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Free Communications

Innovative and sustainable antimicrobial cell therapies for the treatment of severe burn patients

P. Abdel-Sayed¹, S. Jaccoud¹, R. Koopmans², J.-L. Reymond³, W. Raffoul¹, L. A. Applegate¹

Objective

For severe burns exceeding 40% TBSA, split-thickness autografting becomes critical. In such cases, cell therapy such as Cultured Epithelial Autografts becomes life-saving, but with the disadvantage of leaving the patient non-grafted for long periods. Consequently, burn wound infection remains the major cause of mortality, morbidity and wound healing delay, with a prevalence of infection of more than 60% in burn units. Such infections are of particular concern in the context of increasing resistance of bacterial pathogens towards antibiotics, which is among the top ten causes of death worldwide. For these reasons, there is an urgent need for both, the development of effective alternative treatments for infection control along with prompt advances for novel regenerative therapies. Our overall objective is to develop a sustainable and anti-infective cell-based therapy allowing both, enhanced tissue repair and infection control at the beginning of burn care.

Methods

Our sustainable approach consisted of using keratin derived from chicken feathers as natural waste available in large quantities and no or very low cost as scaffolds. Keratin is polymerized with polyesther-co-amides (PEAs) to control the mechanical properties and biodegradability of the scaffold. This latter is then functionalized with progenitor fibroblasts (for an enhanced repair), and with natural antimicrobials as alternative to antibiotics (e.g. propolis, MGO, CBD, phages and dendrimers). We have investigated the biocompatibility of six PEA formulations and of the antimicrobial candidates with progenitor cells.

Results

All PEA scaffolds showed good cytocompatibility with good in vitro cell growth. One formulation was selected for its mechanical integrity. Regarding the antimicrobials, we determined experimentally, for each candidate, the concentrations for which cells were viable. Regarding the antimicrobial potency, MGO and CBD did not show efficacy on bacteria for the concentrations which had cytocompatibility. While having a limited efficacy, dendrimers were preferable anti-infective agents compared with phage, especially taking into consideration GMP-manufacturing and clinical translation.

Conclusions

We can propose the combination with progenitor cells with PEA matrix-linked dendrimers as a sustainable topical treatment of infected burn wounds.

Preoperative detection of abdominal perforating vessels in autologous breast reconstruction using a smartphone-based thermography device

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Objective

Perforator-based microvascular flaps have become the gold standard in autologous breast reconstruction (BR). Preoperative localization of perforating vessels is therefore essential. Various devices and imaging modalities are used for their preoperative assessment, including Duplex-sonography, contrast-enhanced Computed Tomography (CTA) and Magnetic Resonance Angiography (MRA). Thermography however, displays differences of temperature variations of the skin surface and could therefore be useful in identifying tissue perfusion adjacent to perforators. The study aim was therefore to assess the advantages of a smartphone-based thermography device and to compare its accuracy with CTA and MRA.

Methods

Patients undergoing either CTA or MRA for BR using abdominal-based perforator flaps (msTRAM, DIEP) between 01.2019 and 12.2022 were included. Skin perfusion was evaluated using the FLIR One thermography device (FLIR Systems, Inc., USA). Hot spots (HSs) were defined as the hottest 1 cm diameter areas on the skin surface. To identify the HSs, abdominal skin was cooled down to ~17°C using soaked towels and spontaneously warmed to room temperature. The registered perfusion-patterns were then compared with preoperative CTA and MRA.

Results

60 patients were included showing a median thickness of subcutaneous tissue at umbilicus level of 33mm (range 10-54). HSs identified at early intervals of 3min after cooling correlated in 42% (range 25-66) with perforators identified by CTA or MRA in patients with subcutaneous tissue thickness <30mm. Similar correlation of 43% (range 30-100) was observed at 30min after cooling in patients with subcutaneous tissue thickness >30mm. At all other timepoints, thermography showed a highly variable correlation with CTA or MRA ranging from 0 to 75%.

Conclusions

Smartphone-based thermography provides an easy, quick and non-invasive method to identify HSs of variable extension on the skin surface. The correlations of HSs and perforators identified in CTA or MRA depends on registration timepoint after cooling and thickness of subcutaneous tissue. Unlike CTA and MRA, thermography is not able to disclose the true course of the perforating vessels and therefore does not represent a valuable alternative to adequately map fascio-cutaneous flaps and its vascular pedicles respectively vascular branching before or during surgery.

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Industrialization of cellular therapies in modern medicine: 30 years experience in musculoskeletal plastic surgery

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Objective

The Swiss Federal Transplantation program began in the Lausanne University Hospital in 1991 focusing on tissue of all ages from fetal to aged skin. In the late 1990's, cellular therapies were developed for wound healing studying fetal skin of different gestation periods.

Methods

Research was oriented for cell selection techniques specific formulations and procedures for use of cell sources in the clinic. First clinical trials using living progenitor skin cells as novel cell sources began in 2000 with "biological bandages" used for pediatric burn patients followed by chronic wounds in adults.

Results

Following the new Regulations worldwide and acceptation of the Swiss "transplantation act" in 2004, a new program of Transplantation for Musculoskeletal Tissues was organized along with the formal registration and an associated Biobank Program. Focus on musculoskeletal cell banks have successfully produced human bone, cartilage, disc, muscle, tendon and skin sources (fetal to old) under GLP and GMP conditions. Biological bandages, formulated with the new Directives and registered clinical cell banks, have been used routinely in the clinic particularly for severe burns in both pediatric and adult patients. The cell choice has to have low technical limitations, maintenance of differentiated phenotype and limited probability for communicable disease transmission. Out-scaling of primary progenitor cells have to be processed for Master and Working Cell banks under GMP conditions. Full characterization of progenitor cells would include assays for Identity, purity, stability and safety first through in vitro testing and then through clinical trials. Certain cell sources (cartilage, bone and tendon) can be optimized for therapies with enhanced biomechanical properties.

Conclusions

Establishing unique and extensive musculoskeletal cell banks supports the core belief that cell therapies will overtake classic pharmaco-therapeutic management protocols for numerous traumatic pathologies. Clear advantages of allogenic progenitor cells in particular reside in the more organism-respectful and natural stimulation of damaged tissues toward restored health and function.

Full labia minora reconstruction with labia sharing flap: A case report

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Objective

Labia minora appearance influences the perception of body image, self-confidence, and sexual satisfaction. Labia minora total reconstruction can be due after oncologic excision procedure, vulvar or perineal infection, chronic inflammatory genital disease, genital mutilation, iatrogenic deformity and loss after labia reduction procedure, congenital malformation or genetic syndromes.

Methods

A 37-year-old female patient was referred following a debrided vulvar necrotizing fasciitis after a marsupialization of the right Bartholin's gland. Her gynecologic record mentioned conservative treatment of left Bartholinite four years before and surgical resection of vulvar condyloma acuminata. Treating her severe vulvar infection consisting of three debridements in the operating room and prolonged antibiotic therapy. Subsequently, our patient presented a total loss of the right labia minora and the clitoris, and a partial loss of labia majora.

The first procedure included an extended edge incision to create a bridge by suturing the posterior layer to the inner margin of the right defect and the anterior layer to the outer margin. The second part was performed five weeks later with the autonomization of the new labia minora. The two labia are separated with a perfectly vascularized neo-labia. The flap healed uneventfully. The patient was asked to fulfill a questionnaire at 6 months, which confirmed an excellent esthetic result with a like with like reconstruction. Eight months later, a final correction was performed to complete the reconstruction with a lipofilling of the right labia majora.

Results

Two techniques has been previously published with the two-stage posterior cross-labial transposition flap, (one using a top cut leading to a bottom pedicle and another using a bottom cut with an upper pedicle). We proceeded with a one-time resection wedge with a full pedicle, transposing the full height of the labia minora.

Conclusions

This technique guarantees a more solid vascularization and decreases the risk of tearing on the pedicle.

Prophylactic mastectomy in genetic mutation: What is new?

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Objective

I will present you my experience in prophylactic mastectomies in relationship with genetic mutation like BRCA 1 and 2 and the other less frequent mutation like PALB2, CDH1, PTEN, or TP53. Prophylactic mastectomy may reduce the risk of developing breast cancer by about 90% but it doesn't guarantee that breast cancer will never happen. The long term risk of a prophylactic mastectomy after the reconstruction with prostheses has also to be considered.

From 2006 and 2023 I treated 82 patients with a prophylactic mastectomy associated with a genetic disorder. 75 patients had a BRCA 1 or 2 mutation and 7 an other genetic disorder. I will try to show you what is the evolution in the treatment of this special category of patients and present you the follow up and the managing of the complications after the reconstruction.

Salvage of the mastectomy pocket in infected implant-based breast reconstruction using negative pressure wound therapy: A systematic review

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Objective

Breast cancer in women has recently become the most common cancer overall, with an estimated 2.3 million annual new cases. Approximately 22 % of women affected with breast cancer undergo mastectomy, not including all prophylactic mastectomies performed for gene carriers and high risk patients. As a consequence of local surgical treatment, a huge pool of patients requiring organ reconstruction is generated. The majority undergo implant-based reconstruction (IBBR), as it may be offered more easily than autologous reconstruction. Although presumably simple, IBBR is associated with a rather high rate of mid- to long-term complications, including periprosthetic infection, potentially resulting in implant loss and eventually loss of its pocket. Negative-pressure wound therapy±instillation and dwell (NPWT±id) is known to significantly decrease bacterial load and hence salvage compromised soft tissues. However, there is still lack of evidence concerning its use in infected breast implants. The study aim was to show whether NPWT±i-d would be effective to salvage the mastectomy pocket after removal of the infected implant.

Methods

A comprehensive literature search using PubMed, Web of Science and Cochrane databases up to April 2023 was performed, including studies describing the outcome of NPWT±id used to treat infected breast implants after mastectomy and compared with conventional dressings.

Results

Ten studies (n=102 patients) were included, showing that the management of periprosthetic infections using NPWT±id was able to accelerate treatment of infection and maintain the mastectomy pocket for subsequent reconstruction in 83% of the cases (n=51 IBBR, n=38 two-stage reconstruction, n=13 autologous reconstruction). These results are consistent with our own experience, showing a salvage rate of 60% (3/5 cases). Preservation of the skin envelope avoided secondary reconstruction after a defined time interval, reduced number and complexity of surgeries and eventually costs.

Conclusions

Although based on a rather small number of cases originating from case series with a low level of evidence, this innovative surgical approach has to be considered in selected cases of infected implants after breast reconstruction within a breast cancer centre. Based on the current data, it's not possible to define generally accepted recommendations for the use of NPWT±id to salvage the mastectomy pocket.

1

Orthoplastic limb reconstruction using free fibula flap after trauma: Outcomes from a retrospective european multicenter study

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Objective

Free vascularized fibula flap represents the gold standard vascularized bone graft for the management of segmental long bone defects after traumatic injury. The current study represents the largest retrospective multicenter data collection on the use of free fibula flap (FFF) for extremities' orthoplastic reconstruction after trauma aiming to highlight current surgical practice and to set the basis for updating current surgical indications.

Methods

The study is designed as a retrospective analysis of prospectively collected data between 2009 and 2021 from six European University hospitals. Patients who underwent fibula flap reconstruction after acute traumatic injury (AF) or as a late reconstruction (LF) after post-traumatic non-union of upper or lower limb were included. Only extra-articular, diaphyseal fracture were included in the study. Surgical data were collected. Time to bone healing and complications were reported as clinical outcomes.

Results

Sixty-two patients were included in the study (27 in the AF group and 35 in the LF group). The average patients' age at the time of the traumatic event was 45.3 ± 2.9 years in the AF group and 41.1 ± 2.1 years in the LF group. Mean bone defect size was 7.7 ± 0.6 cm for upper limb and 11.2 ± 1.1 cm (p=.32) for lower limb. Bone healing was uneventful in 69% of treated patients, reaching 92% after complementary procedures. Bone healing time was 7.6 ± 1.2 months in the acute group and 9.6 ± 1.5 months in the late group. An overall complication rate of 30.6% was observed, with a higher percentage of late bone complications in the LF group (34%), mostly non-union cases.

Conclusions

Free fibula flap reconstruction represents a reliable and definitive solution for long bone defects with bone healing reached in 92% cases with a 8.4 months of average bone healing time.

Distal radius reconstruction with an osteocutaneous fibula flap for giant cell tumor recidive: A case report

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Objective

Giant cell tumour (GCT) is a rare clinical entity associated with pain, swelling, joint effusion, most commonly localized meta-epiphyseal in long bones. The recommended treatment is resection, however, GCT it is a local aggressive benign neoplasm with a high recurrence rate. We present the case of a 29-year-old woman with a GCT recurrence at the level of the distal radius treated with tumor resection and patient specific reconstruction of the radius with a free vascularised fibula graft (Figure 1). Preoperatively, the patient suffered from severe movement and load-dependent pain in the affected wrist and needed strong pain medication.

Methods

We performed a resection of the distal radius based on 3D CAD-CAM planning with patient-specific guides. The radius was reconstructed with a free double barrel fibula graft from the left lower leg, fixed to the radius with an ulna plate (Figures 2 and 3). For stabilization, a radioscapholunate fusion with 3 x staples (Arthrex, Dyna Nite) and reconstruction of the sigmoid notch (ipsilateral brachioradialis tendon) was performed. A triangular fibrocartilage complex reconstruction was performed according to the modified Brian Adams procedure with ipsilateral palmaris longus tendon strip and FiberTape.

Results

Eight months postoperatively, the patient is pain-free and no longer wears a splint. She is able to work full-time as an accountant. The distal radioulnar joint is stable with discrete bone crepitus. Flexion in the wrist improved significantly compared to preoperatively (40° vs. 10°). The pronation and supination are reduced with 15° each (pre-operative 40°). CT scan and MRI showed complete consolidation with no dislocation of the osteosynthesis material and no evidence of recurrence of GCT.

Conclusions

Our case report shows that in selected patients with recurrences of GCT in the distal radius, a reconstruction with a vascularized free fibula is a valuable surgical option with a satisfactory subjective and objective outcome. The reconstruction resulted in a pain-free, well-functioning result in everyday life for a young patient.

1

Sensory recovery of neurotized skin-grafted gracilis free muscle flaps for lower extremity reconstruction

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Objective

Skin-grafted free gracilis muscle flaps offer several benefits for soft-tissue coverage of lower extremity defects. However, reconstruction often leads to loss of sensation at the reconstructed site. Neurotization may improve postoperative sensation, but current evidence is limited and inconsistent. This study aims to quantitatively analyze sensory recovery of neurotized skin-grafted free gracilis muscle flaps.

Methods

Patients undergoing lower extremity reconstruction between 2020 and 2022 with neurotized skin-grafted free gracilis muscle flaps were prospectively enrolled. Sensation was assessed at 3, 6 and 12 months using monofilaments, two-point discrimination, an electronic vibration device, and cold and warm metal rods. The contralateral side served as control. Patients completed the McGill Pain Questionnaire.

Results

10 patients with median age of 54.3 years (25-72) and mean BMI 27.3 kg/m2 (\pm 4.4) were included. All sensory results significantly improved after 6 months (p<0.05). At 12 months postoperatively, mean monofilament value was 5.35 (\pm 0.48), two-point discrimination was 75.4 mm (\pm 18.6), vibration was 11.14% (\pm 5.26), cold was perceived on average in 48% (\pm 31.6) of flap areas and warm in 50% (\pm 33) of flap areas. At 12 months, all sensory results remained significantly poorer than the control site (p<0.05). Central flap regions were not significantly different than peripheral regions throughout follow up (p>0.05). Pain scores significantly reduced throughout follow ups (p<0.05).

Conclusions

Mechanical, vibration and temperature detection significantly improved after 6 months postoperatively but remained significantly poorer than the control site at 12 months.

A reconstruction of the hand with a pedicled abdominal flap and abdominoplasty closure

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Objective

Necrotizing fasciitis is a life threatening, mutilating disease with a rapid onset that often results in large soft tissue defects. The reconstruction of exposed tissue such as bone, tendons and neurovascular structures often represents a true surgical challenge.

Methods

We report the case of a 62-year-old obese diabetic patient, with Hepatitis C induced liver cirrhosis, who underwent surgery for a left-sided trigger finger of the index in an outpatient setting. One-week post-surgery, the patient developed a phlegmon of both the affected index and middle finger. Despite initial surgical drainage and i.v. antibiotics, rapid progression of the infection with an involvement of all fingers led to the requirement of further extensive surgical debridement. The pathology analysis revealed the suspected diagnosis, necrotizing fasciitis. Consequently, an amputation of all long fingers at the level of the MCP joints with preservation of the thumb was performed. A further microbiological swab came back negative, and upon infection stabilization, the requirement of a flap to cover the stump became evident.

Given the size of the defect alongside bone, tendon, and median nerve exposure, we opted for a pedicled superficial inferior epigastric artery flap with direct closure by abdominoplasty. After three weeks, the flap was weaned. Abdominal healing was unremarkable.

Results

After weaning, the flap became infected resulting once again in the need for debridement, this time followed by secondary coverage with a split-thickness skin graft. Three months later, the stump healed completely and the patient was able to make a claw with her thumb allowing her to grasp objects. She conserved full range of motion of her wrist in flexion/extension as well as pronation/supination. The abdominal donor site healed adequately yielding an excellent aesthetic result.

Conclusions

Given this patients' comorbidities placing her at a high risk for complications, we opted for a pedicled flap over a free flap. The post-operative flap infection confirmed our approach. Performing an abdominoplasty to close the donor site enabled the harvesting of a large flap, which, as such, has yet to be described in literature. We believe that the combination of these two procedures can be indicated in the reconstruction of major skin defects, resulting in an adequate aesthetic result.

Implementing virtual surgical planning and 3D-printed cutting guides for Facial Feminization Surgery with fully automated Artificial Intelligence operative times and cost (AI)-supported digital workflow

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Objective

Transwomen often suffer significantly from masculine facial stigmata with poorer quality of life in many aspects compared to the general female population. Surgical treatments, such as facial feminization surgery (FFS), have been associated with improved quality of life. FFS is already an integral part of most gender reassignment centres. Interdisciplinary collaboration between plastic and cranio-maxillofacial surgery improves its outcome significantly. Although FFS has been performed for several decades, the complex anatomy of the facial skull still presents a major surgical challenge. Modern surgery techniques can prevent severe complications and improve postoperative outcomes. Based on computed tomography data, anatomical structures can be visualized and considered in virtual surgical planning. Cutting guides are particularly useful for procedures requiring osteotomies, offering the highest possible precision. At our institution virtual surgical planning and 3D-printed cutting guides were introduced as standard tools for FFS procedures. Based on computer tomography, osteotomies at the frontal sinus and supraorbital rim, mandibular angle and chin are planned on a regular basis.

Methods

For quality control, accuracy of bilateral mandibular angle reduction in 10 patients using cutting quides was assessed retrospectively. The cutting quides were designed virtually and printed with a 3D printer. Postoperatively, routine control imaging was used to superimpose the postop scan on the planning data to determine the accuracy of the cutting guide.

Analysis of superimposed postoperative CT and digital planning (VSP) showed a deviation of less than 1 mm.

Conclusions

At the University Hospital of Basel, cutting guides are implemented for FFS on a regular basis. These guides allow for the highest precision of osteotomies. They simplify the procedure, improve the surgical result, increase patient safety, shorten the operation time and reduce the need for extraoral approaches and stigmatizing scars.

The effect of flow interventions on the surgeon or nurse level on

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Objective

Operating room (OR) efficiency is essential to providing optimum healthcare and maintaining the financial success of a hospital. This study aims to compare the efficiency of the operating team before and after implementation of strategic modifications focusing on streamlining operating room protocols. In particular, we examined the effect of nurse-driven versus surgeon-driven protocols aiming to reduce perioperative delays resulting from necessary surgical instruments being unavailable at time of surgery.

Methods

OR efficiency data was collected by reviewing the operative records for all free flap surgeries performed by the principal investigator at a tertiary care hospital over a three year period. The procedures were performed between two campuses within the same hospital system. On one campus the nurse-driven intervention (NDI) was performed by implementing a surgical cart with all items needed for free flap surgery. On the other campus the surgeon-driven intervention (SDI) was performed by the surgeon making an effort to bring necessary supplies to the OR before the procedure. Characteristics of each case were extracted from the medical record. Time between room ready, patient arrival to the OR and that of incision were noted from the operative record in addition to total OR time. Set-Up Time and Surgery Time were calculated using the respective start and end times. Respective times before and after intervention were compared on both campuses.

Results

The results showed a significant reduction in Total OR Time in both operating rooms (p < 0.01). Interestingly, Surgery Time showed a significant reduction on the SDI campus but not on the NDI campus (p = 0.4130). In contrast, Set-up Time reduced significantly on the NDI campus but not on the SDI campus (P=0.009). Cost analysis did not show any significant effect of any interventi-

Conclusions

Our results indicate that interventions on the scrub tech and circulator level affect time spent with preparation for the case, while interventions at the surgeon level influence the duration of the surgical procedure. To reach maximum efficiency, review of surgical instruments by both surgeons and nursing staff prior to the start of surgical procedures should be performed in order to minimize delays associated with unavailable surgical tools.

