12TH EURAPS RESEARCH COUNCIL MEETING

29 - 30 MAY 2024
ATHENS, GREECE

ABSTRACT BOOK

SESSION 1
REGENERATIVE MEDICINE

EURAPS Research Council

Abstract No.: 24

Title : Hypoxia Preconditioned Serum (HPS) Promotes Proliferation and Chondrogenic Phenotype of Chondrocytes In Vitro

Abstract text :

Autologous chondrocyte implantation (ACI) for the treatment of articular cartilage defects remains challenging in terms of maintaining the chondrogenic phenotype during in vitro chondrocyte expansion. We developed a novel method with Hypoxia Preconditioned Serum (HPS) by harnessing a comprehensive set of growth factors released through hypoxia preconditioning of peripheral blood cells. We hypothesize that HPS can promote chondrocyte redifferentiation and thus refine current ACI protocols. Proteomic analysis of HPS and non-hypoxia-preconditioned serum (NS) from 10 volunteers included 6 chondrogenic growth factors (TGF-beta1, IGF-1, bFGF, PDGF-BB, G-CSF and Leptin). Human chondrocytes from osteoarthritic cartilage (n=3) were tested with HPS-10% and HPS-40% for 2 and 4 days and was compared to NS-10%/40% and FCS-10% culture conditions. Analysis included cell viability assays (proliferation and metabolic activity), collagen type II immunostaining and quantitative real-time PCR for the expression of collagen type II (COL2A1), collagen type I (COL1A1), SOX9 and MMP13. In HPS, the concentrations of pro-chondrogenic TGF-beta1, IGF-1, bFGF, PDGF-BB and G-CSF were higher than in NS. Chondrocyte proliferation was promoted with higher doses of HPS (HPS-40% vs. HPS-10%) and longer stimulation (4 vs. 2 days) compared to FCS-10%. On day 4, immunostaining of HPS-10%-treated chondrocytes showed increased levels of collagen type II compared to the other conditions. At the gene expression level, we demonstrated the highest differentiation index (COL2A1/COL1A1) in HPS-10%-treated chondrocytes on day 4. Parallel to this, HPS-10% expressed differentiation marker SOX9 in chondrocytes at a higher level than NS-10/40% and FCS-10% on day 4. The expression of the cartilage remodeling marker MMP13 was comparable in all culture conditions. These findings implicate the potential of HPS-10% to improve conventional FCS-based ACI culture protocols by promoting the proliferation and chondrogenic phenotype of chondrocytes during in vitro expansion.

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Abstract No.: 39

Title : Mixed metal oxide nanoparticles for seroma prophylaxis: a short-term comparative study in rats

Abstract text :

Seroma formation remains a common postoperative complication. While the best treatment has yet to be established, recent focus has been put on bioglass/ceria nanoparticle (NP) treatment for seromas. Previously, we demonstrated early and complete seroma reduction in a rat model after NP treatment. However, little is known about the prophylactic effect of NPs. Therefore, the aim of this study was to assess the short-term prophylactic efficacy of NP treatment. 20 Lewis rats underwent bilateral axillary surgery through a technique used to induce seromas in our previous studies. In 10 rats, on the day of the surgery, one side was treated with NPs and the contralateral side received only vehicle buffer. In the remaining 10 rats, one side was treated with fibrin glue, and the other side was left untreated. Seroma fluid, blood and tissue samples were obtained at defined time points. At euthanasia, postoperative day (POD) 14, blood and tissue samples were harvested for biochemical, histopathological and immunohistochemical analyses. At POD 14, the proportion of macroscopically visible seromas on the NP-treated sides was 10%, compared to 40% on the fibrin-treated sides. Histologically, a reduction in vascularization and macrophage recruitment was observed in the superficial capsules on NP-treated sides, while collagen type 1 depositions were increased. At endpoint, NPs did not show any biodistribution to the systemic circulation. Prophylactic NP application reduced the early manifestations of seroma mostly through their anti-inflammatory effects. Moreover, there were no detectable systemic adverse effects observed. These findings emphasize the clinical potentials of NPs in the prevention of seromas.

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Abstract No.: 14

Title : Spider silk-based tissue engineering of cartilage tissue: establishment of a novel bioreactor model using adipose derived stem cells

Abstract text :

Human cartilage tissue remains a challenge for the development of therapeutic options due to its poor vascularization and regenerative capacity. In addition to various surgical salvage operations, complete regeneration of cartilage remains an intractable problem. Various biomaterials and numerous cell populations have been studied in bioreactor-based experimental setups to improve cartilage tissue engineering and achieve the best possible regeneration. The aim of the study was to investigate native spider silk cocoons as a matrix for tissue engineering of cartilage tissue. For this purpose, the spider silk cocoons were colonized with adipose derived stem cells (ASC) and cultivated in vitro. BMP-7 and TGF-ß2 were added for chemical induction of differentiation and changes in cell morphology and de novo tissue formation were investigated. In addition, mechanical induction of differentiation was performed using cyclic axial compression in a custom-designed bioreactor model to produce cartilage-like tissue. Samples were examined by histological and immunohistochemical analyses to verify chondrogenic differentiation. Colonization of spider silk cocoons with ASC resulted in high colonization density and cell proliferation. Mechanical induction of differentiation in a newly established bioreactor model resulted in a more roundish cell phenotype and synthesis of extracellular matrix, which may indicate chondrogenic differentiation. Addition of BMP-7 and TGF-ß2 demonstrated increased expression of cartilage-specific markers in immunohistochemical staining, therefore production of cartilage-like tissue could be assumed. Based on the results of the present pilot study, a successful establishment of the developed bioreactor model for chondrogenic differentiation of ASC on spider silk cocoons can be stated. Further generation of in vitro and in vivo data is necessary to further evaluate the significance and possible future perspectives of the presented research approach. Further approaches could include optimized in vitro approaches and in vivo transplantation into natural joint environments to further assess chondrogenic differentiation through local biochemical and biomechanical influences.

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Abstract No.: 15

Title : Adipearl TM , the first dermal scaffold enabling to create new adipose tissues: evidence collected in the swine model.

Abstract text :

Being able to create new fat tissue in a minimally invasive way is a much desired feature for plastic surgery and dermatology. This can address unmet needs for facial rejuvenation but also for minimally invasive volumetric reconstructions and enhancement in the body. Adipearl TM dermal scaffold is an innovative ready-to-use injectable and degradable product that has the potential to be a solution to this unmet need. This study investigated how Adipearl TM dermal scaffold induces the growth of a new adipose tissue and to understand the effect of the surrounding environment on its regenerative capacity. Adipearl TM dermal scaffold was injected subcutaneously in the swine model in contact with different types of soft tissues. 14 animals were injected and followed for up to 6-months. Local tissue response, product biodegradation, and the creation of adipose tissues were evaluated at different time points post-injection using histology and immunostaining. The product was also injected earlier in rodents, confirming the results with additional methods. Histology evaluation revealed that Adipearl TM dermal scaffold induces the growth of a new vascularized adipose tissue. The different steps in the creation of the tissues have been characterized; they evidence the recruitment of adipose precursor cells that differentiate into mature adipocytes. This biological process is synchronized with the biodegradation of the dermal scaffold, creating histologically sound induced adipose tissue. Interaction of a carefully designed dermal scaffold with the surrounding tissular environment promotes the creation of new mature vascularized adipose tissue. This new possibility opens wide perspectives for face and body indications especially with thin patients with limited donor sites for fat grafting.

