three years to assess outcomes and identify any complications.

Results: The implementation of MAFT significantly reduced the incidence of severe complications, such as intra-vascular injection-induced skin necrosis, blindness, and cerebral vascular accidents. The precise control over fat parcel size and injection depth minimized the risk of unintended vascular injections, thereby preventing these catastrophic events. In the extensive series of over 6000 cases, there were no reports of these severe complications, underscoring the safety and efficacy of the technique. Patient satisfaction was high, with maintained results observed over the three-year follow-up period.

Conclusion: The MAFT technique, along with rigorous preoperative and intraoperative strategies, provides a robust approach to minimizing severe complications in filler injection and fat grafting. These advanced methods enhance patient safety, improve aesthetic outcomes, and offer a reliable solution for both aesthetic and reconstructive purposes. The absence of severe complications in over 6000 cases further highlights the safety of this technique. Future advancements in these techniques are anticipated to further refine safety protocols and clinical results.

Oral Presentation | TAAT Best paper session

A24

The Rejuvenating Effect of Fat Grafting: Fiction or Fact

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Background: Fat grafting has become a prominent technique in aesthetic and reconstructive surgery, particularly for its purported rejuvenating effects. This study aims to evaluate whether these claims hold up under scientific scrutiny by examining the biological mechanisms and clinical outcomes associated with fat grafting.

Objective: To investigate the efficacy of fat grafting in achieving rejuvenation, focusing on the biological basis and clinical evidence supporting its use in aesthetic medicine.

Methods: A review of clinical cases and scientific literature was conducted to assess the outcomes of fat grafting procedures. Emphasis was placed on the role of adipose-derived stem cells (ADSCs) and the stromal vascular fractions (SVFs) in tissue regeneration and rejuvenation. Data from over 6000+ cases of fat grafting procedures were analyzed, with follow-up periods extending up to ten more years.

Results: Fat grafting demonstrated significant rejuvenating effects, including improved skin texture, increased volume with sustainability, and enhanced tissue quality. The regenerative properties of adipose-derived stem cells (ADSCs) and the stromal vascular fractions (SVFs) were confirmed through histological analyses, showing increased collagen production and neovascularization. Patients reported high satisfaction rates, and long-term follow-ups indicated sustained improvements without major complications.

Conclusion: The rejuvenating effect of fat grafting is supported by both clinical outcomes and biological evidence. The integration of ADSCs and SVFs plays a crucial role in the observed benefits, making fat grafting a reliable method for aesthetic rejuvenation. Future research should focus on optimizing techniques to further enhance these effects and explore new applications in regenerative medicine.

Oral Presentation | TAAT APRAS award session 2

A27

Hair Regeneration Using Stem Cell-Conditioned Medium

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Background: Various treatments for hair thinning, such as papule methods, dermarollers, mesotherapy, and mesoguns, have been developed. However, these methods often cause pain and have inconsistent results. This study investigates a new hair treatment method using a needle-free injector to administer stem cell-conditioned medium.

Methods: We measured the hair diameter, hair density, and patient satisfaction of those treated at our clinic. Additionally, we analyzed changes in hair volume and growth patterns according to gender and age.

****Results:**** The needle-free injector treatment caused minimal pain and resulted in high patient satisfaction. It was found to be highly effective for androgenetic alopecia and also beneficial for female pattern hair loss. Typically, treatment for female pattern hair loss requires several months due to the hair follicle cycle and hair growth rate. However, the stem cell-conditioned medium significantly accelerated the growth phase of hair, resulting in early treatment effects.

Conclusion: The hair treatment using a needle-free injector is minimally invasive, can be easily standardized for nurse administration, and is convenient, making it suitable even for patients with needle phobia. Stem cell-derived growth factors are known to possess equal or superior tissue regenerative abilities compared to stem cell transplantation. This study suggests that the induced growth of hair in the anagen phase, increased proliferation of dermal papilla cells and keratinocytes, and enhanced hair follicle growth contributed to the positive outcomes. Hair treatment using stem cell-conditioned medium is considered to lead to increased hair growth, providing significant improvement for patients with frontal hair thinning and moderate to severe vertex alopecia.

Oral Presentation | Free paper (Aesthetic surgical procedures)

A28

Optimizing scarless double chin treatment: Systematic plan through combining surgical, energy based, and manual techniques

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Background: The importance of a tightened sculptured neck and submental region is highlighted nowadays in the trending selfie photos. Surgical liposuction of submental fat may address one component of the double chin problem, other components like loose skin and sluggish lymphatic circulation need attention.

Objective: Evaluating the impact of applying manual lymphatic massage and radiofrequency energy to the submental area following surgical liposuction on aesthetic outcome, patient's satisfaction, and safety.

Methods: A prospective study included patients seeking scarless treatment for double chin deformity. Our plan involved three subsequent steps: PAL of submental fat, manual lymphatic massage, and radiofrequency energy. Follow up continued for 6 months. At each visit, photos were taken, complications were recorded, and visual analogue scales were used to evaluate the pain and patient satisfaction.