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Supermicrosurgical treatment of chronic breast cancer related lymphedema leads to improved patient outcomes

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Objective

Vascularized lymph node transfer (VLNT) entails the autologous relocation of lymph nodes to a lymphoedematous region of the body while lymphaticovenous anastomosis (LVA) creates bypasses between the lymphatic and venous system. Both techniques are meant to lastingly bolster the local lymphatic drainage capacity. The objective of this study is to investigated how VLNT and LVA compare with regards to improved patient outcomes in the treatment of chronic BCRL.

Methods

In this retrospective cohort study, we searched our encrypted database for patients treated for chronic BCRL with either VLNT or LVA and who had a minimum follow-up of two years. We analyzed patient-specific variables including arm circumferences measured at six different locations on both arms before and after surgery as well as the preoperative lymphedema stage and postoperative complications.

Results

87 patients met the inclusion criteria. Preoperatively, the mean differences of the circumferences between the lymphedematous and the unaffected arm in individual patients were not statistically different between the two groups (p>0.05) except for the difference at the level of the wrist (p<004). Similarly, the differences of circumferences did not differ statistically between groups by the end of our follow-up period. Two patients in the VLNT group had stage III chronic BCRL while 55 in the VLNT and 25 in the LVA group had stage II chronic BCRL (p=0.411). While low in both, there was still a significantly higher occurrence of postoperative complications in the VLNT group.

Conclusions

Both VLNT and LVA can be safely performed and result in significantly improved patient outcomes. Both techniques result in very low complication rates, yet there is still a void of high level evidence proving the efficacy of reconstructive lymphatic surgery. Patient reported outcomes need to be introduced as a standard in perioperative surgical assessement.

The ultrasound for the microsurgeon: Waste of time or game changer? Our experience to date

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Objective

Different imaging techniques have always been used to aid the planning of microsurgical reconstructions. In the last years an increasing number of microsurgeons have started performing the ultrasound by themselves without relying on the radiologists. However, being able to master the device at sufficient level requires time and effort, and many surgeons are reluctant to introduce it in their practice.

Methods

In the present study we want to share the first author's experience with the ultrasound. The device was tested in the planning of all microsurgical cases from September 2022 to the present.

Results

Lower limb, head and neck, and breast reconstruction cases are analyzed and the utility of the ultrasound in easing the reconstruction or avoiding complications is evaluated. The amount of time spent in understanding the device and gaining experience is repaid with shorter operative times and reduction of unsuccessful surgical explorations. Novel applications of ultrasound can also be found along the way.

Conclusions

Considering the various advantages and disadvantages, the use of ultrasound by the microsurgeon himself/herself is worthwhile.

Have we reached the summit of the reconstructive ladder with the SCIP-Flap and Perforator-to-Perforator anastomosis?

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Objective

What are the actual advancements regarding reconstructive surgery within the recent years? General conditions in terms of imaging, instruments, etc. have continued to improve. Reflecting on the reconstructive ladder or - rather elevator - with tailored solutions for each patient adjusting to functional and aesthetic outcomes, we dare to state that a summit has been reached with the SCIP flap. Limitations in terms of donor site morbidity or impairment at the defect area due to the possibility of perforator-to-perforator anastomoses make it almost universal. The variability of SCIP flap usage is until today due to its pliability and if desired, being extremely thin, unchallenged, and without comparison.

Anti-CTLA4 immunomodulation can significantly reduce lymphedema development by increasing treg-mediated immunosuppression

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Objective

Lymphedema is one of the most common yet underestimated chronic side effects of oncologic treatment, occuring due to compromised lymphatic vessel function. Previous research suggested that immunomodulation might critically influence lymphedema onset and development, with the underlying mechanisms remaining elusive. In our study, we evaluated retrospectively lymphedema risk in a dedicated patient cohort receiving a-CTLA4 and anti-PD1 immunomodulatory treatment and explored the mechanism of action.

Methods

A melanoma patient cohort was examined retrospectively and the risk of lymphedema development was evaluated among patients receiving lymphadenectomy with or without adjuvant immunomodulatory anti-CTLA4 or anti-PD1 treatment. The presumed molecular targets were assessed in biopsies from lymphedema and control patients. The findings were evaluated in the mouse-tail lymphedema model, performing in depth phenotypic, molecular and functional characterization including histology, RNA seq, flow cytometry and functional imaging.

Results

A total of 1464 patents were screened in the retrospective analysis and 479 received lymphadenectomy. Lymphedema was present in 18.8% of the patients receiving lymphadenectomy (without adjuvant immunotherapy), versus 19% for those receiving anti-PD1 treatment but only 2.9% of the patients treated with anti-CTLA4 developed lymphedema. The analysis of human lymphedema and control biopsies verified the increased CTLA4 expression in lymphedema. Anti-CTLA4 treatment was then evaluated in the mouse-tail lymphedema model, leading to significantly reduced edema and improved lymphatic function assessed by near-infrared imaging. The phenotypic characterization of the immune component and cytokine profile revealed no changes in the Th1/Th2 component but a distinct local increase of the Tregs. Whether Tregs increase systemically in response to anti-CTLA4 treatment was assessed both in mice and in samples from melanoma patients before and after the anti-CTLA4 therapy, proving significantly increased circulating Tregs in response to anti-CTLA4.

Conclusions

Anti-CTLA4 is critically influencing lymphedema, reducing the risk in patients receiving it upon lymphedemactomy and significantly improving lymphedema in an animal model, via a Treg induced immunosuppression. Thus, anti-CTLA4 treatment presents a very promising drug-repurposing approach to prevent or even treat lymphedema.

hPL-human adipose-derived stem cells in IKVAV-functionalised hydrogel conduit Biogelx: An innovative delivery strategy to improve peripheral nerve repair

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Objective

Adipose-derived stem cells (ADSC) are nowadays one of the most exploited cells in regenerative medicine. They are fast growing, capable of enhancing axonal elongation, support and locally stimulate Schwann cells (SC) and protect de-innervated muscles from atrophy after a peripheral nerve injury. With the aim of developing a bio-safe, clinically translatable cell-therapy, we assessed the effect of ADSC pre-expanded with human platelet lysate (hPL) in an in vivo rat model.

Methods

We delivered human ADSC into a 15 mm critical-size rat sciatic nerve defect, embedded within a laminin-peptide-functionalised hydrogel (Biogelx-IKVAV) wrapped by a poly-"2" -caprolactone (PCL) nerve conduit. After a preliminary assessment of ADSC properties in a BiogelX-3D culture, we analyzed the neurotrophic effect in terms of axonal elongation, SC proliferation through the nerve gap and gastrocnemius muscle regeneration.

Results

ADSC retained their stemness, their immunophenotype and proliferative activity when tested in vitro. At six weeks post implantation, robust regeneration was observed across the critical-size gap as evaluated by both the axonal elongation (anti-NF 200) and SC proliferation (anti-S100) within the Biogelx-IKVAV filled PCL conduit. All the other experimental groups manifested significantly lower levels of growth cone elongation. The histological gastrocnemius muscle analysis was comparable with no quantitative significant differences among the experimental groups.

Conclusions

Taken together, these results suggest that ADSC encapsulated in Biogelx-IKVAV are a potential path to improve the efficacy of nerve regeneration. New perspectives can be pursued for the development of a fully synthetic bioengineered nerve graft for the treatment of peripheral nerve injury.

Breast reduction leads to high gain in quality of life independent of surgical technique: Results of a 10-year retrospective single-center study

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Objective

A variety of surgical techniques are used for breast reduction leading to a powerful gain in quality of life of the patients due to physical and psychological relieve. The aim of this study was to create further long-term scientific evidence to hopefully reduce the unnecessary bureaucratic effort to achieve financial coverage. This would also alleviate the psychological burden on patients in the future

Methods

This 10-year retrospective single-center study included 170 patients between 18 and 82 years. A subgroup of 48 patients agreed to a long-term outpatient clinical examination whereby postoperative photo documentation, measurements of the breast and BREAST-Q scales were obtained. Furthermore, a collection of the photographic documentation in 92 cases was prepared and used for an aesthetic evaluation done by three independent plastic surgeons, working at different breast centers, to reduce bias. Complications were graded following the Clavien-Dindo classification.

Results

The indication for breast reduction was either mamma hypertrophy or contralateral symmetrization after breast cancer surgery. 73.5% of patients underwent surgery for breast hypertrophy only, while 26.5% underwent oncoplastic breast reduction. The mean age was 48 years. 52% were operated by the Hall-Findlay technique, 27% by the Lejour method, 14% using the inferior pedicle and 8% by other techniques. The most frequent complication was hypertrophic or painful scarring in 10% of the patients. Classified by Clavien-Dindo, 6% had a grade I, 4% a grade II, 9% a grade IIIa and 12% a grade IIIb complication. The overall complication rate was 32% and no significant difference was found comparing subgroups by surgical technique. Uni- and multivariable logistic regression found resection weight to be a risk factor for complications. There was a significant reduction in ptosis grades among all patient groups. BREAST-Q scores showed a significant improvement when compared to preoperative data across all surgical techniques. Interestingly, there was substantial consensus in relative scoring between surgeons and patients in the aesthetic evaluation. Inter-surgeon/center-differences were also statistically significant, underlining the importance of independent assessors.

Conclusions

Breast reduction leads to high long-term gain in QoL, regardless of the surgical technique.

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The chimeric medial and lateral sural artery perforator gastrocnemius flap for combined soft tissue / extensor apparatus reconstruction in periprosthetic joint infection of the knee

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Objective

Periprosthetic joint infection (PJI) is a severe complication after total knee arthroplasty (TKA). Herein, we present a single-center series of patients with PJI after TKA and combined soft-tissue / extensor apparatus defect treated with a chimeric medial or lateral sural artery perforator (MSAP/LSAP) myocutaneous gastrocnemius flap. Perioperative complications are presented and the orthoplastic outcome one year after surgery is reported.

Methods

This retrospective study included all patients undergoing an orthoplastic revision with a MSAP/LSAP myocutaneous gastrocnemius flap reconstruction for a composite soft tissue defect of the skin and the extensor apparatus in PJI after TKA between 2019 and 2022. Patients had a scheduled follow-up at 6, 12, 26, 52 and 104 weeks postoperative. Perioperative complications and postoperative orthoplastic outcome with a minimum follow up of one year after surgery are reported. The functional assessment included range of motion (ROM) and stability of the knee as well as clinical assessment of new or recurrent PJI of the revised TKA. Furthermore, the American Knee Society Score (AKSS) was measured before and one year after surgery.

Results

In total 8 patients were included (5 female, mean age 73 years). All donor sites could be primarily closed. Short-term follow-up showed successful reconstruction in 7 patients. One patient developed minor wound dehiscence, which was treated conservatively. During long-term follow-up 1 patient developed a perigenicular hemato-seroma, which necessitated evacuation. Infection treatment was successful in all 8 patients, 2 patients developed a new PJI of the TKA 1 respectively 1.8 years after surgery with a new pathogen. Active ROM in the knee joint after one-year was on average 105°, 3 patients showed an active extensor lag. The median clinical AKSS was 64 preoperatively and 91 after one year follow-up (p<0.05) and the functional AKSS 32 and 85, respectively (p<0.05).

Conclusions

The pedicled MSAP/LSAP myocutaneous gastrocnemius flap is a safe option to reconstruct composite soft-tissue including extensor apparatus defects in patients with PJI after TKA yielding near-to-normal functional outcome. It allows complex orthoplastic soft-tissue reconstruction without the need for microsurgical free tissue transfer, which is relevant in the elderly and comorbid patient subgroup.

FREE COMMUNICATIONS

Combining reconstructive and ablative surgical treatment of chronic breast cancer-related lymphedema: Safe and effective

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Objective

We investigated whether a one-stage combination of vascularized lymph node transfer (VLNT) with water jet-assisted liposuction (WAL) can be safely performed and results in improved patient outcomes such as a greater reduction in arm volume when treating chronic breast cancer-related lymphedema (BCRL).

Methods

In this retrospective cohort study, we included all patients from our encrypted lymphedema database treated for chronic BCRL with VLNT or VLNT + WAL who had a minimum follow-up of two years. We analyzed patient-specific variables including arm circumferences as well as patient-reported outcomes before and after surgery as well as surgery time, surgery-related complications and patient satisfaction.

Results

Only the mean preoperative differences of the circumferences between the lymphedematous and the unaffected arm in individual patients showed a statistically significant difference between treatment groups (p <= 0.05). Indeed, patients treated with VLNT + WAL had consistently larger differences in individual sets of arms and therefore more pronounced chronic BCRL. The mean surgery time was significantly longer in the VLNT + WAL group (p <= 0.05). Complications were seldom and similar in both groups. Using a numeric rating scale, the level of patient satisfaction following treatment did not differ significantly between groups (p = 0.323).

Conclusions

Our findings suggest that a one-stage combination of VLNT with WAL does not result in more complications even though it also entails a longer surgery time. This is acceptable as secondary interventions resulting in overall longer surgery times and higher costs can be avoided. A one-stage combination might be especially favourable for patients suffering from more severe chronic BCRL.

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Pre-pectoral implant-based hybrid breast reconstruction combining multi-stage autologous fat grafting and reversed expansion: A preliminary single-institution report

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Objective

Breast reconstruction (BR) after mastectomy includes transfer of autologous tissue, use of implants, or a combination of both. The continuous increase of breast cancer incidence and identification of gene carriers will however result in an increased pool of patients after mastectomy requiring BR. Although long lasting and of high quality, BR using microsurgical flaps will never completely meet the demand, also because not every patient needs, wants or qualifies for a free flap. The study aim was therefore to evaluate our first experience with expander-to-implant based pre-pectoral hybrid BR, using reversed expansion and autologous fat grafting (AFG).

Methods

This approach is based on the expansion of the mastectomy pocket, followed by serial sessions of AFG to increase thickness of the mastectomy flap's residual subcutaneous compartment, while gradually deflating the expander. The last surgical step includes the insertion of an implant to guarantee sufficient volume and central core projection. We present a selected patient group that underwent bilateral mastectomy without indication for adjuvant radiotherapy. Standardized clinical follow-up, photo documentation and MRI were performed.

Results

Between June 2021 and May 2023, 105 BRs after mastectomy have been performed, of which 55 underwent hybrid implant-based BR. 11 patients underwent bilateral hybrid BR (22 breasts) with a mean follow-up of 5 months (range: 0-12). After mastectomy, a mean of 2,4 AFG-sessions (range: 1-4) were necessary to conclude multi-stage BR that lasted 11 months on average (range: 4-21). Fat grafting was able to increase MRI-assessed subcutaneous thickness of the mastectomy flaps by 275% (range: 240-400) in the internal quadrants respectively 169% (range: 75-250) in the external quadrants. Of interest, the patients' BMI was similar at the time of mastectomy and insertion of the definitive implant (23,6kg/m2 vs. 23,8kg/m2).

Conclusions

Repeated AFG-sessions has proven to significantly increase soft tissue thickness and thus allowing for adequate pre-pectoral implant coverage. This results in a natural look and feel of the reconstructed breasts, without breast animation and eventually higher patient satisfaction. The quality and hopefully durability of hybrid BR resulting from repeated addition of autologous fat seems to outweigh the drawbacks of the multi-stage approach and therefore long reconstructive process.

Management of a bone defect and extensive soft tissue loss after an infected knee arthrodesis

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Objective

Failed revision knee arthroplasties are a challenging scenario. If the salvage procedure as a knee arthrodesis ends in a purulent infection with large soft tissue lost, an orthoplastic approach is needed. We like to present a case with early infected knee arthrodesis in combination with extensive soft- tissue lost around the knee.

Methods

This is a case report of a 59-year-old patient with a history of 3 failed knee arthroplasties within 2 years. Radiographically aseptic loosening of the femur component was visible repetitively. As a consequence CARD-planed knee arthrodesis was performed in an orthopaedic clinic with a double-plating system. Unfortunately, the patient sustained wound healing problems, and an implant-associated infection of the knee with soft –tissue loss during follow-up.

Results

In an orthoplastic approach, a DAIR (Debridement, antibiotics and implant retention) was planned in combination with a free vascularized flap to cover the soft tissue defect. During the first debridement, the patient sustained a septic shock and further surgical treatment needed to be delayed. Staphylococcus epidermidis was isolated and an antibiotic therapy was established. After stabilization of the patient in the ICU, soft tissue and bone reconstruction was performed utilizing a free latissimus dorsi flap, including a vascularized inferior tip of the scapula to bridge the large bony defect between the knee articulation (Details see figure 1-3). The femoral and tibial spaces were filled with autologous and allogenic cancellous bone grafts. Three months postoperatively the flap was fully incorporated and no further signs of the infection detectable. Radiographically consolidation of the arthrodesis could be confirmed and the patient was allowed to full-weight bear 3 months after the revision surgery.

Conclusions

The combination of infected knee arthrodesis and large soft-tissue defect is rare. For the optimal treatment, an individualized approach is essential taking advantage of interdisciplinary orthoplastic concepts.

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Revisiting the superficial pedicles SIEA and SCIA in autologous breast reconstruction

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Objective

The DIEP flap is the most used free flap for autologous breast reconstruction worldwide. Despite its many advantages, the donor site morbidity is an ongoing matter of debate. The SIEA flap on the other hand, leaves the rectus sheath and muscle untouched, but has gained limited popularity due to its higher flap loss rate.

Regarding the use of the SCIA/SCIP flap in breast reconstruction there are to date very few reports in the literature. With the current study we want to share our experience with autologous breast reconstruction using the superficial pedicles (SIEA-SCIA/SCIP).

Methods

We analyze our clinical experience in abdominal-based autologous breast reconstruction using the superficial pedicles (SIEA- SCIA/SCIP), illustrating our decision-making process, the advantages and disadvantages compared to the DIEP flap.

Results

Even if limited, our experience with the superficial pedicle-abdominal based breast reconstruction is encouraging.

A wise use of the new available technologies (ICG angiography and color ultrasound) is mandatory to avoid or mitigate the pitfalls that have limited the use of the superficial pedicles in the past. Higher seroma rate compared to the DIEP's donor site seems to be the main disadvantage.

Conclusions

In our opinion the autologous breast reconstruction based on the superficial pedicles of the abdomen could be reconsidered and even offered as first choice to the patients. Of course, the reconstruction should be always tailored to the surgeon's experience and patient's characteristics.

Practical use of biodegradable, temporising NovoSorb® membrane: Our 2-year experience

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Objective

We report on our 2-year-experience with a novel, biodegradable polyurethane temporising membrane (NovoSorb®, PolyNovo, Melbourne, Australia), which had initially been implemented for large burn wounds. NovoSorb™ is used for staged reconstruction with secondary split-thickness skin grafting. We would like to share our experience and learning curve with the application of for NovoSorb BTM Membrane™ as a versatile dermal substitute for various indications of complex wound repair.

Methods

Our case series of 53 patients treated for indications with NovoSorb® from 2020 to 2022 at the Kantonsspital Aarau was evaluated retrospectively. We assessed patient's demographic data, co-morbidities, defect localization and aetiology. Regarding wound management we analyzed the number of debridements, defect size and time to coverage with split thickness skin grafts. We furthermore analyzed complications.

Results

The main indications for defect coverage were defects resulting from infectious diseases (N=23), defects following tumor excisions (N=19), flap harvesting donor site defects (N=4), trauma (N=2), necrotizing fasciitis (N=4) and burn defects (N=1). In 45 of the 53 cases sufficient preconditioning with good vascularization followed by coverage with split-thickness skin grafts could be achieved. Two Patients were lost to follow up, one patient died and in five cases the concept was redirected to secondary healing or converted to flap coverage due to infection or insufficient vascularization of NovoSorb® membrane with consecutive loss. In 23 out of 53 the defects were complex and, in these cases, NovoSorb® showed remarkable capabilities in terms of vascularization and in cases of infection great resistance.

Conclusions

Wound temporization with NovoSorb® proved to be a reliable, easy-to-use solution for a great variety of skin and soft tissue defects. Its superiority is especially evident in cases of complex wound defects, where its potential of fast vascularization and great resistance expand the treatment options.

Is lymphedema a systemic disease? A paired molecular and histological analysis of the affected and unaffected tissue in lymphedema patients

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Objective

Secondary lymphedema is a chronic, debilitating disease and one of the most common side effects of oncologic surgery, substantially decreasing quality of life. Despite the progress conducted in lymphedema research, the underlying pathomechanisms remain elusive. Lymphedema is considered to be a disease affecting an isolated extremity, yet imaging studies suggest systemic changes of the lymphatic system in the affected patients.

Methods

To evaluate potential systemic manifestations in lymphedema, we collected matched fat and skin tissue from the edematous and non-edematous side of the same 10 lymphedema patients as well as anatomically matched probes from control patients to evaluate whether known lymphedema manifestations are present systemically and in comparison to health controls.

Results

The lymphedematous tissue displayed various known hallmarks of lymphedema compared to the healthy controls, such as increased epidermis thickness, collagen deposition in the periadipocyte space and the distinct infiltration of CD4+ cells. Furthermore, morphological changes in the lymphatic vasculature between the affected and unaffected limb in the same lymphedema patient were visible.

Conclusions

Surprisingly, an increased collagen deposition as well as CD4 expression were also detectable in the non-lymphedematous tissue of lymphedema patients, suggesting that lymphedema may trigger systemic changes beyond the affected extremity.