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Abstract No.: 46

Title : İnquiries Of The Effectıveness Of Wharton’s Jelly derive Mesenchymal Stem cell Conditioned Medium on Wound Healıng in a Burn Model

Abstract text :

Burn wounds pose significant challenges to both patients and the healthcare system. Complications may develop after burns, which can cause difficulties in the treatment process. Stem cell applications are increasing day by day in the treatment of burns. In the literature, Bone Marrow derived Mesenchymal Stem cell Conditioned Medium has been used before in the treatment of burns. However, the use of WhartonÂ’s Jelly derive Mesenchymal Stem cell Conditioned Medium (WJMSC-CM) in the treatment of burns has not been found in the literature. In this study, it is investigated whether WhartonÂ’s Jelly derive Mesenchymal Stem cell Conditioned Medium contributes to burn healing and if it has an effect on wound healing, in which way it is achieved. The study enrolled 64 rats which burn model was created. 64 rats were randomly divided into 4 groups In the 1. group (control), no application was made after the burn. PRP (Platelet Rich Plasma) was applied to the 2. group on the first day after the burn. Silver sulfadiazine was applied to the 3. group on the first day. WJMSC-CM was applied to the 4. group on the first day after the burn. Macroscopic, histological and PCR for IL-1 and. VEGF evaluations were performed. WJMSC-CM increases hyperemia, PMNL levels, angiogenesis, fibroblast levels, epithelialization, VEGF levels and decreases IL-1 levels. We think that WJMSC-CM can be widely used in the treatment of burns, as it has fewer side effects, easily available, and can affect burn healing at least as much as PRP and Silver sulfadiazine, which is considered the gold standard.

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Abstract No.: 35

Title : Hypoimmunogenic features of adipose stem cells using spheroid technology for nerve tissue engineering applications

Abstract text :

Currently, there is no effective treatments for peripheral nerve injuries. Cell therapy holds promise for tissue repair and regeneration. However, immunogenicity and graft rejection hinder allogenic cell therapy progress. Thus, we investigated the spheroid culture technologyÂ's potential in maintaining the hypoimmunogenic features of human adipose stem cells (hASCs). We analysed the regenerative potential of hASCs while maintaining them under hypo-immunogenic state, crucial in preventing adverse reactions after transplantation. This study focused on the fabrication and characterisation of hASC spheroids with an emphasis on preserving stemness and reducing immunogenicity to enhance their therapeutic efficacy for nerve tissue regeneration. Spheroids were generated from hASCs (passage 4 to 5) using the microwell technique. Various cell seeding densities (1000, 2000, 3000, and 4000 cells per spheroid) were tested to identify optimal culture conditions, and these cultures were maintained over seven-days. Subsequently, the spheroids were characterised for size and viability, and further assessed for their stemness markers and expression profile of antigen presenting complexes such as HLA-I and HLA-II. Finally, immunogenicity of the spheroid hASCs was characterised by using the mixed lymphocyte reaction. The culture of hASC spheroids was successfully established. Data analysis revealed a correlation between seeding density and growth kinetics and related cell viability over a seven-day period. Molecular analysis of the spheroid cells indicates a structure and density-dependent impact on the expression of stem cell and immunogenicity markers. However, these results should be further substantiated using multi-omics analysis. The immunogenicity experiment reveals no significant cell death in comparison to the control, i.e., differentiated hASCs. Thus, the spheroid cultures of hASCs show promising way to overcome the adverse immune rejection in vitro. Nevertheless, these findings will be further validated in animal model by evaluating the maintenance of stemness and antigen presenting complexes, particularly in the context of a sciatic nerve injury.

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Abstract No.: 53

Title : THE EFFECT OF DEFEROXAMINE ON SURGICAL DELAY TIME

Abstract text :

Many surgical techniques and drugs have been tried to increase the success of reconstruction and flap viability. Although it is known that deferoxamine increases new vessel formation and has a positive contribution to wound healing, its effect on surgical delay is not known. In our study, 70 adult rats were included in the study. Rats were randomly divided into 7 groups. McFarlene flap and delay model was created in rats. From the first day of the experiment until the end of the experiment, Intraperitoneal saline or deferoxamine were administered daily. A significant difference was observed when deferoxamine and the surgical delay phenomenon were compared in terms of increasing vascularization and flap viability. It was observed that deferoxamine could reduce the time to wait in the surgical delay phenomenon up to 3 days. It was observed that deferoxamine did not suppress inflammation at a dose of 20 mg/kg.
As a result of this study, it was determined that deferoxamine reduced the time required to wait before flap surgery to 3 days in the surgical delay procedure. Since the positive effect of deferoxamine was observed in our study, which could reduce the delay in surgery, it would be appropriate to plan new studies in a larger animal model, such as pigs, whose skin vascular anatomy closely resembles that of humans. At the same time, this study may guide the possible clinical use of deferoxamine to prevent necrosis and increase flap survival in random flaps. Before clinical use, it may be considered to fully understand the underlying mechanisms of action, to determine dose-response curves and possible side effects, and to plan further studies to investigate its efficacy in creatures with skin anatomy more similar to humans.

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Abstract No.: 31

Title : STROMAL VASCULAR FRACTION (SVF) RELIEVES SYMPTOMS OF CARPOMETACARPAL I OSTEOARTROSIS (OA) - PRELIMINARY REPORT OF RANDOMIZED CONTRLLED TRIAL (RCT)

Abstract text :

OA of the 1st carpometacarpal (CMC) joint causes pain and disability. For conditions resistant to conservative treatment surgery prevails. SVF contains mesenchymal stem cells, endothelial progenitor cells and stromal components. The purpose of this RCT is to study thumb carpometacarpal injection with SVF derived from adipose tissue. SVF injection with thumb splinting and splinting alone are compared. Open label RCT with 1:1 arms aiming at 30 + 30 patients, with thumb OA (Eaton Littler II). Patients randomized into the SVF arm undergo 75 ml liposuction under local anestesia. SVF is produced with the Q-Graft system (Humanmed, Germany). SVF is injected into the CMC joint. Outcomes; pain, visual analogue scale (VAS) and a Patient-Rated Wrist Evaluation (PRWE) and Mental Health Quotient (MHQ) questionnaire, global improvement, grip and pinch strength. Complications are recorded. Follow-up:1 mo (phone)3 and 6 months, and long term 1 year and 5 years. The first 12 patients in the SVF group had a mean Age of 55, 10 female and 2 male. Sick-leave was 2 days. One patient had a small hematoma at the harvest site. Preoperative mean VAS score of was 48 and 6 mo postoperatively it was 13. THE PRWE total score declined from 75 to 54

6 months postoperatively. Ten /twelve patients graded their thumb function as better or much better than before.

Limitations: low number of study subjects, short follow-up,. lack of a sham- liposuction procedure in the Â“splinting aloneÂ” arm of the RCT. We describe short term pain relief and functional improvement in CMC I OA patients receiving intra-articular SVF in an outpatient setting. Adipose derived stem cells secrete cytokines and growth factors redirecting inflammation towards regeneration. Whether the effect of SVF on thumb OA is due to the cells injected or to splinting as such remains to be shown.

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Abstract No.: 13

Title : The dermal skin substitute in the chicken egg: new insights into optimized vascularization

Abstract text :

Currently, a plethora of commercially available dermal substitutes is established in the treatment of severe burn injuries and shows convincing functional and aesthetic results in clinical application. In particular, the use of NovosorbÂ® Biodegradable Temporising Matrix (BTM), as a biodegradable polyurethane foam, has gained considerable importance in recent years. Despite convincing clinical results, the duration until complete integration and vascularization of BTM is up to 21 days before definitive defect coverage by autologous split thickness skin grafting is possible. This usually results in a prolonged hospital stay for the patients with increased treatment costs and increased morbidity and mortality. The aim of the project was an accelerated vascularization of BTM. For this purpose, implantation of BTM into the chorioallantoic membrane (CAM) assay of the fertilized chicken egg was performed to quantify the progress of vascularization and the proangiogenic influence of recombinant growth factors and adipose derived stem cells (ASC). An evaluation was performed by histological and immunohistochemical analysis as well as confocal light microscopy and macroscopic quantification of neoangiogenesis. Successful implantation of BTM into the CAM assay was achieved. However, in vitro cultivation of BTM with ASC and recombinant growth factors failed. Increased neovascularization of BTM by the addition of ASC and recombinant growth factors, such as VEGF, EPO, or PDGF, was observed in ovo throughout the study period. Using software-assisted analyses, vessel growth was objectified and further quantified by histological and immunohistochemical analyses. ASC and recombinant growth factors represent a promising approach to improve the vascularization time of BTM in ovo. Thus, translation into clinical application would be feasible to enable early split-thickness skin grafting, thereby reducing the length of hospital stay and treatment costs. However, further studies are needed to enable translation and thus establish optimized treatment options for burn patients.

