

**Abstract No.:** 293

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Effects of Microneedle Length and Duration of Preconditioning on Random Pattern Skin Flaps in Rats

**Introduction:**

To date, surgical delay of skin flaps is the most common and reliable method that increases skin flap survival. Microneedling device holds various numbers of needles on a rotating cylinder that forms deep microchannels and increases skin vascularity. The aim of this study was to compare the viability of random-pattern dorsal skin flaps preconditioned for seven and 14 days using 0.5-mm and 1.0-mm microneedles with the results of surgical delay.

**Materials and Methods:**

Seventy-two Sprague Dawley rats were randomly divided into control, surgical flap delay (SFD) and four microneedling groups (seven or 14 days of preconditioning with 0.5 or 1 mm needles). Modified McFarlane flaps were raised on the back of the rats. In Group I, a caudal pedicle skin flap was raised and the flap survival rate was assessed on postoperative day 14. In the SFD group, a bipediced flap was created and after 14 days of surgical delay, all skin flaps were raised. In the microneedling groups, 0.5 mm or 1 mm needles were used for seven or 14 days. After the last procedure all skin flaps were raised in microneedling groups.

**Results:**

The flap survival rates of all microneedling and SFD groups were significantly higher than the control group. The plasma levels of vascular endothelial growth factor (VEGF) did not significantly differ between the groups, but the VEGF level of the skin samples in the SFD group was higher than the control group. The vessel counts of all microneedling and SFD groups were statistically higher than the control group in all skin samples taken before raising the flaps, but the skin samples taken 14 days after raising the skin flap did not show any difference between the groups.

**Conclusions:**

We showed that preconditioning by microneedling can be used to improve the viability of ischemic skin flaps at a level similar to surgical delay.

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Abstract No.: 174

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** The Role of Umbilical Cord Mesenchymal Stem Cells in Reducing Immunosuppressive Drug Doses Used in Allogeneic Transplantations

**Introduction:**

The aim of this study is to demonstrate the role of umbilical cord mesenchymal stem cells (UC-MSc) in reducing immunosuppressive doses by quantitative parameters.

**Materials and Methods:**

1 cm diameter of skin allograft were harvested from back of CD57Bl6 mice and adapted to recipient Balb / c mice. Recipient mice were divided six groups. Group 1: no treatment, group 2: 15mg/kg/day Cyclosporine-A (Cyc-A) was injected, group 3:  $5.7 \times 10^6$  and  $10.3 \times 10^6$  cell/kg UC-MSc were administered at day 0 and 3 respectively, group 4: same dosage UC-MSc with group 3 and 15mg/kg/day Cyc-A, group 5: same dosage UC-MSc and 10mg/kg/day Cyc-A, group 6: same dosage UC-MSc and 5mg/kg/day Cyc-A were administered.

Viability of skin allografts were assessed macroscopically, microscopically, immunohistochemically and thermographically. Level of IL-10, IL-2, IFN-gamma TNF-alpha were measured as biochemical indicators of rejection. End organ damages to kidney and liver due to cyc-A were exposed with organ biopsies at the end of the study.

**Results:**

The most similar findings were obtained from group 2, 4 and 5. No allograft loss was observed for 30 days in these macroscopically. No dermoepidermal separation was observed. Normal epithelial cycles continued in three (mean epithelization scor were 3,5 in Group 3; 3,71 group 4; 3,57 group 5), Banff inflammation scor was low (1,14 group 2; 0,85 group 4; 1 group 5) Ki-67 and Bcl-2 scor weren't statistically significant difference (for Ki-67: 3,57 group 2; 3,71 group 4; 3,57 group 5; for Bcl-2: 3,28 group 2; 3,57 group 4; 3,42 group 5). There were no statistically significant difference in the temperature obtained from allografts and biochemical parameters among these groups. However group 5 was similar to 1, 3 and 6 in terms of end organ damages of liver and kidney.

**Conclusions:**

This study demonstrated that UC-MSc can provide to reduce of dosage of Cyc-A and in clinical practice it can be used safely

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Abstract No.: 81

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Adipose-derived Stromal Cell Therapy Combined with a Short Course Non-Myeloablative Conditioning Promotes Long-term Graft Tolerance in Vascularized Composite Allotransplantation

**Introduction:**

The risks of chronic immunosuppression limit the utility of vascularized composite allotransplantation (VCA) as reconstructive option in complex tissue defects. We evaluated a novel, clinically translatable, radiation-free conditioning protocol that combines anti-lymphocyte serum (ALS), tacrolimus and CTLA4-Ig with adipose-derived stromal cells (ASCs) to allow VCA survival without long-term systemic immunosuppression.

**Materials and Methods:**

Full-mismatched rat hind-limb transplant recipients received tacrolimus FK-506 (0.5mg/kg) for 14 days and were assigned to four groups: CTRL received no conditioning; ASC-group received CTLA4-Ig (10mg/kg BW s.c. POD 2, 4, 7) and donor ASCs ( $1 \times 10^6$  iv, POD 2, 4, 7, 15, 28); ASC-CYP-group received CTLA4-Ig, ASC plus cyclophosphamide (50mg/kg i.p., POD 3); ASC-ALS-group received CTLA4-Ig, ASCs plus ALS (500  $\mu$ L i.p., POD 1, 5). Banff grade III or 120 days were endpoints.

**Results:**

ASCs suppressed alloresponse in vitro. Median rejection-free VCA survival was 28 days in CTRL (n=7), 34 in ASC (n=6) and 27.5 in ASC-CYP (n=4). In contrast, ASC-ALS achieved significantly longer, rejection-free VCA survival in 6/7 animals (86%), with persistent mixed donor-cell chimerism, and elevated systemic and allograft skin Tregs. Banff grading of skin, muscle and vessels confirmed absence of both acute cellular rejection and vasculopathy in long-term animals, which were also negative for donor-specific antibodies.

**Conclusions:**

Taken together, a regimen comprised of short-course tacrolimus, repeated CTLA4-Ig and ASC administration, combined with ALS, promotes long-term VCA survival without need for chronic immunosuppression.

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**Abstract No.:** 7

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** An aberrant adipose tissue gene profile and a distinct immune cell composition underlie lipedema pathology

**Introduction:**

Lipedema is a common disorder affecting mainly women. It is clinically characterized by the painful and symmetrical subcutaneous deposition of adipose tissue in the lower extremities, frequently misdiagnosed as obesity or lymphedema. Despite its increased prevalence very little is known about the implicating pathomechanisms affecting its onset and progress, thus disabling timely identification and management of the disease. Lately, an aberrant lipid metabolism and the dysfunction of the lymphatic vasculature have been postulated to play a role in the pathogenesis of lipedema.

**Materials and Methods:**

The aim of the present study was to characterize in detail the morphological and molecular alterations in the adipose tissue composition as well as the lymphatic vascular component of lipedema patients compared to BMI matched controls. The studies were conducted on anatomically matched skin and fat tissue biopsies, using histology and qPCRs, obtained from 15 lipedema and 15 control female patients. Furthermore, liposuction aspirates and fasting serum probes from the same patients were analyzed using mass spectrometry and ELISAs.

**Results:**

Histological evaluation of the adipose tissue showed adipocyte hypertrophy, with increased fibrosis and immune cell infiltration. The structural changes were associated with an aberrant adipogenesis gene expression profile. Mass spectrometry analysis of the lipid content of both liposuction aspirate and serum revealed a comparable lipid composition in control and lipedema patients. Interestingly, systemically increased VEGF-C levels were found among lipedema patients, coinciding with increased macrophage presence, without resulting into morphological lymphatic vessel differences in comparison to the control patients. Gene expression profiling confirmed these findings and identified a characteristic lymphatic vascular niche in lipedema.

**Conclusions:**

Lipedema presents a distinct disease entity characterized by an aberrant adipose tissue morphology and gene expression profile without a clear lymphatic vascular involvement. The lymphatic-related changes observed may be secondary to lipedema development.

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**Abstract No.:** 171

**Category:** Research

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Functional MRI imaging of peripheral nerves using novel contrast agents: experimental proof-of-concept study

**Introduction:**

Imaging of peripheral nerve injuries can provide detailed information about a nerve's structure but not its remaining function. Based on axoplasmic flow, distribution of specific substances within the nerve may reveal the integrity of axonal transport and thus nerve function. Currently, there are no imaging tools available to evaluate nerve function based on axonal transport for clinical use. In this proof-of-concept study, we test retrograde transport of novel gadolinium-based contrast agents applied to the sciatic nerve in rats using functional MRI.

**Materials and Methods:**

In this experimental study, we performed synthesis of novel molecules comprised of paramagnetic agents and axonal transport facilitators. Radiological validation of the contrast agents was performed in vitro by measuring relaxivity values. Subsequently, these novel contrast agents were applied to the transected sciatic nerve in rats (n=22) for retrograde distribution along the nerve. In an ex vivo trial, the spinal cord and sciatic nerve were harvested on the 7th day after surgery for visualization of contrast agents distribution using MRI. In vivo MRI measurements were performed using a 9,8 Tesla scanner on the 1st, 3rd and the 7th day after surgery. Chemical analysis of harvested samples was performed subsequently to determine the concentration of contrast agents.

**Results:**

The novel contrast agents demonstrated high relaxivity values, varying between 12,1 and 116,8 mM<sup>-1</sup>s<sup>-1</sup>. Ex vivo MRI scans of the spinal cord showed diffuse distribution of signal enhancement in the vertebral canal after HSA-DTPA-Gd application, as well as in vivo in the sciatic nerve on the 7th day after application. Furthermore, the chemical evaluation indicated high concentration of 3,34 ng/mg HSA-DTPA-Gd in the sciatic nerve.

**Conclusions:**

The findings of this study provide radiological and chemical evidence of successful contrast agent uptake into the sciatic nerve and its distribution within the spinal cavity in rats. To elucidate the responsible transport mechanism, further investigation is needed.

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Abstract No.: 33

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Muscle function is preserved after prolonged porcine limb preservation with machine perfusion

**Introduction:**

Optimizing tissue preservation during composite tissue transplantation or replantation procedures still remains a challenge. The current gold standard for preservation – storage on ice – is limited to a maximum of 6 hours until irreversible damage occurs. Machine perfusion is a promising technique for prolonged preservation, however, functional outcomes have been scarcely evaluated. This study aims to compare both functional results and histology after replantation of limbs preserved by machine-perfusion to limbs preserved on ice.

**Materials and Methods:**

The forelimbs of twelve Dutch landrace pigs were amputated and randomly divided into two study groups. Group 1 (n=6): cold storage (CS) limbs, preserved at 4-6°C for 4h. Group 2 (n=6): machine perfused limbs, preserved for 18h using continuous sub-normothermic perfusion with oxygenated University of Wisconsin solution. Limbs were replanted after preservation with a follow-up of 12 hours. Sham surgery was performed on the contralateral forelimb. Primary outcomes were muscle contraction threshold and histology.

**Results:**

Preservation was 5.5hr in CS vs 19.8hr in perfused limbs. Muscle contraction thresholds were comparable between groups; mean thresholds were 90% of the contralateral sham limb and 99% of initial value in CS limbs vs. 125% in perfused limbs (p=0.220). The total histology score was higher in perfused limbs compared to CS (4.8 vs 1.5, p=0.013). This was mainly based on more interstitial edema (1.8 vs 0.3, p=0.003). The scores for muscle fiber damage, inflammation and variation in shape/size of muscle fibers were statistically comparable. Limb weight slightly increased after replantation (CS +13%, perfusion +19%, p= 0.180).

**Conclusions:**

Although overall histological results in machine perfused limbs seem to be inferior to short cold storage, limb muscle contraction remained intact until the end of the experiment and outcomes were comparable to cold stored and sham limbs. Histological findings therefore did not seem to completely correlate to muscle function at 12hr after replantation.

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**Abstract No.:** 58

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Creation of a “Bio-Screen” through Multiple Nerve Transfers to a Single Target Muscle for High Fidelity Prosthetic Control

**Introduction:**

Muscles are effective translators of neural function. In recent years we have demonstrated the feasibility of man-machine interfacing via “Bio-Screens”. This is achieved by transferring nerves, which have lost their target, to new targets proximal to the amputation. Yet only basic extremity function of myoelectric prosthesis can be provided, as the amount of muscle signals is insufficient for intuitive control. Here we present a novel procedure by transferring multiple nerves onto a single target muscle to increase the resolution of neural signaling and thus prosthetic control in a rat model.

**Materials and Methods:**

Using a surgical microscope, the anatomy and surgical feasibility was evaluated. In the main trial, the deep branch of the ulnar nerve alone or together with the anterior interosseus nerve were transferred to reinnervate the long head of the biceps muscle in Sprague-Dawley rats. After twelve weeks of regeneration, we analyzed the muscle function by muscle force analysis, motor unit number estimations and electromyography (EMG). Structural analyses included multi-photon imaging to detect neuroma formation, neuromuscular innervation and muscle fiber type populations.

**Results:**

Constant anatomy was given in all animals and all nerves presented successful reinnervation. The number of neuromuscular junctions by each of the nerves is expected to be in correlation to the nerve’s axonal load. Muscle force is expected to regain near normal levels. As analyses are ongoing, detailed results will be presented at the conference.

**Conclusions:**

This rat model demonstrates, that a muscle can reliably host multiple nerves and that topographically distinct compartments will emerge within the target muscle that can be activated independently. This approach thus leads to a polytopic neural matrix that can display sets of motoneurons of the entire motoneuronal population of the amputated limb. High density EMG pick-up electrodes and adequate signal processing can decipher the neural code and be used for high-fidelity prosthetic control.

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Abstract No.: 55

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : The Effect of D-Dopachrome Tautomerase and Obesity on Inflammation and Wound Repair

**Introduction:**

The pro-inflammatory cytokine macrophage migration inhibitory factor (MIF) is a long-known protein known to be involved in the development of obesity, insulin resistance and adipose tissue inflammation. Recently, its structural homolog D-dopachrome tautomerase (D-DT) was characterized. In previous work we provided evidence for an inverse anti-inflammatory role of D-DT in adipose tissue inflammation primarily. Furthermore, D-DT appears to promote wound healing in vitro whereas MIF's act inhibitory. In the present work, we scrutinized D-DT's impact on obesity, insulin resistance, adipose tissue inflammation and wound repair in an extended in vivo wound healing model.

**Materials and Methods:**

In the first model, wildtype (WT, n=12) and D-dt<sup>-/-</sup> C57BL/6 mice (n=12) were exposed to intraperitoneal lipopolysaccharide (LPS) injection to evaluate D-DT's role in acute inflammation. Animals were sacrificed after 24h and adipose tissue was harvested. In the second model, WT (n=20) and D-dt<sup>-/-</sup> (n=20) mice were fed a high-fat diet (HFD) and weight gain/blood glucose levels were tracked regularly. After 12 weeks, excisional and incisional full thickness defects were placed on the back of the mice. Wound healing was observed over a period of 14 days. Eventually, animals were sacrificed and wounds were evaluated histologically.

**Results:**

LPS injection leads to a downregulation of D-DT protein primarily in adipocytes which in turn alleviates adipose tissue inflammation in scWAT and vWAT. In general, HFD causes a significant increase of body weight and blood glucose levels over the time and impaired wound healing. When compared to WT mice, D-dt<sup>-/-</sup> mice show a trend towards increased weight gain and blood glucose levels with attenuated wound healing.

**Conclusions:**

Our in vivo experiments indicate D-DT's participation in acute adipose tissue inflammation by protein down-regulation in adipocytes. Under HFD, D-DT appears to have a protective function in glucose metabolism, weight gain and wound healing.

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**Abstract No.:** 188

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Evaluation of the Ex-vivo effect of tamoxifen on adipose-derived stem cells: a pilot study

**Introduction:**

Autologous fat grafting (AFG) is a safe and minimally invasive surgical procedure to correct soft tissue defects in reconstructive surgery. The effects of AFG have been attributed to the presence of adipose-derived stem cells (ASCs) in the fat tissue graft. This technique could be useful also in patients who undergo reconstructive surgery following removal of breast cancer. However, these patients are frequently treated with tamoxifen (TAM).

**Materials and Methods:**

We evaluated the ex-vivo effects of tamoxifen on ASCs of patients treated with mastectomy or quadrantectomy and tamoxifen to understand if the cellular functions of ASCs are affected by TAM treatment.

For this study, we selected a total of 24 female patients; 10 of which were patients with breast cancer, treated either with mastectomy or quadrantectomy and tamoxifen. For the control group, we selected 14 healthy female subjects (9 premenopausal and 5 menopausal).

**Results:**

We found that TAM has not effect on cellular proliferation of ex-vivo ASCs obtained from patients treated with TAM compared to control patients. Our results also showed no differences in VEGF secretion (assessed by ELISA) after 4 or 8 days of culture and in apoptosis, measured by FACS analysis, after 48h of culture. We also assessed the expression level of genes involved in the ASC differentiation and we observed no impairment in the differentiation capacity of ASCs of TAM treated patients.

Our results showed that tamoxifen has no effect on cellular functions of adipose-derived stem cells for the first time in an ex-vivo single-centre study.

**Conclusions:**

In conclusion, this study demonstrated that the AFG is an effective therapy also for patients treated with tamoxifen.

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Abstract No.: 304

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : LIPOSUCTION OF BREAST CANCER RELATED ARM LYMPHEDEMA - HOW LONG DOES OUTCOMES LAST? - A PROSPECTIVE 25 YEARS' STUDY

**Introduction:**

Patients with chronic non-pitting lymphedema do not respond to conservative treatment because diminished lymph flow and inflammation result in the deposition of excess adipose tissue subcutaneously. Microsurgical reconstructions, although attractive as a physiological concept, cannot provide complete reduction in chronic non-pitting lymphedema because they do not eliminate the newly formed subcutaneous adipose tissue collections. To remove the excess adipose seems thus to be a logical treatment strategy. This prospective study describes the long-term outcome of liposuction of arm lymphedema.

**Materials and Methods:**

182 women with non-pitting edema with a mean $\pm$ SEM age of  $63\pm 0.8$  years, and with a mean duration of arm swelling of  $8.7\pm 0.5$  years underwent liposuction. Mean age at breast cancer operation, mean interval between breast cancer operation and lymphedema start, and duration of lymphedema were  $51\pm 0.8$  years,  $2.7\pm 0.4$  years, and  $8.7\pm 0.5$  years respectively. Aspirate and arm volumes were recorded.

**Results:**

Aspirate mean volume was  $1768\pm 49$  ml with an adipose tissue concentration of  $95\pm 0.8$  % in the tourniquet fraction. Preoperative mean excess volume was  $1492\pm 57$  ml. Postoperative mean reduction was  $103\pm 2.1$  % at 3 months and  $118\pm 28$  % at 1 year, and more than 100% during 24 years' follow-up, i.e. the lymphedematous arm was somewhat smaller than the healthy arm. The preoperative mean ratio between the volumes of the edematous and healthy arms was  $1.5\pm 0.02$ , rapidly declining to  $1.0\pm 0.01$  at 3 months, and less than 1 after 6 months up to 25 years after surgery.

**Conclusions:**

Liposuction is an effective method for treatment of chronic, non-pitting arm lymphedema in patients who have failed conservative treatment. Because of adipose tissue hypertrophy, it is the only known method that completely reduces excess volume at all stages of arm lymphedema. Removing the hypertrophied adipose tissue is a prerequisite to achieve complete reduction. The newly reduced volume is maintained through constant use of compression garments.