Repair of nasal septal perforations using autologous nasal chondrocyte tissue engineered cartilage

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Objective

Septal perforations are difficult to treat. Standard of care consists in interposition grafting of an alloplastic material, polydioxanone (PDS) plates, combined with an autologous graft, deep temporal fascia (DTF). The use of this synthetic PDS material is associated with risks of infection and extrusion of PDS graft with loss of the graft. We conducted a phase I clinical trial to assess the safety and feasibility of using an autologous nasal chondrocyte tissue engineered cartilage (N-TEC) as replacement of PDS for the reconstruction of nasal septal perforations.

Methods

We recruited from 05/2021-11/2021 five patients at the University Hospital Basel with a nasal septal perforation of a medium size (0.5-2.0 cm). Chondrocytes from a 6 mm cartilage biopsy sample from the nasal septum were expanded, seeded, and cultured onto collagen type I/III membranes (Chondrogide®) in the course of 4 weeks in a GMP facility. The resulting engineered cartilage grafts were shaped intra-operatively and enveloped in harvested DTF. These sandwich grafts were placed and sutured into the septal perforation and protected by bilateral silastic splints. After removal of the splints 6 weeks after the reconstruction, the mucosa is expected to grow over the defect during the healing process. The primary outcomes are safety and feasibility of the procedure, assessed up to 12 months after reconstruction. The repair of nasal septal perforation will be examined by endoscopy 1,5, 3, 6 and 12 months and by computer tomography scan 12 months after the operation. As secondary outcomes, objective and subjective respiratory function will be assessed.

Results

N-TEC were successfully implanted in the 5 patients. In these patients we counted 12 adverse reactions or events and one serious adverse event. Reperforation of 1mm was observed in patient 1 (1 year post-op) and patient 5 (3 months post-op, drop-out). One year post-op in 3 out of 4 patients the self-assessed scores on functionality improved and in one patient the self-assessed score is the same. One year post-op in 2 out of 4 patients the rinomanometry shows a better function with a higher total flow inspiration.

Conclusions

Our first results show that implantation of autologous nasal chondrocyte tissue engineered cartilage (N-TEC) in patients with nasal septum perforation is a safe and feasible procedure and provides initial evidence of functional outcome.

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The use of free vascularized costochondral grafts in hand surgery

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Objective

Costochondral grafts are used in craniofacial reconstructions, e.g. the temporomandibular joint. For this use, the literature solely describes the non-vascularized utilization. In the upper extremity, the use of non-vascularized costochondral grafts has been described in revision surgery after trapeziectomy and in radial head reconstruction.

Evidence suggests that vascularized bone grafts in general lead to higher union rates and faster time to union compared to non-vascularized grafts.

Methods

We present three cases to illustrate the use of vascularized costochondral grafts in hand surgery.

Results

The first case concerns a 62yo supervisor, who presented with pain and restricted motion of the MCP III joint. Two years before, in another clinic, he underwent arthroscopy and cancellous bone grafting of a metacarpal III head defect due to Mauclairs disease. MRI showed a defect of the metacarpal head and cartilage of 7x4 mm. The cartilage base of the first phalanx was intact. We performed a reconstruction using a vascularized costochondral graft with a microsurgical anastomosis to the second dorsal intermetacarpal artery and arthroscopic shaving of the cartilage. After rehabilitation, the patient was pain free, reached full range of motion and returned to work within three months.

The second case concerns a 37yo technician who suffered a scaphoid fracture 4 years before and presented with proximal scaphoid necrosis. We performed a reconstruction using a free vascularized costochondral graft with an anastomosis to the palmar branch of the radial artery. After four months boney consolidation was reached. A pain free wrist flexion and extension of 40 degrees could be reached.

The final case concerns a 24yo male who hit a metal edge with a closed fist. He suffered an impression of the dorsal head of the third metacarpal. With an intact base of the first phalanx, we performed a reconstruction using a vascularised costochondral graft with an anastomosis to the second dorsal intermetacarpal artery. Rehabilitation is underway; results will be available at the conference.

Conclusions

Our experience using free vascularized costochondral grafts shows beneficial results for the patients. We would recommend this technique for cases of small, yet combined bone and cartilage loss. Further development and wider area of application is necessary for full appraisal of this new technique.

The LYMPH trial: An international, pragmatic, randomized, multi-centre superiority trial comparing conservative with microsurgical treatment of chronic breast cancer associated lymphedema

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Objective

A fifth of breast cancer survivors will develop chronic breast cancer-related lymphedema (BCRL). Conservative complex physical decongestion therapy (CDT), which involves manual lymphatic drainage and local compression with bandages, is the gold standard for BCRL. However, it does not prevent BCRL progression as it addresses the symptoms and not the causes of BCRL. Lymphaticovenous anastomosis (LVA) and vascularized lymph node transfer (VLNT) are supermicrosurgical techniques that could treat the cause of BCRL by restoring lymphatic drainage. This international, randomized, controlled trial aims to establish the advantages of surgical treatments over CDT alone for BCRL treatment.

Methods

The effectiveness of LVA and VLNT versus CDT alone will be evaluated in routine practice in hospitals. BCRL patients will be randomly allocated to surgical or conservative therapy only groups. Quality of life (QoL) measures will be determined in both groups with the Lymph-ICF-UL questionnaire at different time points in the first two years after treatment initiation and up to 10 years afterwards to determine the long-term implications of surgical intervention. We will also evaluate additional QoL measures, using the LYMPH-Q and EuroQol EQ-5D-5L questionnaires. Arm volume, safety, burden on patients and pain will also be assessed. We will recruit 252 patients (126 per arm) in total across 7 Swiss and 18 international sites.

Results

Approval from the Swiss Ethics Commission was granted on the 8th of May and we expect to recruit the first patient by June 2023. We are currently preparing trial sites for study initiation and data acquisition. This trial is fully funded with 2.8 Mio CHF by the Swiss National Foundation and the Jubilee award of the Swiss Cancer and Rising Tide Foundations.

Conclusions

BCRL is a debilitating condition posing physical and psychological burden on patients. Two surgical interventions could be available to ease this burden; however, they have yet to be validated. We expect LVA/VLNT to correlate with significantly improved QoL measures over the 10-year assessment period of the study. Lymphatic microsurgical techniques warrant robust clinical investigation to establish them in routine practice as they could provide a significant positive impact on breast cancer survivors with lymphedema.

FREE COMMUNICATIONS

Balancing microsurgery and regenerative medical approaches in the treatment of burn contractures

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Objective

The value of flap surgery in the reconstruction of acute burn injuries and its sequelae is undoubted. In recent years, however, regenerative medicine has challenged classic reparative surgical procedures. While reconstructive microsurgeons emphasize the immediate solution and the elegance of flaps, proponents of regenerative medicine hail the underlying science and minimal invasiveness. Based on profound personal clinical and scientific experience in reconstructive surgery and regenerative medicine, the merits and downsides of these fundamentally diverging approaches in the treatment of burn contractures are discussed.

Methods

The use of various regenerative dermal substitutes and autologous epidermal-dermal constructs in the treatment of 30 burn contractures of the hand, trunk, neck and axilla was investigated. Outcomes were compared with flap surgeries.

Results

Fasciocutaneous flaps are the mainstay for microsurgical flap reconstruction of contractures of the axilla and neck. Importantly, ultrathin fasciocutaneous flap harvest with prior perforator mapping is mandatory for favorable outcomes. Also, advanced strategies such as ALT with fascial slings are helpful to mold the flaps to their respective anatomic area. Dermal substitutes and autologous epidermal-dermal constructs, on the other hand, offer simple and quick, albeit two-staged solutions. While dermal substitutes showed high rates of recurrent contractures, flap reconstruction had overall little tendency towards contractures. Epidermal-dermal constructs were fragile in their early stage, but showed promising results once fully healed when transplanted to static areas.

Conclusions

Based on the current experience, flap surgery performed in experienced hands show an overall better outcome for the resolution of contractures of large joints. Nevertheless, dermal substitutes still are important alternatives particularly in critically ill patients and present viable solutions for static areas including the female breast. In the future, advanced tissue engineering concepts such as epidermal-dermal constructs and other composite solutions may render more feasible, single step solutions.

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The use of Apligraf® in surgical and traumatical full-thickness wounds

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Objective

Since its approval by the Food and Drug Administration (FDA), Apligraf® is commonly used to treat nonhealing venous ulcers and diabetic foot ulcers. This bilayered tissue-engineered skin is composed of human keratinocytes and fibroblasts that have been harvested from neonatal foreskin. The use of this tissue-engineered skin in other type of wounds is yet to be described or published.

Methods

In this retrospective study, we included all patients with surgical and post-traumatic wounds who underwent at least one application of Apligraf® between July 2021 and January 2023 in our Department of Plastic, Reconstructive and Aesthetic Surgery. Apligraf® was used in cases where a split thickness skin graft procedure was not feasible (contraindication to general anesthesia, impossibility to suspend anticoagulative treatment or surgery refusal by the patient. The unique size of Apligraf® measuring 7.5cm in diameter is available and was used in our patients. For small wounds, an Apligraf® was divided into 2 to 3 pieces in order to reduce waste of tissue and therefor limit the price of the application. If a reapplication of Apligraf® was necessary, a gap of a minimum of 14 days between both applications was respected.

Results

In total 14 patients with 20 surgical and post-traumatic wounds were treated with Apligraf® in between July 2021 and January 2023. The mean size of those 20 wounds was 33 cm2 for a dimension of 5,1cm.x 6,3cm. The biggest wound was 73cm2 and the smallest was 3cm2. One to three applications were needed, allowing a 100% healing success rate. The mean time needed for complete wound healing was 31,7 days with a maximun measured at 56 days. No complications, side-effects or adverse reactions to Apligraf® were observed.

Conclusions

Apligraf® can be used as an alternative to a split thickness skingraft, therefore reducing morbidity, pain and bleeding of donor site, with no need for general or local anesthesia. This procedure can be performed within 20 minutes in an outpatient setting.

Beyond the tingling sensation: Unveiling the neurobiological origin of the tinel sign in cross-face nerve grafts for facial reanimation

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Objective

The Tinel sign is the most frequent, efficient, and cost-effective diagnostic tool used to either estimate the progress of regenerating axons in a surgically reconstructed nerve or to substantiate the presence of a structural nerve lesion, e.g. neuroma, tethering or compression. Since its first documented report by Hoffmann and Tinel in 1915, its application has grown immensely. To interpret this sign from a clinical perspective in facial nerve reconstruction procedures and in order to predict potential functional outcomes, we aim to highlight the neurobiological basis of this phenomenon.

Results

Based on neurophysiological characteristics, the Tinel sign must exclusively emerge from afferent axons – carrying signals from sensory receptors to the brain. In facial reanimation, the Tinel sign is frequently used to evaluate the axonal regeneration along cross-face nerve grafts. However, the origin of the Tinel sign along these grafts has remained unveiled due to the traditional view of the extracranial facial nerve as a pure motor nerve. Contrariwise, recent findings by our group have highlighted a motor axonal population of "only" 80% in the facial nerve main trunk, while the remaining nerve fibers are either of sympathetic or sensory nature – the latter originating from trigeminal nerve fibers most likely eliciting the tingling sensation of the Tinel sign. Interestingly, for the buccal branch as frequently used donor for cross-face nerve grafts motor efferents only count about 50% of all axons. Thus, the strict neurobiological differentiation between afferent and efferent axons falls short to explain the regeneration progress of the facial nerve and, conclusively, motor functional outcome might not be adequately reflected by the Tinel sign.

Conclusions

A positive Tinel sign only resonates axonal regeneration of the sensory axons traveling via the cross-face nerve graft from the trigeminal nerve fibers that do not contribute to motor restoration of facial expressions. Therefore, a positive Tinel sign provides limited information regarding motor axonal regeneration, which is critical for planning second-stage surgery in facial reanimation using free muscle transfer.

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Dielectric elastomer actuators for facial paralysis

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Objective

Facial paralysis is a challenging and severely disabling condition, as it alters a patient's ability to express emotion and communicate. Restoring movement is crucial for the patient's quality of life. Traditional therapies can include multiple nerve and muscle transfers, which are complex and require a lot of time. In recent years, the usage of soft artificial muscles as neuro-prosthetics has been explored. The aim of this study is to implement a new strategy for dynamic facial reanimation by using a type of soft artificial muscle, namely a Dielectric Elastomer Actuator (DEA). DEAs are a type of electroactive polymers, showing promising properties similar to natural muscles such as the fact that they are soft, lightweight and allow for large displacements. For this purpose, a neural interface is implemented, which allows the real-time actuation of the DEA. The specifications of the actuator were obtained by comparing it with the characteristics of the facial muscles.

Methods

Surface electromyography (EMG) was performed on the face of a healthy participant to record the signal of the zygomaticus major muscle in motion. The EMG signal processing is done in real time using MATLAB and Simulink, thus making it possible to synchronize the DEA's activity with the healthy individual's mouth movements. Five different DEAs were actuated in real time, each with ten different EMG signal recordings corresponding to the mouth movements while pronouncing the word "hello". The displacement of the DEA and a connected silicone skin surrogate was quantified by using a laser sensor.

Results

The analysis of the signals showed a maximum delay of 28 ms between the end of electromyography signal processing and the DEA displacement. In addition, the maximum delay of the electromyography signal processing amounted to 108 ms. The resulting strain reached 3% with a maximum displacement of 1.2 mm. The delays can be reduced by implementing a different processing strategy.

Conclusions

This study shows the feasibility of using surface electromyography as a neural interface to synchronize the actuation of a DEA to the mouth movement of a healthy participant in real time. Real-time actuation of a DEA led to noticeable movement of a silicone skin surrogate, which shows that the usage of DEA combined with a neural interface presents a promising approach for treatment of facial paralysis.

Robotic-assisted microsurgical head and neck reconstruction

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Objective

Here, we present a successful application of robotic-tools for the treatment of a 63y/o patient, suffering from radionecrosis of the nasopharynx C1- and C2-region after primary radiochemotherapy of a squamous cell carcinoma.

Methods

The soft tissue defect was an antevertebral ulceration exposing a significant part of the cervical spine, leading to a polymicrobial osteomyelitis with a pathologic fracture of the atlas. The reconstructive challenge was to control the infection, prevent further collapse of the bone, provide soft tissue coverage of the exposed bone while preserving airway and oral passage in this hardly accessible and irradiated region. The defect was restored with a transoral-minimal-invasive robotic assisted free radial forearm flap. Standard microsurgical anastomosis to the internal jugular vein and superior thyroid artery was performed after the pedicle was tunneled to the neck through a limited lateral pharyngotomy.

Results

The use of robots gained attention in head and neck surgery. It provides an approach for extirpation of certain tumors of the upper aerodigestive tract, allowing 360° wristed instrumentation and an ability to work beyond the line of sight. In addition, the robotic system can be used in a minimally invasive manner, reducing morbidity compared to standard surgical approaches for cancer resection and reconstruction in difficult-to-reach localizations. While robotic surgery in the head and neck area was initially preserved for small tumors where the defect could be closed primarily or healed per secundam, more extensive tumors, as well as previously radiated patients, are addressed with robotic surgery, which entails free flap reconstruction to improve speech and swallowing function.

Conclusions

This case demonstrates how the combination of robotic surgical tools with microsurgical reconstruction can be a safe approach in anatomically hidden localizations. The operative morbidity can be reduced by using the transoral robotic approach, instead of an extensive dissection to reach the posterior pharyngeal wall. This increases the surgeon's armamentarium in challenging cases. Further establishment is needed to assess the long-term outcomes and cost-effectiveness of robotic surgery in free flap surgery. Despite the potential benefits, the use of robotic surgery in microsurgery is still limited due to the high cost and the need for specialized training.

The value of pedicled perforator flap reconstruction to improve quality of life in rare soft tissue abnormalities

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Objective

Extensive soft tissue calcifications can cause debilitating pain with respective loss of function. One cause can be localized fat-necrosis. The pathogenesis is a benign nonsuppurative inflammation of adipose tissue, which can be caused by subcutaneous drug injections (egpain medications, insulin or fragmin), or other causes like myositis ossificans, which can be caused by trauma, surgery or repeated microinjury.

Painful soft tissue calcifications can significantly impair patients' quality of life (QoL), by limiting their mobility, and causing disability. Non-surgical treatment, such as physical therapy and analgesics, are often the first line management. However, surgical intervention may be considered when conservative measures fail to provide adequate relief.

Methods

We performed a systematic review on the treatment of soft tissue calcifications. Additionally, we present a case of successful quadriple pedicled perforator flap therapy of an extreme example of soft tissue calcifications induced by chronic injections of pethidine with life-changing amelioration in QoL after surgery.

The surgical procedure was done in a multi-step approach, addressing first the left, then right upper and then both lower extremities. During surgery, the lesions could be resected completely and a corresponding soft-tissue reconstruction was performed. Due to the rigidity of the soft tissue calcifications, there was a local radial nerve compression on both upper arms. During surgery we thus performed a complete resection of calcified tissues, followed by radial nerve decompression. An ipsilateral single-perforator TDAP flap was then used, for bilateral defect reconstruction. After successful wound healing of the arms, proximal lower extremity lesions were resected and reconstruction was performed by bilateral pedicled double perforator, venous supercharged DIEP flaps.

Results

The patient underwent quadriple perforator-flap surgery, leading to complete relief of prior existing pain. The patient was extremely satisfied with the functional and aesthetic result.

Conclusions

Despite the technical challenges of pedicled perforator flap-surgery, we wish to encourage it's usage in the treatment of patients suffering fom extensive soft tissue calcifications. What is meant to be extensive surgery can sustainably improve the QoL of our patients.

Central lymphatic surgery: New frontiers in robotic-assisted microsurgery

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Objective

Central lymphatic flow disorders can be congenital or acquired. While the latter can result from any surgery or trauma, congenital lymphatic lesions exhibit a plethora of manifestations, ranging from singular thoracic duct abnormalities to complex multifocal malformations. In case of congestion of the lymphatic flow with reflux into organs and body cavities reconstructive microsurgery is a potent method to improve lymphatic flow. In this context robotic-assisted microsurgery may aid significantly in accessing the prevertebral axial lymphatic system.

Methods

Central lymphatic lesions are rare entities, which should be treated in specialized centers in a multidisciplinary fashion. We report a case series of 7 patients treated by thoracicduct-vein anastomosis to improve central lymphatic flow at different locations and levels. All patients had been treated conservatively including MCT diet, parenteral nutrition and somatostatin without success. Intranodal dynamic contrast MR lymphangiography (IN-DCMRL) was performed. Interventional treatment had been evaluated and not deemed reasonable due to an already impaired lymphatic flow, which would have been worsened by further embolization.

Results

Due to the heterogenous nature of the disease patients were treated individually after interdisciplinary evaluation. Most patients suffered from chronic chylothorax, chylaskos, protein-loosing enteropathy, chyle leak and severe peripheral edema. Thoracic duct abnormalities included traumatic transsection, thrombotic venous occlusion, atresia at the left venous angle with severe dilatation, aneurysmal dilatation and complete absence of the axial lymphatic system with collateralization via the subcutaneous tissue of the trunk. Lympho-venous anastomoses were performed in the neck, the abdomen and the lateral thoracic wall. The success of the microsurgical reconstruction varied depending on the nature of the underlying cause from mild improvement to complete resolution of all symptoms.

Conclusions

In case of disruption of the central lymphatic flow leading to chronic fluid accumulation, lymphatic congestion and protein loss super/microsurgical reconstruction of the axial lymphatic system by thoracic duct-vein anastomoses provide an important means to treat these complex conditions. Robotic-assisted microsurgery represents a promising tool to further improve access and reliability.

Facial Feminization Surgery: Innovations and standard of care at innovation focus on gender variance at Basel University Hospital

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Objective

Transwomen have diminished mental health-related quality of life compared to the general female population. Most of the internal conflict and dysphoria arise from the incongruent physical appearance and its social implications. Facial feminization surgery (FFS) is associated with improved mental health related quality of life and its effectiveness has been demonstrated by artificial intelligence methods. Thus, the importance of the face within other surgical gender reassignment procedures (genital, breast) has become more recognized and FFS is subject to increased demand over the last years. Despite the overall interest, standardized FFS operating procedures (SOP) are not yet available. Our aim was to establish SOPs for FFS at our institution in an multidisciplinary context.

Methods

At our institution, transwomen qualifying for FFS are treated interdisciplinary by plastic, maxillofacial and ENT surgeons. We established SOPs for following FFS procedures: hairline lowering, frontal sinus and orbital rim reshaping, brow lift, rhinoplasty, lip lift, chin reduction, mandibular angle reduction, facial fat grafting and chondrolaryngoplasty.

Conclusions

We present our multidisciplinary surgical approach to FFS procedures in terms of preoperative evaluation, virtual planning, timing, technical execution, postoperative care and outcome evaluation in the context of the current literature.

FREE COMMUNICATIONS

Evaluation of the effects of tranexamic acid administration on hematoma formation, postoperative volume drainage output and length of hospital stay on patients undergoing reduction mammaplasty

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Objective

Reduction mammaplasty is one of the most commonly performed procedure in plastic surgery. Although being a highly elective and rather safe operation, usually executed in healthy patients, postoperative complications may occur. They include, amongst others, hematoma and seroma formation with and incidence of approximately 3 and 1,5%, respectively.