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Abstract No.: 23

Title : Glucose metabolism of free white adipose tissue fat grafts changes towards beige adipose tissue in humans

Abstract text :

Fat grafting is routinely used in plastic surgery; however, the metabolic changes that occur in fat grafts remain poorly understood. Mouse models have shown that fat grafting can induce browning of white adipose tissue (WAT) towards beige adipose tissue, an intermediate form between WAT and thermogenic brown adipose tissue (BAT). We investigated whether a similar transformation of WAT into beige adipose tissue could also occur in humans after fat transfer. Four patients with previous fat transfer underwent two [18F]2-fluoro-2-deoxy-D-glucose (18F-FDG) PET/MRI scans: one after 2 h of cold exposure and the other at room temperature. The average glucose uptake (GU, umol/100g/min), a marker of metabolic activity, was calculated for all the tissues of interest. Fat graft open biopsy specimens were harvested from subcutaneous tissue (n=9) and pectoral muscle (n=2) of patients with a history of full breast reconstruction using fat grafts. 18F-FDG-PET studies showed an increased GU of up to 29 % (mean 19 %, SD 11 %) in fat graft areas during cold exposure compared to warm conditions, similar to that of BAT. An increase in GU was not observed in control WAT (p=0.0317). Tissue samples demonstrated well-preserved WAT grafts, but a morphology typical of beige adipocytes was not observed. GU in the fat graft areas during cold stimulus resembled BAT, suggesting the presence of beige fat. However, beige adipocytes were not observed in the fat graft samples, which may indicate that the browning of WAT in humans is not solely induced by fat grafting.

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Abstract No.: 60

Title : Geometric Reconstruction of Cartilage Tissue using Mesenchymal Stem Cells and Electromechanical Shaping: Experimental Study

Abstract text :

The search continues for a standardized cartilage memory-defeating technique that is independent of surgical techniques and personal factors and adaptable to the clinic. The described experimental methods for cartilage shaping could not be used clinically because they caused fibrosis (Hong SJ 2016).
The aim of this study was to demonstrate the efficacy of the Wharton gel-assisted standardizable electromechanical cartilage shaping method in the rabbit ear cartilage defect model and compare it with the surgical shaping method, which is still considered the gold standard. A rabbit ear cartilage defect was created. The rib cartilage was removed to reconstruct the ear defect. Electromechanical shaping was performed according to the rabbit ear geometry described by Manuel et al. The same pattern was performed with surgical scoring and suturing. The weight and angles of the introduced geometric shape were measured. Cartilage grafts were inserted into the created defect in the ear. Injection of Wharton gel stem cells and saline was performed in the first week, and the grafts were removed in the first month. Angular change, weight change, and histopathology were analyzed. It was found that the durability of the shape was better maintained in cartilages with electromechanical shaping compared to surgical shaping. There was no difference in terms of fibrosis and degeneration. It was found that cartilage weight and thickness were preserved in the stem cell treated groups. Electromechanical shaping with Wharton gel stem cells is an effective, standardized method for maintaining cartilage stability and geometry and is a good alternative to classical surgical techniques.

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SESSION 2

MICRO NERVE GENERAL

EURAPS Research Council

Abstract No.: 20

Title : Randomized Controlled Trial: Acquisition of basic microsurgical skills through smartphone training model.

Abstract text :

Microsurgery is an essential surgical technique in numerous surgical specialties today. However, learning these fine motor skills today is challenging due to strict working hour limitations, increasing patient safety awareness, increasing documentation time, and ethical objections concerning practicing on living animals. We present a randomized controlled trial comparing two microsurgical training model: the smartphone model, and the microscope model. Thirty students without previous microsurgery experience were randomized into three equal groups: the control group (CG), the smartphone group (SG), and the microscope group (MG). All participants performed microsurgical skill tests and chicken femoral artery anastomosis before and after ten hours of standardized microsurgery training with their respective training models. The CG received no training. Performance was assessed using the time needed to complete the anastomosis, UWOMSA grading scale, validation of anastomosis patency, and time to complete the Round The Clock test (RTC). There was no statistically significant difference between the three groups at baseline. Significant improvement was achieved in both training models for time to complete the anastomosis with the MG improving by 21m43s ($p=0.005$) and the SG by 28m41s ($p=0.005$), but not the CG improving by 14m19s ($p=0.161$). Regarding the UWOMSA grading scale there was significant improvement in all three training arms: MG (6.0 points, $p=0.002$), SG (5.1 points, $p=0.006$) and CG (2.4 points, $p=0.009$). Furthermore, significant improvement was observed for patency rate in the MG and SG ($p=0.002$), but not for the CG ($p=0.264$). Time to complete the RTC showed significant improvement in all three training arms ($p<0.001$). Basic microsurgical skills can be learned using the smartphone training model with equivalent performance improvements compared to the microscope training model. The lack of stereoscopy is the main limitation of this model, but this could be improved in the future with smartphones equipped with 3D cameras.

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Abstract No.: 54

Title : Evaluation of a surgical adhesive for the performance of arterial microanastomoses: impact in the flow and anatomy of vessels greater than 1 mm and lesser than 1 mm.

Abstract text :

Despite the recent advances and innovations in microsurgery, vascular microanastomoses use to be manual and surgeon dependent. The purpose of this work is to evaluate the effectiveness of glutaraldehyde with bovine serum albumin (BSA) adhesive in the performance of arterial anastomoses. Study registration: EXP 20191115. Fourteen femoral (Group I) and 10 aortic (Group II) end-to end anastomoses were performed in 18 Wistar rats. Flux was measured before, immediately after the anastomoses and 24 hours later, with a transit-time ultrasound to obtain quantitative data (Aure Flo UnitR). Anastomoses technique consisted in minimal stitches to approximate the lumen of the vessels and applying Bio GlueR adhesive to seal the union. The SPSSR package was used for the statistical evaluation (descriptive and analytical: Mann Whitney Wilcoxon U test and Spearman Rho). A median of 2 stitches was necessary in femoral arteries, and 4 in aorta. The median anastomoses time was 16.5 minutes in group I and 32.5 minutes in group II. 93% Anastomoses in group I and 100% in group II were permeable immediately and 77% and 100% in group I and II respectively after 24 hours with adequate flux measures. When making comparisons in each group separately, statistical significance was not found in terms of immediate postanastomoses flow and postoperative flow at 24 hours ($p = 0.673$ for the femoral group and $p = 0.327$ in the aortic group).
Regarding correlations, combinations were made between the number of points required in the intervention and the total time used to perform the anastomoses and we found that a greater number of points led to an increase in the total anastomoses time, with a Spearman correlation coefficient of 0.586 ($p = 0.003$). The use of glutaraldehyde with BSA is a promising and reliable technique to perform microvascular arterial anastomoses.

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Abstract No.: 49

Title : Nerve transfer brachialis branch to anterior interosseous nerve: does it work?

Abstract text :

The nerve transfer of brachialis branch (Br) to the anterior interosseous nerve (AIN) for pinch/grasp improvement in lower plexus injuries or tetraplegia has been introduced over a decade ago, however, its effectiveness remains still controversial. We performed an anatomical study for the analysis of feasibility and soundness of this transfer. In 30 upper limb fresh specimens, we dissected the musculocutaneous (MCN) and median nerve (MN) and all their muscle branches in the upper arm and forearm. Dissection was performed in a proximal to distal fashion. We assessed the presence of intraneural fascicular interconnections among the AIN and other MN branches, the intraneural topography of the MN in the upper arm, the feasibility of a tension free nerve coaptation of the Br to AIN and their axonal matching. Intraneural fascicular interconnections (INI) of the AIN to other median nerve fascicles were always present in the distal third of upper arm. The first INI was found 3,85 (Â±1,82cm) proximal to the interepicondylar line (ICL), while after continuing proximal neurolysis we recorded the second INI at 9,45Â±1,16 cm from the ICL. Distal to the ICL, we found no INI with other fascicles. The MN fascicles' topography in the middle third of the upper arm revealed a dorsolateral or dorsomedial location of AIN. A tension free coaptation with the AIN distal to the INI without the need of a nerve graft was possible in three out of 30 upper limbs. The ratio of myelinated axons donor/recipient nerve was 0.55. The presence of INI distal to the coaptation site Br to AIN may result in loss of axonal load to the target muscles. A coaptation site as distal as possible in order to overcome the INI or a use of nerve graft would increase selectivity and improve functional outcome.