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Abstract No.: 149

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : SURGICAL MANAGEMENT OF HIDRADENITIS SUPPURATIVA WITH KEYSTONE PERFORATOR ISLAND FLAP

**Introduction:**

Hidradenitis suppurativa is a chronic, relapsing disease of the skin, characterized by apocrine gland and pilosebaceous complex infections, causing recurrent superficial nodules and abscesses, fistula formation, scarring and fibrosis. It is accepted that wide local excision and local coverage is the crucial treatment to prevent recurrence of the disease. We will present our experience in solving the remaining skin defects by using the keystone flaps.

**Materials and Methods:**

All patients presented for surgical treatment of hidradenitis suppurativa between January 2014 and November 2019 were identified from the hospital database. From the 35 patients identified, 21 with hidradenitis suppurativa confined to the axillary (3 ), inguinal (15) or sacrococcygeal (3) regions in Hurley grade II and III were included. All the patients (11 males, 10 females) aged between 21 and 76 years were evaluated retrospectively. One of the patients had a double localization, i.e. inguinal and sacrococcygeal. All the remaining defects were reconstructed with a keystone perforator island flap. We performed a descriptive analysis of demographic data, comorbidities, Hurley scoring, size of the defect, complications, follow-up period, recurrences.

**Results:**

Twentyone patients with localized axillary, inguinal or sacrococcygeal hidradenitis suppurativa were identified, and 22 keystone perforator island flaps were performed. All keystone perforator island flaps survived resulted in a durable coverage of the affected regions. There were no complications. Functional and aesthetic results were satisfactory. The average duration of hospital stay of patients was 5.5 days. The mean follow-up period was 30.77 months (range 6-60 months). We did not observe any recurrences within the follow-up period. All patients returned to their daily activity after 14-17 days after surgery.

**Conclusions:**

These findings confirm that the keystone perforator island flap procedure can be effective for immediate defect reconstruction after wide local excision of advanced hidradenitis suppurativa of the axillary, inguinal and sacrococcygeal regions and provides excellent aesthetic results.

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Abstract No.: 206

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Single versus double gastroepiploic vascularized lymph node transfer for advanced stages of lymphedema. A retrospective case-control study

**Introduction:**

Single (SG-VLN) and double gastroepiploic vascularized lymph node transfer (DG-VLN) have shown promising results for the treatment of advanced stages of lymphedema. The search of literature yields only few other cases describing outcomes following double VLN transfers but no comparative studies have been produced so far. The aim of this study was to retrospectively examine and compare the effects of SG-VLN versus DG-VLN transfer.

**Materials and Methods:**

All patients diagnosed with upper and/or lower limb stage IIB secondary lymphedema who had undergone SG-VLN or DG-VLN between January 2012 and December 2018 were identified from two institutions' databases. Demographic and surgical data were collected. The primary endpoint was the reduction in limb circumference within 12 months post initial surgery, comparing the circumference reduction rate (CRR) of the two groups. Secondary end-points included the reduction of cellulitis episodes and patients' quality of life improvement. A lymphedema-specific quality of life (LYMQoL) questionnaire was performed preoperatively and 12 months post-op.

**Results:**

Eighty-nine patients met the inclusion criteria. There were no significant differences between the two groups with respect to the mean age, BMI, and duration of symptoms. At 12 months of follow-up, higher CRR values were observed in the double inset group ( $p < 0.05^*$ ) both at above elbow/above knee level (SG-VLN:  $70.6\% \pm 0.6\%$ ; DG-VLN:  $72.2\% \pm 0.7\%$ ) and at below elbow/below knee level (SG-VLN:  $59.1\% \pm 1.3\%$ ; DG-VLN:  $61.6\% \pm 3.7\%$ ). Subgroup analyses of the involved limb (upper vs lower) were consistent with the primary treatment effects. The reduction of cellulitis episodes did not differ between the two groups while the DG-VLN group showed better results in the overall satisfaction function, symptoms and mood domains of the LYMQoL questionnaire ( $p = 0.04$ ).

**Conclusions:**

Gastroepiploic VLN transfer is effective in treating advanced stages of lymphedema. The double inset may ensure superior outcomes compared to the single flap placement.

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Abstract No.: 65

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : Refining the surgical decision-making in lymphedema surgery - is MR lymphography the perfect GPS ?

**Introduction:**

Lympho-venous anastomosis (LVA) is a surgical option for selected patients who suffer from lymphedema. Although there is currently no golden standard pre-operative investigation method, lymphoscintigraphy and indocyanine green (ICG) fluoroscopy are widely adopted imaging techniques. The former offers static information on lymphatic function, while the latter allows for real-time visualization of functional lymphatics. However, these examinations have several restrictions and downsides, such as lack of venous info, no differentiation between fat hypertrophy and liquid edema, they are time consuming, and operator dependent. MR lymphangiography is a promising alternative, that not only tackles the aforementioned restrictions of the current standard lymphatic imaging techniques, but also offers three-dimensional information and more accurate pre-operative planning.

**Materials and Methods:**

A prospective study was performed in which 25 patients suffering from lymphedema of the upper extremity were examined. MR lymphography with contrast agent injection in a deep dermal plane was performed. Imaging results were compared to ICG fluoroscopy of the same patients. Additionally, an MR-based mapping system is proposed. The finding of the MR lymphography were correlated to the actual clinical findings peroperatively

**Results:**

Precise localization of lymphatic vessels crossing a vein was achieved in 18 of 25 arms. In 16 of the 18 patients in whom functional lymphatics were localized with an adjacent vein on MRI an LVA was performed successfully. After comparing to ICG fluoroscopy, MRA showed a sensitivity of 90% and specificity of 100%.

Based on our findings a surgical decision making algorithm is proposed.

**Conclusions:**

Based on the finding of our study we can conclude that MR lymphography using a single contrast agent is an accurate and reproducible method for imaging and mapping of lymphatic channels in the lymphedemateous limb. it is also an almost perfect tool for the diagnosis, work-up and surgical decision making in lymphedema surgery.

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Abstract No.: 234

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Evaluation of vascularized lymph node transfer, lymphaticovenous anastomosis and extensive suction-assisted lipectomy in two different combined strategies for lower limb lymphedema

**Introduction:**

In lymphedema treatment, recently described surgical procedures like lymphaticovenous anastomosis (LVA) and vascularized lymph node transfer (VLNT) are becoming increasingly popular. Nevertheless, there is no universal consensus on an appropriate standardized protocol for the treatment of lymphedema. The purpose of this study is to compare the outcomes between the treatment with VLNT and suction-assisted lipectomy and the combination of these techniques with LVA.

**Materials and Methods:**

37 patients affected by lower limb lymphedema were divided into two groups: 21 patients underwent VLNT followed by suction-assisted lipectomy (VLNT group) whereas 16 patients were treated with a combined approach of VLNT and LVA followed by suction-assisted lipectomy (VLNT+LVA group). The two groups were similar in term of BMI, age, comorbidities, cause of lymphedema, lymphedema stage (II and III according to the International Society of Lymphology) and sex distribution. Patients were evaluated one month before surgery and during follow up through clinical examination, circumference measurement, lymphoscintigraphy, skin tonicity and photographic documentation.

**Results:**

Average follow-up was  $2\hat{\pm}0.8$  years. In the overall population, the mean circumference reduction rate was  $52.6\hat{\pm}18.9\%$ ,  $42.9\hat{\pm}25\%$ ,  $19.2\hat{\pm}34.4\%$  and  $36.2\hat{\pm}37\%$  above the knee, below the knee, above the ankle, and at the foot level, respectively, with a statistically significant difference at all levels ( $p<0.01$ ). The VLNT+LVA group scored a greater circumference reduction rate at all levels, compared to the VLNT group, but the difference was not statistically significant. Over the follow-up, a significant decrease in the episodes of cellulitis from the preoperative period was noted ( $p<0.05$ ) but the difference between the groups was not statistically significant.

**Conclusions:**

In conclusion, even though the association between LVA and VLNT together with suction-assisted lipectomy appeared to be beneficial in some patients, probably in milder cases with a higher number of functioning lymphatic vessels, it has not determined a statistically significant benefit in the population studied.

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Abstract No.: 244

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Compression therapy following lymphatico-venous anastomosis does not increase the risk of anastomosis occlusion. An experimental model in pigs.

**Introduction:**

Post-operative compression therapy after LVA's is debated, with no documented direct evidence for or against it. This experimental model allows measurement of pressure gradient applied by compression at the level of the anastomosis and assesses the immediate post-op and 7-day patency of LVA following compression therapy.

**Materials and Methods:**

After ICG mapping, eight LVA's were performed in 6 female experimental pigs, one in each hind limb, lymphatic vessels of 0.3-1.2mm (average 0.64mm) in diameter and correspondingly sized veins. Immediately after the anastomosis, perfusion is assessed via Patent BlueV subcutaneous injection, ICG mapping and transit-time ultrasound flow measurement (TTFM). After confirming the patency, the left hind limb was bandaged using mild compression and the the right limb using high compression. Pressure after compression was measured and standardized using an intra-compartmental pressure monitor to 40mmHg on the right limb, 20mmHg on the left limb in three animals and 40mmHg on the right limb and no compression of the left limb in the remaining three animals. Compression therapy was maintained with re-tightening of the compressive bandages every 24h for 7days, followed by surgical re-exploration and histological examination.

**Results:**

Post-op, all except one 0.45mm LVA were patent. The occluded LVA was redone. Patent Blue V and ICG mapping showed good patency in all other LVA's, no venous reflow. Re-exploration of the LVA sites showed occlusion of the anastomosis in 2 LVA's(66%) with no compression, while in all of the limb treated with 40mmHg compression, all LVA's(100%) were patent. TTFM showed higher flow velocity at 40mmHg site compared to 20mmHg site. Histological examination of occluded LVA's showed thrombus formation, no acute inflammatory response.

**Conclusions:**

We provide direct evidence that compression therapy following LVA is useful to maintain LV anastomosis patency, by increasing the intra-compartmental pressure, thus augmenting the lymphatic flow through the anastomosis, preventing venous reflow and late anastomosis occlusion.

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Abstract No.: 95

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Photoacoustic imaging for detection of age-related lymphatic system changes

**Introduction:**

Lymphatic obstruction and subsequent congestion cause lymphedema. Secondary lymphedema occurs as a potential adverse effect of lymph node dissection. However, lymphedema occurs in a few older patients even in the absence of known etiological contributors. We used photoacoustic imaging to compare lymphatic function between healthy young and old volunteers to gain a better understanding of age-related changes in the lymphatic system

**Materials and Methods:**

We investigated 4 men and 15 women categorized into two groups: volunteers aged <44 years (mean 33.6 years) and volunteers aged >52 years (mean 55.8 years). Indocyanine green was injected subcutaneously into the feet in all volunteers, and lymphatic vessels and veins were observed in the medial side of the lower leg by using a photoacoustic imaging device (PAI-05).

**Results:**

We observed a mean of 5.6 lymphatic vessels in the young group vs. a mean of 7.9 lymphatic vessels in the older group ( $P<0.05$ ). The number of bifurcations also differed significantly (3.1 vs. 8.2,  $P<0.05$ ).

**Conclusions:**

Photoacoustic imaging is a new technology that is useful for real-time, high-resolution (0.2 mm) 3-dimensional observation of blood and lymphatic vessels. Our results highlight age-related changes in lymphatic vessels and such changes include a meandering course of lymphatics with the formation of collateral vessels. Lymphedema in older patients is often diagnostically challenging because conventional modalities are inferior to PAI in accurately detecting and tracing the course of lymphatics. This new modality is a promising tool to gain a better understanding of aging of lymphatic vessels.

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**Abstract No.:** 205

**Category:** Clinical (Hand/Nerve)

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Evolution and refinements of a new dorsal adipofascial digital artery perforator flap

**Introduction:**

Defects at the dorsum of the fingers in cases that bone, joints, and extensor tendons are exposed, often require demanding reconstructive procedures. The purpose of our study is to present a new adipofascial flap based on a single perforator (Dorsal Adipofascial Digital Artery Perforator - DADAP), able to cover large finger dorsal defects.

**Materials and Methods:**

Adjacent to the defect, the flap dissection initially separates the skin flaps from the underlying adipofascial tissue, and then elevates the adipose tissue on a skeletonized radial or ulnar digital artery dorsal perforator as a pivot point. The flap can be rotated 180° as a propeller type, or as a turn-over in larger defects.

In 8 patients (7 male, 1 female), 12 soft tissue defects at the dorsum of the fingers including exposed tendons, bones or joints (3 index, 6 middle, 2 ring, 1 little finger), ranging from 1 X 2 cm to 2 X 4 cm, were reconstructed with a DADAP flap.

**Results:**

The flap size ranged from 2,5X1,5 cm to 8X3 cm. The defects were covered in 9 cases by a propeller type and in 3 by a turn-over flap. In 4 cases a tendon defect and in 3 cases an open joint were reconstructed with a tendon graft. In all cases a splint skin graft (SSG) covered the flaps. In the mean 18-months follow-up, one patient with a distal tip flap necrosis treated conservatively, while a delayed wound healing with partial SSG failure due to hematoma formation was observed in 3 fingers; however, the underlying flap was viable and complete healed by secondary intention. Satisfactory range of motion was achieved in all cases.

**Conclusions:**

The DADAP flap is a fast, safe and reliable solution to cover the defects of the dorsum of the fingers and can be performed under local anesthesia as a day surgery.

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Abstract No.: 269

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** The pedicled medial sural artery perforator flap for reconstruction of soft-tissue defects of knee and leg

**Introduction:**

Since its first description by Cavadas and Hallock in 2001, the medial sural artery perforator (MSAP) flap has gained popularity as a free flap for reconstruction of the head and neck and limbs. It is also potentially useful as a pedicled flap for soft-tissue reconstruction around the knee and upper tibial region, but does not appear to be widely used for this indication.

We present our experience of the pedicled MSAP flap in lower limb reconstruction

**Materials and Methods:**

We describe our experience of 7 patients who underwent reconstruction of soft-tissue defects around the knee and upper tibial region over a 3 year period, of whom 5 were males and 2 were females. Four defects were around the knee, 2 post-traumatic, one following septic arthritis, and one after excision of a squamous cell carcinoma. Three defects were in the upper tibial region, all of them post-traumatic with underlying open fractures. The size of defects ranged from 8 x 5 cm to 23 x 12cm. The secondary defects were closed directly in 4 cases, and grafted in 3.

**Results:**

The procedure length ranged from 110 to 270 minutes, and the inpatient stay from 3 to 8 days. One flap developed partial necrosis that healed on conservative management; the remainder survived completely. There was one partial wound dehiscence that healed spontaneously.

**Conclusions:**

The pedicled MSAP flap is a reliable and relatively quick technique for reconstruction of soft-tissue defects around the knee and upper tibia, with a low complication rate.

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Abstract No.: 105

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Propeller Flaps For Lower Limb Reconstruction Following Oncological Resection. Is age a predicting factor for complications?

**Introduction:**

Perforator flaps are frequently used to repair small to moderate size defects of the lower limb as they allow a "like with like" reconstruction, do not impair major vascular axis and reduce operating time. However, complication rates are debated with contradictory data about patients' age. The aim of this retrospective study is to evaluate the incidence of age-related complications in lower limb reconstruction with propeller flaps.

**Materials and Methods:**

Two hundred and four perforator flaps have been performed at our Institution between 2014 and 2019. Eighty-two flaps were propellers but only those used for oncological defects, on the lower limb, with angle of rotation  $\geq 90^\circ$ , have been selected for this study. Patients have been grouped according to age respectively group A  $>65$  years and group B  $< 65$ , and complications have been analyzed with Mann Whitney unpaired t-test with Welch correction.

**Results:**

Forty-seven cases matched the inclusion criteria. 26 patients belonged to group A while 21 to group B. Comorbidities such as heart disease, diabetes and hypertension were slightly higher in group A with no significant differences ( $p= 0.9027$ ). Mean age was 81, 5 (group A) vs 55,9 (group B). Mean flap size was 68,56 (group A) vs 69,57 (group B). Mean rotation angle was 117,5 8 (group A) vs 132,38 (group B). No major complications such as total flap loss were registered. Partial distal necrosis was observed in 5/26 (19,2%) and in 3/21 patients (14,2%) and these differences were not statistically significant ( $p= 0,3705$ )

**Conclusions:**

Age  $> 65$  years did not seem to increase the incidence of complications in propeller flaps used for lower limb reconstruction in oncological cases. However, larger studies are needed in order to better elucidate the importance of specific comorbidities, such as hypertension or diabetes, which may act a more relevant role.

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Abstract No.: 276

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Effect Of Different Silicone Implants' Surfaces (smooth, Textured, Nano-textured) On Peri- implant Capsule Formation And Inflammatory Response Development In A Rodent Model

**Introduction:**

Breast implant safety is a very hot topic. We studied the impact of inflammatory response and periprosthetic capsule formation with four different implants' surfaces from three different companies.

**Materials and Methods:**

Four groups of 14 Sprague Dawley rats received one scaled-down implant. Each animal received only one implant. Each implant had a different average surface roughness ranging from Group 1 (Ra=3.2µm) Group 2 (Ra=0.8µm), Group 3 (Ra=62µm) Group 4 (Ra=75µm). All animals received an MRI scan at 60 days. Seven animals of each group were sacrificed at 60 days and the periprosthetic capsules were sent for histology analysis. The remaining 7 animals of each group received an MRI scan at 120 days and afterwards were sacrificed and their periprosthetic capsules were sent for histology analysis.

**Results:**

Mean periprosthetic capsule thickness at 60 days in group 1 (0.113mm) and 2 (0.145mm) on MRI was inferior compared to Groups 3 (0.195mm) and 4 (0.186mm) at 60 days (p<0.001). The same result was observed at 120 days (Group1=0.126mm, 2=0.142mm, 3=0.154mm,4=0.149) p=0.980. Group 4 showed a significantly decreased implant thickness between 60 days (0.186mm) and 120 days (0.149mm) (p=0.039). Mean periprosthetic capsule thickness at 60 days in group 1 (0.280mm) and 2 (0.214mm) on histology was inferior compared to Groups 3 (0.320mm) and 4 (0.406mm) at 60 days (p=0.005). No difference was seen in the same group from 60 to 120 days. The same result was observed at 120 days (Group1=0.213mm, 2=0.220mm, 3=0.407mm,4=0.454) p<0.001. Inflammatory reaction was higher in Group 4 both at 60 (p<0.001) and 120 days (p=0.006). Microvessel density was not different among groups at 60 (p=0.256) and 120 days (p=0.452).

**Conclusions:**

Smooth implants (Group 1 and 2) lead to a thinner capsule with less inflammatory infiltrate compared to textured implants (Group 3 and 4) in a rodent model.

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**Abstract No.:** 199

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Full Breast reconstruction with Autologous Fat Transfer: interim results from the BREAST-trial

**Introduction:**

The BREAST-trial is the first multicenter randomized study in the world which evaluates efficacy and safety of autologous fat transfer (AFT), or lipofilling, for a full breast reconstruction. An important unanswered question regarding efficacy is the influence of this reconstruction method on the patient reported Quality of Life (QoL). Interim results and the first data regarding this outcome will be presented from both lipofilling patients as well as the control group.

**Materials and Methods:**

In the BREAST-trial the primary outcome measure is the patient reported QoL. This is measured by the validated BREAST-Q questionnaire. QoL is reported at the start of the reconstruction, as well as at six and twelve months after the reconstructive trajectory. Besides changes in QoL, the QoL of AFT-patients is compared to those in the control group who underwent an implant-based reconstruction.