Results: 42 patients were included, mean age 38.1. Complications reported were edema, pain and transient marginal mandibular nerve paralysis. The pain scores were highest on the first visit. The mean satisfaction score on the final visit was 8.76 (Fig.1). None of the patients asked for further surgical neck lift.

Conclusion: Adding manual lymphatic massage and radiofrequency energy to the submental area in the early post-liposuction period may be considered a satisfactory, simple, reproducible, rapid, and safe plan for scarless neck rejuvenation.

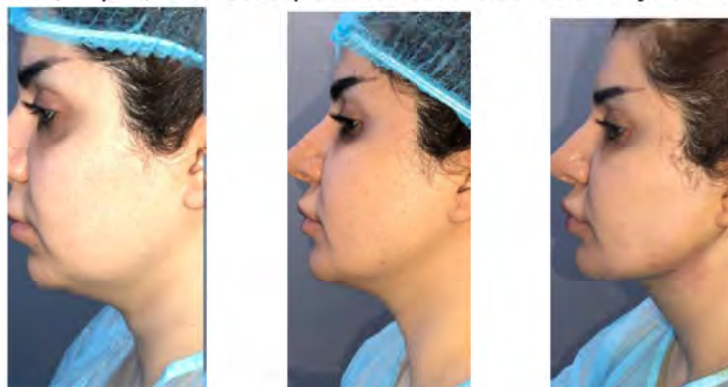


Fig. (1): A: Before liposuction of double chin. B: after performing PAL of submental fat. C: After completion of manual massage and radiofrequency

Oral Presentation | Free paper (Non-surgery)

A29

Peeling Back the Layers: A TikTok Analysis of Chemical Peel Content

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Background

Chemical peels have seen a resurgence in popularity, with a fourfold increase in worldwide interest since 2010 based on Google Trends data.

Objective

This study analyzed chemical peel content on TikTok to investigate potential disparities in Fitzpatrick skin types represented, user engagement levels, and information dissemination.

Methods

The top 15 videos were reviewed for 13 popular chemical peel hashtags on TikTok, excluding non-English, unrelated, and duplicate videos. Data extracted included engagement metrics, chemical agents used, content types, and patient experiences. Appropriate statistical tests were conducted.

Results

195 videos were included, totaling nearly 199 million views and over 8 million likes. Full face (91.1%) was the most common treatment area. Phenol (17.4%), salicylic acid (11.3%), and TCA peels (11.3%) were most prevalent. Top treatment indications were pigmentation (24.7%) and acne scars (14.9%).

Patient experiences (35.6%), education (23.7%), and live peeling (23.2%) were the main content types. Less than one-third (31.6%) were by healthcare providers. Among providers, most were MDs (49), followed by DOs (5).

Patient experiences were largely positive (57.8%). The MD+DO subgroup had significantly higher engagement metrics than patients. Fitzpatrick scores >3 vs. <3 differed significantly for phenol peel content, with the <3 group more represented.

Conclusion

This overview of TikTok's chemical peel content reveals potential patient exposure and racial disparities within cosmetic treatment marketing.

Oral Presentation | Free paper (Non-surgery)

A31

An injection method that uses “HA” to improve perioral aging.

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Background: Traditional anti-aging focuses only on aging around the eyes and sagging of the face, while problems around the mouth are gradually discovered after the eye area.

Objective: To improve the smoothness of the perioral flatness, intramucosal combined subcutaneous injection can be used to minimize pain.

Methods: Through the adjustment of the lip, mandibular angle, jaw line, “ogeen” line, piriform fossa “DMCF” and other structures. “MOV” injection partitions are proposed to track the effect of injections.

Results: According to the specific situation (“MOV” partition adjustment) analysis to adjust different schemes, the results showed that most patients had smooth perioral flatness and better coordination and natural coordination of skin and flesh during orotic orbuli muscle movement after one month after surgery, and had a high level of satisfaction.

Conclusion: Effectively improve the flatness of the perioral mouth, improve the perioral aging, and achieve effective dynamic anti-aging effect.

Keywords: Peroral aging, MOV, HA, Intramucosal injection

Oral Presentation | Free paper (Non-surgery)

A32

An improved injection method for non-painful abobotulinumtoxin A to lift the entire face

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Background: In the past, traditional AbobotulinumtoxinA(AboBoNT-A) injection methods for facial lifting, which were used to inject the platysma, failed to achieve the desired lifting effect. Patients experienced significant pain, and the treatment outcomes were unsatisfactory, resulting in low satisfaction rates.

Objective: To achieve rapid and long-lasting facial lifting and clear jawline effects by improving the injection points, concentrations, and injection levels of AboBoNT-A, while reducing patient's pain during the injection process.

Methods: Through dynamic and static assessments, AboBoNT-A was injected into the platysma and other descending muscles, while preserving the lifting muscles. By enhancing the lifting force of the galea aponeurotica and relaxing the tension of the platysma, the facial soft tissues were lifted. The AboBoNT-A (produced by Galderma, 300su, diluted with 3ml of normal saline, with 5su injected at each point) was used, and the treatment outcomes were evaluated one month later.