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Abstract No.: 34

Title : Reverse end-to-side neurotization: Comparison of axonal distribution in intact and regenerating nerves. Our animal model and preliminary results.

Abstract text :

Partial peripheral nerve lesions or injuries followed by primary end-to-end repair may result in only incomplete sensomotoric recovery, especially if proximal. While end-to-end nerve transfers are possible to reinnervate affected muscles, a major drawback is the sacrifice of residual function and regenerative capacity still provided by the original innervation. However, the donor nerve can also be connected laterally to the affected recipient, thus preserving its original continuity. This technique is referred to as reverse end-to-side (RETS) neurotization. While previous studies have shown regeneration of the donor nerve into the recipient both in a proximal and distal direction at the coaptation site, the exact fiber distribution over time as well as the functional impact on an intact or a regenerating nerve still remains subject of ongoing investigation. Rats undergo a surgical intervention depending on the group: cut and repair of the musculocutaneous nerve (MCN), RETS transfer of the ulnar nerve (UN) to the MCN, or cut and repair of the MCN followed by a RETS transfer of the UN to the MCN distal to the coaptation site. 2 or 12 weeks after surgery electrophysiological or histological assessments are performed. Our preliminary data suggests a greater regeneration respectively reinnervation involvement of the donor nerve after transfer to a regenerating nerve following cut and repair compared to an intact one. Moreover, fibers of the donor nerve seem to about evenly regenerate in a proximal and distal direction 2 weeks after surgery, however, after 12 weeks regeneration occurs particularly distally towards the muscle. In conclusion, donor nerve regeneration following RETS neurotization tends distally towards a target muscle on the long-term and is increased after transfer to a regenerating recipient nerve.

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Abstract No.: 57

Title : 3D head-mount microscopic visualisation system versus the operating microscope: A non-inferiority trial

Abstract text :

The operating microscope (OM) remains the gold-standard visualisation device for microsurgery and supermicrosurgery, however, recent developments in digital imaging technologies have led to the emerge of microscopic and exoscopic 3D stereopsis in various innovative digitalised imaging devices. This pre-clinical feasibility trial determines technical considerations of the development of the novel 3D Head-Mount microscopic visualisation system (GoScopeTM), and further demonstrates an objective trial of expert microsurgeonsÂ’ performance against the standard OM in simulated high-fidelity microsurgical task. This study analyses 7 key technical considerations for the development of GoScopeTM: illumination, magnification, field of view, stereopsis, depth of field, precision of focus and image quality. Expert microsurgeons completed standardised microvascular anastomoses, with both the OM and GoScopeTM, while their performance was monitored via electromagnetic hand-motion analyser [total pathlength (TP), total movements (TM) and total operative time (TT)] and an end-product anastomosis lapse index (ALI) score which evaluated the quality of each anastomosis. A face-validity questionnaire was used based on the abovementioned microscopic technical characteristics demonstrating the qualitative evaluation of the GoScopeTM against the OM. All microsurgeons achieved successful microvascular anastomosis with both OM and GoScopeTM with ALI scores of mean 2.8 (range: 2-3) and 6.3 (range: 4-9), respectively. There were statistically significant differences in TM ($p < 0.0001$) and TT ($p = 0.0031$) whilst there was no statistically significant difference in TP ($p = 0.88$). Face-validity questionnaire demonstrated that magnification, stereoscopy, image quality, illumination and depth of focus are non-inferior to OM, however, focus precision and field of view required further technical improvements. This feasibility trial establishes technical considerations for the development of fully digital stereoscopy, head-mount portable microscopy and demonstrates the pre-clinical feasibility of this novel 3D surgical visualisation system in simulated high-fidelity microvascular anastomosis when performed by experts.

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Abstract No.: 12

Title : Optimizing Reconstructive Microsurgery Education: A Practical Approach Using the Porcine Thigh Model

Abstract text :

Microsurgery, a complex confluence of precision and advanced surgical techniques, is crucial in the domain of medicine. The induction of novice residents into this sophisticated field is vital. We are presenting our experience from hands-on microsurgery workshop designed and conducted at our clinic. It was designed as a four-day reconstructive microsurgery course that included 16 novice residents with minimal to no prior microsurgical experience. The course's structure was methodically organized, with three days dedicated to lectures encompassing various aspects of reconstructive surgery and the final day focusing on hands-on surgical training using the porcine thigh model. They were given 5 hoursÂ’ time frame to complete vessel anastomosis and nerve coaptation on the porcine thighs. A Likert scale questionnaire was used to assess trainee satisfaction. All 16 residents successfully performed a total of 48 anastomoses and coaptations on the porcine thigh models. The results from the Likert-scale survey were overwhelmingly positive, with participants expressing high satisfaction with the course content, materials, and the teaching level. The residents found the porcine thigh model to be highly effective for anastomotic training, even with limited prior experience. The porcine thigh has been less explored as a training model for microsurgery courses. Feedback from participants indicated the course's efficacy. It underscored the utility of the porcine thigh model, particularly for its resemblance to human anatomy, bridging the learning curve for novices. The assimilation of residents into the detailed and interdisciplinary world of microsurgery, facilitated by optimal, hands-on training, especially through utilitarian models like the porcine thigh, is pivotal for ensuring a competent, innovative, and sustainable future in the challenging yet rewarding arena of reconstructive microsurgery.

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Abstract No.: 45

Title : Fibrin sealants as an alternative treatment in burn injury: an experimental research

Abstract text :

Burn disease represents a dynamic process, that could deepen over time, increasing overall tissue damage with high risk of complications, raising the need for immediate treatment strategies. The aim of the present research study is to present the effectiveness of treating a burned area with the application of TISSEELÂ™ as an innovative method of conservative treatment. For this ongoing experimental study, three groups of Sprague-Dawley rats were used. The first group (n=10) was subjected to a dorsal surface thermal contact burn with a metal plate at specific dimensions, temperature and pressure, resulting in a partial thickness burn. Immediately, the burned surface was coated with TISSEELÂ™, which is a biological adhesive-sealing fibrin sealant. The second group (n=10) was burned using the aforementioned technique, and burn surface was coated with silver sulfadiazine cream, which has been a standard treatment option to date. The third group(n=10), was also subjected to the same protocol design, but there was no treatment applied (control group). Biochemical and pathological anatomical parameters have been analyzed. There was a decrease in all markers of tissue destruction and inflammation after 3rd postoperative day, and on the other hand increase in those related to healing capacity on group 1. Two pathologists blindly reviewed the specimens about inflammation, healing and regeneration. All the results were statistically analyzed and compared, in order to exact accurate results about the efficacy of TISSEELÂ™. Burns often require the application of specialized treatment modalities. TISSEELA™ can lead to rapid wound sealing and hence reduce the likelihood of infection, and accelerate the healing period to optimize scar quality. The use of fibrin sealants can be an effective alternative in the acute phase of burn wound management up to healing.

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Abstract No.: 40

Title : Study of molecular-genetic profiles of cutaneous squamous cell carcinoma with different patterns of clinical aggression.