Tranexamic acid (TXA) is an antifibrinolytic drug, used to reduce significant blood loss in multiple clinical settings. It is also known to suppress inflammatory pathways, resulting in reduced posttraumatic and postoperative edema.

The aim of the study was to evaluate the anti-hemorrhagic effect of TXA in patients undergoing reduction mammaplasty. In order to do so, postoperative rate of hematoma was evalutated. Moreover, we analyzed the rate of seroma formation, total drainage volume production, retention time of the drains as well as length of hospital stay.

Methods

All patients undergoing reduction mammaplasty at the Department of Plastic, Reconstructive and Aesthetic Surgery EOC between October 2015 and October 2021 were analyzed. The patients were either administered TXA systemically for 48 hours or did not receive TXA at all (control). All data were analyzed using nonparametric formulas.

Results

157 patients underwent a total of 240 reduction mammaplasties. 31 cases were excluded due to incomplete data or patient dropout. Thus, a total of 209 cases were enrolled in the study, i.e. 138 cases in the control-group and 71 cases in the TXA-group. 3 hematomas were observed in the control-group compared to none in the TXA-group. No seromas were reported. Total drainage volume was significantly lower in the TXA-group compared to the control-group (TXA: 41,6 ml vs. control: 53,8; p=0.0124 resulting in a reduction of the mean length of hospital stay (TXA: 1,6 days vs. control: 2,15 days; p=0.0001)

Conclusions

TXA is a safe drug which reduces not only the risk of post-operative hematomas to be surgically drained, but also total drainage output of the surgical wound, resulting in earlier drain removal and reduced hospital stay. TXA should therefore be offered a wider use in plastic surgery, particularly in times where federal offices of public health impose more and more out-patient surgery.

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Adipose stem cell spheroids for peripheral nerve regeneration: An experimental study

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Objective

The current treatment options of peripheral nerve injuries, despite substantial advancements, are still unsatisfactory. One promising approach is fibrin-hydrogel nerve conduits (FNCs) loaded with human adipose stem cells (hASCs) for nerve guidance, protection and for local release of neurotrophic factors (TNFs). The combination of FNCs and ASCs showed promising results in vitro and in vivo for nerve regeneration. Within this context, ASCs based spheroids are emerging for enhanced cytokine profile. However, their therapeutic effect on nerve regeneration is unknown. Thus, the present study aimed for fabrication and characterization of hASCs spheroids for nerve tissue engineering applications.

Methods

Spheroids based on hASC (passage 4 to 5) were generated using agarose microwell mould. For identifying the optimal culture conditions, various cell seeding densities (i.e., 1000 or 2000, 3000 and 4000 cells/spheroid) were used and the cultures were maintained over seven days. Subsequently, the spheroids were characterized by measuring the size, growth kinetics and intracellular ATP content.

Results

hASC spheroids have been well established. In general, the size and the ATP levels correlated to the cell seeding density. After a 24-hour period of compaction, the spheroid-size and the ATP content remained stable over 7 days for low-density spheroids. For the high density (i.e., 4000 cells/spheroid), the size and the ATP content showed a marked decline in the last days of culture (day 6 and 7).

Conclusions

We successfully established optimal conditions for fabrication of hASC spheroids for seven days. Monitoring the growth of spheroids with their size and ATP levels revealed early changes in spheroid viability. To further validate this model, NTFs expression profile will be analysed. Subsequently, spheroids will be combined with FNCs for treating the sciatic nerve injury in rats.

Microneurovascular phalloplasty: Choice of recipient vessels and nerves in our clinic and in comparison to the current literature

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Objective

In the literature, a large number of possible pedicled and free flaps for phalloplasty in transgender patients are depicted. Accordingly, different approaches in the choice of microsurgical vascular anastomosis and nerve coaptations are used. Here our clinical experience and technical modifications over time are highlighted and compared to the current literature.

Methods

A retrospective analysis of all transgender phalloplasties at our clinic between 2009 - 2022 was conducted. The choice of recipient vessels and nerves for the microneurovascular anastomosis was evaluated and compared to a systematic literature review.

Results

The literature seems to favor the microvascular anastomosis to the femoral artery and the saphenous vein in free flap phalloplasties, followed by anastomosis to the deep inferior epigastric vessels (DIEA/V). Nerve coaptations to the dorsal clitoridal nerve or the ilioinguinal nerve are often described, although it is rarely specified whether the coaptation is performed by epineural suture or fibrin wrap.

In our clinic, we mostly perform a "tube-in-tube" radial forearm flap phalloplasty. Due to the stigmatizing large donor region, we alternatively offer a pre-expanded ALT flap, followed by urethroplasty with a smaller radial forearm flap. The majority of our cases were anastomosed to the femoral artery and the saphenous vein, as well as to the ilioinguinal nerve. However, in select cases, the DIEA/V was chosen as recipient vessel.

Conclusions

The increasing demands but also the increasing experience and learning curve make it possible to offer customized surgical options, despite the small patient population. So far there is no gold standard in terms of donor vessels or nerve coaptation.

Evaluating the benefit of progressive tension sutures at the donor site in autologous breast reconstruction: Retrospective cohort study

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Objective

As seroma formation is a common donor site complication following autologous breast reconstruction, our surgical protocol was adapted by introducing progressive tension sutures (PTS). This study aimed to evaluate the influence of PTS at the donor site in autologous breast reconstruction on seroma formation, aesthetic outcome and patient satisfaction. Additionally, further risk factors of seroma were assessed.

Methods

This retrospective cohort study analyzed data of 400 patients who received autologous breast reconstruction between 2018 and 2022. 204 patients received traditional donor site closure, and 188 patients received PTS with or without drain placement. Proportional incidence of seroma was described and multivariable logistic regression assessed risk factors for seroma formation. At the deep inferior epigastric artery perforator (DIEP) donor site, patient satisfaction was further described by administration of the BREAST-Q and the aesthetic outcome was graded by three blinded participants.

Results

514 breast reconstructions were performed on 400 patients. The incidence of seroma formation was lower in the PTS group compared with traditional closure. Multivariable analysis showed that patients who received PTS were 40% less likely to develop seroma. The aesthetic outcome was considered more pleasing both objectively and subjectively if PTS were performed. Regarding patient satisfaction, no difference was found in the postoperative physical well-being between the two groups.

Conclusions

In this large cohort, we found a lower proportion of seroma if PTS were performed. PTS were also associated with reduced odds of seroma formation and were described to be aesthetically more pleasing. PTS should be considered in autologous breast reconstruction.

FREE COMMUNICATIONS

Neoligament grafts yielding primary progenitor tenocytes: Allogeneic tissue engineering and surgical proof-of-concept for hand ligament regenerative medicine

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Objective

The aim of this study was to establish a bioengineering and surgical proof-of-concept for artificial ligaments grafts yielding cultured and viable primary progenitor tenocytes. Specifically, the first objective was to verify the in vitro compatibility of both components, as well as to describe critical and key functional attributes of the combination product, aiming to eventually enhance graft bio-integration in vivo. The second specific objective was to validate the applicability of the scaffold in two clinical procedures of hand ligaments surgery (i.e., ligamento-suspension plasty after trapeziectomy and ulnar collateral ligamentoplasty at the thumb) within a cadaveric study.

Methods

To verify if the considered cellular active substance was capable of adhering on tendon extracellular matrix components, an in vitro adhesion study was performed. Two scaffold seeding strategies were investigated: a static cell seeding protocol and a dynamic cell seeding protocol involving incubation under rotational agitation. Cellular metabolic activity, distribution on the scaffold and extracellular matrix component synthesis were all assessed. The manufacturing process was then refined in order to be transposable to GMP manufacturing. Lastly, a surgical cadaveric study was performed during which the products were used in a ligamento-suspension plasty after trapeziectomy as well as in a thumb metacarpophalangeal ulnar collateral ligamentoplasty.

Results

In vitro qualification (cellular active substance and finished product), optimization, and manufacturing process development showed that the cell-based combined preparations could be simply and rapidly obtained. The biocompatible transplants presented homogeneous cellular colonization in vitro (cellular coating along scaffold fibers) and other critical and key functional attributes (tendon extracellular matrix synthesis and deposition along scaffold fibers). An optimal controlled GMP-transposable manufacturing process was established for the progenitor tenocyte-seeded grafts and the cadaveric study enabled clinical protocols to be established for hand ligaments surgery using the considered devices.

Conclusions

Overall, this study established a proof-of-concept for the translational development of a functional tissue engineering protocol for allogeneic hand ligament regenerative medicine, in view of a pilot first-in-man clinical trial.

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The evolution of vaginoplasty in gender confirmation surgery at University Neuronavigation Hospital Basel: Technical adaptions, surgical and patient related outcome

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Objective

Penile inversion (PI) is still the most common technique in vaginoplasty while many modifications of this classic technique are widely used. We adapted the surgical technique in the resent years, using an urethral flap technique. Points of interest are the surgical outcome, evolution of complication rates and patient related outcome.

Methods

We analyzed data retrospectively between 2015 and 2021 in patients undergoing vaginoplasty at our center and performed an online survey for patient related outcome including satisfaction with body image and overall quality of life, aesthetic, sensory, and functional parameters, including urological and sexual outcomes, and decision for surgery. Validated questionnaires were used like the Gender Congruence and Life Satisfaction (GCLS) scale, the Hamburg Body Drawing Scale (HBDS) and the Inclusive Sexual Function Inventory (ISFI).

Results

We found a significant reduction in major complications from 37.8 to 6.9 % in recent years as well as reduction of secondary corrections. Functional urological problems were rare. Overall, patients reported high satisfaction with body image, quality of life and aesthetic outcome after vaginoplasty.

Conclusions

Vaginoplasty is a save and efficient procedure in gender confirmation surgery with relatively low complication rate and high patient satisfaction regarding body image, quality of life, functionality, sexuality, and decision for surgery.

Neuronavigation applied in interdisciplinary approaches and beyond

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Objective

Under the suspicion of an intracranial foreign body (FB) a 46-year-old patient was investigated by CT scan to plan the exstirpation with neuronavigation (NN) by the Neurosurgeons in our hospital. NN is a computer assisted tool, which connects the real time surgical site with the preoperative imaging by an infrared pin and creates 3D images which allow the surgeon to facilitate the orientation.

As the FB showed to be in the deep plane of the soft tissues and cause radiating pain our Plastic Surgery Department got involved to perform the scar revision. With previous diagnostics we could plan the scar revision as a joint approach and take advantage of NN.

Methods

The uneven scar and the maximum of pain were not clearly identifiable clinically. The NN allowed to localize the FB, to which we orientated the scar revision. The Surgery was planned with both disciplines to use the NN additionally and to do the scar revision. The surgery was performed under general anesthesia.

Results

The spot marked with the NN and the spot where we found the FB matched. We could remove the FB which corresponded to a projectile which hit the patient 20 years ago during the war in Eritrea. The Patient is now symptom-free and without any impairment of mimics.

Conclusions

This case highlights the practical benefits of NN. It leads to further discussions about its possible applications in Trauma, Oncologic and Reconstructive Surgery which we would like to present in an interdisciplinary Twin-Talk.

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Tribute to J.F.S. Esser and his cheek rotation flap and our own experience

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Objective

The cheek rotation flap first described from Johannes Esser 105 years ago (Esser, J. F. S. (1918). Die Rotation der Wange und allgemeine Bemerkungen bei chirurgischer Gesichtsplastik. FCW Vogel.) is an ideal reconstructive modality as it uses available local tissue and leaves the cheek with minimal disruption of the normal boundaries of the aesthetic facial subunit. Johannes Esser was a pioneer of plastic surgery and laid the foundation for local flaps especially in the face.

Methods

In our clinic we treat over 200 people with non-melanoma skin cancer in the face every year. Some of them can be operated with direct skin closure but others have defects which need flap reconstruction. With some exciting cases, we want to outline the impact of this technique and bring it back in the minds of plastic surgeons with taking the fear of rotating this big subunit close to so many sensitive structures.

Results

One of the key benefits of Esser's local cheek flap is that it minimizes scarring and preserves the natural contours of the face. This is achieved by using tissue from the same area as the defect, which ensures a seamless transition between the repaired area and the surrounding skin by respecting the aesthetic facial subunits.

Conclusions

We can demonstrate that Esser's local flap in the face is still, after it was described first 1918, an innovative surgical technique for facial reconstruction with high cosmetic benefits.

Integrating patient reported outcome measures in facial feminization for male-to-female transgender patients

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Objective

Facial feminization surgery (FFS) is a hot topic and an important step in transfeminine patient's surgical transition. Patient reporting outcome measures (PROMs) allow surgeons to choose right indications, analyze strengths and weaknesses of the surgical approach and contributes to technical advancement. However, collecting standardized PROMs pre- and postoperatively after FFS is scarce. Here, we describe an analysis of systematically evaluated quality of life questionnaires before and after FFS at Innovation Focus on Gender Variance at the University Hospital Basel.

Methods

Data were retrospectively extracted from records of patients scheduled for FFS at the University Hospital Basel from 2020 to 2023. We included adult male-to-female patients with completed pre- and postoperative questionnaires assessing quality of life in social, private and professional aspects. A minimum follow-up of 6 months was requested. Full FFS included at least three different surgical procedures such as frontal sinus setback, orbital rim remodeling, hairline lowering, blepharoplasty, rhinoplasty, lip lift, chin or mandibular angle reduction, autologous fat grafting and Adams apple reduction.

Results

PROMs were integrated successfully. Twenty-five patients were treated, of which nineteen patients with a total of 121 procedures were enrolled. Only three complications according to Clavien-Dindo (Grade I, Grad II and Grade 3b) were observed. The overall satisfaction rate after FFS was 85% and there was a significant change (p<0.001) in satisfaction from pre- to postoperative evaluation. Patients were more confident with their appearance and they were less limited in social and professional activities. There was a significant correlation between the score reached before and after surgery (p<0.037).

Conclusions

FFS is a safe procedure with a high rate of satisfaction. Expectations, especially with a low preoperative score, should be addressed carefully. Standardized integration of PROMs helps to reduce wrong expectations. Moreover, FFS reduces gender dysphoria and improves quality of life.

Recipient vessel strategy for microsurgical lateral foot reconstructions: Is the posterior tibial artery the vessel of choice to avoid lateral ankle bulging?

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Objective

Soft tissue defects over the lateral foot require frequent microsurgical reconstruction. We emphasize a technique, using posterior tibial artery (ATP) as the recipient vessel via a tunnel underneath the Achilles tendon to avoid flap bulking over the lateral malleolus. We present two cases with similar lateral foot defects that were treated by means of free Anterolateral Thigh (ALT) flaps.

Methods

Two recent cases of patients with critical lateral foot defects distal to the lateral malleolus were compared after microsurgical reconstruction. Both patients showed an open 3-vessel run-off in the lower legs. Patient 1: 70-year-old man with lower ankle joint and talonavicular arthrodesis due to septic arthritis. Wound infection occurred resulting in exposed peroneal tendons. ALT flap was raised with a long pedicle of 12cm in length. Dissection of ATP for 3cm length. Communication between the defect site and the medical vessel bundle was created by preparing a channel ventral to the Achilles tendon. Some fatty tissue located between the calcaneus and Achilles tendon was removed (Kager's fat pad). This space should be released so that the surgeon's index finger can pass it without any tension. The ALT-pedicle was transferred through the channel following end-to-side anastomosis to ATP. Patient 2: 39-year-old man after radical excision of a diffuse tenosynovial giant cell tumor in the area of the right hindfoot. Wound healing disturbances occurred. A critical defect of 4x1cm with dead space remained. Due to former giant cell tumor removal, the ATP was not suitable as recipient vessel. Usual ALT flap harvest. End-to-side anastomosis to the ATA.

Results

Using the Achilles tendon channel and access to the ATP allowed a reduction of flap size. In contrast, with the usual recipient vessel access to the ATA, it is often necessary to place a significant amount of flap volume over the lateral ankle to cover the pedicel and enable inset of the flap. Thus, more aggressive secondary flap reduction procedures are required and especially subsequent shoe fitting is more challenging.

Conclusions

The ATP-approach by means of Kager's fat pad removal, creates a vascular connecting channel underneath the Achilles tendon in order to enable tension-free end-to-side anastomosis to the ATP. It allows more custom-made flap reconstruction with less volume and bulging at this challenging location.

Cognitive nerve transfers for spasticity treatment in upper motor neuron syndrome

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Objective

Stroke is nowadays a leading cause of disability with devastating sequelae. Nevertheless, not all the muscles are equally affected, as some may turn spastic or paretic and other remain intact. This unique pathophysiological mosaic dictates a precise therapeutic plan. A life-lasting treatment, precisely adapted to every single patient's needs and to disease pattern, is currently missing. Hyperselective muscle denervation and subsequent cognitive reinnervation with appropriate donor nerves may break the pathological spastic circuit and provide volitional muscle control. We performed cognitive nerve transfers in stroke patients and prospectively investigated their effects on clinical and functional level.

Methods

To provide volitional muscle control of finger flexors and wrist/fingers extensors we transferred the nerve branch to brachialis muscle to the anterior interosseous nerve and the nerve branch to the lateral head of triceps to the deep radial nerve in a total of ten hemiplegic patients. We additionally reinnervated the spastic pronator teres muscle with a branch to the pectoralis major muscle using a vascularised graft. Supplementary surgical steps were performed as needed. Nerve donors had always been carefully selected with a minimum of M4 strength. Clinical and functional outcomes are evaluated 6 and 12 months and 24 months after surgery.

Results

So far seven patients have completed the 12-month follow-up. All patients presented with an improvement in all clinical and functional scores with statistical significance (p<0.05) for DASH and modified Ashworth scale.

Conclusions

Cognitive muscle reinnervation through selective nerve transfers seems to reduce spasticity while providing volitional control and may offer the possibility for permanent biological improvement of hand function. in stroke patients. A longer follow-up and higher number of patients is needed.

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Is there a change in the clinical presentation of the "flesh-eating disease"? Novel atypical manifestation of life threatening soft tissue infections with group A streptococcus

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Objective

Over the last year, we have noticed repeatedly invasive group A streptococcal (GAS) soft tissue infections with unusual aggressive clinical course but atypical clinical presentation. In the same period, an increasing number of severe GAS cases have also been reported in literature, especially in children in the UK and France. GAS is the most common cause of necrotizing soft tissue infections and can lead to shock and multiple organ failure. To point out this ongoing trend we present four notably severe and atypical clinical manifestation of GAS infections.

Methods

Four female patients presented with a variation of symptoms (fever, dyspnea, cough, tolerable localized pain). The remarkable atypical clinical presentation in all cases was the discrete skin discoloration in proportion to the underlying necrosis of deep tissues. They all rapidly progressed into a septic shock with multiple organ failure and in two cases extensive bilateral necrosis of deep tissues.

Results

In all tissue analyses, a monomicrobial infection with invasive GAS was detected. One of four patients died as a result of in-hospital infection recurrence. The outcomes after surgical intervention in those cases with bilateral infection were either a massive functional impairment (Figure 1a-c) or extremity loss (Figure 2a-c). All patients required prolonged stay in the ICU/IMC postoperatively and still needed further excision due to aggressive disease progression, despite initial emergency radical debridement down to healthy tissue.

Conclusions

There is a lack of information regarding a possible ongoing trend of invasive GAS infections in adults with particularly aggressive course. Further investigations are needed to understand better the change in clinical development and possible correlation with specific pathogen serotype mutations. Until then, particular awareness is advised for physicians to identify such atypical and aggressive manifestations in order to achieve the best possible outcomes in an interdisciplinary.

Currently available dermal substitutes as a carrier for mechanical SVF: A comparative in-vitro analysis

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Objective

Current treatment concepts for large volume skin defects can include temporary covering with hydrolytic absorbable membranes, also termed dermal subsitutes (DS). A number of medical products are currently available for intraoperative use, including Suprathel, Novosorb BTM, Integra, or Kerecis. The exact components and production steps are well kept trade secrets; however, the compositions can vary from polylactic acid to decllularized fish-skin. The general concept is a two-stage operative approach, applying the dermal substitute to cover the defect and after the inital resorption phase lasting 3-4 weeks, a split skin graft can be applied to the defect. This methodology has remained unchanged for many years and can yield differing results. We aim to investigate the combination of a dermal substitute with a cell-based treatment strategy. Of the current therapies considered angiogenic strategies to restore micro-vascularization in large-volume skin defects, Human adipose tissue-derived stromal vascular fraction (SVF) has immense potential. SVF is a heterogeneous cell population, composed mainly of mesenchymal stromal and endothelial cells and is isolated from adipose tissue following liposuction. This study aims to compare 4 commercially available skin graft products coated with freshly isolated SVF from human patients. The procedure will mimic the intraoperative procedure that could be applied in the future, when covering large surface area burns.

Methods

Human SVF cells were cultured on either Suprathel, Novosorb, Integra, or Kerecis for 9 days under cell culture conditions. The patches were characterized histologically for extra cellular matrix deposition, vessel-like formation and protein expression. Protein expression in the supernatant was analysed for total protein concentration.

Results

After 9 days, Kerecis showed the least degradation compared to the other DS. There was no significant difference in visible vessel-like structure formation either on or in any DS in immunofluorescence analysis. Total protein concentration was analysed using a BCA protein assay, demonstrating a highly significant amount present in Kerecis when compared to the other DS.