**Results:**

Until now, in the BREAST-trial 176 patients have been included. In total 82 of them received a reconstruction by means of AFT and 83 had a reconstruction with prosthesis. In total 72 patients received a full follow-up of twelve months after their last operation. Serious adverse events are rare and not related to the AFT-procedure, specifically in comparison to implant related complications. Statistically significant differences in favor of AFT were seen at 12 months follow-up in three of the five subdomains on the BREAST-Q ( $p=0.010$ ,  $p=0.045$ ,  $p=0.045$ ).

**Conclusions:**

The interim results of the BREAST-trial confirm the presumed potential of autologous fat transfer. Therefore, both researchers as well as patients deem this method as a valuable addition to the arsenal of free-flap breast reconstruction and implant-based breast reconstruction.

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**Abstract No.:** 242

**Category:** Clinical

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** The preshaped breast principle: an algorithm in the reconstruction of large and/or ptotic breasts.

**Introduction:**

In large ptotic breasts surgeons remain reluctant to perform nipple-sparing mastectomy due to a higher risk of nipple areola complex (NAC) and/or mastectomy skin necrosis. Delaying NAC on a dermoglandular pedicle allows complete circumareolar dermal neovascularization to the NAC before a NSM is performed in a second stage three months later. Reincision and prelevation of the same delayed skin flaps minimizes the risk of necrosis.

**Materials and Methods:**

Macromastia and ptosis patients opting for risk-reducing nipple-sparing mastectomy or having a peripherally localized carcinoma in situ, were offered a two-stage mastopexy/reduction through Wise pattern incisions followed by reconstruction. Only the dermoglandular pedicle bearing the nipple areola complex, remained. A delayed nipple-sparing mastectomy and simultaneous tissue expander-to-implant or free flap reconstruction was scheduled three months later. Follow up time was at two weeks, three and six months.

**Results:**

Forty-nine procedures were performed in 29 patients. The average age was 45 years (range, 22 to 72 years). Patients' median body mass index was 26,79 kg/m<sup>2</sup> (range, 19 to 35 kg/m<sup>2</sup>). Thirteen patients had a family history of breast cancer (five with carcinoma in situ), two had fibrocystic mastopathy and twelve patients were genetically predisposed. We included two free flap and 47 prosthetic reconstructions. One patient had diabetes and two smoked. Two cases of transient epidermolysis of the NAC and one partial skin necrosis occurred; no NAC occurred. No implant or free flap had to be removed.

**Conclusions:**

Preshaping of the difficult breast is a reliable method to reduce necrosis of skin envelope and NAC. The oncological criteria determine whether it is possible to perform this staged procedure, waiting three months for the second stage. Preshaping to perform delayed nipple-sparing mastectomy creates a safe skin and NAC footprint allowing any kind of prosthetic or autologous breast reconstruction. We present our standard of care algorithm for NSM in difficult breasts.

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**Abstract No.:** 312

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Total Breast Reconstruction by Internal Expansion and Autologous Fat Transfer (AFT):

**Introduction:**

Total breast reconstruction with AFT alone is an attractive alternative. But fat is not a tissue expander and cannot simultaneously stretch the mastectomy envelope, expand the limited recipient tissues and revascularize to survive. External vacuum expansion has been used to address this limitation, but its success critically depends upon patient compliance. Internal tissue expanders are readily available and their subsequent removal leaves behind tissue laxity with room for the required large volume grafts. We report our five-year experience with breast reconstruction using internal expansion and AFT.

**Materials and Methods:**

For the immediate reconstructions, at the time of the mastectomy, we insert subpectoral expanders and graft about 400ml in all tissue planes. We avoid collections larger than 3mm across by meticulously grafting thin rows between individually teased muscle fibers. After full expansion, 3-months later, we replace the expander with a half-sized implant and graft the loosened dome of tissue back to its original volume. For patients who already have implant reconstructions, we reverse-expand by replacing their implant with another about half the size and graft the resultant laxity to restore their original volume. We repeat halving implant sizes while doubling recipient tissues thickness with AFT every 3 months till the reconstruction is totally autologous.

**Results:**

We performed 255 breast reconstructions with this technique. To become totally autologous with satisfactory volume and shape, 95% (61/65) of the immediate non-radiated required 1-3 expansion-AFT procedures after their mastectomies. Of the non-radiated implant reconstructions, 92% (121/132) were completed in 2-4 procedures. Radiated breasts required 2-5 additional procedures. Aside from requiring additional grafting sessions, there were no significant complications.

**Conclusions:**

Total autologous breast reconstruction can be reliably achieved with this minimally invasive technique. Implants and tissue expanders provide the necessary skin envelope while stepwise reverse expansion creates room for AFT.

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Abstract No.: 94

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Autologous fat grafting oncological safety. A single-centre equivalence study

**Introduction:**

Autologous fat graft, otherwise named "lipofilling", is a minimally invasive surgical technique that uses the own patient's adipose tissue to correct disfiguring and painful sequelae after breast cancer surgery. Despite its wide use and proven efficacy, experimental research has demonstrated that autologous fat graft could stimulates angiogenesis and tissue regeneration, thus potentially increase the risk of loco-regional breast cancer recurrence

**Materials and Methods:**

We conducted a single-center retrospective equivalence study on 2397 consecutive female patients treated at our Institution between June 2006 and December 2015. Study population was composed by 414 patients treated with autologous fat graft after oncological surgery and 1983 patients not treated with fat graft. Biological characteristics (luminal, HER2-positive, triple negative breast cancer) were balanced between the two groups; both intraepithelial and infiltrating tumors were included in the same proportion in the two groups.

**Results:**

Mean follow-up from surgery date was 4.2 years in the case group and 3.9 years in the control group. Mean time distance between surgery and first fat graft was 1.39 years, regarding the case group. A loco-regional recurrence could be observed in 4,5% of patients in case group and in 5,3% of patients in control group, to be considered statistically equivalent ( $\alpha = 5\%$ ,  $\beta = 0.05$ ,  $1 - \beta$  power = 80%).

**Conclusions:**

To our knowledge this is the most numerous "single center" study demonstrating that autologous fat graft do not imply an increased rate in loco-regional recurrence in patients with an history breast cancer.

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Abstract No.: 275

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Oncological safety of Fat Grafting in Breast Reconstruction

**Introduction:**

Fat grafting (FT) has an important role in breast reconstructive surgery. Some concerns remain with regards to the oncological safety of transplanting mesenchymal and adipose stem. We present a retrospective study analysing the impact of FT in local recurrence incidence.

**Materials and Methods:**

From a prospectively maintained database 761 patients who underwent breast reconstruction from 2005 to 2016 were identified. Information regarding demographics, tumor characteristics, surgery information and follow-up were collected. Exclusion criteria were: patients with distant metastases at diagnosis, recurrent tumor or patients with incomplete data regarding primary tumor. A multivariate regression model was applied to identify the impact of the variables on the incidence of local recurrence. A p value <0.05 was considered statistically significant.

**Results:**

237 (31.1%) patients received at least one session of FT vs 524 (68.9%). 328 (43.1%) patients underwent radical mastectomy, 259 (34%) skin sparing mastectomy and 174 (22.9%) nipple sparing mastectomy. 348 (45.7%) patients underwent reconstruction with autologous tissues, 146 implant- based (19.1%), 247 (32.4%) mixed and 20 (2.8%) only by FT. 428 patients were diagnosed with IDC (56.2%), 87 with ILC (11.4%), 193 with DCIS (25.4%), 41 with LCIS (5.4%) and 12 (1.6%) with others. 160 tumours were Grade 1 (21%), 280 Grade 2 (36.8%), 317 Grade 3 (41.7%) and 4 Grade 4 (0.5%). 457 (60.1%) patients did not have lymph nodes metastasis at diagnosis while 304 (39.9%) did. 49 (6.4%) patients had a local recurrence while 712 (93.6) did not. Multivariate analysis showed that FT did not increase risk of local recurrence OR 0.062 (CI 0.008-0.460) p<0.007, Grade 4 tumours increased risk of local recurrence OR 28.3 (CI 1.5-530) p<0.025

**Conclusions:**

FT was not associated with a higher probability of locoregional recurrence in patients undergoing breast reconstruction therefore it can be safely used for total breast reconstruction or aesthetic refinements.

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**Abstract No.:** 49

**Category:** Clinical (Microsurgery)

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** NEW ERA WITH MEDICAL 3D PRINTING FOR PRE-OPERATIVE PLANNING OF COMPOSITE FREE TISSUE TRANSFER IN HEAD AND NECK RECONSTRUCTION.

**Introduction:**

Accuracy of the reconstructed bony structures is the key for achieving favorable aesthetic and functional results in head and neck reconstruction.

In order to be precise for the preoperative planning in oncological resections, trauma, composite flap harvesting and reconstruction, we have applied 3D Printing techniques.

**Materials and Methods:**

22 patients treated (12 male and 10 female). 14 had neoplasia and 8 traumas (mandibular or maxillary defect). Each patient undergoes a CT scan following an appropriate scanning protocol. The image data (DICOM) is converted to a 3D virtual model using appropriate medical software (MIMICS) and the actual 3D replica of the bony structures is reproduced using 3D printers. In oncology patients, we preoperatively build a physical model to illustrate the tumor position allowing for accurate planning of the resection margins. The resection is then performed on the anatomical model, which is also used afterwards to pre-bend the fixation plates. The bony resection is duplicated and reproduced in a polymethylmethacrylate resin. In that way, a bone template is created that can be sterilized and utilized at the time of the composite flap harvesting. This allows the accurate fabrication in situ (osteotomies), prior to division of the pedicle, thereby minimizing warm ischemia time, accurate fixation of the composite flap, maintaining the condyles in place and achieving accurate occlusion.

**Results:**

The advantages of utilizing office-based simple 3D modelling techniques include: 1) Time and money economy comparing with stereolithographic models 2) Accuracy in oncological resections 3) Ideal aesthetic and functional result 4) Decreased morbidity of donor site 5) Facilitated decision making in choosing the appropriate donor site 6) Reduced surgical time.

**Conclusions:**

In-house medical 3D printing offers accuracy, theatre time economy and ultimate aesthetic and functional results in composite free tissue transfer in head and neck reconstruction.

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**Abstract No.:** 39

**Category:** Clinical (Cleft/Cranio)

**Time:** 4

**CR:** Yes

**Event :** 31st Annual EURAPS Meeting

**Title :** CAD CAM applied to total nasal reconstruction, a case report

**Introduction:**

Total nasal reconstruction is a challenge and requires a lot of experience. Many small secondary procedures are often needed to achieve a satisfactory result.

**Case Report:**

5 years after the resection of the left nasal ala and reconstruction with a left forehead flap, a 70 years old male patient presented a recurrence of squamous cell carcinoma of the nasal mucosa, extended to the septum. He underwent a subtotal rhinectomy, neck dissection and implantation of a forehead tissue expander.

Post-operative 3D data were acquired by a CT scan. An old CT scan was used to acquire data on the native nose. The reconstruction was planned by Computer Aided Design (CAM), in order to reproduce a nose that was similar to the native nose, but smaller to reduce the reconstructive risks. Starting from the desired naso-labial angle, we designed a titanium plate for the structure. The plate was complementary to the patient's nasal bones, so that one only positioning was possible. The titanium plate and a copy of the plate in polyamide were printed by Computer Aided Manufacturing (CAM) and sterilized.

The final planned nose surface was developed into a bidimensional plate, that was used as a template to draw the needed flap on the expanded forehead.

The polyamide plate was used as a guide to shape the lining: the lining was obtained with local flaps from the cheeks. After the lining was completed the guide was removed and the titanium plate was positioned. The forehead flap was then inset.

The pedicle was divided after 3 weeks.

The nasal reconstruction is stable at 6 months.

**Conclusions:**

The use of CAD CAM makes nasal reconstruction predictable and easier. More data should be collected to determine if a titanium plate can be considered a safe method to reconstruct the nasal structure in the long term.

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**Abstract No.:** 165

**Category:** Clinical (Cleft/Cranio)

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** MIDFACE RESECTION AND RECONSTRUCTION IN HEAD AN NECK ONCOLOGY A 15 YEARS SINGLE INSTITUTION EXPERIENCE

**Introduction:**

The purpose of the study is to review our experience and evaluate our results over the last 15 years in patients with advanced midface tumors

**Materials and Methods:**

The medical records of 20 patients were reviewed by the head and neck oncology clinic 15 patients were male and 5 female with a mean age of 67 years. The commonest anatomical site of the primary was the maxilla in 14 patients and bilaterally in 5 patients. In 13 patients there was an orbital and anterior fossa extension. In 3 patients there was a parotid and middle ear extension. Surgical resection included in the majority of the cases maxillectomy in combination with orbital exenteration or orbitectomy and anterior fossa resection. In three cases parotidectomy and petrosotomy was performed. Reconstruction was performed with osseous radial forearm flap in 4 cases, latissimus with scapular bone flap in one case, dynamic temporalis in 5 cases, rectus in one case and anterolateral thigh flap in 5 cases in combination with temporalis and in one case vastus lateralis.

**Results:**

With a mean follow up of 9 years 17 patients are still alive and disease free.

**Conclusions:**

In conclusion midface resections are safely performed with a combination of microvascular and dynamic reconstruction of the face offering our patients quality of life improvement

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## Title

Risk factors for the development of deformational plagiocephaly: a systematic review and meta-analysis

## Authors

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Word count

291

**Background:** There are a number of risk factors which change the odds of developing deformational plagiocephaly. Our objective was to conduct a systematic review and meta-analysis to assess the risk factors for the development of deformational plagiocephaly.

**Methods:** The study was conducted in accordance with PRISMA guidelines (PROSPERO identifier: CRD42020204979). PubMed and Web of Science were searched (21 August 2010 through to 21 August 2020) for observational studies which assessed risk factors for deformational plagiocephaly. Main outcomes were any risk factors (non-modifiable or modifiable) which alter risk for the development of deformational plagiocephaly. When feasible, pooled meta-analytic estimates were provided using fixed- or random-effects models.

**Results:** A total of 17 studies met the inclusion criteria. Meta-analysis demonstrated significant odds ratios for risk factors associated with developmental plagiocephaly, including male gender (OR, 1.66; 95% confidence interval (CI) 1.13 to 2.43;  $I^2$ , 63.25%;  $N=4$ ), supine sleeping position (OR, 3.23; 95% CI 2.05 to 5.10;  $I^2$ , 17.26%;  $N=2$ ), head position preference (OR, 4.76; 95% CI 3.44 to 6.57;  $I^2$ , 0.00%;  $N=3$ ), vaginal mode of delivery (OR, 1.55; 95% CI 1.07 to 2.23;  $I^2$ , 0.00%;  $N=3$ ), and low maternal education level (OR, 1.66; 95% CI 1.17 to 2.37;  $I^2$ , 0.00%;  $N=2$ ). Factors with non-significant odds ratios which indicated lack of association with deformational plagiocephaly included small for gestational age (OR, 1.74; 95% CI 0.91 to 3.31;  $I^2$ , 37.08%;  $N=2$ ), multiple pregnancy (OR, 1.97; 95% CI 0.30 to 13.15;  $I^2$ , 87.04%;  $N=2$ ), and cephalic presentation at delivery (OR, 0.53; 95% CI 0.10 to 2.86;  $I^2$ , 88.61%;  $N=2$ ).

**Conclusion:** Risk factors for deformational plagiocephaly include male gender, sleeping supine, head position preference, vaginal delivery, and lower maternal education. Public health policies focusing on addressing head position preference and maternal education may reduce the prevalence of deformational plagiocephaly.

Abstract No.: 61

Category: Clinical (Cleft/Cranio)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Furlow re-palatoplasty in treatment of Velopharyngeal insufficiency of patients with unilateral complete cleft lip and palate

**Introduction:**

Velopharyngeal insufficiency (VPI) is a common problem after cleft palate repair that is often related to palatal shortening and insufficient levator reconstruction. For VPI correction in our cleft unit, Furlow double-opposing Z-plasty is the most common operation. The aim of the study was to assess the efficacy of Furlow re-palatoplasty in treatment of mostly severe VPI in unilateral cleft lip and palate (UCLP) patients.

**Materials and Methods:**

This retrospective analysis comprised 109 consecutive UCLP patients born between 1997 and 2014 with VPI operated by two high volume cleft surgeons. Two patients were excluded: one lacked adequate patient records, and one's VPI could not be reliably evaluated retrospectively from patient records due to severe developmental disorder of speech. Pre- and postoperative evaluation of velopharyngeal function was done perceptually, and instrumentally by Nasometer. The post-operative follow-up visit occurred 6 to 12 months after VPI surgery.

**Results:**

Before Furlow re-palatoplasty, VPI was severe in 96% (105 of 109) and moderate on 4% (4 of 109) of patients. Median age at Furlow re-palatoplasty was 5.6 years (range 2.8 to 21.9), and 84% of patients achieved adequate velopharyngeal competence: competent in 65% (71 of 109) and borderline competent in 19% (21 of 109). Nonsyndromic Finnish patients had adequate postoperative velopharyngeal function in 89% (70 of 79); with syndromic and adoption patients the consecutive numbers were 50% (4 of 8) in the former and 82% (18 of 22) in the latter. Compared to Finnish nonsyndromic patients, syndromic patients had more residual VPI ( $p=0.003$ ) but adoption patients did not ( $p=0.251$ ). Complications of Furlow re-palatoplasty included hemorrhage, postoperative mild airway obstruction, and wound-healing problems, each arising in two (1.8%) patients. Fourteen (13%) patients needed second VPI operation.

**Conclusions:**

Furlow re-palatoplasty seems to be a safe and useful treatment option for VPI in patients with previously repaired UCLP with a success rate of 84%.

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**Abstract No.:** 88

**Category:** Clinical (Cleft/Cranio)

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Why should we incorporate functional reconstruction when managing residual unilateral cleft lip nasal deformities? A thirty year experience.

**Introduction:**

Many procedures/modifications are reported for correction of residual unilateral cleft lip nasal deformities. Surprisingly the vast majority of publications focus on nasal appearance and little/no attention is given to the management of coexisting airway obstruction. Yet such conditions might potentially have significant impact on patients' quality of life and wellbeing. The objective of this communication is to stress the significance of equal attention in managing functional and aesthetic aspects of the deformity based on our 30 year experience and suggest incorporation of such approach to various treatment protocols. Our multidisciplinary protocols will be discussed in detail, and the rational of our approach substantiated with representative cases.

**Materials and Methods:**

217 patients treated at our center with 2-9 years of follow up and complete pre/postoperative clinical, photographic records and patient feedback were included. Procedures were individualized and performed after extensive clinical, imaging and functional evaluation(rhinomanometry). A variety of nasal techniques were applied to achieve symmetry, aesthetic balance and to correct the airway obstruction.

**Results:**

166 patients(76.4%) had significant objective functional and aesthetic improvement. This number increased to 85.9% when subjective breathing data were used. 29 patients(13.07%) had aesthetic but modest functional improvement, 21(9.85%) required additional surgery to improve appearance.

**Conclusions:**

Based on our long term experience, analysis of data and positive patient feedback who in the vast majority were alleviated from their debilitating symptoms, we would like to stress the importance and rational for incorporation of functional reconstruction in all cases of residual cleft nasal deformities.. Extensive evaluation, detailed understanding of all anatomic and physiologic aspects of the deformity, use of the most appropriate procedures are prerequisite for success. Understanding breathing physiology through subjective and objective evaluations is of great assistance in the planning. Rhinomanometry when available, offers an objective tool to further appreciate airflow and resistance and substantiate further functional results.