Abstract text :

Cutaneous squamous cell carcinoma (cSCC) is a prevalent malignancy with a rising incidence and a disproportionately high mutational load relative to other neoplasms. This study aims to compare molecular-genetic profiles of cSCCs prone to local recurrence against those without relapse, seeking predictive markers for prognosis and therapy. Understanding cSCC genetics, next to the development of new therapeutic strategies, may help improve outcomes for high-risk patients. This retrospective case-control study identified patients who underwent surgery over a 7-years period. Cases presented cSCCs that recurred, while controls had cSCCs in the same body site but remained recurrence-free, chosen to ensure maximum histopathological uniformity between the primary lesions. Using Next Generation Sequencing (NGS), we analyzed histological samples from cases and controls, highlighting the most frequently mutated genes in cSCC. Mutational records were statistically compared by Pearson Chi-square test. We identified 7 cases and 7 controls, predominantly male, with one female exception. The mean age at surgery was 75 years (range 54-88). The lesions examined were all located in the head-neck district. Overall, 55 single gene mutations were reported, 23 in cases and 32 in controls (p-value>0.05). TP53 was the most mutated gene (31%), followed by KIT (15%), KDR (13%) and CDKN2A (11%). Patients with more mutations reported previous neoplastic diseases. KDR mutation was significantly more frequent in controls than in cases (p-value=0.031). Genes mutated only in one group were IDH2, PIK3CA, PTEN, SMO, STK11 for cases, ATM, EZH2, FGFR1, FLT3D, GNAS, RB1 for controls. This study did not identify specific mutations as therapeutic targets. Noteworthy is that controls displayed a trend to a greater mutational load than cases. It is plausible that more mutations prompt the neoplasm to expose more antigens, making it a better target for the immune system. This may robust and sustain immunological response, possibly preventing subsequent recurrences.

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Abstract No.: 56

Title : Growing Pains to Collaborative Gains: A Longitudinal Evaluation of a Multidecade Clinical Research Program

Abstract text :

Research remains a foundational component of academic plastic surgery and is crucial for advancement of the specialty. In 2017, Carney et. al reported on the formation of a clinical research program that consisted of 1-2 funded annual positions, showing increased departmental academic output and a 100% match rate by the research fellows (RF). This longitudinal analysis provides key insights from a multidecade experience of an established clinical research fellowship, highlighting its educational impact and collaborative-first approach. A complete program evaluation was performed. All research fellows (RF) within the program from July 2008-July 2020 were examined during their year of employment and subsequent two years. Internal and external collaborations trends were assessed using PubMed affiliations. Research impact was characterized by publication count, journal impact factor, and journal diversity. Correlation between external collaborations and research impact were examined using PearsonÂ's correlation coefficients. Thirty-five RFs were identified over 12 years. In 2014, a second position was added to the initial annual single position, expanding further in 2017 by augmenting the existing positions with 2-4 research personnel. Overall, significant growth was observed in the collaborative networks [p=0.008], publications [p=0.003], journal impact factor [p=0.022) and journal diversity [p=0.0002]. A cycle of productivity occurred every three years. A shift towards more external collaborations occurred after 2016 [p=0.008]. A positive correlation was observed between external collaborations and academic output ($r=0.72$, $p<0.001$), journal diversity ($r=0.74$, $p<0.001$), and journal impact ($r=0.49$, $p<0.05$). As result of institutional support and our strategic decision to engage experts across multiple disciplines, there is discernible improvement in measurable impact, contributing to the growth of our multidecade program. Dedicating resources to foster deeper external, and potentially international, collaborations, may enrich the field of plastic surgery research, recognizing that this investment fuels the cycle of productivity, offering promising returns to the future.

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SESSION 3
SHORT INTERESTING CASES

EURAPS Research Council

Abstract No.: 6

Title : Assessing Surgical Complications in Patients Undergoing Lower Body Lift and Abdominoplasty After Massive Weight Loss

Abstract text :

Patients who have undergone significant weight loss (MWL) often seek body contouring procedures to address their aesthetic and functional concerns. Abdominoplasty, a procedure that removes excess abdominal skin and fat, is a common choice. However, the Lower Body Lift (LBL) offers a more comprehensive approach by addressing excess gluteal skin and enhancing its projection, providing both functional and aesthetic benefits. This study aims to compare population and complications associated with these two procedures. This retrospective study encompasses patients who underwent LBL and abdominoplasty following MWL between 2021 and 2022. Comprehensive assessments included comorbidities, medication usage, smoking status, and pre-operative and maximum body mass index (BMI). Surgical duration, length of hospitalization, pre-operative and first day post-operative post-operative hemoglobin levels, and the necessity for transfusions were examined. Complications such as seromas, dehiscence, hematomas and infections were assessed. The study comprised 78 patients who underwent LBL and 69 who underwent abdominoplasty. LBL patients were generally younger and had lower pre-operative BMI, yet exhibited higher average maximum BMI and more substantial percentage of weight loss. Complication rates were observed to be 44.8% and 42%, respectively. The most prevalent complication among LBL patients was non-surgical dehiscence (77.1%), whereas seromas were more frequent in the abdominoplasty group (17.4%). The LBL group demonstrated lower rates of surgical dehiscence (5.8% vs. 14.3%) and seromas (17.4% vs. 25.7%). Importantly, the LBL group displayed a statistically significant positive correlation with an increased risk of transfusions ($p = 0.022$), with a transfusion rate twice as high as that of abdominoplasty patients (11.5%). In conclusion, LBL procedure is recommended for younger patients who have experienced more substantial weight loss. Despite exhibiting a higher incidence of major complications compared to abdominoplasty, which patients should be informed about, it is a safe surgical intervention with the potential for achieving superior final aesthetic outcomes.

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Abstract No.: 11

Title : Impact of Body Contouring Surgery on the Quality of Life of Patients with Massive Weight Loss

Abstract text :

Patients with massive weight loss (MWL) often exhibit varying degrees of lipodystrophy and may experience physical symptoms such as intertrigo, all of which have an impact on their mental health and social life. In most cases, there is a demand for improved body contour through surgery. This study aims to assess the impact of body contouring surgeries on the quality of life of these patients. The study was conducted on patients who underwent body contouring surgeries between January and May 2022 in the context of massive weight loss (MWL) responded to the subjective Body Q questionnaire, addressing the following topics: Distress related to appearance, satisfaction with body image, satisfaction with the abdomen, and overall satisfaction with their body. The questionnaire was repeated six months after the surgery. The sample included 49 patients with an average age of 49.6 years, and 98% of the patients were female. The average preoperative BMI was 26.2 kg/mÂ². The most common procedure performed was mastopexy. Surgeries with the most significant impact on body image were gluteoplasty and abdominoplasty. Overall, there was an improvement of at least 50% in all evaluated scores. Statistically significant correlations were established between mastopexy and the improvement of distress related to appearance and between abdominoplasty and satisfaction with body image and abdomen. The complication rate was 42.5%, with suture dehiscence (27.5%) being the most common complication, and most patients did not require surgical reintervention. Massive weight loss (MWL) is associated with significant body deformities that have a substantial impact on patients' personal and social lives. Body contouring surgery plays a crucial role, as it brings about aesthetic and functional benefits for this population.

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Abstract No.: 43

Title : Harlequin Ichtyosis: surgical approach to a severe clinical case. Case report.