Conclusions

These in-vitro results demonstrate large differences between the tested DS. Further research is needed to examine the effect of these differences in a clinical setting.

Immediate direct to implant prepectoral breast reconstruction using a 3-D pre-curved biocompatible ADM and smooth round implants:
A prospective observational cohort study

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Objective

We designed a prospective observational cohort study to analyze patients undergoing immediate prepectoral breast reconstruction (PBR) using an innovative 3-D pre-curved biocompatible acellular dermal matrix (ADM) specifically designed for breast reconstruction completely covering a smooth round breast implant in prepectoral position. The collagen structure of the porcine matrix may improve implant biocompatibility, reducing adverse reactions and supporting the proliferation of adipose-derived stem cells differentiating into adipocytes. The primary aim was to assess mastectomy and reconstruction-related complication rates, while the secondary one was to identify related risk factors.

Methods

Females aged 18-80 undergoing immediate PBR were included from April 2019 to April 2021. Patient demographics, tabagism, prior radiotherapy, neoadjuvant chemotherapy, surgery details (surgeons, type and weight of mastectomy) were considered risk factors for complications. Data regarding number of drains, drains' volume, day of drains removal, and breast implant characteristics were collected. Complications were divided into mastectomy- (bleeding, mastectomy skin flap necrosis) and reconstruction-related (seroma, infection, red breast syndrome). Data were analyzed with the Kruskal-Wallis H and binary logistic regression tests.

Results

Fifty-seven patients (102 breasts) received 12 unilateral and 45 bilateral procedures with mean age 48,1 yrs and mean BMI 23,6 kg/m2. Fifteen patients were smokers and 10 breasts received radiotherapy prior to mastectomy. Mean drain collection was 485,9 cc and were removed at 15,7 days post-op. We report 41 complications, 33 mastectomy- and 8 reconstruction-related, 14 patients needed reoperation, of whom 7 wound revision under local anaesthesia, and 7 explanations, with an implant loss rate of 7,6%. The binary logistic regression analysis for mastectomy and reconstruction-related complications did not identify any variable with a statistically significant impact (p>0.05) on complication rate.

Conclusions

This is the first prospective study analyzing patients with DTI-PBR with 3D pre-curved biocompatible ADM and smooth round implants only. Our results showed that the success of the technique is not influenced by the surgeons' experience and/or other risk factors. Drains' volume is comparable to other reconstructive techniques, but drains are left in place for longer.

Customizable autologous tissue engineered graft for phalanx construction in children with symbrachydactyly

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Objective

Symbrachydactyly is a rare congenital upper limb anomaly, that occurs in 1/30,000-1/40,000 live births resulting in children born with short boneless fingers. Nowadays, these pediatric patients are treated with phalangeal bone transfer from the foot. However, morbidities are occurring at the donor site which result in unstable toes with significant disfigurations that worsen with the child growth. In this project, we used adipose-derived stromal cells (ASC) from adult and pediatric donors in a developmentally-inspired strategy to engineer osteogenic grafts for phalanx reconstruction via endochondral ossification (ECO).

Methods

Adult human ASCs isolated from the stromal vascular fraction (SVF) were seeded first onto collagen sponges and exposed for one week to chondrogenic in vitro to generate individual cartilage spheres (10-30mm3). Then, the cartilage spheres are assembled together (stacked on a 27G needle) and matured for 3 weeks in vitro to generate clinically-pertinent osteogenic grafts shaped as a phalanx. Finally, the bone forming capacity of these HCTs was assessed by implantation in an ectopic immunocompromised mouse model, reflecting the clinical scenario of phalangeal soft tissue pocket, for up to 12 weeks.

Results

In vitro, we were able to generate phalanx graft in cylindrical shape of clinically relevant sizes (length ranging from 6 to 10mm width ranging from 2 to 5mm) using adult and pediatric (15- to 24-month-old) donors. The presence of large pockets of cartilage tissues within the constructs was confirmed by histology.

In vivo, after 4 weeks of implantation, we could observe early signs of endochondral ossification evidenced mineralization of the implanted cartilage tissues revealed by micro-CT with some bone remodeling. After 8 to 12 weeks of implantation, the bone remodeling was more advanced with an increase of the bone content and the presence of bone marrow pockets in the implanted constructs observed on histological sections.

Conclusions

Taken together, these results demonstrate the feasibility of an autologous approach using ASCs to generate osteogenic phalanx grafts of pertinent clinical size for children born with symbrachydactyly despite the limited amount of tissue available in pediatric patients.

Thromboembolic events in burn patients: An analysis of risk factors and different anticoagulants

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Objective

Burn patients are in a state of increased inflammatory activity and activated coagulation, putting them at risk for thromboembolic events (TE). Additionally, certain patient- and treatment-related factors are associated with an increased risk of thrombus formation. We aimed to evaluate the incidence of TE and identify potential risk factors, including patient characteristics, surgical treatment, anticoagulation strategies and laboratory parameters.

Methods

A single-center retrospective cohort study was conducted at the University Hospital Zurich on all patients >18 years and with a total body surface area (TBSA) of >= 10% admitted and treated between 2002 and 2020. Medical reports of patients with and without TE were descriptively analysed. The association of time to TE with TBSA was assessed by cause-specific Cox models adjusted for different covariates. The association of time to TE with type and dosage of anticoagulants was assessed using a cause-specific Cox proportional hazards model with time-dependent covariates, applied to a matched subset of patients.

Results

The incidence of TE was 8.1% in our cohort of 642 patients. There was a statistically significant increase in the hazard for TE by a factor of 1.02 (95% CI 1.00 to 1.03; P<=0.05) per percent increase in TBSA. Former alcohol abuse (HR=2.54, CI 1.33 to 4.84, P=0.005) and a higher body mass index (BMI) (HR=1.06, 95% CI 1.00 to 1.12, P=0.046) are patient-related risk factors for the development of TE. We found elevated C-reactive protein and procalcitonin levels at the time of event (TOE). Furthermore, anti-Factor-X activity (aFXa) levels at the TOE were below the level required for adequate prophylaxis.

Conclusions

Our results show a moderate risk of TE among burn patients, underlining the importance of close monitoring of burn patients with regard to thrombus formation. Diagnostics should be initiated generously considering the risk of occult thromboses. Particularly, patients with higher TBSA and BMI, and previous alcohol abuse may be evaluated more regularly for TE. Elevated inflammatory markers suggest that inflammatory processes contribute to thrombus formation and should be closely monitored. Inadequate aFXa levels in patients with TE prior to the event suggest increased heparin resistance; aFXa levels should be determined regularly and therapy adjusted to minimise the risk of TE.

Expansion into the future: Complex autologous skin substitutes for severe burn patients

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Objective

Since the invention of cultured epidermal autografts (CEA) by Rheinwald and Green in the 1980s, the use of autologous skin substitutes are considered to be an important treatment tool in massive burns with a lack of donor sites to harvest autologous skin grafts. In the past the main disadvantage of this innovative technique was the poor quality of skin which leads in the majority of the cases to a poor quality of life.

Methods

During the last 20 years a multi-professional research team at the University Children's Hospital Zurich and the University of Zurich established a novel complex autologous skin substitute consisting of a matrix containing autologous fibroblast with overlying autologous keratinocytes. In a phase I study we investigated the safety of this skin substitute when used in patients with skin defects. Furthermore, in a multicenter phase IIb study, its use in severely burned patients is compared to the standard of care method (1:3 meshed STSG).

Results

In the phase I study we were able to show that our novel complex skin substitute can be used without any harm to the patient. In the multi-center phase IIb study it was possible to show a significantly greater expansion rate by using an initial 4cm2 autologous skin biopsy to produce the novel skin substitute compared to the expansion ratio of 1:3 of a autologous split thickness skin graft as standard of care.

Conclusions

In the phase I study we were able to show that our novel complex skin substitute can safely be used on the patient. In the multicenter phase IIb study it was possible to show that a significantly greater expansion rate can be attained when producing the novel skin substitute from an initial 4cm2 skin biopsy compared to the expansion ratio of 1:3 of autologous split thickness skin grafting as a standard of care procedure.

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Large Volume Vibration Expansion Lipofilling is a safe and effective technique in free-flap breast reconstruction

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Objective

Free flap surgery is become the gold standard in breast reconstruction thanks to advances in microsurgical set-up. Often these procedures need a touch up operation like scar revision or volume correction. In case of large breast the amount of fat transfer needed can be quite impressive. Standard lipofilling involves manual fat transfer by small volume syringes; this technique is well validated but time consuming. In this paper we review a series of 15 patients underwent a Large Volume Vibration Expansion Lipofilling (La.V.V.E.L). To the best of our knowledge this is the first application of this technique to microsurgical breast reconstruction.

Methods

Fifteen patients have bee included in this retrospective analysis. All patient are female and all patients underwent mono or bilateral free flap breast reconstruction. Main inclusion criteria were the need of big volume (>300cc) augmentation, main exclusion criteria was smoking or uncontrolled oncologic disease. In all cases Microaire PAL system was used for infiltration of Klein solution, separation and aspiration. Revolve system was used for fat decantation. Fat was withdrawn by multiple 50cc syringes and re injected with Microaire Pal system.

Results

Eighteen (12 single and 3 double) flap were treated with La.V.V.E.L technique, 12 were DIEP flap, 2 were PAP flap and 1 was TUG flap. All patient have been operated in general anaesthesia, all fat harvesting have been performed with wet technique. No immediate complications have been reported; only one case of firmness of a breast has been noticed. All the patients have been operated with an outpatient regimen. Mean follow up is 1 year. Average quantity of fat grafted was 389cc mean operatory time was 54 min, only 4 patients required a second session of fat transfer.

Conclusions

La.V.V.E.L technique is a well-validated technique for gluteal augmentation and for prosthetic breast augmentation, our results shows that it is safe and effective in case of free flap breast reconstruction.

Reconstruction of the upper right extremity using ipsilateral pedicled and contralateral free latissimus dorsi flap following successful treatment of necrotizing fasciitis

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Objective

Necrotizing fasciitis is a severe and life-threatening condition with a mortality rate ranging from 30% to 50%. Early diagnosis and prompt, radical debridement of all affected layers down to healthy tissue are crucial for the survival of patients. Secondary plastic reconstructive wound closure is inevitable in surviving patients.

Methods

We report on a 71-year-old female patient who exhibited an agitated state and high fever at Zurich Airport during her transit from Rome to Miami. After initial care at the hospital nearby the airport, the patient was urgently transferred to our hospital. Upon admission to the shock room, the patient required immediate medical resuscitation, including pharmacological and later mechanical support, and showed fulminant necrotizing fasciitis affecting her right arm. An immediate, radical debridement of all affected structures was performed, and the patient was admitted to the intensive care unit. Following a total of 5 operations and comprehensive intensive care therapy, a cardio-pulmonary stable patient with a viable but extensively injured upper extremity was observed after 5 weeks, necessitating extensive plastic reconstructive soft tissue coverage.

Results

By utilizing an ipsilateral pedicled and a contralateral free latissimus dorsi flap, a functional and aesthetically pleasing reconstruction of the right upper extremity was achieved following the prior necessary radical debridement.

Conclusions

Only through early diagnosis and prompt and radical surgical debridement of all affected structures, optimal intensive care management, and plastic surgical reconstruction in a microsurgically specialized center, can successful treatment of necrotizing fasciitis be accomplished.

Sensitized forehead flap for nasal reconstruction after extensive melanoma resection: A case report

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Objective

Forehead flaps remain today the workhorse for reconstruction of large nasal defects. Based on the robust vasculature to the forehead via the supraorbital, supratrochlear, and terminal branches of the angular and dorsal nasal vessels, they allow a wide pedicled flap mobilization. Supratrochlear and supraorbital nerves follow the arteries, allowing sensitive innervation of the forehead flap.

We present the first description of a sensitized forehead flap for subtotal nasal reconstruction after extensive desmoplastic melanoma resection.

Methods

An 86-year-old male patient was referred to our department for excision of a desmoplastic melanoma, Breslow 11.2 mm of the left nasal wing. R0 resection was achieved and cleared by the histopathological analysis. Due to the aggressive nature of this desmoplastic melanoma with perineural infiltration, despite the location, 2 cm security margins were taken after approval by the tumor board. (Fig 1)

The first step of reconstruction was undertaken using a right sided paramedian forehead flap. The ENT specialist mobilized and rotated the residual septum to allow sufficient projection. The flap was inverted using the forehead skin as inner nasal lining, and a split thickness skin graft taken from the thigh was used to cover the external surface. We included the supratrochlear nerve in the flap. Direct closure of the caudal part of the donor site was achieved, the remaining skin graft was used to cover the cranial part.

Eight weeks later, we autonomized the flap by resecting the vascular pedicle. During this procedure we localized the 3 branches of the supratrochlear nerve. The nerves were carefully skeletonized and the remaining subcutis and skin graft were excised. A new bed for the sensory nerves was created between the eyebrow and radix nasi. (Fig 2)

Results

R0 resection and reconstruction were obtained, with a satisfactory esthetic result. (Fig 3). Follow-up at 6 and 12 weeks showed optimal healing and complete persistence of sensitive innervation of the inner lining. The patient initially described the sensory feeling along the forehead, this resolved after 4 weeks.

Conclusions

Cutaneous nerves can and should be conserved in flap mobilization for coverage of nasal defects. This allows sensitive innervation of the reconstructed area. We believe that providing sensation to the skin of the nasal tip, alae and dorsum of the nose is important.

Vascularized bone graft reconstruction following bone tumor resection at a multidisciplinary sarcoma center: Outcome analysis

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Objective

Bone tumor resection often results in extensive bone defects. Vascularized bone grafts are well established and used to improve functional outcome and maintain oncologic safety. Publications comparing the various available bone graft options are rare. We focus on the clinical outcomes after reconstruction of bony defects with vascularized bone grafts.

Methods

Twenty-five cases of bony tumors were reconstructed with free vascularized bone grafts (17 fibulas, 5 iliac crests, 3 medial femoral condyles; 14 fibulas for femoral or tibial reconstruction in combination with allograft or extracorporal radiated bone). Unionrates, hypertrophy, functional and oncologic outcomes, as well as local complications were assessed.

Results

Fibula flaps with a mean size of 16.7cm achieved bony union in 86% after 5 months. Union rates in iliac crest flaps (mean size 5cm) were 80%. With medial femoral condyle bone grafts (mean size 2.5cm) bony union was accomplished in all cases in 4 months. Functional outcomes were good to excellent in all groups of reconstruction, and no significant difference was seen. Complications were highest after reconstruction with a fibula flap (5 cases of graft fractures).

Conclusions

Through bony reconstruction with vascularised flaps, long-term functionality can be maintained. Cosmetic satisfaction is high without compromising oncologic safety.

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The importance of patient-reported outcome measures in female pelvic

Reinnervated profunda artery perforator flap for tongue reconstruction: Prospective pilot study

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Objective

Extensive glossectomy defects cause significant deficits in swallowing and speech, subsequently impairing quality of life. The anterolateral thigh (ALT) flap is considered a workhorse flap to reconstruct such defects. Previous studies assessing reinnervated ALT flaps reported superior sensory recovery, swallow function and patient satisfaction in patients with reinnervated flaps compared with ALT flaps without reinnervation. Recently, the profunda artery perforator (PAP) flap has emerged as an alternative solution for glossectomy defects in malnourished patients with thin lateral thigh thickness. Yet, PAP flap reinnervation has not been described. The aim of our study is to assess sensory recovery and functional outcomes after subtotal or total glossectomy defect reconstruction with reinnervated PAP flaps. Preliminary data is presented 12 months after study initiation.

Methods

We conducted a prospective case series starting in 05/2022. All patients with a (sub)total glossectomy defect receiving reconstruction with a reinnervated PAP flap were included. Two-point discrimination, Semmes-Weinstein monofilament, pain and temperature testing were performed before and after 3, 6 and 12 months of surgery at the reconstructed site and compared with the donor site before flap harvesting. Speech and swallow function were assessed with the MD Anderson speech and deglutition scale. Quality of life was recorded using the EORTC QLQ-H&N35.

Results

From 05/2022-05/2023 six patients underwent (sub)total glossectomy defect reconstruction with reinnervated PAP flaps. A branch of the posterior femoral cutaneous nerve was coaptated to the lingual nerve in all cases. Mean age was 69 years and mean BMI was 25 kg/m2. Mean follow-up was 6 months. Mean two-point discrimination at the tip of the reconstructed flap improved from >10mm at 3 months to 7.3mm at 6 months. Pain and temperature perception at the tip of the flap were present in 40% of patients at 6 months. At 6 months, median MDA speech and deglutition scores were 4 (intelligible speech) and 3 (liquid diet only). No patient reported neuropathic pain at the donor site at 6-month follow-up.

Conclusions

This is the first case series describing and assessing reinnervated PAP flaps for (sub)total glossectomy defect reconstruction. Reinnervated PAP flaps may provide benefits to recovery of sensation and function with little detrimental impact on the donor site.

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defect reconstruction: No future without them

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Objective

Patient-reported outcome measures (PROMs) can be used to assess the success of vulvoperineal reconstruction after gynecologic and pelvic malignancies from a patient perspective. The objectives of this study are to (1) analyze the use of existing PROM tools within this patient population and (2) assess the need for the development of a new, standardized tool for this patient population.

Methods

We performed a systematic literature search within the bibliographic databases Embase, Medline and Web of Science. We included English-language studies published after 1980, including randomized controlled trials, cohort studies, and case series with more than 10 participants. We subsequently screened for articles which included quality of life (QoL) measures or PROMs. Finally, we extracted the individual PROM tool(s) used by each article.

Results

Our overarching search resulted in a total of 2574 abstracts, of which 692 met our inclusion criteria. Of the 692 eligible articles, only 27 studies using one or more PROMs as an outcome measure were found. Of the 27 articles, 17 met the inclusion criteria for this study. After a full text screening, a total of 14 individual PROM tools were identified. In total, less than half of all surgical papers used PROM tools as a measure of success, leading to a frequency of PROM tools use of merely 39,5%.

Conclusions

The use of PROMs as measure of success of reconstructive surgery is increasing, however, within this patient population, there is a broad variety of tools in use, making the comparison of patient reported outcomes and the drawing of any evidence-based conclusions nearly impossible. Based on our findings, we cannot fully support the use of any of the existing instruments for this specific patient population. The generic tools which are highly validated, do not adequately depict the specific needs of this population, while the specialized tools aren't validated by standardized quality criteria in their indication and development. Therefore, there is a need for a well-developed PROM tool based on patient input, tailored to the specific needs of this patient population.

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Proprioceptive feedback restoration for natural prosthetic control

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Objective

New therapeutic concepts utilizing bionic reconstruction have advanced to an established option, enabling patients to regain motor function of the upper extremity. Nevertheless, recovery of sensory feedback in bionic reconstruction still presents a great obstacle, which is often reported by patients as a disturbing problem.Interestingly, potential implementation of proprioceptive feedback in bionic reconstruction of the upper extremity is still poorly explored. To address these questions, we performed a novel nerve transfer to a skeletal muscle to achieve proprioceptive reinnervation and establish a high-fidelity sensory feedback for bionic reconstruction.

Methods

In a rat model, the sternomastoid muscle was used as a target muscle for proprioceptive reinner-vation due to its high muscle spindles (MS) density. The ulnar nerve was transected distal to the dorsal and palmar branches and tunneled under the ipsilateral major pectoral muscle to spare adjacent structures. Coaptation is done epimysial using two interrupted sutures at the motor entry point of the sternomastoid muscle (n=30). As a control the ipsilateral marginal mandibular branch of the facial nerve is used for the pure motor reinnervation (n=30). Twelve weeks after the surgery, whole-mount staining of the reinnervated muscle was used to show the reinnervated neuromuscular junctions (NMJ) and MS. Neural sources of the reinnervating nerve fibers were assessed using doble intramuscular retrograde labeling. Muscle fiber composition was analyzed using triple immunofluorescent staining. The functional assessment was performed using ENG and EMG measurements.

Results

Surgical feasibility of the novel nerve transfers has been proven. No adverse events related to the surgical procedure were observed, all animals tolerated the procedure well. The motor, as well as proprioceptive reinnervation in the ulnar nerve transfer group, has been shown in the CNS as well as within the muscle. Muscle fiber switch was observed in both groups. The electrophysiological assessment showed reproducible proprioceptive signals from the reinnervated muscle using the ulnar nerve.

Conclusions

We demonstrated the feasibility of a new nerve transfer in the animal model. The findings of this study provide multi-level evidence of proprioceptive reinnervation after a nerve transfer for their implementation into the sensory feedback for bionic prosthetics.

A single center retrospective study on 100 consecutive lipedema surgeries: Technical considerations and outcome analysis

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Objective

Lipedema is a disease characterized by a painful and abnormal growth of fat tissue in upper and lower limbs sparing the trunk, hands, and feet. It occurs almost exclusively in women and can be associated with lymphedema, venous disease and obesity, which always worsens patient's symptoms. When the conservative therapies are insufficient, liposuction is the most common surgical approach for the treatment of lipedema. Various liposuction techniques exist for surgical treatment of lipedema; in our retrospective study we compared standard suction assisted lipectomy (SAL) with dry liposuction under tourniquet in the legs and power assisted liposuction (PAL) with wet technique.