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**Abstract No.:** 25

**Category:** Clinical (Microsurgery)

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** The role of microvascular flap reconstruction in palliation for head and neck cancer. Is it making sense? Our center 's 15 years experience

**Introduction:**

Salvage surgery is the best option for many patients with recurrent cancer of the upper aerodigestive tract (UADT) especially when original therapy included irradiation. The primary objective of this study was to fully assess the value of salvage surgical procedures in the treatment of local and regional recurrence and also to evaluate the role of surgery for symptom palliation in patients with advance head and neck malignancy.

**Materials and Methods:**

41 patients were examined at the head and neck combined oncology clinic and fulfilled the salvage survey criteria i.e. decided to undergo further wide surgical resection and free flap reconstruction after previous definitive treatment. The recurrent site was primarily the tongue and FOM in 18 cases.

Resection included mandibulectomy and glossectomy in the majority of the cases (21) and total glossectomy in 18 cases. Reconstruction was performed with various types of free flaps, predominately RFF.

**Results:**

20 patients died during the first 2 years of follow up from local recurrent disease mainly. 21 patients are still alive 3 patients are less than a year of follow up.

**Conclusions:**

Salvage surgery of T1, T2 recurrent tumours and microvascular reconstruction offers patients improvement in quality of life and also quality of dying in T3 and especially T4 tumours alleviating symptoms such as bleeding, pain, dysphagia, non-healing ulcers, airway obstruction.

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Abstract No.: 40

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Enhanced recovery after head and neck reconstruction with a free flap - identifying challenges and early results

**Introduction:**

Microvascular reconstruction of defects after head and neck cancer surgery are challenging procedures often followed by long postoperative hospital stays and high complication-rates. Enhanced recovery after surgery (ERAS) has previously been demonstrated to be superior compared to conventional care for a wide variety of procedures, including microsurgical breast reconstructions.

We present our experience in developing an ERAS protocol for microvascular reconstruction after head and neck cancer and our results of the transitional period ahead of complete ERAS implementation.

**Materials and Methods:**

In order to identify relevant areas of intervention for ERAS in head and neck cancer patients we retrospectively reviewed procedures involving reconstruction with a free flap in head and neck cancer patients (excluding scalp and laryngeal reconstructions) in the period 2014-2016.

The historical results were compared to those from the period of protocol-development and partial implementation of the ERAS-programme, including the introduction of functional discharge criteria, in the years 2017-2018.

Statistical analysis was performed using Fischer's exact test and students t-test.

**Results:**

We included 51 patients in the pre-ERAS group (2014-2016) and 35 patients in the transitional group (2017-2018). LOS was significantly reduced from 21.3 to 15.4 days ( $p=0.02$ ). The number of patients that had a tracheostomy was significantly reduced from 86% to 23% ( $p<0.0001$ ) and the average time spent in the ICU was reduced from 35 to 22 hours ( $p=0.04$ ). There was no difference in 30 days post-operative mortality or complications (re-operations, flap loss, additional IV antibiotic treatment or re-admissions).

**Conclusions:**

Implementation of an ERAS programme for microsurgical reconstruction after head and neck cancer has the potential to improve the surgical pathway for these patients.

We safely reduced the LOS by 6 days through our transitional period before the full implementation of the ERAS programme.

In the future we expect to further improve treatment and recovery for these complex patients.

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Abstract No.: 241

Category: Clinical (Microsurgery)

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : Aesthetic and Functional Outcomes in Tertiary Mandibular Reconstruction

**Introduction:**

Purpose: Unsuccessful or failed mandibular reconstruction occasionally occurs and will not only leave patients with undesirable function and contours but also challenging second or third time corrective operations. The aim of the study is to identify the cause of the previous failures and evaluate the cosmetic and functional outcome of the tertiary mandibular reconstruction.

**Materials and Methods:**

Materials and methods: A retrospective analysis of the experience of our multidisciplinary team was conducted during the 10-year period from 2009 to 2019. All thirty-three patients included in this study had prior unsuccessful or failed mandibular reconstructions. Secondary or tertiary re-reconstructive surgical approaches were attempted, and their results were collected and presented. Patients self-evaluated speech, chewing, swallowing (Functional Intraoral Glasgow Scale), and facial appearance (University of Washington Quality of Life Questionnaire for Head & Neck)

**Results:**

Results: The patients had 3.5 previous operations in the average. Seven Condyle-ramus-body, 8 ramus-body, and 18 symphysis defects were recorded. The causes for previous failed mandibular reconstructions were various: unreconstructed defects (n= 4), failed plate reconstruction (n= 21) previous flap necrosis (n=2), failed nonvascularized bone grafts (n=2), recurrence of radionecrosis/osteomyelitis (n= 4). Fibular flaps were transplanted successfully in all patients for mandibular re-reconstructions: 11 osseous, 13 Osseo-cutaneous and 9 chimeric flaps. The extent of previous operations often required the use of contralateral neck recipient vessels (19 out of 33 cases). Virtual surgical designs and 3D imaging and printing were conducted in all patients. Dental implants were placed in 8 patients. Functional score was  $11.16 \pm 0.37$  and Facial Appearance score  $3.3 \pm 0.5$ .

**Conclusions:**

Conclusions: Secondary or tertiary mandibular reconstruction can still achieve good functional and cosmetic outcomes, but careful case selection and well-rounded preoperative plans for patients should be emphasized.

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Abstract No.: 26

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Jaw-in-a-day & intraoral approaches: the aesthetics in bony reconstruction of the jaw anno 2020.

#### Introduction:

Virtual planning added accuracy and improved aesthetics for bony reconstruction of the jaw after ablative surgery. However, the subsequent dental rehabilitation requires 6-12 months before completion. This causes strong psychological distress in patients that lost a substantial portion of their jaw. The jaw-in-a-day strategy allows for early restoration, performing the virtually guided resection, bony reconstruction and insertion of an implant-retained dental prosthesis in one operation. Intraoral approaches furthermore omit external scars.

#### Materials and Methods:

An in-house digital dental laboratory in conjunction with virtual planning allows the prosthesis to be created with CAD-CAM technology (ProPlan Materialise tm, Leuven, Belgium) and a hospital-based Stratasys Connex3 Objet 350 printer. An occlusion-driven technique was set up and focusses on optimal form and function. This requires a close collaboration among the plastic and maxillofacial surgeons, prosthodontist and dental laboratory technician.

#### Results:

We performed 120 bony reconstructions with 3D in house planning since 2016, with fibula (n=108), DCIA (n=9) and angular scapula (n=3) bone free flaps to restore the mandibula (n=109) and the maxilla (n=11).

Cause : resection of spinocellular carcinoma (SCC, n=95), osteoradionecrosis (n= 21), ameloblastoma and cemento-ossifying fibroma (n=4). Flap revision 12,8 %, flap loss 6,67 %, double flaps 7,2 % (ALT + fibula = 4,8%, gracilis + fibula =2,4%). Radiotherapy in 92,8%.

This experience resulted in using the "jaw-in-a-day" strategy. We describe a maxilla reconstruction using a DCIA flap and an intraoral microvascular approach with immediate dental restoration after ameloblastoma resection.

#### Conclusions:

According to the early available data, immediate restoration of the jaw and associated dentition strongly adds to the quality of life, decreases the number of procedures and general anaesthetic in long-term perspective. Intraoral microvascular approaches may add to the aesthetic outcome.

Long-term follow-up data are required to validate the impact on flap and implant success rates and, hence, the role in the treatment of patients with malignancies.

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**Abstract No.:** 157

**Category:** Clinical (Microsurgery)

**Time:** 4

**CR:** Yes

**Event :** 31st Annual EURAPS Meeting

**Title :** The periosteal-cutaneous chimeric medial femoral condyle free flap for subtotal ear reconstruction: a new application for a versatile flap

**Introduction:**

Traumatic or congenital total/subtotal loss of the ear are best addressed by reconstruction using rib cartilage. We present here a case of a 29 y.o. patient who had total loss of the upper 2/3 of the right ear after bombing in Somalia and secondary infected chondritis. The patient refused both epitheses and rib cartilage harvest (he previously had thoracic war trauma).

The periosteal free medial condyle (FMC) flap has gained high popularity in reason of its high vascularization and its role in promoting healing in complex scenario like tracheomalacia. After discussion with the patient a reconstruction with a free FMC was decided.

**Case Report:**

The chimeric FMC flap was harvested chimeric with skin paddle.. A thin sheet of femoral cortex was used as basal ear frame, while part of the contralateral concha was trimmed as neo-helix, The periosteum was wrapped around the whole framework. The flap was transferred to the recipient site and anastomosed to the facial vessels. The chimeric skin paddle assured the retroauricular skin coverage while the anterior part of the construct was covered by a thinned anterior dermal flap. Postoperative course was uneventful. At 8 weeks postop we performed a defatting of the skin paddle and patient was started on a soft compressing molding.

At 6 months, the patient was satisfied with the result, could wear glasses and was socially integrated.

**Conclusions:**

The chimeric FMC can assure a highly vascularized periosteum that will partially go through ossification, guaranteeing a solid ear frame while avoiding infections due to non-vascularised components. Moreover, the skin paddle avoids the use of skin grafts. This solution, despite not being the primary choice for ear reconstruction, showed satisfactory results in terms of ear shape and infection prevention. The FMC chimeric free flap can be considered in cases when ordinary cartilage rib reconstruction is refused, contraindicated, or failed.

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**Abstract No.:** 48

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** A COMBINED PLASTIC SURGERY AND CARDIOTHORACIC APPROACH FOR THE MANAGEMENT OF BOTH CONGENITAL SINGLE LUNG AND POST-PNEUMONECTOMY SYNDROME WITH INTRATHORACIC PROSTHESIS IN CHILDREN

**Introduction:**

Postpneumonectomy syndrome (PPS) is a rare condition of dynamic airway obstruction arising after pneumonectomy or, in congenital single-lung physiology. Without a second lung to occupy the thoracic cavity, the heart and mediastinal contents can shift excessively towards the dead space, while the great vessels rotate presenting with severe respiratory compromise. The plastic and cardiothoracic surgery teams have developed a combined technique of intrathoracic prosthesis placement to occupy the dead space to alleviate the symptoms due to an absent lung.

**Materials and Methods:**

Patients with PPS and congenital single lung and were recruited undergoing intrathoracic prosthesis placement for PPS were included. A muscle sparing lateral thoracotomy preserving the latissimus dorsi and serratus anterior was also perfected to improve post-operative recovery and the need for subsequent reoperation.

**Results:**

Twenty-one children with PPS from 2010 and 2019 underwent intrathoracic prosthesis placement via a muscle sparing lateral thoracotomy approach, with a median follow up of 75 months. Single lung etiology was congenital in 12 children (5 agenesis, 7 hypoplasia), and postpneumonectomy for 9 children. Pre-operative ventilation was required in 12 patients, and pre-operative ECMO was required in 2 patients. The median age and weight at first airway surgery was 3.5 months, and 5 kg, respectively. Intrathoracic prosthesis placement was concurrent with intracardiac repair in 5 patients, and further airway interventions (dilatation, tracheostomy) in 7 patients. Postoperatively, 10 patients remained on continued respiratory support, with 3 only on nocturnal support with good quality of life during day. There were no operative deaths.

**Conclusions:**

A collaborative team approach involving Plastic and Cardiothoracic Surgery has improved management of this rare and debilitating condition where a physiological single lung, congenital or post-pneumonectomy, poses a risk of PPS in children. Intrathoracic prosthesis placement via a muscle sparing approach leads to significant improvements in technique and functional outcomes.

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Abstract No.: 122

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : A new surgical approach in the management of severe pectus deformity

**Introduction:**

Pectus excavatum (PE) is the most common congenital chest wall deformity. PE is sometimes associated with cardiorespiratory impairment, and often associated with psychological distress, especially for patients in their teenage years. Surgical repair of pectus deformities has been shown to improve both physical limitations and psychosocial well-being in children. The most common surgical approaches for PE treatment are the modified Ravitch technique and the minimally invasive Nuss technique. A technical modification of the Ravitch procedure, which includes bilateral mobilization and midline transposition of the pectoralis muscle flap, is presented here.

**Materials and Methods:**

From 2010 to 2016, 12 patients were treated by a modified Ravitch procedure with bilateral mobilization and midline transposition of the pectoralis muscle flap for severe PE. Outcomes, morphological results, and complications were analyzed with respect to this new combined surgical approach.

**Results:**

There was a statistically significant difference between pre- and postoperative values ( $P = 0.0025$ ) of the Haller index at the 18-month follow-up, showing a significant morphological improvement for all treated patients. After surgery, no morbidity and mortality were noted. The mean hospital stay was 7 days, and all patients were discharged without major complications.

**Conclusions:**

This technique significantly improved patients' postoperative morphological outcomes and significantly reduced long-term complications, such as wound dehiscence, skin thinning, and hardware exposure.

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Abstract No.: 277

Category: Clinical

Time: 4

CR: Yes

Event : 31st Annual EURAPS Meeting

Title : THE USE OF FALD FLAP FOR POLAND SYNDROME CORRECTION

**Introduction:**

Poland Syndrome (PS) is a sporadic and congenital disease with a wide spectrum of presentations. The correction of breast and thoracic deformities in this syndrome have constituted an important challenge for plastic surgeons over the years. The absence of the pectoralis major muscle causes various degrees of breast asymmetry as well the absence of the anterior axillary fold, which is essential for the natural appearance of the chest. We present a male case of PS with severe left thoracic wall deformity, corrected with Fat Augmented Latissimus Dorsi muscle (FALD) flap.

**Case Report:**

A 23-year-old male patient came to our attention with an evident anterior thoracic wall asymmetry, left pectoralis major muscle aplasia and rib cage asymmetry. Reconstruction was performed with the pedicled FALD flap. The adipose tissue was harvested simultaneously from left trochanteric area using Coleman technique and was injected into the superficial and deep adipose layer of the dermo-adipose paddle. The muscle was sutured to the periosteal costal bone to restore the anterior axillary fold and to replace the morphological anatomy of pectoralis major muscle. The dermo-adipose paddle was fixed exactly where the chest hollowing was the greatest. The restoration of the anterior axillary pillar and the replacement of the pectoralis major muscle were achieved fixing the belly of Latissimus Dorsi muscle flap to the periosteum of costal ribs. A second session of Fat grafting was requested to correct minor aesthetic defect and complete the reconstruction. The aesthetic and functional results were satisfactory.

**Conclusions:**

The possibility of adding fat in dermo-adipose paddle over the Latissimus Dorsi muscle could guarantee excellent results in replacing the hollowing of the chest wall in Poland Syndrome, avoiding the use of implants and all its related complications.

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Abstract No.: 173

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : Pedicled ALT flap for Abdominal Wall Reconstruction - A Two Centre Experience

**Introduction:**

We report one of the largest case series to date, of 11 successful cases of complex large abdominal wall reconstruction with a pedicled ALT flap. In all cases, an eccentric perforator-based pedicled ALT flap including wide fascial extension, was transferred to the abdominal defect; fascial portions were sutured to the remnant abdominal fascia to restore the patients' abdominal wall, whilst the overlying skin paddle was used to address the skin defect.

**Materials and Methods:**

A retrospective study was performed looking at patients that underwent abdominal wall reconstruction with a pedicled ALT flap at St Marks Hospital and St Thomas' Hospital between 2011-2019. Data was extracted looking at patient demographics, co-morbidities, adjuvant therapy and post-operative outcomes. Post-operative outcomes included return to theatre, length of hospital stay, presence of hernia and wound complications.

**Results:**

The study identified a total of 11 patients. The mean age of patients was 55 with a 5 male and 6 female patient distribution. The average length of stay was 47 days. All patients achieved healing of their abdominal wound and donor site. In terms of complications, 2 patients required an early return to theatre for venous congestion, with one of them developing a wound dehiscence and subsequent hernia.

**Conclusions:**

Our experience has shown that this flap is a safe, robust and reliable option for reconstruction of the anterior abdominal wall following major excisions, with an acceptable rate of complications compared to other reconstructive options.

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Abstract No.: 80

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : MESH - A Four-Letter Word When Performing Abdominal Surgery in Prior Hernia Repair Patients?

**Introduction:**

Mesh reinforcement of hernia defects protects against recurrence but may confer increased risk for complications during subsequent abdominal surgery (AS). The objective was to evaluate the risks associated with prior incisional hernia repair (pIHR) and mesh on outcomes after common AS operations.

**Materials and Methods:**

Patients undergoing AS operations, including bariatric, small and large bowel resection, cholecystectomy, prostatectomy, and gynecologic procedures were identified within Statewide Inpatient/Ambulatory Databases (2009-2014; Florida, Iowa, Nebraska, New York, Utah) and followed for longitudinal healthcare outcomes. Surgical history was ascertained in a three-year period prior to index procedure. Logistic and Cox regression after a one-to-one propensity score-matching (rate 92-95%) determined the association of adverse outcomes (surgical, medical, surgical/medical composite, prolonged length-of-stay, mortality, and one-year readmissions) for pIHR with and without mesh relative to no prior-AS and prior-AS.

**Results:**

Overall, 424,548 index AS operations were identified with 3,094 pIHR, of which 60.4% had mesh. Adjusted analyses demonstrated pIHR with mesh was associated with increased postoperative surgical complications (Odds Ratio 1.23 [95% Confidence Interval 1.01-1.49]; p=0.04) and surgical/medical complication composite (OR 1.21 [1.01-1.44]; p=0.04.), as well as complication-related readmissions within one-year (OR 1.17 [1.01-1.36]; p=0.04) relative to no prior-AS. However, there were no differences in medical complications, prolonged length-of-stay and mortality (p>0.05). Analyses of patients with non-mesh pIHR only had an increase in surgical complications compared to no prior-AS (OR 1.40 [1.1-1.79]; p=0.01). There were no differences in any of the outcomes between non-mesh pIHR and prior-AS (p>0.05).

**Conclusions:**

Surgical morbidity is increased when re-operating through a mesh-reinforced abdominal wall. The increased risk extends beyond the risk conferred from prior AS or pIHR alone.

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Abstract No.: 107

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : Lumbar Perforator Flaps for coverage of extensive defects with osteomyelitis: shifting the paradigm ?

**Introduction:**

Lumbosacral osteomyelitis is a rare, although serious condition if not appropriately treated. Studies have suggested the preferred use of muscle or myocutaneous flaps to prevent recurrent infections. However, late evidence suggests that radical debridement and dead space obliteration are more important than the type of flap. The lumbar perforator flap is a reliable local option with low donor site morbidity, but its use in case of osteomyelitis is scarcely described. We aimed to report long-term outcomes of lumbar perforator flaps to cover lumbosacral defects with chronic osteomyelitis.

**Materials and Methods:**

This retrospective investigation included seven consecutive patients (10 flaps) with extensive defects of the posterior midline at L2-S1 level (defect size  $287 \pm 136$  cm<sup>2</sup> (average  $\pm$  SD)). Four patients presented following recurrent tumor resection, while in two patients the defect was due to vascular jeopardy of internal iliac arteries. Last defect derived from a neglected wound in a paraplegic patient. All patients had bone infection. Infectious details and postoperative complications were recorded.