Abstract text :

Harlequin Ichthyosis is a rare, congenital disease.
It affects approximately 0,5/100.000 new borns.
Harlequin Ichthyosis can be differently expressed, in literature mild to severe clinical cases are described and less than 10 cases have been surgically treated.
Most of times topic therapies as well as systemic ones are the golden standard to treat this cutaneous disease.
We experienced a very severe clinical case in our hospital that we treated with a surgical approach and that we would like to share with you. Last year a baby girl with a severe Harlequin Ichthyosis was born in our hospital..
We immediately started systemic retinoids administration, she was put in incubator, monitored.
All the internal organs were perfectly functioning.
She underwent cutaneous biopsies in order to confirm diagnosis.
She was blind and temporary unable to hear because of severe expression of keratine everywhere, also inside both ears.
Dermatologists, pediatricians, ophtalmologists and Ent doctors have been immediately contact for a multidisciplinary approach.
We were asked to do fasciotomies in order to free hand and feet. During the first week of life we tried to remove keratine from hands, feet, face and arms in order to allow her to grow regularly.
We treated her using a Â“microsurgicalÂ” approach, using loop in order to remove keratine totally and not only to do fasciotomies that wouldnÂ’t have been sufficient in order to allow a regular growth of her body.
Systemic therapy as well as topic one were contemporary administred.
Surgery was performed in incubator with the help of general anestesia for half an hour every two or three days. After ten days she was no more blind. She could eat and hear normally. I find that surgical approach in severe Harlequin Ichthyosis disease can be considered innovative and as well more efficient than topic and systemic therapy alone

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Abstract No.: 48

Title : Investigating Patient Decision Aids for Breast Reconstruction: A Comprehensive Analysis

Abstract text :

Breast reconstruction is a pivotal decision for women post-mastectomy. Patient decision aids (PDAs) serve as essential resources, equipping individuals with comprehensive information about breast reconstruction options, potential risks, benefits, and expected outcomes. These tools empower patients to actively participate in the decision-making process, bridging the information gap and fostering a sense of ownership over their healthcare choices. A systematic review of literature was carried out, spanning from 2010 to 2023. Peer reviewed papers were selected from scientific and biomedical search engines PubMed, Medline and Web of Science employing statistical tests to assess PDA efficacy. Effect sizes (Cohen's d) measured the relationship strength between PDAs and crucial outcomes. Confidence intervals (95% CI) enhanced effect estimate precision, while mean differences quantified variations between the PDAs and control groups. Statistical analysis, informed by robust tests, unveiled a substantial positive PDA impact. The computed effect size of 0.72 (95% CI 0.61Â–0.83) indicated a moderate to large effect, enhancing patient understanding. PDA users reported significantly higher decision satisfaction (mean difference 1.43, 95% CI 1.15Â–1.71) and experienced a substantial reduction in decisional conflict (mean difference -0.56, 95% CI -0.75 to -0.38). Notably, the use of PDAs fostered more patient-centred discussions between healthcare providers and patients. This investigation emphasizes the significant effectiveness of PDAs in enhancing breast reconstruction decision-making. Statistical tests confirm their positive impact, improving patient understanding, satisfaction, and reducing decisional conflict. Integrating standardized PDAs into clinical practice and culturally sensitive multimedia resources is paramount. Empowering patients with tools for informed decisions remains a fundamental step in patient-centred care. Further research should explore PDA implications in diverse populations, ensuring equitable access and better patient experiences.

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Abstract No.: 3

Title : Ambulatory Breast Reconstruction Surgery

Abstract text :

Ambulatory breast reconstruction surgery offers patients the chance to regain self-confidence after mastectomy while reducing the physical and emotional toll of prolonged hospitalization. A retrospective study of patients undergoing breast reconstruction in an ambulatory setting between January and December of 2022. Data on variables, such as etiology, type of defect, timing of reconstruction, type of reconstruction, procedures and complications, were analysed. A total of 92 procedures were performed in 63 patients. The mean age was 52.1 years (18-70). Of these, 94.70% were of neoplastic etiology. In 92% of cases, breast reconstruction was initiated following total mastectomy. No immediate reconstruction was performed on an outpatient basis. The majority of operative times consisted of subsequent surgeries in 92% of cases and delayed reconstruction in 8%. Regarding the type of reconstruction, autologous reconstruction was chosen in 35% of patients, implant-based in 52%, and mixed in 13%. The most frequently performed surgical procedures were as follows: Areola-mamillary complex reconstruction (25%), contralateral breast symmetrization through reduction mammoplasty or mastopexy (22%), expander-to-implant exchange (11%), autologous flap reshaping (11%), lipofilling (10%), and implant replacement (10%). Four patients experienced complications (6.3%), of which 2 were infections requiring readmission to the Hospital (3.1%). In 40 cases (68%), Ambulatory Surgery culminated in the completion of breast reconstruction. Breast reconstruction involves several incremental steps leading to the final outcome. Based on our departmentÂ's experience, the initial operative procedure was conducted with hospitalization, while subsequent stages were performed on an outpatient basis. Consequently, it is evident that ambulatory surgery plays a crucial role in breast reconstruction. Proper patient selection has led to a low rate of complications. Immediate breast reconstruction in an ambulatory setting is our next goal.

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Abstract No.: 32

Title : The impact of plastic surgery training in reduction mammoplasty procedures: a comparative study

Abstract text :

As the demand for breast reduction procedures rises, a broader range of general surgeons with various specialty backgrounds are now carrying out these operations. Nevertheless, there is limited information available about the comparative outcomes of these patients. Data from a single institution were examined retrospectively for all reduction mammoplasty procedures conducted between 2005 and 2019. The patients were categorized based on their surgeon's training background, distinguishing between plastic surgery (PS) and general surgery (GS). Descriptive statistics and regression analyses were employed to assess discrepancies in outcomes. A total of 995 patients were included: 770 with PS cases and 220 with GS cases. The mean age was similar (44.7 vs. 44.4 years, p=0.771). Compared to GS patients, PS patients were more likely to have a higher BMI (27.9 kg/mÂ² vs. 26.9 kg/mÂ², p<0.001) and also had more comorbidities (19.7% vs. 15.1%, p<0.001).
PS resected significantly more breast tissue than GS (658.7g vs. 602.8g, p=0.016), while mean blood loss and operative time were similar. Postoperative complication rates were similar (20.0% vs. 11.1%, p=0.669), as well as postoperative infection rates (17.3% vs. 9.7%, p=0.867). Re-operation rates were slightly higher in PS (12.0% vs. 2.4%, p=0.073) at follow-up The varying outcomes observed in breast reduction procedures performed by practitioners with backgrounds in plastic surgery (PS) compared to those in general surgery (GS) may suggest potential differences in procedural approaches and algorithms specific to each subspecialty, which could contribute to the observed differences in outcomes.

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Abstract No.: 62

Title : Breast Implant Illness: A Histopathological Study

Abstract text :

Breast Implant Illness (BII) is a wide range of symptoms which maybe be related to breast implants. The symptoms are non-specific, like fatigue, brain fog, joint pain, rash and many more. BII is not yet recognized as an official medical diagnosis and the cause of BII is still unknown. There are several theories, however, none of them brought satisfactory answers. Some studies suggest that the cause of the symptoms is leaking silicon into the surrounding tissues and subsequential immune response. The goal of our study was to assess the histological samples of capsula and surrounding tissues for presence of silicone particles. We examined 82 biopsies of a breast implant capsula and surrounding tissues. The biopsies were evaluated histologically in formalin fixed sections routinely stained with haematoxylin and eosin, van Gieson and elastin, and periodic acid-Schiff reaction. An immunohistochemical examination with primary antibodies directed against pan-cytokeratin, vimentin, and CD68 (lysosome marker) were also performed. The breast implant related changes were evaluated using standard light microscopy and in polarized light. Histopathological examination of the capsule and pericapsular tissue revealed dense fibrosis with loss of elastic fibers, varying degree of non-specific inflammation, foreign-body type reaction, dystrophic calcifications, and synovial metaplasia. Silicone leakage with variable degree of inflammatory reaction was identified in 46 specimens, eleven of them came from patients without clinically apparent breast implant rupture. The silicon leakage from breast implants was detected outside the capsula in ruptured and also non-ruptured breast implants with different immunological response.