Results: Most patients achieved good lifting effects, manifesting as a clear jawline, smoother facial contours, lifting of the soft tissues in the mid-to-lower face, reduced fatigue, and changes in face shape. Additionally, 80% of patients experienced a more comfortable injection process and had a high level of satisfaction.

Conclusion: The application of modified painless AboBoNT-A injection techniques for comprehensive facial lifting can achieve better facial lifting effects and reduced pain, significantly improving patient satisfaction.

Keywords: face lifting,Botulinum Toxin,AbobotulinumtoxinA,Non-Painful injection

Oral Presentation | TAAT APRAS award session 2

A33

Preliminary Outcome of Enhancing Transdermal Delivery of Autofluorescence Nanoparticles Assisted of Picosecond Laser and Fractional CO₂ Laser

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Background: Picosecond laser could produce laser-induced optical breakdown, which might enhance transdermal drug delivery. Fractional CO₂ laser could induce vertically ablated channels that could also help transdermal drug delivery. In addition, we use a kind of self-assembled fucoidan nanoparticle that have autofluorescence to observe the effect of transdermal drug delivery.

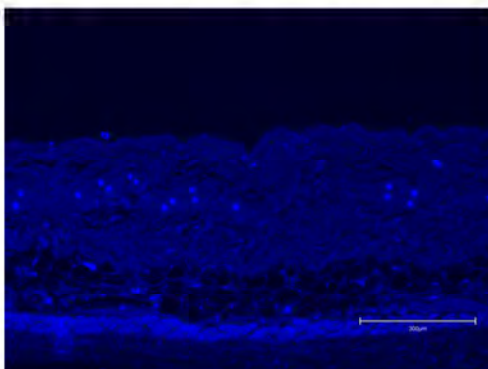
Objective: We want to investigate whether picosecond laser-induced cavitation can serve as a drug reservoir to help nanoparticles remain in the dermis for a longer period. At the same time, we want to know if the nanoparticles can diffuse from the channels induced by CO₂ fractional laser into the surrounding tissues rather than remaining within the channels.

Methods: C57BL/6 were divided into three groups: a picosecond laser group, a CO₂ laser group, and a control group. Each group was treated with nanoparticles self-assembled by dendrimer (PD-ET-12) and fucoidan.

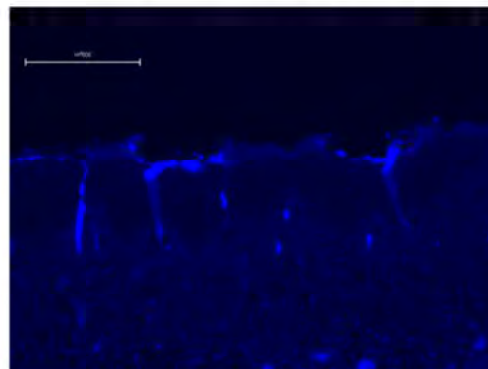
Results: At 0.5 hours, large fluorescent spots can be observed, which could reduce the number of nanoparticles remaining outside the dermis, minimizes drug wastage, and enhance drug delivery efficiency. At 2.0 hours, the fluorescent spots appear smaller but more numerous. At 2.0 hours, a clear contrast can be observed, with the coagulation zones appearing darker and the deeper layers exhibiting more fluorescence.

Conclusion: LIOB could serve as a drug reservoir to help nanoparticles remain in the dermis. Analysis of the fluorescence in tissue sections indicates that nanoparticles can penetrate deeper into the skin when assisted by CO₂ laser treatment.

picosecond laser group at 2.0 hours



CO₂ laser group at 2.0 hours



Oral Presentation | Free paper (Aesthetic surgical procedures)

A34

A treatment plan for orbital aging

Yu Hua

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Background: Exploration of treatment plans for Asian individuals with congenital flat brow arches, acceptable tightness of the forehead, and sagging upper eyelid skin.

Objective: A treatment method of double eyelid incision eyelid shaping and eyebrow arch filling for orbital aging.

Methods: From January 2022 to January 2024, 105 female patients underwent double eyelid incision eyelid shaping and eyebrow arch filling surgery, including improvement of ptosis of the eyelid tail, eyebrow, eyelid, and zygomatic curves.

Results: 105 patients recovered to normal 4-6 months after surgery, with concealed incisions and significant improvement in orbital aging.

Conclusion: Through double eyelid incision eyelid shaping and eyebrow arch filling surgery, ① reducing surgical incisions, concealing scars, and effectively reducing muscle integrity damage. ② Effectively improve skin laxity around the orbit and increase bone volume around the orbit. It is a safe and effective method of annual orbital rejuvenation treatment.

Oral Presentation | Free paper (Non-surgery)

A35

Bioactive glass in clinical applications

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Objective: Explore the clinical application of regenerative materials
(bioactive glass)

Methods: All patients were treated with bioactive glass and hyaluronic acid
mixture

Results: Using a bioactive glass mixture for treatment in 1500 cases, no
other complications occurred except in 8 cases due to insufficient dose

Conclusion: Bioactive glass is a safe and ideal bony filler