**Results:**

Patients were in general poor medical condition (including peripheral arterial disease, hypertension, diabetes, or a combination of these). Eight flaps were raised as propeller perforator while 2 as V-Y perforator. One propelled flap had venous congestion on POD1 and required a revision surgery to be converted to V-Y. Subsequent partial flap necrosis was treated conservatively. One patient presented a dehiscence requiring a surgical revision. All flaps were closed primarily except for one patient whose flap presented a mild intraoperative congestion, which was treated by delayed closure with uneventful outcome. Time to complete healing was  $29 \pm 17$  days (mean  $\pm$  SD). No flap loss occurred and all patients had effective coverage at a mean follow-up of 20 months.

**Conclusions:**

Lumbar perforator flap is a reliable option to cover large soft tissue defects in the lumbosacral area despite chronic osteomyelitis.

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**Abstract No.:** 59

**Category:** Clinical

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Lotus petal flap reconstruction: quality of life and sexual functioning following perineal reconstruction

**Introduction:**

Lotus petal flaps (LPF) are applied following extensive extra levator abdominoperineal resection. The vulvoperineal area is known for wound healing complications, especially in patients that underwent radiotherapy prior to the resection. The LPF technique closes the defect with well vascularized, non-irradiated soft tissue. There is no data available of the influence of the reconstruction on the quality of life and sexual functioning. Research on vulvar reconstruction suggests that the reconstruction may have a large impact.

**Materials and Methods:**

A cross-sectional analysis was performed following perineal reconstruction with the LPF. Quality of life was measured using the EORTC QLQ-C30 and CR29 questionnaires. The results were compared to a control group in which perineal defects were closed without flaps. Sexual functioning was only measured in patients following LPF reconstruction using the Female or Male Sexual Function Index (FSFI and MSFI) questionnaires.

**Results:**

Fifteen out of 23 patients (65%) completed the questionnaires. The control group consisted of sixteen patients. Both groups did not differ in age and gender. However, the tumors and treatment of the LPF group were more extensive. Also the follow-up time was significantly different. There were no significant differences in quality of life between both groups. Preoperatively 87% of the patients was sexually active in the LPF group; this dropped to 33% after treatment. The median score of the FSFI/MSFI was 16.8.

**Conclusions:**

This is the first study on quality of life and sexual functioning following perineal reconstruction with the LPF technique. However, conclusions should be made with care given the small sample size. Despite more extensive tumors and treatment in the LPF group, the quality of life following LPF reconstruction was comparable to the group without reconstruction. However, the LPF reconstruction seemed to effect sexual functioning and activity.

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Abstract No.: 84

Category: Clinical (Microsurgery)

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : THE "RADIO-SOME" GUIDE FOR GLUTEAL, PERINEAL AND MEDIAL THIGH PERFORATORS FLAPS DISSECTION

**Introduction:**

A "radio-some" based anatomy can provide a better evaluation of the anatomy of perforator vessels and provide landmarks to facilitate flap dissection. The superior (SGA) and the inferior gluteal artery (IGA), internal pudenda artery (IPA) and profunda femoris artery (PFA) perforator flaps are widely used in different soft tissue defects, breast and head and neck reconstruction. The aim of the study is to exhaustively depict the topographical anatomy of those "radio-some" to perform a safer perforator flaps dissection.

**Materials and Methods:**

CTA scans of 70 thighs, 80 gluteal regions, 120 perineal areas, were two-blinded reviewed to assess the source artery, location, number, type, caliber and anatomical localization of SGA, IGA, IPA and PFA perforators. The location of perforators was reproduced using a normalized two-dimensional Cartesian coordinate system, centered onto defined bone landmarks different for each anatomical region.

**Results:**

Mean number of perforators for each anatomical space was: 11.4  $\pm$  4.8 from SGA, 7.92  $\pm$  4.5 from IGA, 1.2  $\pm$  0.8 from pudenda internal artery, 3.2  $\pm$  1.02 from profunda femoris artery. Detailed results showed, in summary, a constant radiological area for each anatomical region, in which the chance to find a reliable perforator vessel is statistically higher. This zone, identified using volume rendering technique, can be transposed on the skin of patient.

**Conclusions:**

For each anatomical region is possible to find a reliable, constant and reproducible "radio-some" area, where the most suitable perforators can be identified for SGAP, IGAP, pudendal flap and PAP flap harvesting. This finding can be of support for surgeons approaching perforator free or propeller flap of those regions

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Abstract No.: 201

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Restoration of spinopelvic continuity with the free fibula flap after limb-sparing oncologic resection

**Introduction:**

Oncologic hemipelvectomy can cause significant mechanical instability, requiring reconstruction of the pelvic ring in order to restore spinopelvic continuity. Previously described methods include autografts, allografts and implants, with poor long-term outcomes. We hypothesize that the free fibula flap (FFF) after oncologic hemipelvectomy is safe and effective, resulting in high bone union rate and good functional outcomes.

**Materials and Methods:**

We performed retrospective review of all patients who received FFF after hemipelvectomy, with or without sacrectomy, at a single tertiary cancer center from 2003-2017. Surgical outcomes were assessed. Bony union and time to union were based on imaging. Functional outcomes included ability and time to ambulation. Univariate and multivariate analyses were performed.

**Results:**

46 patients (25 males vs. 21 females) received FFF. The mean follow-up was 3.28 years and the most common pathology was chondrosarcoma (30.4%). 30% underwent preoperative radiation and 65% required neoadjuvant chemotherapy. 8 patients received single-strut reconstructions and 38 had a double-strut. The most common recipient vessels were the external iliac artery and common iliac vein. All patients were able to ambulate with assistance at a median of 12 days, while the median fusion time was 183.5 days. The nonunion rate was 10.9% and hardware breakage rate was 26.1%. Only 1 patient required hardware removal and there were no flap losses. 16 patients (34.8%) developed surgical complications. Nonunion was associated with surgical complications (OR=10.8; p=0.018), reoperation (OR=9.6; p=0.013), tobacco use (OR=9.6; p=0.013), and advanced age (OR=1.1; p=0.002). Hardware breakage was associated with history of chemotherapy (OR=8.1; p=0.03) and median time to fusion (OR=1.1; p=0.04). Using objective assessment tools, 3-years post-operative functional outcomes approached those of healthy adult normative values.

**Conclusions:**

FFF for pelvic reconstruction poses as a safe procedure to restore spinopelvic continuity and preserve ambulation. Our results indicate that pelvic reconstruction using vascularized bone graft may provide favorable surgical and functional outcomes.

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**Abstract No.:** 254

**Category:** Clinical

**Time:** 4

**CR:** Yes

**Event :** 31st Annual EURAPS Meeting

**Title :** Robotic assisted reconstructive surgery: A report of two cases of perineal reconstruction utilising the Singapore flap assisted with DaVinci surgical system.

**Introduction:**

The innovation of robotic surgery has transformed many specialties across the surgical field. Plastic surgeons work jointly with many disciplines to provide reconstructive services. Hence, it is important to embrace this novel technology and be familiar with it. It adds a new prospective to surgery in limited operative space. We present our experience of vaginal reconstruction with robotic assisted flap inset This is the first report of using such technique in perineal reconstruction to the best of our knowledge.

**Case Report:**

We present two cases of vaginal reconstruction following cystectomy, urethrectomy and vaginal resection utilising the Da Vinci Robot. A Singapore flap was used to reconstruct the vaginal defect in both cases. The flap was raised in a standard approach, de-epithelialized and tunnelled through to the defect. The inset of flap was then carried out utilising the Da Vinci Robot allowing the surgeon to obtain access to the proximal vagina in the retroperitoneum. We note that this technique of flap inset did not add to the total operative time. At follow up both patients did not suffer significant flap or vaginal complications

**Conclusions:**

This report highlights our experience using robotic assisted techniques to augment flap inset in a narrow operative field. Robotic surgery is feasible with a relatively short learning curve and can be used efficiently in areas of limited access. This technique is now routinely used in our unit for cases undergoing robotic assisted surgery in conjunction with the urology team. It allows good access and relative ease of suturing in what was previously a difficult and slow procedure.

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**Abstract No.:** 153

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Closure of complex enterocutaneous fistulas with a pedicled or free muscle flap using a parachute technique

**Introduction:**

Enterocutaneous fistulas (ECF) remain one of the most challenging complications after abdominal surgery. Fistula closure often requires a major laparotomy with resection of the fistula-bearing intestinal segment. This procedure is associated with a significant risk for complications, high morbidity and mortality. Many patients are not suitable for this type of surgery due to comorbidity or a hostile abdomen. We describe the parachute design as a new method for closure of an ECF.

**Materials and Methods:**

A retrospective study was performed of patients with recalcitrant ECF operated with the parachute design from 2004 to 2019. All patients were either operated with the use of a pedicled rectus abdominis or a free latissimus dorsi muscle flap. The flap was sutured into the fistula opening using a parachute technique and covered with a skin graft. A negative pressure device was used temporarily to immobilize the flap to the abdominal wall. No bowel resection was required.

**Results:**

We operated 10 patients with ECF using the parachute design technique. All patients were unsuitable candidates for traditional fistula surgery due to a high risk for complications. Seven of them were operated with a pedicled rectus abdominis muscle flap. Three patients were operated with free latissimus dorsi flap of which one with a combined free latissimus dorsi and serratus anterior muscle flap.

Surgery was successful in 8 out of 10 patients. Two patients required a re-operation for leakage and was then successful. Surgery failed in two patients with the rectus abdominis flap due to insufficient distal bowel passage.

**Conclusions:**

Parachute design with a pedicled rectus abdominis or a free latissimus dorsi muscle flap is a promising technique for patients with ECF where standard surgical intervention is associated with a high risk for complications. This extraperitoneal method provides tension-free closure of the fistula without compromising the intestinal lumen.

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Abstract No.: 207

Category: Clinical

Time: 4

CR: Yes

Event : 31st Annual EURAPS Meeting

**Title :** A new technique for vesicovaginal fistula closure: Cystoscopic-guided autologous fat injection in the bladder wall combined with a dehydrated human amnion plug.

**Introduction:**

A vesicovaginal fistula is a feared complication after obstetric, gynaecologic and urologic procedures and causes significant morbidity. Traditionally, treatment has been via an abdominal or vaginal approach, often with the use of interpositional flaps. The senior author has previously developed, and published, a technique for closure of rectovaginal fistulas with autologous fat injection. We have now evolved the principles from this technique to a new treatment of vesicovaginal fistulas

**Case Report:**

Two patients with a vesicovaginal fistula were referred to our hospital for treatment as spontaneous closure was not obtained with conservative measures. One patient had a simple vesicovaginal fistula. The second patient had a complex vesicovaginal fistula communicating with a cavity next to the uterus. This fistula could not be treated with a standard procedure because of a hostile abdomen after radiotherapy.

During cystoscopy the fistula tract was cannulated with a catheter and autologous fat was injected in and around the fistula wall through the injection port of the cystoscope. Finally, a plug of dehydrated human amnion was connected to the catheter and drawn into the fistula tract. Afterwards the catheter was removed.

Closure of the vesicovaginal fistulas was obtained in both patients. There were no postoperative complications. Follow up revealed no recurrence after 8 months. The complex fistula was referred after 4 months. Recurrence of the vesicovaginal fistula could not be confirmed by MR or by cystoscopic examination in anesthesia. The minor discharge came from the cavity next to the uterus communicating with the vagina. The patient had no complaints of urine leakage.

**Conclusions:**

Cystoscopic-guided autologous fat injection combined with an amnion plug could be a new and promising technique for closure of vesicovaginal fistulas. This minimal invasive technique is simple to perform and associated with no donor site morbidity.

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**Abstract No.:** 47

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Arterio-venous malformations of the ear: New classification and multidisciplinary management approach

**Introduction:**

Arterio-venous malformations (AVMs) of the ear are rare and challenging vascular lesions of the head and neck region. It is vital, therefore, that all patients are treated within a dedicated multidisciplinary team (MDT) setting. The aim of this study was to establish a classification of the auricular AVMs and propose a combined interventional radiological and surgical approach based on our experience.

**Materials and Methods:**

All consecutive patients presenting with AVMs of the ear were reviewed by the Vascular Anomalies MDT before and after diagnostic angiography. Patients selected for intervention underwent synchronised embolization using Onyx 18 followed by surgical excision within 7 days and either immediate or staged reconstruction depending on type.

**Results:**

A total of 9 patients between 2014 and 2018 (left 5, right 4) (female 4, male 5) with age of first symptoms, birth-14 years old, and age of presentation 3-21 years old.

We propose a new classification for auricular AVMs into four types based on clinical and radiological appearance guiding treatment approach:

I - involves a small component of the ear allowing excision and immediate reconstruction post embolization; 2 patients

II - affects the superior two thirds of the ear with sparing of lobule and conchal bowl; patients undergo embolization, excision and monitoring before formal reconstruction; 5 patients

III- involves the entire ear requiring embolization and pinnectomy. If there is no recurrence patients can be offered a carved rib cartilage reconstruction or prosthesis; 1 patient

IV- involves the ear and surrounding tissue, making surgical management and subsequent reconstruction extensive. 1 patient

**Conclusions:**

We have developed a combined interventional radiological and surgical approach with a new classification guiding the treatments related to the anatomical and angiographic appearance for patients with AVMs of the ear. We believe that this has streamlined and improved the management of this complex and rare group of patients.

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**Abstract No.:** 66

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Surgical treatment of large and giant congenital melanocytic nevi of the cheek.

**Introduction:**

Congenital melanocytic nevi of the cheek and adjacent facial region are unusual. Although their malignant potential can be debated, they present a significant aesthetic concern. In this article, the authors present an expanded approach to evaluation and surgical treatment of these lesions in pediatric patients.

**Materials and Methods:**

43 patients aged 6 months to 18 years, were operated from 2003 to 2019 by the senior author. All patients had congenital melanocytic nevi involving one or both cheeks, with or without extension into the surrounding periorbital, nasal, temporal and lip areas and to the anterior neck. Follow-up ranged from 6 months to 17 years.

**Results:**

All patients were treated successfully with surgical excision of their congenital nevi and reconstruction with expanded or distant flaps. The workhorses for reconstruction were the expanded flap of the adjacent cheek for large nevi and the expanded supraclavicular artery perforator flap for the giant lesions. Adjacent areas (nose, lower eyelid etc.) were reconstructed with local expanded flaps, distant flaps and full thickness skin grafts. Complications included infection in 1 patient, expander exposure in two patients and asymptomatic lateral cicatricial ectropion in two patients.

**Conclusions:**

Early evaluation and treatment of large and giant congenital melanocytic nevi of the cheek may help in preventing the aesthetic, functional, and health-related issues for the patients. Although most of the current group of infants and young children will not reach full facial growth for more than another decade and a half, and therefore await critical assessment of their long-term outcomes, the authors hope that the surgical experience gained to date and the suggested surgical algorithm will assist surgeons in managing these complex reconstructions.

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Abstract No.: 43

Category: Research

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : RNA Expression Levels in Cutaneous Squamous Cell Carcinomas of Immunocompromised Organ Transplant Recipient Patients Compare to Immunocompetent Individuals

**Introduction:**

The incidence of cutaneous squamous cell carcinoma (cSCC) in immunosuppressed solid organ transplant recipients (OTR) is 100 fold greater than in immunocompetent individuals (ICP). Although common, very few studies have focused on comparing the genetic expression levels of different genes of cancer initiation pathways between OTR and ICP and none has identified nor fully explains the altered frequency or biological behavior of OTR cSCC. Our study aims to find a novel Genes expression difference, by comparing RNA level of genes involved in the cancer initiation pathways such as tumor suppressor genes and proto-oncogenes in cSCC of immunosuppressed solid organ transplant recipients compare to immunocompetent individuals.

**Materials and Methods:**

48 samples of cutaneous SCC from our outpatient clinic were enrolled to the study, 21 from immunosuppressed patients who are OTR (kidney, liver and lung recipients). Gene expression analysis was performed on RNA using nanostring probe technology. The analysis included 40 different genes from 13 cancer-associated canonical pathways including: MAPK, STAT, PI3K, RAS, Cell Cycle, Apoptosis, Hedgehog, Wnt, DNA Damage Control, Transcriptional Regulation, Chromatin Modification, and TGF-beta.

**Results:**

Expression levels of the genes related to different canonical pathways were compared between samples of immunocompetent and of immunosuppressed patients. Key driver mutation pathways were upregulated when comparing between the OTR and ICP populations. in sun exposed tumors we found upregulation of genes in several pathways in OTR compared to ICP. We compared the genetic expression in different tumor differentiation grades, and found moderate and poorly differentiated tumor in the OTR group have upregulation in all 40 genes examined.

**Conclusions:**

Characterization of the molecular biology of OTR cSCC and the analysis of genetic differences with respect to ICP cSCC will help to define the malignant potential of this high-risk variant and allow the optimization of diagnosis and treatment. Several oncogenic pathways were identified to be upregulated, further investigation is required.

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**Abstract No.:** 145

**Category:** Clinical

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Pre- Mohs Pathology- A Deceiving Report?

**Introduction:**

Mohs micrographic surgery (MMS) has been recognized as the most precise surgical intervention for margin-controlled excision of non-melanoma skin cancer (NMSC). MMS demonstrates good results in reducing tumor recurrence rates with minimal aesthetic disturbance. Patients are often referred for MMS following diagnostic tissue sampling or excision with positive margins. The goal of this study was to evaluate the implication of histologic examination prior to MMS.

**Materials and Methods:**

Retrospective review of consequently presenting patients between February 2017 and June 2019 who underwent MMS due to NMSC of the head and neck area by the senior author (n= 880).

Collected and analyzed data included: patient demographics, initial tumor size, site and subtype, duration between excision or biopsy and surgery, size of excision, results from intraoperative pathology analysis, number of MMS stages, type of closure technique, and final pathology reports.

**Results:**

Among 575 patients with residual NMSC after excision or biopsy, 37.2% exhibited no residual tumor during MMS, with 2.4% of defects required reconstruction using skin graft or local flap. Moreover, in cases that clinically only a scar was noticed, it made it harder for the surgeon to determine the extent of the tumor, causing the number of stages required until clear margins to be significantly higher, when compared to cases with clinically evident tumor (p=0.02). On the other hand, 14.4% of the 305 patients referred for MMS without prior tissue sampling, showed benign histopathology and 1% of defects required reconstruction.

**Conclusions:**

Plastic surgeons must be aware of these findings, and adjust treatment to reduce the extent of unnecessary disfigurement in patients without residual tumor. However, reconstructive procedures may still be necessary in the case of no persistent tumor. Therefore, this should be emphasized to MMS patients as part of the informed consent.

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**Abstract No.:** 111

**Category:** Clinical

**Time:** 4

**CR:** Yes

**Event :** 31st Annual EURAPS Meeting

**Title :** Combined use of Isolated Limb Infusion and Electrochemotherapy for metastatic melanoma deposits in the upper limb

**Introduction:**

Loco-regional metastatic melanoma can be devastating for the patient and challenging for the physician. Surgery remains the treatment of choice for most melanoma local recurrences however various modalities may be considered in patients who are not candidates for surgical resection. We present a case of multiple metastatic melanoma deposits of the upper limb that resolved completely with the combined use of Isolated Limb Infusion (ILI) and Electrochemotherapy (ECT). To our knowledge, this is the first combined therapy for upper limb disease.