Methods

We conducted a retrospective clinical study with a cohort of 100 patients who received a clinical and surgical follow-up at the CHUV in Lausanne. The cohort was divided into two groups depending on surgical technique (SAL vs PAL) and outcomes were analyzed according to BMI and Lipedema stage. All the surgical aspect as well as the result of post-operative clinical, functional, and aesthetic outcomes were analyzed.

Results

The SAL group is associated with an increase in the average operating time (143 min) compared to the PAL group (114 min). The SAL group is also linked with an increase in the mean number of required procedures, but we consider the result not significant (1.8 vs 1.6 in the PAL group). Moreover, the occurrence of complications, mostly anemia and PE, is slightly higher in the SAL group (22%) compared to the PAL group (17%). Regardless to the surgical technique used, high BMI and late stage of lipedema (III and IV) were linked to a higher mean number of surgeries (1.87 for Stage III vs 1.42 for Stage I) and complication rates (29% for Stage III vs 13% for stage II).

Conclusions

Lipedema treatment is complex. Surgical aspects can play a crucial role in reducing post operative morbidity and increasing pain relief.

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Enhancing viability of mechanically isolated stromal vascular fraction by using methacrylated gelatin as a carrier

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Objective

Mechanically processed stromal vascular fraction (mSVF) is a great cell source in regenerative medicine and a more pragmatic alternative to enzymatically isolated SVF. Viability and other cellular properties of SVF can be enhanced by carriers, like methacrylated gelatin (GelMA) which is a tunable, light-inducible hydrogel with high biocompatibility. In the present study we investigated GelMA as a carrier for mSVF in an in vitro setting.

Methods

Lipoaspirates were collected and processed to mSVF which was then mixed with GelMA. Non-encapsulated mSVF served as a control. Cell viability was determined over 21 days. Secreted basic fibroblast growth factor (bFGF) levels were evaluated at multiple timepoints by ELISA. IHC was performed to detect VEGF-A, Perilipin-2, CD73 expression at day 7 and 21. The influence of GelMA-mSVF on human dermal fibroblasts was determined in a co-culture assay using the same viability assay protocol.

Results

GelMA-mSVF had a significantly higher viability after 21 days (p <0.01) when compared to the control group and secreted stable levels of bFGF. IHC demonstrated that VEGF-A was primarily expressed at day 21, Perilipin-2 and CD73-positive cells were observed on day 7 and 21. Furthermore, GelMA-mSVF significantly enhanced fibroblast viability as compared with GelMA alone (p <0.01).

Conclusions

GelMA may prove to be an ideal carrier for mSVF as it sustains cell viability and proliferation with release of growth factors, whilst facilitating adipogenic differentiation, stromal cell marker expression as well as fibroblast proliferation.

Preclinical learning curve study of robotic-assisted microsurgery in surgeons with different skill levels

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Objective

Microsurgery requires is a complex skill set. Clinical training on patients is often not possible or feasible for microsurgical trainees. This emphasized the importance of preclinical practice in a controlled laboratory environment. The addition of surgical robotic systems, although already established in other fields, is still very new in microsurgery. Our study aims to provide insight into the learning curve of participants with different skill levels at robotic-assisted microsurgical tasks in a training environment.

Methods

Participants were recruited from within our department and consisted of residents and attendings at different skill levels. All participants received a hands-on training session with the surgical robotic system before starting the study session. The Symani Surgical System comprises two robotic arms equipped with a dilator and a suture-cutting needle holder, respectively. The user controls the arms remotely using manipulators. The setup included the VITOM exoscope and video monitor to allow accurate visualization using 3D glasses. The study consists of three separate sessions. During each session, participants perform robotic-assisted anastomoses of three 2 mm silicone vessel models with six single nylon 8-0 sutures.

Results

Prior to the first session, demographics and data on surgical, microsurgical, laparoscopic, robotic and gaming experience were collected. During the session, duration of task execution is timed and all events like tearing of the suture or vessel are documented. Using anonymized video recordings of the sessions, an experienced microsurgeon from our department reviews all anastomoses and evaluates the execution using an adapted version of the "Structured Assessment of Microsurgical Skills" (SARMS) score. Preliminary results show that across all levels of surgical and microsurgical experience, participants could rapidly reduce the time needed to complete an anastomosis after becoming more acquainted with the surgical robotic system. The rate of complications also decreased with the number of anastomoses achieved.

Conclusions

Preliminary results of our study show that the skill set used to perform microsurgical anastomoses with a surgical robotic system can be quickly acquired by surgeons and trainees. Final results will provide more insight into whether specific levels of expertise result in a higher quality and speed of suturing.

The advantage of robotic-assisted lymphatic microsurgery in deeper anatomical planes: A case series

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Objective

Microsurgery has become the standard of care for lymphatic reconstruction. With increasingly demanding techniques including supermicrosurgery on smaller and smaller vessels, robotic-assisted surgery has emerged as a new approach to push reconstructive limits due to motion scaling and better accessibility of deeper anatomical regions such as the axillary cavity. As the precision of the robot is achieved at the expense of operating speed among other variables, the surgeon must weigh the enhanced dexterity against the added operating time, as well as the cost for the robotic surgical system itself for an optimal use of resources. We present a case series performing robot-assisted lymphatic reconstructive surgery in the axilla, where the robot-assisted approach presented an advantage over manual microsurgical operating techniques.

Methods

With this case series, we present the experiences from a single center performing robotic-assisted lymphatic reconstructive surgery using the Symani® Surgical System since 2021. Free lymphatic tissue transfer from the omentum was performed by means of end-to-end anastomosis of the right gastroepiploic artery with the thoracodorsal artery of the affected axilla using the Symani® Surgical System in combination with the Zeiss KINEVO® 900 exoscope.

Results

A total of eight patients received robot-assisted free lymphatic tissue transfer. No complications occurred and the Symani® Surgical System was used successfully to perform the arterial anastomosis in all cases. Access to the axillary cavity by means of a limited incision was improved using the robotic system when compared to hand anastomosis due to the longer robotic instruments. Remote and more comfortable positioning of the surgeon using the exoscope was enhanced by excellent dexterity and motion precision.

Conclusions

The ability to improve the surgeon's position combined with improved stability and motion precision of robotic systems for operating in deeper anatomical planes and on smaller structures supports its use. Progress regarding operating time and cost is crucial and future research should validate the effectiveness of robotic-assisted surgery in larger clinical studies, but crucial initial steps have been taken.

The value of perforator flaps in present and future of vulvoperineal reconstruction

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Objective

Patients with advanced vulvoperineal cancer require a multidisciplinary treatment approach to ensure oncological safety, timely recovery and the highest possible quality of life (QoL). Reconstructions in this anatomic region are associated with a high complication rate of about 30%. In recent times, flap design has evolved towards perforator-based approaches to avoid (donor site) complications of conventional reconstructive procedures. Perforator flaps have already been shown to be a valid solution for vulvoperineal reconstruction, but their superiority in this specific area of the body is not yet well established.

Methods

To create high level evidence from the existing literature, we conducted a systematic review using Embase, Medline and Web of Science to identify relevant studies comparing the outcome of perforator and non-perforator flaps in vulvoperineal reconstruction in terms of complications rate. Included were English-language studies published after 1980, including randomized controlled trials, cohort studies, and case series with more than 10 participants. Targeted population were female patients over 18 years who underwent vulvoperineal reconstruction. Data on demographics and surgical outcomes were extracted and classified using the Clavian-Dindo classification.

Results

Initial screening identified 2,576 studies, of which 693 met our inclusion criteria. After full-text screening, we included 43 studies in our systematic review, which encompassed 1,884 patients. Among these, 31 (72%) studies with 1,708 (90%) patients were allocated to the non-perforator flap group. Surprisingly, the overall surgical short-term complication rate was comparable between both groups. Long-term complications were not reported and the assessment of patients QoL was scarce.

Conclusions

Vulvoperineal reconstruction using perforator flaps shows promising results with comparable complication rates to conventional procedures. Although technically challenging, this technique allows to preserve relevant anatomical structures. Therefore, we believe that this technique should be a first line choice when confronted with complex vulvoperineal defects. There is an urgent need for systematic evaluation of patients QoL.

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Obesity-related pubis lymphedema enclosing genitalia: An atypical case of genital reconstruction

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Objective

Massive localized lymphoedema (MLL) secondary to obesity has been scarcely reported in the literature, especially in the pubic area and genitalia, and is associated to BMI more than 40 kg/m^2. Reconstruction in the genital area is challenging as failure can lead to infertility. We report the case of a 37 years old patient known for morbid obesity with 68.8 kg/m^2 BMI and hypogonadism-obesity syndrome presenting an unusually voluminous scrotal MLL mass.

Methods

Initial diagnosis was made through an abdminopelvic angio-CT scanner showing a voluminous pubic mass enclosing the scrotum of $27 \times 35 \times 26$ cm with adipous density, infiltration of tissue and cutaneous enlargement, along with bilateral inguinal adenomegalies of reactional aspect. Hydrocele or inguinal hernia are ruled out. Needle-biopsies showed a fibroadipous and vascular tissue in small abundance with no signs of malignancy.

We opted for a penile and testicules excavation with in toto excision of the pubic and scrotal mass. Important lymphatic oozing was observed during dissection. Scrotum was reconstructed with local adipocutaneous flaps paired with an adjacent thigh skin flap, and penis shaft with a split-thickness skin graft. Mini abdominoplasty was also performed for pubic excess skin and fat resection. In total a 7.5 kg scrotal mass was resected.

Results

Surgery was performed with no postoperative complications. Histopathology showed massive and diffuse lymphedema with discrete acute focal inflammation and rare focal liponecrosis, without signs of malignity and without Mdm2 expression, excluding liposarcoma.

Conclusions

Massive localized pubic lymphedema enclosing genitalia has been scarcely reported in the literature, with frequent complications and recurrence rate.

We report a successful resection and genital reconstruction of such pathology.





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Poster Presentations

Hyperbaric oxygen treatment promotes axonal outgrowth

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Objective

Hyperbaric oxygen (HBO) is a promising therapeutic approach to promote peripheral nerve regeneration. Underlying mechanisms of action are poorly understood resulting in inconsistent treatment protocols and unclear indications. The present study evaluated the effects of single or repeated HBO treatment alone or in combination with nerve growth factor (NGF) on PC12 cells. Cell proliferation, survival and differentiation (neurite outgrowth) were analyzed.

Methods

PC12 cells were exposed to a single session of HBO (90min) or daily sessions on four consecutive days. Five groups were studied with or without NGF stimulation: control (21% oxygen), 100% oxygen at 1.0 ATA (atmosphere absolute), 2.0 ATA, 2.5 ATA or 3.0 ATA. Brightfield imaging, live/dead assay, cell proliferation using alamar blue reagent and axonal outgrowth using immunostaining of tubulin beta-III were performed.

Results

Single dose of HBO treatment enhanced the proliferation of PC12 cells without NGF at all pressure conditions compared to control(p<0.05). In contrast, repeated HBO sessions without NGF increased dead cell count at 2.0ATA, 2.5ATA and 3.0ATA compared to control(p<0.01). Of note, repeated HBO treatment in NGF-stimulated PC12 cells resulted in maintained cell numbers and significant increase in axonal outgrowth as evidenced by tubulin beta-III staining (p<0.05). However, 3.0 ATA impeded axonal outgrowth in all groups.

Conclusions

While single HBO exposure significantly increased cell numbers in cells without NGF stimulation, repeated HBO decreased cell count and induced cell death. Interestingly, NGF exhibited neuroprotective effects against oxidative stress-mediated cell death in PC12 cells. Of note, repeated HBO treatment (1-2.5 ATA) resulted in significant stimulation of axonal outgrowth in NGF-stimulated cells. These results hold great promise for neural repair and regeneration applications. Further research is needed for investigating the underlying mechanisms of NGF-HBO mediated functional effects in vitro and in a rat model of sciatic nerve injury.

Is free nipple grafting required in patients undergoing reduction mammoplasty for gigantomastia? A systematic review of the literature with meta-analysis

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Objective

Gigantomastia is a debilitating condition characterized by excessive growth of breast tissue that impacts the patients' quality of life. Basically, two surgical concepts are described to treat this condition: the limited length pedicle (LP) technique including concomitant free nipple grafting (FNG) and the elongated pedicle (EP) technique, which maintains continuity of the nipple-areo-la-complex (NAC).

Initially and despite the less satisfactory aesthetic outcome, FNG was considered the preferred technique to treat hypertrophic breasts requiring resections exceeding 1000 g of parenchymal and adipose tissue, due to concerns of insufficient perfusion to the NAC. Recently, many studies have guestioned this indication.

The study aim was therefore to evaluate the safety of the NAC-carrying EP technique in patients with gigantomastia eventually questioning the need of FNG.

Methods

A literature search using PubMed and Cochrane databases was performed, including studies describing the outcome of EP technique in case of resection of more than 1000 g of breast tissue. Thereby, a meta-analysis was conducted to evaluate the rate of NAC-necrosis, whereas descriptive statistic was applied to assess all other surgery-associated complications.

Results

Twenty-eight studies with a total number of 1'355 patients (2'656 breasts) were included. EP demonstrated an extremely low rate of NAC-necrosis. Moreover, the analysis demonstrated that the EP technique was also associated with a low rate of ischemia-independent complications and a very high probability to maintain NAC-sensation equal to preoperative state.

Conclusions

Current evidence indicates that EP technique should be the preferred surgical method to treat gigantomastia and massive ptosis whenever indicated. It has proven to be safe. Furthermore, it yields superior aesthetic and functional outcomes, including breastfeeding and preservation of NAC sensation compared to LP technique.

The use of kerecis Omega-3 fish skin for the treatment of burn wounds: A retrospective single-center analysis

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Objective

Until today, deep-partial thickness burns are a challenge to manage. Among the broad range of treatment options for wound conditioning and dermal replacement, biological scaffolds such as the recently introduced fish skin-based scaffold Kerecis Omega-3, have gained popularity. We herein report the experience with Kerecis Omega-3 in the treatment of acute burn wounds at our Burn Center.

Methods

In this retrospective case series, ten patients with deep-partial thickness burns treated with Kerecis in the years 2020 to 2022 at the Burn Center of the University Hospital of Zurich were evaluated. We assessed the effect of Kerecis Omega-3 Fish Skin Scaffold on wound healing, complications, such as wound infection, and the need for further intervention.

Results

Four of the patients were female, and six were male. The mean affected total body surface area (TBSA) was 41% (range 9%-80%). The average abbreviated burn severity index (ABSI) score was 8 (range 4-11). The primary surgical indication for Kerecis was wound coverage in the acute setting whereas in two cases chronic wound healing disturbances were the reason for application. Three patients were treated in the thoracic area, and all others were treated on their extremities, mainly arms and hands. In two patients, post-surgical infections were observed with subsequent removal of the Kerecis matrix. Four patients healed spontaneously with Kerecis only while six patients required additional skin grafting.

Conclusions

Kerecis Omega-3 Fish Skin Scaffold is an attractive option for conditioning wounds of burned patients with deep-partial thickness burns prior to skin grafting. Its efficacy as a dermal substitute demands further investigation.

Pyoderma Gangrenosum following reduction mammoplasty: A systematic review of the literature

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Objective

Pyoderma gangrenosum (PG) is a rare inflammatory neutrophilic dermatosis that can develop at a surgical site. Diagnosis can be challenging at its presentation causing delay on appropriate treatment. The aim of this study is to review the current literature as well as to describe clinical presentation, diagnostic pathway and treatment of PG after reduction mammaplasty in order to define a standardized multidisciplinary diagnostic and therapeutic approach. In future, this may ease early identification and prompt treatment, and eventually minimize severe morbidity and long-term sequelae.

Methods

The entire PubMed/Medline database was screened following the PRISMA guidelines to identify studies describing PG that have occurred after reduction mammoplasty.

Results

Twenty-eight articles including 31 patients reported a PG after breast reduction surgery between January 1988 and March 2022. Twenty-one (68%) patients presented with skin ulcerations, 14 (45%) with erythema, 5 (16%) with vesicles. Out of the 30 cases that underwent bilateral surgery, 18 (60%) developed PG bilaterally. In 12 out of 31 patients nipple-areolar complex (NAC) involvement was evaluated, though in 10 patients (83%) the NAC was spared. Of the 20 patients (65%) that underwent skin biopsies for histopathological examination, 18 (90%) showed neutrophilic infiltration of the dermal layers. All 31 patients (100%) showed rapid clinical improvement after introduction of immunosuppressive therapy.

Conclusions

PG can result in devastating skin alterations also after reduction mammaplasty if misdiagnosed. However, it presents with constant yet unspecific local and general signs and symptoms that can be recognized in order to early initiate an appropriate pharmacological treatment.

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Prediction of skin sensitization potential of biocides on HaCaT cells and primary keratinocytes

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Objective

The aim of this study was to analyze the sensitization potential of two isothiazolinone biocides, Chloromethylisothiazolinone (CMI) and Methylisothiazolinone (MI) on human primary cultured keratinocytes cells as well as on a keratinocyte cell line (HaCaT). These biocides are found as preservatives in cosmetics, paints, glues, and detergents and can cause skin atopic dermatitis on patients. To prevent or reduce the occurrence of atopic dermatitis, there is a need to understand the hazards and biological processes associated with exposure to chemicals that might induce skin sensitization. Even if these biocides are well described, the effect on primary skin cells was not reported in the literature.

Methods

We first establish the concentration of biocide which lead to a cellular viability of 80% (CV80). To do so, cells were treated for 48hr with 12 concentrations of biocides ranging from 400ug/mL to 0.195ug/mL and then the cellular viability was evaluated with the cellTiter assay. Afterwards, we analyze the effect of these biocides at 3 concentrations (CV80 and two lower concentrations) on the expression of 4 selected genes involved in the mechanism of skin sensitization (Nrf2, HMOX1, IL8 and IL18) by real time qPCR. Gene expression was tested after 15min, 1, 2, 4, 6 and 24hr of exposure.

Results

The CV80 concentration of CMI was found to be 1.56 ug/mL for HaCaT cells and 0.78ug/mL for primary keratinocytes and of 12.5ug/mL for HaCaT cells and 6.25ug/mL for primary keratinocytes for MI. Real Time qPCR show a huge increase of HMOX gene expression (more than 100x) for HaCaT and the primary keratinocytes already after 2hr of treatment with a peak at 6hr in a dose-dependent manner. For other genes no, significant variation was observed.

Conclusions

In this study, we present contradictory results with regard to the published literature for CV80 concentration of CMI and MI which have reported a CV80 of 149.6ug/mL for CMI vs 1.56ug/mL in our experiments and 25ug/mL vs 12.5ug/mL for MI biocides. This discrepancy is probably due to the experimental settings.

Regarding expression profiles of genes implicated in the sensitization pathway, we observed an overexpression of HMOX1 in cells treated with the biocides in HaCaT cells as well as in primary keratinocytes.

Hydrotherapy in scar management

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Objective

Hydrotherapy is the oldest and most consistently used therapy in medicine. It represents the use of water for medical purposes and has been involved in burn wound care since the 17th century. And yet, the lack of standardized worldwide recommendations feeds into the controversy surrounding this practice. In Switzerland, although hydrotherapy is present in the early stages of burn wound management, the focus is on rehabilitation post wound closure, whereas in the United States for example, it is mainly defined within the scope of in-patient wound cleansing. At the CHUV hospital, standard operating procedures for burn rehabilitation have been developed and integrated into the Standard of Care, using localized hydro-mechanical stimulation of burn sites followed by constant pressure large-bore and filiform showers targeting specific scarred areas. In collaboration with Lavey medical center, located at the Lavey hot spring center for the rehabilitation of burn patients, we have established specialized protocols for the hydrotherapy of burn patients with excellent clinical outcome, namely more uniform skin structure, color and visco-elasticity in addition to a decrease in pruritus and increased patient comfort and long term satisfaction. Given its impressive results, hydrotherapy is incorporated in a number of other pathologies as well. We often refer patients with widespread scars from necrotizing fasciitis who are left with important tissue loss and functional impairments, and breast cancer survivors that have undergone radiotherapy treatments that often leave the shoulder and thorax areas impaired.

Regaining active knee extension by muscle transfer of the hamstrings: "Gocht"-procedure as an option?

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Objective

After irreparable damage to the femoral nerve or complete resection of the quadriceps femoris muscle, active extension of the knee joint is impossible, leading to gait instability with an increased risk of falling. Transposition of the biceps femoris and semitendinosus muscle first described by Gocht in 1918 as replacement of the knee joint extensor provide a functional substitute for the ability to walk and stand. We present the case of a 53-year-old female patient who was treated with this technique, after the femoral nerve had to be segmentally sacrified during an extended tumor resection of the upper thigh.

Methods

After individual consideration of the options, the patient was recommended functional replacement using the biceps and semitendinosus muscles. Intraoperatively, we detached the tendon of the biceps femoris which inserts at the fibula head and mobilised the tendon proximally. This was followed by a ventral pull-through. The ventral orientation thus allows for optimal force development. The tendon was woven into the patellar tendon and sturdily sutured. A similar procedure was performed with the semitendinosus muscle.