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Abstract No.: 41

Title : A Novel Treatment for Spinal Cord Injury Using Stacked Hydrogels to Support Stromal Vascular Fraction Cells

Abstract text :

Spinal cord injury (SCI) is the most common and debilitating injury of the spine. Cell therapy has been increasingly recognized for its therapeutic potential, including SCI treatment. In particular, cells derived from stromal vascular fraction (SVF), which can be easily harvested and processed from the patient's adipose tissue, represent a promising and achievable treatment. However, specific challenges need to be addressed before SVF can be safely and effectively used to treat SCI in humans. One challenge is delivering SVF to the spinal cord safely and effectively. Biomaterials are a promising approach to this challenge, as they can provide mechanical support for cells and tissues, facilitating the long-term controlled release of cellular molecules. Autologous fat was harvested and processed with the Lipogem Collector to obtain a mechanical fragmentation of the adipose tissue, avoiding the use of enzymes and thus maintaining the structure of the adipose cell population, enabling the identification of SVF. Thereafter, SVF was fluidically loaded into lyophilized hydrogels. Cell survival, adhesion, and density were evaluated over time in vitro and efficacy in a preclinical mouse model under GLP conditions. A novel and innovative hydrogel has therefor been developed that holds promise for the field of SCI repair. This technology involves stacking multiple thin-film hydrogel layers to support SVF, significantly improving cell recording and survival, and providing a scalable approach for future clinical trials. Furthermore, this new therapeutic tool has also been tested in a preclinical mouse model of SCI, demonstrating good viability and a paracrine effect able to improve hind limb motor recovery over time. This novel hydrogel stacking system presents a translatable approach for SCI patients in situ, maximizing the immunocompetent, protective and regenerative effects of a multi-therapeutic cell treatment with the advantages of an autologous clinical approach that can be performed during initial column stabilization surgery.

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Abstract No.: 63

Title : INFLUENCE OF SMALL-VOLUME LIPOSUCTION ON METABOLIC SYNDROME CONDITIONS, A PROSPECTIVE STUDY OF 12 PATIENTS

Abstract text :

Liposuction is a surgical method for fat aspiration, which reduce the amount of subcutaneous fat and might affect the potential of development of metabolic syndrome, not even of its separate parameters, but also its clinical manifestations. The adipose tissue is important in regulating insulin sensitivity and is severe risk factor for metabolic syndrome. Clinical findings associated with metabolic syndrome include central obesity, dyslipidemia, insulin resistance - impaired glucose tolerance or diabetes mellitus, hypertension, and high rates of atherosclerotic disease. Nevertheless, it is not yet clear what long-term metabolic consequences the removal of a portion of adipose tissue has. Previous studies have produced conflicting results.
The aim of our study was to analyse the effect of liposuction on the lipid profile and glucose metabolism in healthy women. 12 patients who underwent liposuction were included in the study. Blood pressure, body fat percentage and lipid profile were measured before surgery and approximately one year after surgery. In addition, insulin sensitivity was measured in female patients using an oral glucose tolerance test. Long-term liposuction led to a slight reduction in body fat ($p<0.05$) but did not affect blood pressure or insulin sensitivity. Although total cholesterol and LDL cholesterol were reduced, this decrease was not statistically significant. The results of the study are consistent with some of the published data, which indicated a slight decrease in blood lipids, but no other possible changes were observed in our small set of patients. Liposuction with a small aspirate volume does not seem to induce any significant metabolic changes but our results show a positive effect on overall body fat reduction. A larger cohort and longer follow-up are needed to evaluate the effect on lipid profile, blood pressure and glucose metabolism.

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Abstract No.: 58

Title : Investigating the role of METRNL in the injury response following fingertip amputation

Abstract text :

Replantation of the fingertip is a challenging microsurgery and requires extensive technical skills. To improve replantation success it is important to understand the mechanisms regulating healing and regenerative potential at the injury site. The protein METRNL has shown reparative proangiogenic functions in models of cardiac injury and skin wound healing, we hypothesized METRNL might be similarly involved in the healing response following amputation of the fingertip. We collected human digit tip samples from our clinic and used immunostaining to identify the presence of METRNL and its receptor KIT. To determine potential sources of METRNL we stained for immune cell presence using CD11b and to assess proangiogenic function we stained for the endothelial cell marker CD31. We found co-localization of METRNL and KIT along the nail bed, suggesting the protein may be involved in the post-amputation response. There appeared to be recruitment of immune cells to the injury site, and METRNL staining was near CD31+ cells suggesting it may contribute to the post-amputation angiogenesis response. Our results suggest METRNL may be involved in the healing response following fingertip amputation. The colocalization of METRNL, KIT, and CD31+ endothelial cells along the nail bed suggests this ligand-receptor interaction may contribute to healing and regeneration via an angiogenic response. We plan to continue our characterization of METRNL in the fingertip to understand its roles in healing and assess its potential as a therapy to encourage the success of replantation microsurgeries.

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Abstract No.: 66

Title : Automatic motion analysis of lunate type I and II healthy wrists using dynamic CT imaging

Abstract text :

Four-dimensional Computed Tomography (4DCT) is an emerging imaging modality that enables non-invasive analysis of wrist motion. Lunate morphology may influence wrist kinematics. This study aims to analyze and compare wrist kinematics of lunate type I and type II in healthy wrists using 4DCT and a fully automated motion analysis algorithm. This study included 4DCT scans of healthy wrists. A static CT scan and two dynamic imaging sequences were acquired: wrist radial-ulnar deviation (RUD) and flexion-extension (FE), resulting in 144 dynamic CT scans per wrist. The lunate type was assessed using the static CT scan. Carpal bones were automatically segmented in each scan using an artificial intelligence-based algorithm. Subsequently, the capitolunate angle (CLA), scapholunate angle (SLA), and radiolunate angle (RLA) in the sagittal plane were automatically estimated per dynamic frame and re-sampled per wrist positions for inter-subject comparison. The median and maximum CLA, SLA and RLA values were calculated for FE and RUD. Finally, the range of motion (ROM) was determined. A Mann-Whitney U-test was utilized to compare both groups. 42 healthy wrists, 26 lunate type I, and 16 lunate type II were scanned. No significant difference was found between the two groups for all parameters (SLA, CLA, RLA, and ROM). For example, the maximum and interquartile range for SLA were as follows: RUD 75.10deg [70.38 - 80.58deg] vs 73.73 deg [60.23 - 82.15deg], p=0.5954 and FE 92.00 deg [85.30 - 97.19 deg] vs 90.14 deg [79.79 - 95.47deg], p=0.6787. Automatic motion analysis using 4DCT was performed on healthy wrists, and the difference between wrists with a lunate type I and lunate type II was assessed. These preliminary results showed no significant difference. Future research will expand on the sample size and number of parameters and analyze the effect of the lunate type on the kinematics of wrists with ligament lesions.

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Abstract No.: 7

Title : Amnion membrane assisted bile duct anastomosis

Abstract text :

With the introduction of liver transplantation, cirrhosis is no longer the fatal end-stage of liver failure. As liver transplant surgery became widespread, various complications related to it has risen. Complications related to bile duct anastomosis are relatively common. The aim of our study is to introduce a surgical technique that can be used in many different clinical scenarios requiring bile duct anastomosis including liver transplantation The experiment was designed using 30 Wistar-Albino rats. Eight of them were in the sham operation control group, in which only the common bile duct dissection and exposition were done without any additional surgical intervention. 11 animals were included in the anastomosis (control) group; in which after the common bile duct was cut at its widest point, anastomosis was performed with an end-to-end microsurgery anastomosis technique with nylon sutures. 11 animals were included in the experimental group; in which after the common bile duct was cut, an end-to-end anastomosis was made with microsurgical anastomosis and amniotic membrane wrapped around. To reveal the effects of the amniotic membrane on anastomosis patency, it was demonstrated radiologically by administering contrast material from the distal to the anastomosis under general anesthesia at the postoperative first week and animalsÂ’ livers were removed to show the histological findings. As a result, although there was no difference between the anastomosis and the experimental group macroscopically and radiologically at the exploration performed at the postoperative first week, a significant difference was found in the total Verhofstadt score in the liver materials of the experimental group microscopically. Although there are many clinical implications, this topic could not get enough amount of attention from researchers. We think, in the future our experimental model will guide the studies to be done in this field and will contribute to the literature which could lead to clinical applications.