**Case Report:**

An 85-year-old lady was presented with multiple metastatic melanoma deposits of her left forearm. These nodules were all distal to the original lesion which was excised 20 months previously. She had undergone multiple previous resections and reconstructions with skin grafts, and the only surgical option available was amputation. There was no evidence of metastatic disease elsewhere. Under general anesthesia, she underwent ILI using 15mg of Melphalan and 150mcg of Actinomycin-D in 200cc of heparinized Saline. Circulation time was 39 minutes and the limb was washed out with 1lit of Hartman's. The tourniquet was released and the limb circulation was assessed at the end of the procedure and found intact. She then underwent ECT with 2500iv Bleomycin followed by the application of electrical current with Cliniporator (IGEA®). A 15mm Hexagonal probe was used to treat visible lesions. The highest voltage and frequency used were 3.5V and 4mA respectively. Her postoperative course was uneventful and she was discharged 8 days later. 3,5 months post-operatively all metastatic deposits showed complete regression. Seven years post-op she is free of recurrences with no evidence of metastatic disease elsewhere. She remains under regular reviews

**Conclusions:**

This case has shown that a complete response can be achieved when both ECT and ILI are combined in an upper limb melanoma metastasis, particularly where no other surgical options are available.

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Abstract No.: 287

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : KEYSTONE DESIGN FASCIOCUTANEOUS ISLAND FLAP FOR CLOSURE OF NEURAL TUBE DEFECTS

**Introduction:**

Neural tube defects are not a common condition with an incidence of 4 per 10.000 births worldwide. The most typical form is known as myelomeningocele (MMC) or spina bifida, in which both meninges and spinal cord herniate through a large vertebral defect.

Relatively small skin defects after dural repair may be directly closed. However, larger defects require reconstructive closure which is often challenging.

In our institution we have been using the keystone perforator island flap (KPIF) to reconstruct moderate to large MMC defects for the past seven years.

**Materials and Methods:**

We reviewed all neural tube defects treated in collaboration with the Neurosurgery department from september 2012 to september 2019, selecting for further analysis those in which a KPIF had been used for immediate reconstruction after dural repair. Our series consists of 14 patients.

**Results:**

Wound healing was satisfactory in all 14 cases. Mean age at the time of surgery was 18 months, with three patients been treated as newborns. Mean length of hospital stay was 12 nights.

Mean follow-up was 18 months. Two cases of wound dehiscence inferior to 1 cm occurred, healing uneventfully with topical treatment. There was no associated skin flap necrosis, infection or cerebrospinal fluid (CSF) leak. No need for reintervention was noted after the reconstruction was completed.

In the long-term, all keystone flaps were sensate above the level of spinal lesion with aesthetically acceptable scars and no restricted movement-range of the back.

**Conclusions:**

In our experience the fasciocutaneous keystone flap is an ideal reconstructive method for MMC defects. It offers a robust and durable coverage with a very low rate of complications and minimal donor-site morbidity. It provides good tissue bulk and reduces wound tension over the midline, thus minimizing the risk of CSF cutaneous fistula. The cosmetic results are also satisfactory.

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Abstract No.: 35

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Overcoming wound healing complications following radiotherapy in breast dermal fibroblasts through the influence of pre-adipocytes.

**Introduction:**

Impaired wound healing in irradiated tissue is a significant clinical problem which may be improved by stromal vascular fraction (SVF) containing pre-adipocytes. We studied the morphology and behaviour of fibroblasts derived from human breast skin exposed to radiotherapy treatment to investigate challenges presented by irradiation prior to reconstruction, and whether the pre-adipocyte secretome has potential therapeutic benefit.

**Materials and Methods:**

Morphology metrics - spread cell area, perimeter and circularity - of irradiated (IR) and non-irradiated (Ctrl) dermal fibroblasts (DFs) were measured using ImageJ. Cells isolated from the SVF of human breast tissue were analysed using flow cytometry and immunocytochemistry. Conditioned medium (CM) was collected from pre-adipocytes and the effects of secreted factors compared with fibroblast growth factor (FGF)-2 on metabolic activity (AlamarBlue), proliferation (CyQuant) and scratch wound migration of DFs (n=2 Ctrl, n=4 IR donors).

**Results:**

All DFs had similar mean cell areas; however IR DFs had an increased perimeter ( $p=0.06$ ) and reduced circularity ( $p<0.01$ ) resulting in a more spindle shaped appearance. IR DFs exhibited impaired proliferation and migration, but had a higher metabolic activity than Ctrl DFs. SVF cells from human breast subcutaneous fat were positive for pre-adipocyte markers CD10, CD105 and CD73, and CD45 negative, confirming a high yield of pre-adipocytes using our protocol. Pre-adipocyte CM and FGF-2 increased proliferation of Ctrl DFs; yet had no effect on IR DFs. In contrast, pre-adipocyte CM was capable of stimulating migration of IR DFs.

**Conclusions:**

IR breast DFs have a spindle morphology, higher metabolism, reduced proliferation and slower migration during in vitro wound closure; characteristics which may contribute to poorer wound healing following radiotherapy. Human pre-adipocytes secrete soluble factors that stimulate the migration of IR DFs. Thus, the SVF may present an opportunity for future therapies to tackle the negative consequences of skin irradiation following breast reconstruction.

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**Abstract No.:** 185

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting,

**Title :** The future of interfaces in bionic reconstruction - a fully implantable myoelectric system

**Introduction:**

Bionic reconstruction has proven to be a valid therapeutic option for cases of severe upper limb defects in which biological reconstructive procedures are unable to sufficiently restore function. Currently, myoelectric upper limb prostheses are typically controlled by surface EMG signals of remnant muscles of the stump. However, the low selectivity as well as varying quality during signal acquisition heavily impact prosthetic control making it both cumbersome and unintuitive. Implantable electrodes are placed on or in a muscle and thus may overcome the issues of transcutaneous signal acquisition.

**Materials and Methods:**

In cooperation with Ripple Neuro (Salt Lake City, USA), we evaluated a fully implantable myoelectric system in both a cadaver and large animal study. The implanted system consists of a central electronic piece gathering information from 32 intramuscular electrode contacts. The EMG signals are telemetrically sent to an external receiver and can then be used as control signals for a prosthesis.

**Results:**

The system was implanted in sheep for 5 months and demonstrated both mechanical stability and functionality as well as excellent EMG signal quality of the different muscles. The cadaver study provided a proof-of-concept for the implantation of this system at different amputation levels of the upper extremity (transradial, transhumeral, glenohumeral).

**Conclusions:**

Based on the results of the long-term implantation in a large animal model, this system has the potential to overcome many issues currently seen in myoelectric prosthetic control. When combined with selective nerve transfers, this opens the possibility of acquiring a previously unattainable amount of myoelectric control signals which will greatly improve precision and intuitiveness of prosthetic limb control.

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**Abstract No.:** 258

**Category:** Clinical (Hand/Nerve)

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** The occipital triangle: the anatomical landmark for diagnosis and treatment of neurovascular occipital compression syndromes

**Introduction:**

Occipital pain is frequently associated to migraine headaches, with more than 60% of our patients presenting with signs of greater and lesser occipital neuralgia. Here, we describe the anatomical landmarks to diagnose and treat occipital neurovascular compression syndromes.

**Materials and Methods:**

12 anatomical specimens were dissected in the occipital area through a 4.5 cm oblique incision parallel to the lateral edge of the trapezius muscle. The most peripheral segment of the greater and lesser occipital nerves before exiting under the skin were identified and described in this study.

**Results:**

The greater and lesser occipital nerves, the intersecting occipital artery and lymphatic nodes were invariably found in a triangular space. The boundaries of this inverted triangle were the lateral edge of the trapezius, the medial edge of the sternocleidomastoid muscle and the nuchal line. Nerve and vessels exited the triangle piercing the nuchal line to innervate the skin. Through this approach all previously described compression points along the greater and lesser occipital nerve could be identified and released.

**Conclusions:**

The described triangular area is primarily important to perform reliable and safe occipital nerve blocks to confirm the diagnosis of occipital neuralgia. Once diagnosis is confirmed, direct surgical access to this area allows for complete decompression of the occipital nerves under local anesthesia. We defined this anatomical area the occipital triangle, which clinically corresponds to the area of maximum pain for most of the patients.

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**Abstract No.:** 259

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Results from minimally invasive surgical treatment of occipital neuralgia under local anesthesia

**Introduction:**

Since the first description of migraine surgery by dr. Guyuron, a large debate still exists about whether this surgery has real effects on migraine as this disease remain largely unknown. Here we describe a novel, minimally invasive approach to address occipital migraines.

**Materials and Methods:**

38 patients with occipital neuralgia were treated and followed up for at least 12 months. Occipital neuralgia was defined as pain along the course of the greater and lesser occipital nerve, irradiating to the temporal area and or behind the eyes. Local infiltrations of anaesthesia and cortisone were performed to confirm diagnosis. Under local anesthesia, in lateral position, we performed surgical decompression of the occipital nerves through a 4.5 oblique incision across the nuchal line.

**Results:**

66% of patients had over 50% reduction in migraine days per month, 21% had complete remission and 13% did not show any improvement. 86% of patients had a reduction of the baseline occipital pain, which corresponded to the drop by 80% in the use of anti-inflammatory drugs. In these patients, the use of anti-migraine drugs dropped from an average of 14 to 3 per month. 31% of the patients had a second trigger and 18% had a third trigger. Complications included occipital refractory neuropathic pain in 1 patient due to scar contractures and requiring revision and wound complications in 2 patients.

**Conclusions:**

To our knowledge, this is the first report on successful outcome of surgical decompression for occipital neuralgia under local anesthesia. Results were surprisingly positive also in patients with the diagnosis of cluster headaches. Since it is unknown to date what is the main target to decrease pain in migraine surgery, minimally invasive approaches and more research in this field are highly warranted.

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**Abstract No.:** 178

**Category:** Clinical

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Our personal experience with the surgical treatment of severe migraine headaches

**Introduction:**

Globally, approximately 15% of people are affected by migraine headaches. One third of patients do not respond to standard therapies and side effects limit the application. Surgical treatment of migraine comprises neurolysis or avulsion of sensory branches of trigeminal and occipital nerves located at specific trigger sites (sites of nerve compression). This study represents our personal experience with the treatment of migraine headaches.

**Materials and Methods:**

Patients treated between 2015 and 2017 with a minimum follow up of 12 months were assessed. 54 patients with 256 trigger deactivations in 60 surgeries were included. All patients were officially diagnosed with severe migraine by a neurologist, evaluated with a standardized questionnaire and had a positive respond to nerve blocks. Selection of trigger sites were guided where the pain usually starts and confirmed by the nerve block.

**Results:**

91.7% of patients had a significant improvement of migraine headaches after surgery. The mean pain reduction was 76.1%. 26.7% had a complete elimination of symptoms. 6.7% of patients had no change of symptoms.

**Conclusions:**

Migraine surgery can safely and successfully treat patients with severe migraine. In 50 of our 54 patients resistant to all prior standard therapies migraine headaches could be reduced or eliminated.

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**Abstract No.:** 27

**Category:** Clinical

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Spontaneous smile after smile reanimation surgery: a systematic review and meta-analysis

**Introduction:**

Restoring a spontaneous and emotional smile remains the ultimate goal in smile reanimation surgery. In this systematic review and meta-analysis, the reported proportion of spontaneous smiles after smile reanimation procedures was summarized and compared, and associations of reported proportions with sex, age, physical therapy, pre-operative duration of facial palsy and follow-up time were explored.

**Materials and Methods:**

The PubMed, EMBASE, CinAhl, PsycINFO, Web of Science and Cochrane databases were searched for publications reporting the prevalence of spontaneous smile after smile reanimation surgery. Data regarding the prevalence of spontaneous smiles, type of smile reanimation, sex, age at the time of operation, physical therapy, duration of facial palsy prior to the operation, follow-up time, measurement method, and assessor was extracted. Meta-analysis and meta-regression analysis was performed in Comprehensive Meta-Analysis V3 using a random effects model accounting for clinical heterogeneity.

**Results:**

Facial nerve-driven smile reanimation resulted in the highest proportion of spontaneous smiles (83%), followed by hypoglossal (45%), masseteric (32%) and accessory nerve-driven smile reanimation (32%). Dual innervation resulted in a higher proportion of spontaneous smiles (approximately 50% increase). When adjusting for the donor nerve used and dual innervation, postoperative physical therapy resulted in a significantly higher proportion of spontaneous smiles.

**Conclusions:**

Facial nerve-driven smile reanimation results in the highest proportion of spontaneous smiles. When non-facial donor nerves are used, dual innervation techniques increase the proportion of spontaneous smiles. Physical therapy seems to be beneficial for the development of a spontaneous smile.

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Abstract No.: 282

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Lower Lip Reanimation with anterior belly of digastric two staged technique

**Introduction:**

Lower lip depression was historically regarded a neglected area of facial paralysis, but with refinement of techniques, has gained increasing attention. We present the first detailed description and evaluation of a two-stage technique, using first a cross facial nerve graft (CFNG) and then the anterior belly of digastric muscle (ABDM), innervated by the CFNG, to restore dynamic, spontaneous depression of the lower lip.

**Materials and Methods:**

Retrospective analysis of patients who underwent two-stage lower lip reanimation in our unit (2010-2018). Patient demographics, aetiology and operative details were collected. Clinical photographs and videos were graded pre- and post-operatively using a 5-point scale, by 21 independent observers.

**Results:**

29 patients were eligible for analysis. 8 had an isolated lower lip paralysis, 21 either partial or complete facial palsy. 10 patients had a developmental aetiology; 11 had paralysis secondary to tumour resection; 6 had Bell's palsy; 1 was secondary to a vascular malformation and 1 iatrogenic injury. There was a mean of 15.1 months between CFNG and ABDM transfer. There were minor complications in 4 patients and 1 case was abandoned due to insufficient ABDM length. Patient follow up ranged from 12-72 months. 5 patients underwent lipofilling to correct lip notching. The mean score for all patients 2.0 pre-operatively; 3.3 post operatively. All patients demonstrated improvement (mean +1.05 points).

**Conclusions:**

This procedure is our first choice for patients with longstanding marginal mandibular branch paralysis and provides coordinated spontaneous depression of the lower lip, thus enhancing the overall perioral animation and smile.

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**Abstract No.:** 30

**Category:** Clinical (Microsurgery)

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Relational Anatomy of the Mimetic Muscles and Its Implications on Free Functional Muscle Inset in Facial Reanimation

**Introduction:**

The human smile is a complex coordinated activity of mimetic muscles predominantly recognizable by a superolateral pull at the commissure and elevation of the upper lip. The aim of this study was to revisit the muscles of facial expression responsible for these motions, evaluate their relational anatomy and orientation, and relate this to optimal positioning of free muscle transfer in smile reanimation

**Materials and Methods:**

Nineteen hemifaces from fresh cadaveric specimens were dissected. A subsuperficial muscular aponeurotic system skin flap was elevated to expose the zygomaticus major, zygomaticus minor, levator labii superioris, and levator labii superioris alaeque nasi. Muscle location, length, width, angle of pull, and any anatomic variation were noted

**Results:**

All specimens had zygomaticus major, levator labii superioris, and levator labii superioris alaeque nasi muscles present bilaterally. Conversely, the zygomaticus minor was present in only 10 of 19 hemifaces. There was no significant difference in muscle length, width, or line of pull between specimen sides. Of all the assessed muscles, the zygomaticus minor had the most transverse line of pull, at  $31.6^\circ$ ; the zygomaticus major was more oblique with a line of pull of  $55.5^\circ$ ; and the levator labii superioris and levator labii superioris alaeque nasi were oriented almost vertically with angles of  $74.7^\circ$  and  $79.0^\circ$ , respectively.

**Conclusions:**

The mimetic muscle vector is quite vertical in comparison to the angle obtained by traditional dynamic smile reconstruction surgeries. A more vertical vector, especially at the upper lip, should be considered in smile reconstruction

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**Abstract No.:** 112

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Sensorimotor connections between CN V and CN VII may provide a possible anatomical and histologic basis for synkinetic buccinator hypertonicity

**Introduction:**

Buccinator muscle hypertonicity is a disfiguring sequela often observed in patients with post-paretic synkinesia. The buccinator muscle is dually innervated through plexus-like connections between the trigeminal and facial nerves- receiving both motor and sensory innervation. However, it is currently unknown why this specific muscle receives its innervation through this sensorimotor network. This study aims to elucidate the innervation of this muscle and provide suppositions on how its dysregulation may underlie buccinator hypertonicity.

**Materials and Methods:**

5 formalin-fixed and fresh-frozen hemifaces were dissected. After exposing distal branches of the facial nerve, the mandible was resected. CN V/CN VII anastomoses were meticulously dissected, and verified by histology, using S100, H&E, VAcHT, and TH staining. Biopsies of the buccinator, masseter, and orbicularis oculi muscle were analyzed using the same stains.

**Results:**

Plexiform anastomoses between the buccal nerve and buccal branches were found in all hemifaces. Histologic analysis revealed a fusion of V3 and VII fibers into a single nerve. VAcHT staining showed a linear decrease in mean staining intensity along the length of the anastomosis toward the V3 connection point, indicating fusion of sensory and motor fibers. A higher concentration of sensory fibers and a co-localization of sensory nerve endings with motor fibers were also observed in buccinator muscle biopsies, but notably absent in those of the masseter and orbicularis oculi.

**Conclusions:**

The close coupling of sensory and motor innervation was found to be a unique feature of the buccinator muscle. Anatomical and histologic findings seem to suggest CN V and CN VII are involved in a concerted feedback system with the buccal nerve possibly contributing proprioceptive information from the buccinator muscle while the facial nerve contributes motor response. An imbalance between motor and proprioceptive feedback may underlie buccinator hypertonicity, however, further studies are needed to elucidate this concept.

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**Abstract No.:** 57

**Category:** Clinical (Hand/Nerve)

**Time:** 4

**CR:** Yes

**Event :** 31st Annual EURAPS Meeting

**Title :** Successful reinnervation of the diaphragm after bilateral phrenic nerve section and immediate reconstruction using contralateral phrenic nerve orthotopic graft

**Introduction:**

The consequences of unilateral phrenic nerve injury range from an asymptomatic radiographic abnormality to severe pulmonary dysfunction. On the other hand, bilateral injury inevitably leads to ventilator dependence. Strategies for phrenic nerve reconstruction include primary suture, interpositional nerve grafts or neurotization. We describe an unique case of successful reinnervation of the diaphragm in a patient who required urgent immediate phrenic nerve reconstruction.

**Case Report:**

A 40-year-old woman underwent resection of a giant synovial sarcoma (24 x 12 x 13 cm) located in the anterior mediastinum. Both phrenic nerves were infiltrated by the tumor. On the right side, a 8-cm long segment had to be resected, leaving a 3-cm long distal stump and a viable proximal stump. On the left side, most of the nerve with part of the diaphragm muscle were resected, resulting in an unrepairable lesion. The microsurgical team was urgently called to perform phrenic nerve reconstruction and prevent the patient from ventilator dependence. A 10-cm nerve graft was harvested outside of the tumoral zone from the residual left phrenic nerve and secured to the contralateral stumps with epi-perineural Prolene sutures. The patient recovery was followed until three months post-operatively, when Ultrasonography revealed a mean diaphragmatic excursion of 7.03 cm. Chest Radiography acquired during inspiration also confirmed improved function of the right hemi-diaphragm. Night oximetry was normal (basal SaO<sub>2</sub> 93.2%, oxygen desaturation index 5.1). Therefore, patient was weaned from mechanical ventilation.

**Conclusions:**

Our unique case represents the first report of successful reinnervation of the diaphragm with a contralateral phrenic nerve orthotopic graft. According to the like with like reconstructive principle, the use of the contralateral nerve graft, which shared the same diameter, cross-sectional shape, number of fascicles and fascicular pattern of the recipient, combined with the immediate timing of repair, is probably the reason for the successful result of the reconstructive procedure.