Results

Post-operatively, independent walking without orthosis is possible and the results are more predictable than after free microvascular functional muscle flaps. The operation has improved the patient's ability to walk and stand and she is no longer dependent on a walking aid in her familiar surroundings. The patient is pain-free, especially nerve pain is denied. An active knee joint extension of 40° (M4) is possible. Two years after the operation, the patient still attends physiotherapy twice a week. The literature also shows that the "Gocht"-procedure for knee extensor replacement is a safe method for significant functional improvement in suitable patients. This allows the patient to have a functional and orthosis-free gait pattern.

Conclusions

In the presented case, transposition of the biceps femoris and semitendinosus muscle to replace the knee joint extensor after resection/denervation of the quadriceps muscle succeeded in allowing the patient to regain the necessary walking and standing ability to cope with everyday life without the need for orthosis. The method originally described for poliomyelitis sequalae can be an elegant option to reconstruct complete deficits of knee extension mechanisms.

Evaluation of the safety and effectiveness of progenitor biological bandages in burn care (Bru_PBB clinical study)

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Objective

The current gold standard treatment for 3rd- or deep 2nd-degree burn wounds is skin autografting, which creates a Donor Site Wound (DSW). The Burn Center of the CHUV (Lausanne, Switzerland), with more than 30 years of clinical experience in the therapy of severe burns, has developed Progenitor Biological Bandages (PBB), composed of human skin progenitor cells from GMP-clinical cell banks (i.e., FE002-SK2 cell type) seeded on a biodegradable collagen scaffold (Kollagen resorb, Resorba). Based on a retrospective clinical study (Al-Dourobi, 2021) that confirmed the safety of PBB treatment, a larger prospective clinical study aiming to demonstrate the efficacy of PBBs in the allogeneic cytotherapeutic treatment of the DSW and 2nd-degree burn wounds is currently under preparation in the CHUV.

Methods

Seventy-six patients among pediatric and adult severe burn patients will be enrolled in this randomized prospective trial. Patients (i.e., candidates for a skin autograft) will be randomly allocated for the treatment of their DSW in two groups: Group A treated with PBBs and Group B treated with standard bandages (Jelonet, smith&nephew). Bandages will be placed on the DSW and maintained in place for a maximum of 15 days with two dressing's changes at day 5 and 10. Wound status (i.e., percent of re-epithelialisation), as well as complications, will be evaluated during this acute cytotherapeutic treatment phase.

Results

To verify the hypothesis of high therapeutic performance of PBBs as compared to the standard treatment, short-term safety and efficacy will be evaluated during the acute treatment phase, as well as for the long-term maintenance treatment to measure skin quality of the repaired wound. The study was approved by the respective and competent Swiss health authorities (NCT 05339490) and is ready to include the first burn patients.

Conclusions

Having demonstrated the safe clinical use of PBB, we will be able now to show the efficacy of PBBs for treating 2nd-degree burns. This clinical study will allow plastic surgeons to regularly implement this historically documented safe and standardized allogeneic cell therapy for acute wounds through a multidisciplinary therapeutic approach for severely burn patients in our Burn Center.

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Available techniques to minimize scars in surgical management of gynecomastia: A review

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Objective

Gynecomastia and lipomastia are benign proliferations of the male breast affecting 32-65% of men. The surgical techniques described in the literature are numerous, yet most of them leave stigmatizing scars when it comes to skin resection. The purpose for this study was to conduct a systematic review summarizing currently available data on scarless skin retraction techniques and to describe our preferred technique to treat skin excess in gynecomastia patients.

Methods

A systematic review of the literature was conducted by screening PubMed and EMBASE databases aiming at identifying available techniques to avoid skin resection in gynecomastia or lipomastia patients (Simon grade IIb and III). Surgical techniques, patient satisfaction rates, time of follow up and complications were assessed.

Results

Eight studies were identified, describing the following scar-reducing techniques: laser-assisted and ultrasound-assisted liposuction, either with or without endoscopic mastectomy, and radiof-requency-assisted liposuction followed by microneedling. Informations about Simon's grade were missing in one article. Two studies only took into account Simon grade IIb or III. The remaining studies described their technique on patient with and without skin laxity. Overall complication rates were low for the described techniques ranging from 1.5% to 10% and patient satisfaction rates high ranging from 87.5% to 100%. Transcutaneous netting has been reported to reduce hematoma occurrence but no reports specifically studying the role of netting in managing skin redundancy in gynecomastia patients could be found.

Conclusions

Little data is available on scar-less skin retraction techniques for gynecomastia patients with excess skin. Where skin redundancy is high, many authors still prefer techniques including skin resection. We advocate a minimally invasive technique for all patients with gynecomastia, including Simon grade IIb and above using liposuction combined with transcutaneous netting which allows for skin retraction and for intraoperative fixation of the NAC at the desired position. Prospective studies assessing the efficacy of transcutaneous netting in promoting skin retraction in gynecomastia are warranted in order to confirm whether results similar to what has been described in facelift patients can be achieved.

POSTER PRESENTATIONS

"Cyclist's nodule": A rare and challenging condition

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Objective

Perineal nodular induration (PNI) is a benign soft tissue proliferation that is associated with saddle sports, especially road cycling. Chronic lymphoedema resulting in the development of fibrous tissue has been suggested as an etiological pathway of PNI. Due to the location and appearance of the tumor, conservative and surgical treatments have been described.

Methods

We report the case of a 42-year-old male Caucasian cyclist with an extensive PNI that developed over 10 years, which was accompanied by a non-healing wound in the last few months. The patient history and clinical findings pointed to the diagnosis of an extensive cyclist's nodule with fibrosis related disruption of lymphatic drainage. Due to the tumor's size, conservative therapy was not appropriate, and a novel surgical approach was pursued.

Results

The surgical excision was combined with tissue doubling and lymph vessel obliteration. Intraoperative ICG-monitoring was performed to identify lymphatic leakage and to minimize recurrence risk. Additionally, an epicutaneous negative wound therapy device was placed over the wound. The post-operative recovery was prompt, and the patient could return to cycling six weeks after surgery without signs of recurrence within a follow-up period of twelve months.

Conclusions

We hope that this report draws attention to this condition in times of increasing popularity of cycling sport.

This report demonstrates the need for specific and individual surgical solutions for successful treatment of "cyclist's nodule".

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Towards improved cell therapy for clinical construction of the skin

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Objective

Ideal management of severe burn patients is challenging due to the time necessary to provide cell therapy strategies for full cover. Severe burn patients having over 40-50% total body surface area affected are in life threatening circumstances and immediate cover along with strategies to find enough remaining donor sites for skin grafting is essential. First cover can be done temporarily with cadaver, porcine skin or dermal substitutes and we report on biological bandages to help prepare wound beds and begin early treatments. Cultured autologous epidermal cells remain necessary for severe deep burns and we report evolving methods which may provide earlier full treatment of patients using off-the-shelf dermal fibroblasts as a substrate to deliver the patient keratinocytes in record timing.

Methods

Adult and allogenic fibroblasts were used to induce the production of collagen extracellular matrix following the protocol developed by our laboratory and use for routine production of dermo-epidermis cultured grafts. In brief, when a skin biopsy arrives keratinocytes and fibroblasts cells are cultured. For the preparation of dermo-epidermis, confluent fibroblasts are treated with 10^-4 M Vitamin C for one week, then keratinocytes are seeded on the top of the collagen sheet for one additional week prior to patient delivery. We performed the preparation with both adult and progenitor fibroblasts cells from GMP-clinical cell banks already used on hundreds of patients (i.e., FE002-SK2 cell type) and evaluated the time for dermo-epithelial cell delivery.

Results

FE002-sk cells treated with 10^-4 M Vitamin C show a higher production of collagen than adult fibroblasts resulting in a more solid dermo-epithelial preparation. Moreover, the time of production decreased from 5-6 weeks to 3-4 weeks.

Conclusions

This work shows that the time for the preparation of fresh dermo-epithelial preparations could be reduced by 40% by using allogeneic progenitor fibroblasts which assure a stable and safe clinical cell source.

Interdisciplinary management of cervical necrotizing fasciitis with descending mediastinitis

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Objective

Descending cervical necrotizing fasciitis (DCNF) is a rare but fatal bacterial soft-tissue infection of the head and neck region. It usually develops from a local infection and rapidly spreads along the deep fascial planes of the neck. A serious complication of DCNF is the descending necrotizing mediastinitis (DNM), in which the infection spreads to the chest cavity causing severe inflammation and necrosis of the mediastinal tissues. This can lead to sepsis, organ failure and an increased mortality rate of up to 64%. We report on our experience and management of patients with DCNF and DNM.

Methods

Three patients (2 male, 1 female) with DCNF and DNM hospitalized between November 2022 and May 2023 were included. A medical chart review focusing on diagnosis and treatment modalities as well as literature research regarding DNM were performed.

Results

The cause of DCNF and DNM remained unclear in all cases. All patients presented with fever, 2 with painful swelling of the neck, 2 with pain in the left shoulder/arm. Streptococcus pyogenes was detected in all cases. Preoperative CT-scans showed an involvement of the mediastinum in all cases. All patients underwent aggressive surgical debridement and received broad-spectrum antibiotic therapy and IVIG. In 2 cases a direct interdisciplinary operative management of plastic and thoracic surgery was performed with a 100% survival rate. In 1 case proper management was delayed and thoracotomy was performed during the second-look operation, upon which the patient died postoperatively. Literature shows, that early aggressive intervention limits the progression of DNM. All our patients required cardiovascular support, postoperative ventilation, and developed acute renal failure due to septic shock. One patient developed vocal cord paresis requiring tracheotomy. Another patient displayed unilateral diaphragmatic paresis. Fasciocutaneos flap reconstruction was performed after a median of 2 weeks.

Conclusions

While necrotizing fasciitis is a clinical diagnosis, its neck-descending subtype necessitates a CT-scan to rule out mediastinitis. Any signs of mediastinal affection should initiate an explorative thoracotomy. Early diagnosis and a straight-forward interdisciplinary treatment approach of plastic and thoracic surgeons as well as infectiologists and intensive care physicians is crucial for the patient's survival.

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Lateral chest, a stepchild in breast surgery

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Objective

The lateral chest deserves special attention as a separate aesthetic unit during planning and execution of all breast shaping surgery. If not properly addressed, it leads to less-than-ideal results, with an aesthetically inharmonious and distorted appearance, if excessive tissue is left behind during breast surgery. Whereas this holds true for all procedures ranging from breast reduction to mastopexy (with or without the use of an implant), the need to correct the lateral chest is particularly pronounced in both male and female massive weight loss patients, where the correction of the lateral chest tissues is necessary for repositioning the inframammary fold and restoring breast contour.

Methods

Various surgical procedures to correct the lateral chest tissues in both female and male breast surgery will be detailed on the poster:

- Circumferential bra-lift
- Direct excision of lateral chest tissue excess
- Lateral repositioning of the inframammary fold
- Use of lateral chest wall tissue for auto-augmentation of the breast and/or to correct asymmetries

Results

Pre-, intra- and postoperative pictures will be demonstrated on the poster.

Conclusions

Failure to properly address the lateral chest wall during shaping breast surgery leads to less-than-ideal results. Although not all resulting scars can always be hidden in a Bikini top, patients generally still prefer scars over contour deformities.

Necrotizing fasciitis: Two cases with involvement of 20-40% of total body surface and reconstruction with BTM (Novosorb) and split thickness skin graft

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Objective

We discuss the treatment of a 33-year-old male patient suffering of 40% of total body surface as well as a 59-year-old female patient with a defect of 20% of total body surface due to necrotizing fasciitis. The currently propagated techniques for reconstruction following necrotizing fasciitis are either a local flap, a free flap, or split thickness skin grafts. Other options include the use of subdermal synthetic material (Integra, Matriderm or BTM/Novosorb).

Methods

33-year-old male patient suffering from a defect at the anterior and posterior torso involving 40% of total body surface due to necrotizing fasciitis with streptococcus pyogenes. We first performed several debridement's to achieve a clean wound bed. Bacterial samples were isolated, and an empiric antibiotic therapy was started. The patient was further treated by the Intensive Care Unit staff. After achieving a clean wound bed, we performed reconstruction with BTM (Novosorb) following split thickness skin grafts. On the other hand, we treated a 59-year-old female patient suffering a defect of about 20% of total body surface of the left upper and lower leg due to necrotizing fasciitis with streptococcus pyogenes. After several debridement's and medical stabilization through the Intensive Care Unit staff, we also performed reconstruction with BTM (Novosorb) and split thickness skin grafts.

Results

The final result showed very well-integrated split thickness skin grafts with no signs of wound dehiscence or persistent infection. In the 33-year-old male patient we achieved a split thickness skin graft take rate of 95% and the 59-year-old female patient achieved a take rate of approximately 100%.

Conclusions

In the literature several techniques are described, either using a local flap, a free flap or skin grafts. In our cases we used subdermal synthetic material (BTM/Novosorb) following split thickness skin grafting due to the large total body surface involved. Our result showed well-integrated split thickness skin grafts of approximately 95-100%, a good alternative to the common techniques to cover a defect following necrotizing fasciitis.

Use of closed-incision negative-pressure therapy in reduction mammaplasty: A systematic review of the literature

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Objective

Using closed incision negative pressure therapy (ciNPT) in breast surgery has already proven its benefits. As patients undergoing reduction mammaplasty are at risk of wound complications such as delayed healing, infection and dehiscence, the use of ciNPT should be considered.

Methods

PubMed, Medline and Google Scholar databases were searched for clinical studies published up until May 2023 comparing the efficacy of ciNPT versus standard of care (SOC) in postoperative wound management of breast reduction surgery. Specific outcomes of interest were wound dehiscence and necrosis, delayed healing, surgical site infection (SSI), seroma and hematoma.

Results

A total of five studies (766 breast reductions in 383 patients, 342 breasts treated with ciNPT and 424 with SOC) were found, of which two retrospective and three prospective randomized trials. In four of the five studies; ciNPT and SOC dressings were used simultaneously in the same patient, ciNPT was applied on one breast and SOC dressings on the contralateral breast. In the last one, either ciNPT or SOC dressings were applied on both breasts. When compared with SOC dressings (commonly Steri-stripsR), this systematic review has shown that ciPNT has a positive outcome in reducing post-operative wound complication rates, which was 14% (48/342) vs 23.6% (100/424) in ciNPT and SOC, respectively. The prophylactic application of ciPNT is as a result associated with significantly fewer surgical site complications including SSI, wound dehiscence and necrosis.

Conclusions

Despite its known disadvantages (noise, less comfortable, bulky) and its higher cost than SOC dressings, this review gives an overview over existing data for using closed incision negative pressure therapy (ciNPT) in breast reduction surgery providing its efficacy.

Oblique flankplasty as an alternative to inverted-t-scar-abdominoplasty

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Objective

Abdominoplasty is the most common body contouring procedure, with 991,361 procedures performed in 2021 according to the ISAPS Global Survey. Over the past decade, surgeons have enhanced patient outcomes through the development of new techniques and combined procedures, such as selective liposuction in limited areas, innovative approaches like Hurwitz's Oblique Flankplasty, and adjunctive treatments like radiofrequency for skin tightening.

Methods

To demonstrate the wide range of techniques and combined treatments for abdominal contouring, this study reviews current literature and incorporates personal experiences to discuss these techniques. Focusing on vertical tightening, we compare two techniques: Dennis Hurwitz's Oblique Flankplasty and A. Lee Dellon's Fleur-de-lis abdominoplasty performed as inverted-t- scarabdominoplasty. The lecture presents the techniques, indications, and includes critical evaluations with selected case presentations.

Results

Both the Oblique Flankplasty and the Fleur-de-lis abdominoplasty/ inverted-t- scar- abdominoplasty address excessive horizontal skin laxity, with certain advantages favoring the Oblique Flankplasty, such as avoidance of the median abdominal scar and lower complication rates.

Conclusions

When considering vertical tightening, it is important to discuss both techniques with the patient. Ultimately, the choice of technique should align with the patient's preferences. Comprehensive knowledge of all available techniques assists in improving treatment outcomes, minimizing complications, and achieving long-lasting results.

Volumetric assessment of breast volume by Vectra H2 handheld device in different positions

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Objective

The three dimensional (3D) volumetric assessment of breast volume is getting more and more recognition in breast surgery. It can be used in the preoperative planning, intraoperatively for the assessment of symmetry, as well as postoperatively to evaluate the results. However, the intraoperative measurements are done with the patient in a sitting- and by some authors even supine position in contrast to the pre- and postoperative assessments, which are done on a standing patient. The aim of this prospective study was to compare the assessments in sitting and supine positions to the standard standing position.

Methods

We used the Vectra H2 Handheld device. Between January 2022 and February 2023, a standardized 3D volumetric assessment in 3 positions was routinely performed on 160 patients undergoing breast surgery to evaluate the breast volume. The outcomes of measurements in sitting and supine position were then compared to that of the standard standing position to evaluate the accuracy and correlation.

Results

All in all 100 measurements of 87 patients (all female) with a mean age of 46.5 years (range 17-80) were included in the study. The measured volumes of each evaluated breast (n=200) were compared between the 3 positions. The 3D volumetric assessment in the sitting position with a mean volume of 488.28 \pm 208.14 cc showed no significant difference from the standing position 495.44 \pm 204.46 cc (p =0.28). The mean volume in the supine position was 375.13 \pm 148.03 cc and thus significantly different from the standing position (p<0.01).

Conclusions

Three-dimensional volumetric assessment of breast patients in sitting position is reliable and correlates with the assessment of a standing patient. Henceforth, the intraoperative assessments should correlate with the actual breast volume and are safe to rely on for intraoperative adjustments. The breast volumes measured in supine position did not statistically correlate with the standing position, yet the measured volume difference between two breasts proved to be consistent along all three positions.

Inferior gluteal artery perforator (IGAP) flap in autologous breast reconstruction: A proportional meta-analysis of surgical outcomes

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Objective

The inferior gluteal artery perforator (IGAP) flap is an alternative technique for autologous breast reconstruction. In contrast to other commonly used techniques, there is a paucity of literature on the safety and efficacy of the IGAP flap. The aim of this study was to perform a systematic literature review and meta-analysis of postoperative outcomes and complications associated with the IGAP in autologous breast reconstructions to validate its safety.

Methods

A systematic review of literature was performed following PRISMA guidelines. Articles reporting post-operative outcomes of IGAP flaps in autologous breast reconstruction were included. A proportional meta-analysis of post-operative complications was performed to obtain their proportions with 95% confidence intervals (CIs).

Results

Seven studies met the inclusion criteria, representing a total of 239 IGAP flaps in 181 patients. The total flap loss rate was 3% (95% CI 0-8%), partial flap loss rate was 2% (95% CI 0-4%), hematoma rate was 3% (95% CI 0-7%), overall donor-site complication rate was 15% (95% CI 5-28%), overall recipient-site complication rate was 24% (95% CI 15-34%), and the overall complication rate was 40% (95% CI 23-58%).

Conclusions

This meta-analysis provides comprehensive knowledge on the safety and efficacy of the IGAP flap in autologous breast reconstruction. It evidences its overall safety and validates its role as an effective option in breast reconstruction.

1

Versatility of the peroneus brevis muscle flap for distal leg and ankle defects: A systematic review

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Objective

Soft tissue defects of the distal one third of the leg and ankle are challenging and management with simple split thickness skin graft or conservative measures is often difficult. The Peroneus Brevis muscle flap is well described in the literature to cover such defects. The aim of our study is to review its different applications and potential complications.

Methods

A systematic review of all existing evidence on the Peroneus Brevis muscle flap for coverage of distal leg soft tissue defects in adult populations was performed in March 2023 using PubMed, Cochrane Library and ReserachGate, in accordance with the PRISMA statement. The rates of flap loss, skin graft loss, flap necrosis, graft necrosis and donor site morbidity were assessed.

Results

A total of two hundred forty-eight records were identified in the literature search. Of those, fifteen met the PICOS criteria. All selected studies were of retrospective nature. Overall, two hundred twenty-two patients receiving Peroneus Brevis muscle flaps were analysed. Indications for reconstruction were essentially post-traumatic distal leg defects, infected and non-healing wounds and chronic ulcers. The average overall complication rate was 14% (31/222) with the most commonly reported complication being skin graft loss. We observed three cases of flap loss, fifteen cases of skin graft loss, two of them requiring a regraft, ten cases of flap tip necrosis and three cases of skin graft necrosis. No cases of donor site morbidity were described in the selected articles.

Conclusions

The current systematic review shows that the Peroneus Brevis muscle flap for coverage of distal leg and ankle soft tissue defects is a versatile, safe and reliable option with low complication rates and donor site morbidity.

Implementation of a microsurgery training skills lab at a tertiary care center in Switzerland

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Objective

Microsurgery training in skills labs at high volume centers around the world has proven beneficial for residents and junior consultants before real life surgery is performed. However, microsurgical training opportunities beyond operation theaters are scarce throughout plastic and hand surgery programs in Switzerland.

We report on the implementation of a microsurgery training program designed for residents and junior consultants at the Department of Plastic Surgery and Hand Surgery at the Cantonal Hospital Aarau.