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**Abstract No.:** 126

**Category:** Clinical (Microsurgery)

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Complex sciatic nerve injuries: Is the prognosis bad?

**Introduction:**

Since 1988 we have operated 2560 nerve injuries from which 15 involved the sciatic nerve. The prognosis of these lesions has been depicted as poor in the literature and is best known from war injury .

The long regeneration distance from the axons has been the critical issue in the sciatic nerve . Is the functional recovery poor? Our aim is to describe the restoration of function in these 15 patients after 2.5 years and their ability to regain work.

**Materials and Methods:**

The mean age of the patients was 38+-6years. 13 were men, 2 women. Four lesions were located close to the pelvic bones, 5 lesions involved the femur shaft, 6 were located in the popliteal fossa.

3 lesions were repaired acutely,12 came for secondary reconstruction between 2 and 32 weeks post-injury..

All possible methods for nerve reconstruction were applied in these cases .

The Functional Sciatic Nerve Index(FSNI) was calculated before and after surgery . The ultimate evaluation was 1) ability to walk without device 2) return of sensation and 3)work regain

**Results:**

The FSNI improved significantly ( $p<0,01$ ) from the time before surgery compared to the evaluation after 2.5 years.

12/15 patients regained protective sensibility without pressure ulcers on the sole of the foot. 2point discrimination can not be measured. 11\*/15 returned to their original work with some adaptation in shoes.

Nerve reconstruction with improvement of the vascular bed are key factor in the final outcome

**Conclusions:**

The prognosis of Sciatic nerve injuries is much better as reported in the literature . The micro-nerve reconstruction is worthwhile to do for the individual patient.

The young age is important for the recuperation and early exploration is advocated.

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Abstract No.: 279

Category: Clinical

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : AGE CORRELATION BETWEEN, CLINICAL AND AESTHETIC OUTCOMES IN BREAST RECONSTRUCTION

**Introduction:**

Breast reconstruction is an elective procedure, specific indication may vary according to patients' age. Risk-factors related complication in different type of reconstruction were assessed as a function of age to highlight eventual contraindication.

**Materials and Methods:**

From 2004-2014, 1251 consecutive reconstructions (993 patients) were retrospectively analysed and divided per age in group-A (<50yr), group-B (≥50=59yr), group-C (≥60=69yr), and group-D (≥70yr). Each group was categorized on type of reconstruction in the implant-based, pedicled flap, free flap and fat graft subgroups. Patient demographics, comorbidities, ASA class and length of stay were assessed using Chi-square and Kruskal-Wallis H analysis to investigate complications rate among age-groups considering  $p < 0.05$  as significant. Pre and postoperative digital photographs were used to grade aesthetic results by patients and blinded plastic surgeon team.

**Results:**

Overall complications rate was 25.2%, including capsular contracture/implant leak 25.2% and wound dehiscence 7%, being the most common complication in implant-based and autologous reconstructions, respectively. Mean length of stay was 5.4 days ( $p = 0.357$ ). Age, ASA class, smoking-history, previous radiotherapy wasn't correlated with an increased risk of complication. BMI was the only significant predictor ( $p = 0.001$ ) but OR (1.2) demonstrated only minimal risk increase. Implant-based subgroup was associated with a higher complication risk compared to the other reconstructive procedures (OR 2.5,  $p = 0.001$ ). In all age-groups, autologous reconstructions (pedicled, free flap and fat graft) was correlated with a statistically significant lower complication rate compared to implant-based reconstruction ( $p = 0.001$ ). Patient and surgeon aesthetic surveys demonstrated an overall positive opinion in all age-groups ( $p > 0.05$ ), but slight lower patient satisfaction in implant-based reconstruction reflecting morbidity related to prosthesis.

**Conclusions:**

Advanced-age it is not a risk factor for breast reconstruction, while implant based reconstruction was associated with a higher risk of complication compared to autologous one, that may provide older woman with greater benefits.

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Abstract No.: 78

Category: Aesthetic

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Evaluation of Aesthetic Revisions After Autologous Breast Reconstruction: An Analysis of 3,780 Free Flaps

**Introduction:**

Data on aesthetic revisions (AR) after free flap autologous breast reconstruction (FFABR) are lacking. We sought to ascertain AR rates after FFABR, as well as factors associated with revisions.

**Materials and Methods:**

Patients undergoing FFABR (2008-2017) were identified in a prospectively-maintained registry. Breast AR included scar revisions, fat grafting, liposuction, dog ear excision and implant-related revisions. Revision rates and mean number of revisions were calculated. Cox regression controlling for potential confounders determined patient-level and operative factors associated with AR. The unit of analysis was at the flap-level.

**Results:**

We identified 2,352 patients undergoing 3,780 flaps; 75.4% were bilateral. Characteristics more likely to be present in flaps undergoing AR included White race, lower ASA class, cancer, and lymphedema (all  $p < 0.05$ ). Type of flap, chemotherapy and radiation therapy also differed between cohorts ( $p < 0.05$ ). There were no differences in age, obesity ( $BMI > 30$ ), comorbidities, or reconstruction timing ( $p > 0.05$ ).

The AR rate was 36%, the median time-to-first-revision was 299 days after discharge (IQR 186-514), and 80.5% occurred within two years. The majority of flaps that underwent AR required one revision (66.2%), 12.6% underwent  $> 2$  revisions. Liposuction was the most common AR (17.4%).

Factors independently associated with AR included White race (Ref. Black; Hazard Ratio [HR] 1.42 [95% Confidence Interval: 1.13-1.78],  $p < 0.01$ ); delayed reconstruction (HR 1.16 [1.02-1.32],  $p < 0.01$ ); DIEP (Ref. muscle-sparing free TRAM flap; HR 1.11 [1.05-1.18],  $p < 0.01$ ), SIEA (HR 1.5 [CI: 1.13-2],  $p < 0.01$ ), and other flap (GAP, TUG, PAP; HR 3.1 [2.34-4.11],  $p < 0.01$ ); surgical site occurrences (HR 1.31 [1.16-1.48],  $p < 0.01$ ); and medical/surgical complication (HR 1.49 [1.32-1.68],  $p < 0.01$ ).

**Conclusions:**

One-fourth of flaps require at least one AR after FFABR and most occur within two years. White race, type of flap, delayed reconstruction and complications are associated with increased AR. These data should be used to set appropriate expectations preoperatively and to illustrate the timeline of reconstruction in patients seeking FFABR.

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**Abstract No.:** 67

**Category:** Research

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Evaluating the perfusion patterns of selected perforators in a hemi-DIEP flap with dynamic infrared thermography and indocyanine green fluorescence angiography.

**Introduction:**

The balance between flap size and perfusion area of a dominant perforator can be a challenge. In this study we applied invasive indocyanine green fluorescence angiography (ICG-FA) and non-invasive dynamic infrared thermography (DIRT) to evaluate perfusion patterns of hemi-DIEP flaps following perforator dissection.

**Materials and Methods:**

Patients selected for DIEP breast reconstruction were prospectively included in the study. Preoperative perforator mapping was performed on all patients with computer tomographic angiography (CTA) and a handheld Doppler Ultrasound for perforator mapping as a standard routine. Afterwards, they were examined with DIRT and ICG-FA in general anaesthesia, both before the operation and after flap dissection with preserved dominant perforators.

**Results:**

30 hemi-DIEP flaps were dissected on the abdomen of 15 selected females (average BMI 26.6 kg/m<sup>2</sup> [24 - 30]). 40 % had previously been operated in the lower. Hot spots on DIRT were associated with the brightest first appearing fluorescence spots on ICG-FA and these corresponded with suitable perforators selected during surgery. Both DIRT and ICG-FA demonstrated comparable changes in the perfusion patterns of the skin flaps after perforator dissection. Thermal patterns from the skin surface observed with DIRT made it possible to continuously monitor the perforator activity during surgery, while ICG-FA only provided a short-time dynamic image of perfusion. Areas with disturbed flap microcirculation due to deep adhesions from previous surgery were easier to interpret with two coloured ICG image.

**Conclusions:**

DIRT is an easy non-invasive technique for visualizing perforator perfusion after perforator dissection, but ICG-FA is useful among patients who have been previously operated in the abdomen. Both techniques are reproducible and the perfusion results corresponds well with each other.

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Abstract No.: 216

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Do bilateral procedures increase the burden of risks for breast reconstruction with DIEP flaps at obese patients?

**Introduction:**

Prophylactic and therapeutic nipple sparing mastectomies with simultaneous breast reconstruction have been constantly increasing. Obesity is a well known risk factor for higher complication rates in breast reconstruction. In this study, we aimed to compare bilateral and unilateral procedures in obese patients who underwent breast reconstruction with DIEP flaps.

**Materials and Methods:**

79 consecutive patients who underwent breast reconstruction with DIEP flap in our department between 2017-2019 were included in this retrospective study. 28 patients with BMI > 30 were classified as group 1 and 51 patients with BMI <30 were group 2. The patients in Group 1 were further divided into three subgroups as bilateral reconstructions, unilateral reconstructions and unilateral reconstructions with symmetrization to the contralateral breast. Postoperative complications, the length of hospital stay, operation time were evaluated. In addition, the effect of bilateral procedures on complications in obese patients was compared.

**Results:**

Group 1 had significantly more rates of dehiscence (11/28 vs 9/51, p=0.023), mastectomy skin flap necrosis (16/28 vs 13/51, p=0.033), and reoperation (13/28 vs 11/51, p=0.004 ). The operation time was significantly higher in group 1 (p=0.023). There was no significant difference, between groups in terms of hematoma or seroma formation (4/28 vs 6/51), flap loss (2/28 vs 3/51) and pulmonary tromboembolism (1/28 vs 4/51) rates. When obese subgroups were compared, no significant difference was observed regarding medical and surgical complications.

**Conclusions:**

Our results, in parallel to the existing literature, point out the higher complication rates associated with obesity in microvascular breast reconstruction. Yet, bilateral procedures did not significantly increase the complications in obese patients. Our study shows that bilateral procedures can be performed in these cases by taking appropriate prevention and informed consent.

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Abstract No.: 260

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Enhanced Recovery Early Discharge in Microsurgical Breast Reconstruction. The Two Day DIEP - a Feasibility Study

**Introduction:**

The standardisation of postoperative care with enhanced recovery after surgery (ERAS) protocols has been shown, in various surgical specialities, to decrease postoperative length of stay, reduce analgesic use and reduce healthcare costs. The implementation of such an ERAS pathway for free flap breast reconstruction at our institution in 2015 has led to significant reductions in inpatient length of stay (LOS), and a trend toward discharging as early as day two postoperatively when ERAS criteria are met. This study analyses the feasibility and safety of two day LOS in such patients

**Materials and Methods:**

Single centre retrospective cohort study of all DIEP breast reconstructions under ERAS protocol care since April 2015; 2 day LOS (D2) vs. >2 day LOS (>D2). Patient demographics, intraoperative care, postoperative outcomes and complications were assessed.

**Results:**

64 patients were discharged at day 2 post DIEP to June 2019 (8.7% of 674 total cases). No difference in rates of bilateral, bipediced or contralateral reduction cases were seen, but significantly fewer D2 discharges were immediate reconstructions (28% vs 42%,  $p<0.05$ ). Mean BMI (28.4 vs 32.6,  $p<0.05$ ), residence distance from hospital (22.1 vs. 34.2 miles,  $p<0.05$ ) and rate of no PMH (67% vs. 48%,  $p<0.01$ ) were all significantly less in D2 patients. D2 morphine PCA use was lower in the early postop period (5.4 vs. 12.2mg,  $p<0.01$ ), with all patients mobile at day 1. Both 30 day readmission (3.39% vs. 8.59%) and early return to theatre (0% vs. 7.62%) were significantly lower in D2 cases.

**Conclusions:**

Management with 2 day LOS in DIEP breast reconstruction is rising in our unit. This practice appears safe with complication rates among these patients being lower than the whole DIEP cohort. Specific demographics and patient characteristics may help identify suitable potential candidates for early discharge preoperatively.

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Abstract No.: 120

Category: Clinical (Microsurgery)

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Positive effects of the Enhanced Recovery After Surgery (ERAS) protocol in DIEP flap breast reconstruction.

**Introduction:**

Enhanced recovery after surgery protocols are successfully implemented in different surgical specialties, but little is known about the effect in microsurgical breast reconstructions. The aim of this study was to determine whether an enhanced recovery after surgery (ERAS) protocol contributes to a reduced length of stay without an increase in postoperative complications for patients undergoing a DIEP flap breast reconstruction.

**Materials and Methods:**

The effect of the ERAS protocol was examined using a single-center retrospective cohort study. Patients who underwent surgery between November 2017 and November 2018 using the ERAS protocol were compared with a historical control group (pre-ERAS) who underwent surgery between November 2016 and November 2017. The primary outcome measure was hospital length of stay. Secondary outcome measures were postoperative pain and postoperative complications.

**Results:**

152 patients were included (ERAS group, n = 73; pre-ERAS group, n = 79). Mean hospital length of stay was significantly shorter in the ERAS group than in the pre-ERAS group (5 vs. 6 days, p <0.001). The average pain score was 1.73 in the ERAS group compared to 2.17 in the pre-ERAS group (p = 0.032). There were no significant differences between the groups in postoperative complications. The ERAS group experienced less constipation (41 vs. 25 patients, p= 0.028).

**Conclusions:**

An enhanced recovery after surgery protocol contributes an accelerated postoperative recovery of patients undergoing a DIEP flap breast reconstruction. In this study a significant decrease was found in hospital length of stay, patient-reported pain score and adverse health issues.

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Abstract No.: 204

Category: Clinical (Microsurgery)

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** An algorithmic approach for simultaneous breast and upper-limb lymphedema reconstruction with a predesigned chimeric DIEP & lymph-node flap

**Introduction:**

Introduction. Autologous chimeric DIEP and vascularized inguinal lymph node (VILN) flap provides an excellent option for simultaneous breast and upper-limb lymphedema (ULL) reconstruction. We propose an algorithm for using a predesigned chimeric abdominal flap for simultaneous breast-lymphedema reconstruction.

**Materials and Methods:**

Methods. Between 2012-2019, twenty-two consecutive women (mean age 49years) suffering from mastectomy and ULL had a delayed reconstruction with a combined DIEP-VILN transfer. All patients underwent a preoperative SPEC-CT of both groins to select the VILN flap, and a CTA to select the abdominal perforator and predesign the DIEP island accordingly. Based on our algorithm, we considered the location of the selected VILN and abdominal perforator: ipsilateral or contralateral to the mastectomy side(MS). When the VILN and abdominal perforator are both ipsilateral (a) or the VILN is ipsilateral and perforator contralateral to the MS (b), the DIEP island is designed in an orthograde fashion; when the VILN and perforator are both contralateral (c) or the VILN contralateral and perforator ipsilateral to the MS (d), the DIEP island is designed in a reverse way and the chimeric flap is transferred to the chest after 180o rotation. Post-operative qualitative and quantitative volumetric assessment was performed.

**Results:**

Results. Fourteen chimeric flaps were type (a) or (b), while eight were (c) or (d). Twenty-one flaps fully survived; one partial DIEP flap necrosis was recorded. Five patients experienced minimal donor-site wound complications; four patients required minor secondary breast revisions. After mean 23months' follow-up, symptomatic and functional improvement of all patients' ULL was recorded, with 53% mean volume reduction. Lymphoscintigraphy at 12-18 months postoperatively showed an improvement in 79% of cases. No donor-site lymphedema was documented.

**Conclusions:**

Conclusion. Using a predesigned chimeric DIEP-VILN flap, our algorithm may provide a safe approach to simultaneous breast and lymphedema reconstruction; it optimizes aesthetic and functional results and minimizes the risk for donor-site complications.

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**Abstract No.:** 301

**Category:** Aesthetic

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Quantifying outcomes of nanofat microneedling with Canfield facial scan analysis

**Introduction:**

Regenerative medicine has become an important player in rejuvenating therapies. The introduction of microneedling to promote percutaneous collagen deposition is now combined with stromal vascular fraction in a treatment called nanofat microneedling. This method ensures a deep dermal deposition of nanofat while the needling activates a dermal non-inflammatory wound healing cascade.

**Materials and Methods:**

Nanofat microneedling can be performed with a sterile needling device containing 20 1,5mm gold plated titanium needles with a central pump system connected to a 8cc vial filled with nanofat (Guangzhou Ekai elektronik Technology Co, Guangzhou, China). One-hundred patients received nanofat microneedling of the face and were evaluated pre- and postoperatively with a Canfield facial scan analysis system measuring facial spots, wrinkles, texture, pores, UV spots, pigmentation, erythema and porphyrins in a standardized manner. The scans were taken at both six and nine months postoperatively.

**Results:**

Canfield facial scan analysis showed that nanofat microneedling has a distinct effect on skin quality and induces changes in facial wrinkling, texture, pores and porphyrins. The measurements showed that changes were ongoing both at six and nine months postoperatively with a certain interindividual variability in response to the treatment.

**Conclusions:**

The skin of patients receiving nanofat microneedling of the face showed quantifiable changes in skin quality parameters, measured by a standardized facial scan analysis system. As observed in other fields of regenerative medicine, effects might be minimal in the first months and become more apparent over time. Nanofat microneedling could play a role as an antiaging therapy to slow down the skin aging process.

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**Abstract No.:** 50

**Category:** Aesthetic

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** High SMAS technique with platysmaplasty vs MACS lift. Comparing the results regarding longevity and patients' satisfaction.

**Introduction:**

The aim was to review our results in High SMAS technique combined with platysmaplasty compared with the MACS lift the last 6 years.

**Materials and Methods:**

42 patients (37 women and 5 men) underwent facelift by the same surgeon. 24 High SMAS and Platysmaplasty and 18 MACS lifts. Their mean age was 60,5 for the High SMAS group and 58.1 for the MACS group and their follow up time was mean 33,58 months and 35,77 months accordingly. In the High SMAS group all the necks have been opened submentally and fully dissected laterally with platysma plication and lateral platysma release for better mandibular and neck definition. In the MACS lift group the standard technique as originally described was used. All the patients were reviewed by filling a questionnaire prepared by our psychologist regarding the level of satisfaction of the procedure, if the result is lasting, how was their post op recovery and if they would suggest the procedure to a friend. We also compared the complications of the two groups, operative time and reviewed their before and after photos with the same conditions (same camera and flash vs no flash) regarding the mandibular and neck definition.

**Results:**

The High SMAS group had longer surgery, longer recovery period, higher overall complication rates (12,5% vs 5,5%). Higher satisfaction rate for the lasting results over time with the High SMAS vs MACS (79% vs 33%). Friend recommendation for surgery was 62,5% vs 77,8%. Our view comparing before and after photos was that the High SMAS group had far better jaw line and neck definition lasting over time than the MACS lift technique.

**Conclusions:**

Even though the risk of complications is higher and theatre time is longer the High SMAS technique with platysmaplasty gives far better long-lasting aesthetic results and more satisfied patients when compared with the MACS technique.

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**Abstract No.:** 223

**Category:** Clinical (Cleft/Cranio)

**Time:** 4

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Temporalis Suspension of the Orbicularis: The Missing Link in Facial Rejuvenation

**Introduction:**

To address the descent of the cheek-lid junction, traditional face lift procedures resort to filling the tearthrough with fat and tightening the orbicularis through ciliary incisions. We postulate that the true anatomic basis of this deformity is laxity and gravitational descent of the orbicularis muscle fibers; often accentuated by longstanding botox paralysis and filler weight. Therefore, proper correction requires orbicularis tightening and suspension of the muscle to a more cephalic structure. We hereby describe this procedure and present our experience with 100-consecutive cases.