Methods

In early 2023, we launched a skills lab training program for residents and junior consultants focusing on basic manual techniques in microsurgery. Our skills lab consists of six microscopes with 5x to 30x magnification (5 Leica microscopes A60 S and 1 Leica Emspira-3 digital microscope), to which the team of junior residents (5), senior residents (4) as well as junior consultants (5) has permanent full-time access. In addition to basic microsurgical instruments, a 3D-printed and patented "microsurgery arena" is available to perform tasks of increasing difficulties – starting from simple stiches through small holes to performing end-to-end anastomoses on tubular biological tissues simulating human vessels. Regularly held instructional courses by the senior surgeons of our department guarantee microsurgical training under supervision upon a short theoretical introduction with valuable tips and tricks.

Results

After completion, the quality of the microvascular anastomoses is evaluated and documented using the digital microscope for a standardized feedback. The participants receive a certificate that serves as proof for their SIWF curriculum.

Conclusions

Skills lab-based manual training in microsurgery is essential to develop competence for real-live microsurgical procedures. We observed that "dry practice" accelerates the learning curve of trainees and ultimately increases the efficiency and safety when performing microsurgery in the operation theater.

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Is reduction mammaplasty in adolescents a safe treatment? A systematic review and meta-analysis

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Objective

Reduction mammaplasty is well-established as an effective treatment for symptomatic macromastia. Although the procedure is commonly performed in adolescent patients, the safety of the procedure has not been established in this population. Moreover, operating at a young age raises considerations on recurrence risk and lactation conservation. This review aimed at investigating the evidence behind these concerns.

Methods

The PRISMA guidelines were followed to perform a systematic review of the literature through PubMed, Cochrane Library, Web of Science and Embase. We identified all original clinical studies focusing on reduction mammaplasty in patients under the age of 21 published before March 2023 and reporting surgical complications which was our primary outcome. Complications were classified according to the Clavien Dindo system. When available, secondary outcomes included preoperative complains, post-operative patient satisfaction, breast hypertrophy recurrence and breastfeeding outcomes. Meta-analyses were performed when possible.

Results

The search identified 1406 articles, 19 of which met inclusion criteria, representing 4477 adole-scent patients who underwent reduction mammaplasty for symptomatic macromastia. Mean age at surgery was 17.3 years old. Amongst complications, Clavien-Dindo grade I were noticeably prominent, and grade III complications rate was low. One death has been reported. Re-operation for recurrence was rarely reported. Post-operative satisfaction was high. Some patients had post-operative lactation success, while breastfeeding renouncement was not necessarily linked to history of breast reduction.

Conclusions

By classifying post-operative complications with the well-established Clavien Dindo system and performing meta-analyses, our study suggests that reduction mammaplasty is a safe treatment for symptomatic macromastia in adolescent patients. This study stands as an update to our work presented in 2021 (Nichols et Al.). As efficacy of surgery is widely recognized compared to conservative measures, we advocate patients should not be discriminated for surgery because of their age.

Biomarkers in Breast Implant Illness

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Objective

Breast implant surgery is the most common procedure performed by plastic surgeons globally, with nearly 2 million women undergoing augmentation surgery each year. Breast implant illness (BII) refers to a large non-specific range of symptoms, such as fatigue, pain, brain fog, hair loss, arthritis, and psychological symptoms like depression and anxiety. However, BII is currently not defined as an official medical diagnosis, and data on the immunological/inflammatory correlate of BII symptoms is scarce. We set out to find alterations of inflammatory/immunologic markers in the bloodstream of female patients after breast implant augmentation with and without BII symptoms.

Methods

Firstly, a systematic review according to PRISMA guidelines was performed summarizing the results of currently available literature on studied blood biomarkers in patients with breast implants (with or without BII symptoms). Secondly, in a prospective cohort study, we are recruiting patients with silicone breast implants and BII symptoms by analysing blood sera with an immunological and inflammatory focus (e.g. routine inflammatory markers, interleukines, growth factors etc.). A comparison group of women with silicone implants without symptoms of BII and a control group of healthy women without implants is additionally included.

Results

The literature search resulted in a total of 19 articles with 2353 patients. The most studied biomarkers were antinuclear antibodies, anti-dsDNA, inflammatory markers, and human leukocyte antigen complex. A distinct biomarker profile for patients with BII symptoms has not yet been identified. In our prospective cohort study, half of the desired sample size has been included (BII patients (n = 10/20) and the comparison groups (10/20)).

Conclusions

Over the past 30 years, research has shown alterations in serological markers in reaction to the presence of silicone breast implants. However, the values analyzed in the literature are extremely heterogeneous, as are the respective results. The results of our prospective study might help to understand the pathophysiological aspects of BII in general and may contribute to future diagnostic resources.

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Impact of adjuvant treatment on free flap volume in head and neck reconstruction: A systematic review of the literature and meta-analysis

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Objective

Limited data exists regarding the effect of adjuvant treatment on free flap volume in head and neck reconstruction. An adequate free flap volume however is an important predictor of functional and patient-reported outcomes in head and neck reconstruction.

Methods

A systematic review of Medline, Embase and the Cochrane Central Register of Controlled Trials was conducted using the PRISMA (Preferred Reporting Items for Systematic review and Meta-analyses) guidelines. 6710 abstracts were screened, and 36 full text papers reviewed. Nineteen studies met the inclusion criteria and were used to extract data for this analysis.

Results

We performed a meta-analysis of fourteen two-arm studies comparing the impact of adjuvant radiotherapy versus no adjuvant radiotherapy. The main analysis revealed that 6 months postoperatively, irradiated flaps show a significant reduction of free flap volume of 8 % compared to non-irradiated flaps. The average interpolated pooled flap volumes 6 months postoperatively were 76.4% in irradiated flaps, and 81.8% in non-irradiated flaps. After a median follow-up of 12 months postoperatively, irradiated flaps showed a total flap volume of 62.28%, compared to non-irradiated flaps with 76.93%. Regarding chemotherapy, four studies reported no significant difference on free flap volume.

Conclusions

Adjuvant radiation significantly reduces free flap volume compared to non-radiated flaps, which ranges from 5 to 15.59%. Clinicians should consider this when planning surgical reconstruction of head and neck defects. Large-scale prospective studies with standardized protocols and well-defined follow-up measurements could help define the ideal personalized free flap volume for optimal function and patient-reported outcomes.

POSTER PRESENTATIONS

Reverse abdominoplasty in patient presenting with sub costal nephrectomy scar and transverse muscle incisional hernia

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Objective

Abdominoplasty and its different approaches have been widely described to improve abdominal wall contour. However, the role of reverse abdominoplasty, a less commonly performed technique, and its indications are not fully understood. Recent advances in the understanding of the vascular supply to the anterior abdominal wall have made this technique more popular, but there is still limited information available in the literature. In this report, we present the case of a 52-year-old woman who underwent a reverse abdominoplasty using an existing subcostal scar from a previous nephrectomy.

Methods

A 52-year-old female patient was referred to our department in November 2022 for a 1.5 cm right subcostal eventration in the L1 area, according to the European Hernia Society classification, and excess dermal adipose tissue in the abdominal region. She had a medical history of clear cell renal carcinoma treated with a nephrectomy and right adrenalectomy by bi-subcostal laparotomy in 2018, and adjuvant immunotherapy between 2018 and 2020. We recommended a combined procedure involving a reverse abdominoplasty and an anterior ventral hernia cure.

Results

No surgical complications were observed and the patient achieved both aesthetic and functional improvement after 6 and 9 months of follow-up.

Conclusions

The reverse abdominoplasty approach can be used in cases where there is a pre-existing subcostal scar. This technique offers many advantages and is a pragmatic option that can help prevent abdominal wall necrosis while producing excellent aesthetic and functional outcomes.

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Objective

Penile squamous cell carcinoma represents 95% of malignant tumours of the penis, originating in the inner mucosal lining of the glans, coronal sulcus, or foreskin.

For superficial tumors of the glans (pTis, pTa), focal chemotherapy / immunotherapy, laser ablation, radiation therapy or glans resurfacing is suggested. Invasive carcinoma (T1 and over) requires surgical excision or glans amputation, resulting in an unsightly deformation of the penis, functional disorders of the urinary line and psychological effects. The current standard is to achieve narrow, but negative margins to preserve the phallus without jeopardizing local cancer control. However there are no reconstructive guidelines.

We report a case of invasive pT1G2 squamous cell carcinoma of the glans which was excised without phallus deformation using a dermal matrice and split thickness skin graft.

Methods

A 74-year-old male, presenting a pT1G2 squamous cell carcinoma of the glans, was referred to our department. (Fig 1). Initial MRI showed no extension to the corpus cavernosum, and the inguinal ultrasound showed no adenopathy. Local complete resection with a minimum of 3 mm margins with immediate reconstruction was accepted by the multidisciplinary board.

Surgical excision began at the coronal sulcus, distal to the lesion. In toto de-epithelialization of the glans was undertaken, taking surgical margins at the tumor level. (Fig 2a)

Matriderm was used for dermal reconstruction at the tumor site. (Fig 2b) A split thickness skin graft was used to reconstruct the glans as an entity. Circumferential Vicryl sutures were used on the coronal sulcus, and a quilting suture was used over the glans. (Fig 2c) Post operative dressings were changed daily, urinary catheter was removed on day 5, and the patient returned home showing no signs of discomfort.

Results

Complete R0 resection was obtained. We successfully reconstructed the glans, in a single step procedure, using a dermal substitute and a split thickness skin graft. Surgical results after 6 weeks show a healed glans with preservation of sensitivity to the aera. (Fig 3)

Conclusions

Matriderm can be used to add dermal thickness at sites of deep excision of penile carcinoma, allowing reconstruction without depression deformity. This allowed reconstruction of the glans as an anatomical unit with sensitivity and shape preservation.

Medial femoral condyle free flap: A systematic review of applications and proportional meta-analysis of surgical outcomes

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Objective

Recalcitrant bone non-union and osseous defect treatment is challenging and often requires vascularized bone transfer. The medial femoral condyle has become an increasingly popular alternative for reconstruction. The study aims to review its different applications and synthetise its surgical outcomes.

Methods

A systematic review of the current literature including all studies assessing surgical outcomes of free medial femoral condyle flap for bone reconstruction in adults was directed on January 31, 2023. Flap failure and post-operative complications were assessed and synthetised with a proportional meta-analysis using a random effect DerSimonian–Laird model.

Results

Fourty articles describing bony reconstruction in the head & neck, upper limb and lower limb areas were selected. Indications ranged from bony non-union and bone defects to avascular bone necrosis. Flap variations were frequent, with either pure periosteal, cortico-cancellous-periosteal, cortico-chondro-periosteal or compound flaps with skin, vast medialis or sartorius muscle being described. Overall failure rate was 1% (95%CI 0.00-0.08) in head & neck applications, 4% in the lower limb (95%CI 0.00-0.16), 2% in the upper limb (95%CI 0.00-0.06) and 1% in articles analysing various locations simultaneously (95%CI 0.00-0.04). Overall donor site complication rate was 4% (95%CI 0.01-0.06), without accounting for resolutive symptoms such as transient hypoesthesia, knee pain and mobility reduction. Major complications reported were 3 femoral fractures, 1 superficial femoral artery injury, 1 medial collateral ligament injury and 1 septic shock due to pace-maker colonization.

Conclusions

The medial femoral condyle flap is a versatile option for bone reconstruction with high success rates and low donor site morbidity.

Oncoplastic reduction mammoplasty: Systematic review of the literature and meta-analysis of surgical outcomes and complications

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Objective

Breast-conserving surgery (BCS) is the standard of care for early-stage breast cancer, but can often result in unsatisfactory cosmetic outcomes. Oncoplastic surgery aims to address these issues by combining local excision with plastic surgery techniques to improve oncologic and aesthetic outcomes. By incorporating breast reduction techniques into cancer surgery, wider margins of excision can be achieved, leading to enhanced oncological safety and reduced recurrence rates without causing significant asymmetry. This systematic review and meta-analysis aims to provide an updated understanding of the surgical outcomes associated with oncoplastic reduction mammoplasty.

Methods

A systematic review of literature was conducted according to PRISMA guidelines. Only studies published from 2015 onwards were selected for inclusion. Reports focusing on post-operative outcomes following oncoplastic breast reduction were included. A proportional meta-analysis of post-operative complications was performed to obtain their proportions and 95% confidence intervals (CIs).

Results

Eighteen studies met the inclusion criteria, representing a total of 2565 oncoplastic breast reduction procedures in 2534 patients. The overall complication rate was 20% (95% CI 16-26%), the hematoma and seroma rate were 3% (95% CI 2–4%), and 4% (95% CI 2–5%), respectively. Nipple-areolar complex necrosis rate was 2% (95% CI: 1–3%). The positive margin rate following OBR was 11% (95% CI 6–17%).

Conclusions

Oncoplastic reduction mammoplasty is a safe and effective alternative to mastectomy and traditional breast-conserving surgery in the treatment of early-stage breast cancers. This approach enables patients to attain superior aesthetic outcomes while remaining safe from an oncological perspective.

Axonal mapping of the motor cranial nerves

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Objective

Cranial neuromuscular systems are among the most highly controlled effectors in the human body. Basic functions such as mastication, swallowing, oral competence, and respiration must function reliably early on under the most complex circumstances such as breastfeeding but must attain an even higher competence in life enabling verbal and non-verbal communication, intimacy, and emotional expression. All these functions require a complex interplay between proprioceptive feedback, high-fidelity sensory input, and virtuous motor control. Despite the well-established innervation pattern, the interplay of afferent feedback and motor control in the cranial motor systems remains scarcely explored.

Methods

Nerve samples (facial nerve branches, masseteric and hypoglossal nerves) were harvested at predefined sites from six human heart-beating organ donors. A double immunofluorescence staining was performed using anti-neurofilament combined with anti-choline-acetyltransferase, anti-thyroxine-hydroxylase or anti-myelin-basic-protein to distinguish and quantify the different axon types.

Results

Quantification analysis revealed more than 10,000 axons for each the facial and hypoglossal nerve, of which 75% were efferent in nature in both nerves. The rest of the facial nerve's main trunk axon population (25%) comprised non-myelinated sympathetic nerve fibers. The hypoglossal and masseteric nerves showed in contrast motor, sympathetic and as expected a significant portion of proprioceptive axon populations. The facial nerve's branches revealed a mix of motor, sympathetic and additional afferent axon populations.

Conclusions

This axonal mapping is the first to accurately quantify the axon populations in the facial nerve branches as well as the hypoglossal and masseteric nerves. The significance of the relatively high number of sympathetic fibers (25%) is not yet understood, however, may explain clinical symptoms such as hemifacial spasm.

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Cutaneous melanoma of the lip: A SEER analysis of epidemiology and survival outcomes with focus on surgery and other treatment options

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Objective

Cutaneous melanoma of the lip is a rare malignancy with a low overall survival. Few studies exist in the literature to aid its diagnosis and treatment. The purpose of this study was to assess the different treatment modalities by collecting cases from a single database and to provide current information on the epidemiologic characteristics of cutaneous lip melanoma.

Methods

The SEER database was searched for demographic, clinical-pathological, and therapeutic characteristics. The Kaplan-Meier model was used to analyze the overall survival of the study population, and survival curves were modelled. Univariable analysis between subgroups was carried out using the log-rank test. Surgery was further assessed with a multivariable cox regression, where the surgical procedure was adjusted for Breslow thickness.

Results

Patients aged 62.4 years on average, and 62.7% of them were males. A total of 386 melanomas of the cutaneous lip were identified. Mean overall survival was 155.1 months, median overall survival was 187 months, and 67.4% had localized disease

Conclusions

Cutaneous melanoma of the lip has a poor prognosis with a 5-year OS of 75.2%. Surgery remains the mainstay of treatment, with less invasive surgical approaches yielding a comparable overall survival to surgery with greater margins

Introducing a competency-based medical curriculum for plastic surgery at the Cantonal Hospital in Aarau

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Objective

There is a growing shift towards competency-based medical education (CBME) worldwide and it is rapidly becoming the expected standard. In 2018, the introduction of a national outcomes reference framework for the undergraduate medical curriculum (PROFILES) shifted medical education in Switzerland towards CBME. As a next step, residency programs need adjustment. A CBME curriculum for plastic surgery should provide exposure to core principles of the field while demonstrating competence through performance of index procedures. The education should prepare the resident for entering independent practice after residency. Defining Entrustable Professional Activities (EPAs) is a major step in CBME, which lately has been established by the Royal College of Physicians and Surgeons of Canada for Plastic Surgery. In Switzerland, EPAs have been introduced to several specialties. So far, to our knowledge, only the University Hospital Zurich has started a pilot program introducing a selection of EPAs in plastic surgery. Our goal is to establish the first CBME curriculum in our department of plastic surgery at the Cantonal Hospital in Aarau.

Methods

A CBME curriculum for plastic surgery at the Cantonal Hospital in Aarau was planned according to the adapted five steps defined by Knox et al.

Results

So far, we implemented the first four steps. In the first two steps, we developed a list of competencies and milestones through modification of the EPAs for Plastic Surgery from the Royal College of Physicians and Surgeons of Canada, specifically adding the currently required competencies on the regional, national and European level. The third step included the adaptation of our teaching strategies through reinforcement of mentoring, staged operative exposure as well as more case-oriented teaching. The fourth step included the introduction of a selection of EPAs and its assessment.

Conclusions

A unique challenge in planning and implementing a competency-based residency in plastic surgery is the wide breadth of operations performed. Different teaching styles may be employed but need to be adapted to match CBME. The implementation of EPAs and its assessment is feasible in our department. We plan to report the assessment of competencies and the outcome evaluation determining the effectiveness (fourth/ fifth step) at the national meeting of Swiss Plastic Surgery in 2024.

VIDEOS

Videos

Targeted muscle reinnervation into lumbrical muscles for treatment of symptomatic digital stump neuroma

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Objective

To present the surgical technique and preliminary results of treatment of painful digital end-neuromas with targeted muscle reinnervation into lumbrical muscles

Methods

Case presentation-Surgical technique:

We performed neuroma excision and targeted muscle reinnervation into the second lumbrical muscle. The motor entry point is found approximately 18mm proximal to the A1 pulley (proximal end) of the middle finger. First, we began by dissecting the nerve to the lumbrical muscle, so that we would not exceed the 20-min tourniquet time for nerve stimulation. The ulnopalmar digital nerve of the index was dissected to the level of the dorsal nerve branch at the metacarpophalangeal joint. Intraneural neurolysis was then performed from distal to proximal over another centimeter to preserve the dorsal branch and reach the target. The recipient nerve was transected about 8mm proximal to the motor entry point. Tension-free coaptation without size discrepancy was possible.

The coaptation site was sealed with fibrin glue, and the nerve was blocked with an intraneural injection of ropivacaïn 1%.

Results

At three-month follow-up the patient perceives no pain or slight pain (VAS 1-2) with light touch on the ulnar stump side. So far, we have treated three patients with painful digital stump neuromas with targeted muscle reinnervation into lumbrical muscles. Patient-reported outcomes show significant improvement in his quality of life, sleep and mental health.

Conclusions

Targeted muscle reinnervation into expendable hand muscles appears to be a new therapeutic option with promising results. The anatomy is constant, as shown by several previous anatomical studies.

Mastering the curve: The near-circumferential extended abdominoplasty

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Objective

Body contouring aims to correct excess tissue, mainly after weight loss. Many different techniques have been described, often highly depending on «artistic eye» of an experienced surgeon to achieve symmetry and an esthetic outcome. Moreover, certain techniques tend to accentuate or produce anatomical deformities resulting in suboptimal outcomes. Le Louarn and Pascal described the high superior tension abdominoplasty, subsequently adapting this concept to circular lipectomies (body lifts). The former is limited in its ability to address the skin excess of the flank and lateral thigh, often resulting in a dog ear. The latter is very effective in addressing this issue, however is associated with a higher rate of wound breakdown, the risk of gluteal cleft elongation ("plumber's crack deformity") and midline volume ("puffy" midline").

This video describes the senior authors modified near circular extended abdominoplasty technique: patient selection, systematic preoperative markings, operation technique, and its limitations.

Methods

The video underlines the indication and outcomes of this procedure, with an emphasis on markings and technical pearls. Typical postoperative results are depicted.

Results

The near circumferential abdominoplasty addresses the limitations of the classic abdominoplasty, with a superior definition of the hip and waistline, without disrupting the gluteal crease and risking midline wound complications. The limitation of the technique is mainly the inability to correct midline skin excess.

Conclusions

The extended abdominoplasty is a safe procedure that allows for superior waistline definition compared to the classic abdominoplasty, without the potential midline complications associated with circumferential lipectomies. The marking routine depicted in this video yields reproducible, favorable esthetic results.

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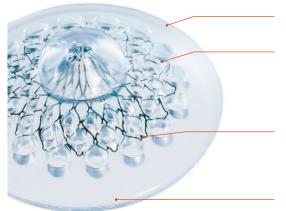
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Smooth, biocompatible silicone⁵

Floral shaped nitinol frame⁶

The nitinol frame allows a minimal incision, as it is key to recover the original shape of the implant when it is folded and inserted and also provides softness in response to pressure⁵.

Perforated silicone shell⁶

The perforated silicone capping allows a rapid integration and fixation to adjacent tissue, avoiding rotation or displacement⁶.

A stable platform for the nipple structure⁶



CONGRESS ORGANISATION

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