**Materials and Methods:**

Through a temporal hairline incision, we elevate a thin skin flap up to the orbital margin and expose the temporal muscle. Then, under high power magnification, we dissect the lateral cephalic segment of the orbicularis and elevate it as a thin muscle flap while preserving the facial nerve branches coursing underneath. Cephalic pull on the dissected muscle brings up the cheek-lid junction and treats the tearthrough without distorting the lateral canthus. Then we maintain the correction by plicating and suspending the muscle to the temporalis fascia with a resorbable suture. We close the incision after very minimal skin resection. We occasionally add fat grafting to correct the orbital hollowness of prior fat resections.

**Results:**

We performed this isolated procedure on patients with no lower lid skin excess and a persistent tearthrough deformity after traditional lower blepharoplasty and facelift failed to adequately rejuvenate the midface. Compared to the ciliary approach with muscle tightening and resection, this temporal suspension procedure better corrects the anatomic deformity without distorting eye shape. We encountered no facial nerve palsy. However, as a drawback, exposure of the muscle and its suspension required a more cephalic extension of the incision along the temporal hairline.

**Conclusions:**

Temporal suspension of the isolated orbicularis muscle is an anatomically safe and sound procedure that correctly rejuvenates the midface and peri-orbital area.

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**Abstract No.:** 29

**Category:** Aesthetic

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Visualization of an individual patient's arterial network of the face through Augmented Reality

**Introduction:**

Filler injections have become increasingly popular nowadays, but intra-arterial injection of fillers may lead to skin necrosis or even blindness. Due to a strong variability of the arterial course of the face, even a thorough knowledge of the vascular anatomy cannot guarantee a completely safe filler injection. No imaging method has been described that can comprehensively visualize the arteries of the face without radiation or contrast injection; equally non-existent are technologies that can display the arterial network in real time on the face of a patient.

**Materials and Methods:**

20 healthy volunteers underwent a 3D-TOF Magnetic Resonance Angiography (MRA) in an oblique coronal plane after infrared (IR) facial heating. Imaging was done both on 1,5 and 3 Tesla MRI devices. To avoid intravenous contrast injection, a 3D Time of Flight (TOF) flow-based technique was used. The arterial network was isolated as a 3D mesh and visualized through custom-built Augmented Reality (AR) software, using either the front- or the back cam of any smartphone.

**Results:**

Both the 1,5T and 3T MRA allowed visualization of the most important arteries of the face: Facial (in 89% of the cases), Angular (87%), Superior (84%) and Inferior (84%) Labial, Lateral Nasal (97%), Dorsal Nasal (84%), Supratrochlear (87%), Supraorbital (68%), and Superficial Temporal Arteries 100%). Dental wires or bone screws may have caused artefacts. No complications were reported. All visible arteries on MRA and their according depth levels could effectively be visualized on the patient's face using a custom-built AR application. The accuracy of the displayed arteries was confirmed using Duplex Ultrasound.

**Conclusions:**

This technology not only represents the first analysis of the arterial network of the face of an individual patient without radiation or intravenous contrast injection, but also the first description of an accurate and dynamic visualization of the individual arterial network in AR on the patient's face.

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**Abstract No.:** 300

**Category:** Aesthetic

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** Revision Rhinoplasty in Cases with Open Rhinoplasty: Lessons to be Learned from 252 Cases, and Analysis of Risk Factors

**Introduction:**

The revision rhinoplasty rates reported in the literature range from 5 to 15%. In this study, patients who required aesthetic revision surgery after open rhinoplasty were retrospectively screened for risk factors.

**Materials and Methods:**

Of 4003 patients who underwent open rhinoplasty between 2013 and 2018, 252 patients who underwent revision were included in the study. Nasal deformities before the revision were determined for each patient and evaluated in terms of their statistical relationship with preoperative nasal morphology and surgical techniques used.

**Results:**

The revision rate was found to be 10.8%. Mean age was 31.9 years. Thirty patients were male, while 222 were female. The three most common aesthetic reasons for revision were insufficient nasal tip rotation (37.7%), hanging columella (30.2%) and supratip deformity (28.6%).

According to the logistic regression analysis:

The use of strut increased the risk of inadequate nasal tip rotation by 5.3 times compared to the tongue-in groove technique, while inadequate nasal tip projection prior to surgery increased this risk by 2 times, and the presence of a low NL angle increased it by 0.8 times. Being over 40 years increased the risk of hanging columella by 6.8 times, while the use of strut grafting instead of tongue-in groove increased this risk by 5.9 times. The use of strut grafts instead of the tongue-in groove technique increased the risk of supratip deformity by 2.2 times.

**Conclusions:**

To ensure adequate nasal tip rotation after surgery in patients with advanced age and low nasal tip projection and rotation, it will be more appropriate to either use the tongue-in groove technique or to rotate the nasal tip more than normal. In patients with advanced age (>40 years) and low NL angle prior to surgery, the use of tongue-in groove technique instead of strut grafting may be advantageous for reducing the incidence of supratip and hanging columella.

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Abstract No.: 38

Category: Aesthetic

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Role of thin skin thickness in the choice of rhinoplasty technique: analysis of long-term results and patient satisfaction

**Introduction:**

The aim of this randomized controlled study was to analyze the long-term results of patients with thin skin thickness undergoing rhinoplasty.

**Materials and Methods:**

The study was performed with a randomized block design. Patients were randomly divided into 4 groups: group 1, camouflage of the dorsum with diced cartilage; group 2, camouflage of the dorsum with lipofilling; group 3, camouflage of the dorsum using temporal fascia; and group 4, no camouflage of the dorsum were used. Patients answered the Italian version of the FACE-Q rhinoplasty module. We compared the pre- and postoperative patient satisfaction in the 4 groups using the chi-squared test for unpaired data. Two plastic surgeons reviewed all the postoperative photos of the study patients and rated the photos on a scale of 1 to 5.

**Results:**

A total of 101 patients, underwent to primary rhinoplasty between January 2012 and March 2018, satisfied the inclusion criteria and were enrolled in this study. FACE-Q results revealed statistically significant differences ( $P<0.01$ ) between the preoperative and postoperative values in group 1 versus the other groups. Over the long-term follow up, group 1 maintained stable results in comparison with other group ( $P<0.01$ ). Group 4 underwent to the major numbers of secondary procedures in comparison with other groups ( $P<0.01$ ). According to evaluations by the 2 reviewers, group 1 group 3 were the most satisfactory outcomes ( $P<0.01$ ).

**Conclusions:**

This was the first randomized study to show that the thin skin thickness needs always a procedure for camouflage of the dorsum and the diced cartilage is the best choice for a good long-term outcome.

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Abstract No.: 230

Category: Aesthetic

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Safely And Stably Nasal Dorsum Restoration Following Dorsum Reduction in Primer Rhinoplasty: Transosseous Horizontal Matress Suture and Subcartilagenous Transmucosal Suture

**Introduction:**

Nasal dorsum hump reduction is one of the most common reasons for patients to seek rhinoplasty surgery. Separation of the upper lateral cartilage from the septum and bone and subsequent cartilage hump excision during rhinoplasty disrupts the natural anatomy of the dorsum. Following preservation of the osteocartilaginous structures, an anatomical position should be restored to maximize both functional and aesthetic result.

**Materials and Methods:**

324 patients who underwent primary rhinoplasty between January 2014 and January 2018 were included. Of the patients, 186 (57.4%) were female and 138 (42,6%) were male. Nasal hump reduction were performed and holes in the nasal bones were created drill machine using a 1 mm drill bit. Once the nasal bones can be approached freely at the midline, two holes were made using the drill. The nasal bones were stabilized at the midline using a 4.0 polidioksanon suture. The inner mucoperichondrium of the ULCs was fixed to the septum with two sutures. The ULCs remain in their natural position with these sutures.

**Results:**

On quantitative computer analysis , the dorsal aesthetic lines of 299 (92.2%) patients were symmetrical. Dorsum irregularities were found in 12 (3.7%) patients. Revision surgery was planned in six (1.8%) of these patients. Six (1.8%) patients had a suture reaction and six (1.8%) patients underwent revision surgery in postop year one due to tip problems. Therefore a total of 18 (5.5%) patients required revision rhinoplasty The results of the ROE scores show that 65% and 28%. of patients gave 4 points and 3 points for ROE questionnaire which shows that 93% of points were 3 and higher.

**Conclusions:**

Reconstruction of disrupted nose dorsum anatomy in rhinoplasty surgery is necessary for successful results. The protective and restorative techniques for nasal dorsum described provided a stable, permanent, soft, symmetrical and natural nose dorsum at one year follow up.

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Abstract No.: 294

Category: Aesthetic

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

**Title :** Cartilage Sparing Otoplasty: The Effects of Adipo-Perichondrial Flap-Assisted Posterior Auricular Muscle Complex Technique on the Repair of Prominent Ear Deformities

**Introduction:**

In the repair of prominent ear deformities, the main objectives are to recreate the antihelical fold, reduce projection in patients with a large concha, and normalize the distance between the ear and the cranium. PAMC is a strong structure including the trapezius muscle, occipital muscle, extrinsic ear muscles, temporal fascia, and sternocleidomastoid fascia, and it can be used as a graft for reconstruction. The posterior auricular muscle, also located in PAMC, adheres to the concha behind the ear and plays an important role in the position of the ear and its connection with the cranium. This study evaluated the efficacy of the adipo-perichondrial flap-assisted posterior auricular muscle complex (PAMC) flap technique, which involves a new approach to the repair of prominent ear deformities.

**Materials and Methods:**

A medially based PAMC flap and a laterally based adipo-perichondrial flap were elevated in 22 patients with prominent ear deformities. In order to shape the ear, the PAMC flap was sutured to the transition zone between the helix and antihelix, and the adipo-perichondrial flap to the periosteum of the mastoid bone. The ear-cranium distances were measured preoperatively and at postoperative sixth months.

**Results:**

Thirteen patients were female and nine were male. The mean age of the patients was 19.4 years, and the mean follow-up period was 10.6 months. The ear-cranium distance significantly decreased in the postoperative sixth-month evaluations compared to the preoperative values ( $p < 0.05$ ). No relapse, suture exposition, hematoma, keloid scar or infection was observed.

**Conclusions:**

PAMC is a strong anatomical structure that includes the trapezius muscle, occipital muscle, extrinsic ear muscles, temporal fascia, and sternocleidomastoid fascia. By elevating this structure as a flap and combining it with an adipo-perichondrial flap, successful results can be achieved in the repair of prominent ear deformities, which prevents relapses and maintains the shape of the ear in the long term.

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**Abstract No.:** 158

**Category:** Aesthetic

**Time:** 8

**CR:** No

**Event :** 31st Annual EURAPS Meeting

**Title :** A novel approach for tuberous breast correction using Power-Assisted Liposuction, Loops and Lipofilling (P.A.L.L.L.)

**Introduction:**

With the growing popularity of autologous fat grafting in breast procedures, the authors adopted a composite tuberous breast reconstruction using tissue recruitment, autologous fat transfer and surgical loops.

**Materials and Methods:**

Between 2014 and 2018, a total of 34 patients underwent tuberous breast correction by combined lipofilling and the use breast loops. After infiltration of the donor site and fat harvesting, infiltration and tunnelisation of the breast are performed to release the tethering fibers and mesh expand the native matrix, especially to the lower pole. Thereafter, reshaping of the breast is performed using loops passed through skin stab incisions with a 3-mm 3-hole cannula. Using a number 2 unabsorbable suture, 2 loops around the breasts are taken. The first loop is designed to define the footprint, recruit tissues from the breast surroundings, and expand the lower pole. The second loop is placed to fixate and suspend the inframammary fold in its new position. Each loop spans the superficial subcutaneous tissue at the lower inner and outer quadrants, the deep plane at the upper quadrants of the breast. In cases of ptosis, a third loop is placed around the nipple areola complex to reduce the size and elevate it. Finally, lipofilling is achieved in a multiplanar multiaxial pattern. Thus, the final breast volume results from the native breast volume, its surroundings and the volume of fat injected.

**Results:**

Of the 34 patients, 21 had bilateral malformations. A single session (mean transfer volume, 162 ml) was required in 22 cases. A second session (mean transfer volume, 184 mL) was necessary in the remaining cases. Patients were very satisfied in 94% of cases. No complications were observed.

**Conclusions:**

Lipofilling combined with loops is a novel, simple, and safe technique for tuberous breast correction. The aesthetic outcome is natural, implant free, and long lasting.

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Abstract No.: 36

Category: Clinical

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Does Breast Reduction Surgical Technique Play a Role in Clinical, Aesthetic, and Patient-Reported Outcomes? A Comparison of the Superomedial and Inferior Pedicle Techniques

**Introduction:**

It is unknown whether surgical technique affects clinical and patient-centered outcomes for patients undergoing breast reduction (BR) for macromastia. We sought to ascertain the impact of BR technique on clinical, quality of life (QoL) and aesthetic outcomes.

**Materials and Methods:**

Patients undergoing a superomedial pedicle (SMP) or inferior pedicle (IP) BR for macromastia were identified between 2016-2019. Seven independent reviewers rated breast aesthetics (scale: 0-100) of a subset of patients comprised of 50 matched-patients without postoperative complications who were operated on by a single surgeon. The assessed aesthetic domains were: volume, shape, symmetry, nipple areolar complex (NAC) appearance, scars, and overall. Patient characteristics, composite complication (surgical site occurrence, reoperation, readmission, ED visits), Breast-Q QoL scores, and aesthetics were analyzed using descriptive statistics and Kruskal-Wallis tests. Risk-adjusted logistic regression was used to determine the association of technique with postoperative outcomes.

**Results:**

Overall, 155 patients underwent BR, 61.9% IP and 39.1% SMP. Seventy-six (49%) completed both a pre- and postoperative Breast-Q. Patients' median age was 38 years-old (IQR 26-51); obesity (BMI>30) was prevalent (48.4%). The majority were Black (51%), had ≥DDD cup-size (71.3%), grade-III ptosis (69.1%), brassier notching (94.8%), and rash (75.5%). Weight of tissue removed and sternal notch-to-nipple distance were comparable between technique cohorts (p>0.05). IP patients were more likely to experience surgical complications (28.1% vs. 11.9%, p=0.03), a trend that persisted within risk-adjusted regression (Odds Ratio 2.69 [95% Confidence Interval 1.06-6.81]; p=0.04). No significant differences in QoL were found by technique (p>0.05). SMP aesthetics rated higher in the scarring domain (mean 61.0 [SD 14.1] vs. 52.2 [SD 14.5], p=0.04). Average volume, shape, NAC appearance, and overall scores favored the SMP technique but weren't significant (p>0.05).

**Conclusions:**

Patients undergoing BR by the SMP approach demonstrate lower complication rates and better scarring aesthetics relative to IP patients. However, surgical technique does not seem to impact patients' QoL.

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Abstract No.: 52

Category: Research

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : Satisfaction of Dutch Women with their Breasts: A Population Survey using the Breast-Q

**Introduction:**

Little is known on how satisfied women are in general with their breasts and which factors influence breast satisfaction. The aim of this study was to fill this gap by collecting data on breast satisfaction from the general population in relation to psychological, physical and mental well-being.

**Materials and Methods:**

This study was a cross-sectional population survey performed in 2019 in the North of the Netherlands among randomly selected women between 20 and 80 years. Breast satisfaction was measured in the 1334 participants with the preoperative reconstruction Breast-Q module. Other applied questionnaires were: the Hospital Anxiety and Depression Scale (HADS), Short Form Survey (SF-36) and a custom made questionnaire on baseline characteristics. Representativeness was assessed by comparing the participants to Dutch normative data. Possible factors influencing "satisfaction with breasts" were analyzed using multivariate linear regression analyses.

**Results:**

The median (IQR) Breast-Q score for "satisfaction with breasts" was 63 (58-79) on a 0-100 scale. Higher age and higher SF-36 scores had a positive effect on breast satisfaction ( $p < 0.001$  and  $p < 0.001$  respectively). A higher BMI, smoking and anxiety score  $> 8$  were negatively associated ( $p < 0.001$ ,  $p = 0.013$  and  $p < 0.001$  respectively, multivariate linear regression analyses).

**Conclusions:**

The data gathered through this study can serve as a reference in future population and patient based studies.

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Abstract No.: 211

Category: Research

Time: 8

CR: No

Event : 31st Annual EURAPS Meeting

Title : Current trends in breast reduction - an international appraisal

**Introduction:**

Breast reductions and mastopexies continue to rank among the most frequently performed plastic surgical procedures worldwide. However, there exists consensus on several aspects of the procedure, but a plethora of controversies remains. Aim of this study was to compare the most relevant operative factors on an international level in order to further standardize this common procedure according to evidence-based guidelines.

**Materials and Methods:**

A questionnaire was sent to over five thousand active breast surgeons in 77 countries worldwide. The survey was divided in categories according to the volume of removed breast tissue: 50 - 500g, 500 - 1000g, and > 1000g and inquired about current controversies, new technologies, common practices, secondary procedures, and surgeon demographics. The findings and variations were evaluated and correlated to evidence-based literature.

**Results:**

A total of 1431 surveys were gathered, corresponding to a response rate of 29 percent. While certain approaches and common practices prevail also on an international basis, there exist several geographic controversies. For example, while the majority of respondents (51-79 percent) reported to use the inverted T approach, discrepancies were seen in the use of pedicle type. Irrespective of resection weight, in most geographic regions a superior or superomedial pedicle made the first rank, except in North America and South East Asia, where an inferior based vascularization seems to be preferred.

**Conclusions:**

There exists accordance regarding several aspects of breast reduction surgery, however international practice patterns remain very incoherent. Plastic surgeons may still benefit from internationally applicable high-level studies in order to create universally applicable, standardized, and evidence-based practice guidelines.

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Abstract No.: 62

Category: Aesthetic

Time: 4

CR: No

Event : 31st Annual EURAPS Meeting

Title : The Posterior Arm Flap for Reshaping the Postbariatric Breast

**Introduction:**

Post-bariatric surgery tries to correct physical defects and body deformities. Because of the intrinsic complexity of massive weight loss (MWL) patients, more than a single procedure is required. We report a combined surgical method able to improve arms' and breasts' contour that aims to obtain a satisfying functional and aesthetic result by reducing surgical times and costs.

**Materials and Methods:**

9 female MWL patients with proper body mass index was clinically evaluated and considered suitable for surgery. Surgical project was supported by detailed anatomical studies of the arm. While authors performed a modified Pascal-Le Louarn brachioplasty for the upper arm, a standard McKissock mastopexy followed by a Wise pattern skin closure was selected to obtain the breast lift. By sparing the proximal pedicle, the fasciocutaneous flaps were harvested on both posteromedial sides of the arms. The posterior arm flaps (PAF) were tunnelled and transposed below the subcutaneous skin bridge across the axilla and finally used to increase the breast mound. Clinical aesthetic outcomes were assessed according to Breast-Q test.

**Results:**

No complications were reported. After the 6-month and 1-year follow-up, both arms' silhouette was documented as healthy and symmetric. Breasts were soft, without any signs of ptosis and/or contracture. No skin disorders or scar hypertrophy or lymphedema were reported. BREAST-Q score of patients revealed a higher patient satisfaction.

**Conclusions:**

PAF in breast contouring procedures is an interesting surgical option, but more patients need to be treated to validate the effectiveness of the procedure. This technique should be considered when there is a need for simultaneously improving arm's contour and breast's volume and shape.

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