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Do you have any disclosures? No

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Abstract No.: 33

Title : Evaluation of Resensibilization in Flaps Containing Sensory Nerves in the Animal Model- a Systematic Review and Meta-analysis

Abstract text :

Growing interest is being given to the sensitization of flaps in the clinics. Although epineural coaptation with flaps was published decades ago, the method has not yet become the gold standard. Evaluation in patients is mainly done by clinical tests. This being mostly impossible in animal experiments, here, other methods have proven themselves. The aim of our meta-analysis is to get insight into these tests of re-sensitization of flaps in animals. Subsequently, in a bench to bedside fashion, these methods can enrich future clinical trials providing objective, patient independent results. This systematic review was performed according to the criteria of the Preferred Reporting Items of Systematic Reviews and Meta-Analyses statement PRISMA. Pubmed, Embase and Cochrane Library were searched to identify all papers testing sensibility recovery in flaps in animals. The risk of bias in individual studies was assessed using SYRCLEÂ's RoB tool. 196 articles were identified. After exclusion of duplicates, and reference search, a systematic screening of 187 titles and abstracts led to the inclusion of 28 articles for full text analysis. 13 papers were included, testing a total of 376 animals. Sensibility testing was undertaken using either the mechano-nociceptive field evaluation (rat; pinching evokes the Cutaneous Trunci Muscle reflex), or immunohistochemical staining for proteins that are relatively specific for sensitive nerves, as PGP 9.5 and CGRP. Temporo-spatial analysis revealed relevant return of nerve fibers after 15 (12-24) days with distribution all over the flaps when compared to mainly peripheral resensibilization in controls. Quantifying neuroproteins in the skin is beneficial. Specificity of the tested proteins for sensory nerve fibers is limited. Our future study will involve proteomics, the behavior of not only said markers but the whole proteome will be studied with the aim of providing objective evidence for the superiority of sensitized flaps.

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SESSION 4

SOCIAL AESTHETIC BREAST

EURAPS Research Council

Abstract No.: 38

Title : quantiFACE - A Novel Open-Source Computational Tool to Assess and Monitor Facial Paralysis: A Pilot Study

Abstract text :

The subjective nature of outcomes analysis in facial paralysis makes it challenging to disseminate data accurately and universally about these injuries. Physicians resort to subjective scales and photographs as there is currently a dearth of reliable and quantitative tools to accurately analyze facial function. Prior methods utilizing Emotrics and eFACE software lack automatic point registration and depth-field characterization. The authors describe the creation and implementation of an open-source, electronic, quantitative facial function tool (quantiFACE), which provides clinicians with patient tailored numerical data and interactive facial mapping for: tracking postoperative outcomes, assessing efficacy of interventions, and universal dissemination of data. Providing both prospective and retrospective analytic methods, quantiFACE can be used in person or with past 2D images. quantiFACE was applied to 10 subjects pre- and post-operatively with varying facial features, 732 points of interest were extracted, and 3D comparison maps were created. Point by point analysis was performed to create 3D deformation maps visualizing and quantifying the changes in: commissure excursion, lower lip depression and upper lip deviation. quantiFACE novelly illustrated depth of change in facial expression as well as registered global changes seen following facial reanimation surgery. Focusing on postoperative perioral data, patients affected and unaffected side commissure excursion was altered by 7.9% and 9.5% respectively, while upper and lower lip symmetry improved by 51% and 58% respectively. This pilot study suggests that quantiFACE is a novel and reproducible patient-specific clinical tool to quantify, monitor and assess facial function and recovery in facial paralysis patients.

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Abstract No.: 68

Title : Comparison of Polypropylene and Polydioxanone in the Hemitransdomal Suture: A Novel Rabbit Ear Cartilage Model

Abstract text :

Lower lateral cartilage reshaping is one of the basic steps in rhinoplasty. Hemitransdomal suture is frequently used for dome narrowing. Different suture materials can be used for hemitransdomal suture. In this study, we investigated the effectiveness of polypropylene and polydioxanone in hemitransdomal suture by designing a new experimental model in the rabbit ear cartilage. Twelve young adult male New Zealand White rabbits were used. The bipediculated inverted-U-shaped cartilage was elevated in each ear of the rabbits. Two hemitransdomal sutures were applied using 5-0 polypropylene on one ear and 5-0 polydioxanone on the other ear randomly. A 5 mm high cartilage mound was created with two hemitransdomal sutures on each side. The sample size was twelve both in the polypropylene group and the polydioxanone group (n=12). All animals were sacrificed after three months. Cartilage mound heights were measured. The samples were examined histologically in terms of fibroadipose tissue, inflammation, foreign body granuloma, cartilage degeneration and presence of inclusion cyst. Cartilage mound height was significantly higher in the polypropylene group than in the polydioxanone group at the end of the third month [3.75 mm (Â± 0.68) versus 3.03 mm (Â± 0.69); $p<0.05$]. There was no significant difference between two groups in histological analysis ($p>0.05$). Polypropylene suture may be more effective in maintaining the shape given to the dome by hemitransdomal sutures in rhinoplasty.

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Abstract No.: 70

Title : The Regional Disparity Affecting Equitable Access to Gender Affirming Surgery: Social Media Use Among Plastic Surgeons

Abstract text :

The study explores racial representation trends in social media use among plastic surgeons, particularly those focusing on gender-affirming care, and its potential impact on transgender and gender diverse (TGGD) individuals seeking gender-affirming surgery (GAS). Given the TGGD community's reliance on social media due to limited healthcare access, and the surge of plastic surgeons using social platforms to connect with patients, understanding racial representation's role in GAS accessibility is crucial. The study examines this within the context of varying racial demographics across different U.S. regions. Using the TransHealthCare database, 250 gender-affirming surgeons in the U.S. were randomly selected, of which 56 had relevant Instagram accounts. A total of 51,698 posts were extracted from these accounts and manually analyzed by 4 blinded reviewers. The posts were categorized based on skin color using the Fitzpatrick Scale, and regional groupings were established according to the surgeon's practice location (Northeast, South, Midwest, West). Population data from the 2020 U.S. Census was integrated to compare racial representation in the posts with each region's population. Results revealed 3,101 eligible posts, with notable disparities in racial representation, as only 375 (12.1%) portrayed non-White subjects. The Southern region exhibited the largest discrepancy (Equity Ratio, ER = 0.55) between post racial composition and the local population, indicating potential unconscious racial bias. Conversely, the Northeast and West regions demonstrated overrepresentation of non-white patients (ER = 1.69 and 2.24, respectively), while the Midwest achieved nearly perfect representation (ER = 1.01). The findings underscore the importance of addressing unconscious racial bias in surgeon social media use, as it may hinder Black transgender patients' access to GAS. Regionally, substantial disparities in racial equity were noted, particularly in the Southern region. Surgeons are urged to tailor their social media practices to support equitable GAS access by being cognizant of the demographics they serve.

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Abstract No.: 28

Title : Assessing Racial and Ethnic Disparities of the Plastic Surgery Research Human Capital in the US: A Comparative, Big Data Study Using Web-Scraping, Artificial Intelligence

Abstract text :

Workforce diversity in medicine and surgery across the healthcare ladder remains an elusive goal. Improving workforce diversity is one strategy to improve patient medical outcomes and reduce health care disparities. This study deploys a novel AI methodology to evaluate racial representation in the US plastic surgery research human capital over the last 12 years We collected authors, titles, and affiliations of all publications in all PubMed-indexed plastic surgery journals via an AI, web-scraping algorithm. We used RaceAPI (race identification software), to infer the race of authors. We identified 16,825 publications, from 7,709 (5,355) first (senior) authors across the US. We found that 68.4% (72.6%) of first authors (senior authors) are White, 18.0% (14.2%) are Asians, 6.5% (6.7%) are Black or African American, 5.1% (4.7%) are Hispanic, and 2.0% (1.8) have names associated with Arab descent. In our 12-year timespan the white race represents the majority of researchers despite the slight decrease in its numbers. Our analysis shows an increase in Asian researchers, and a marginal increase in Hispanic plastic surgeons. We find statistically higher researcher productivity of White plastic surgery researchers (2.15 papers per author) relative to their Asian counterparts (1.97 papers per author) (p=0.027). Our big data study, accurately concludes that racial minorities are disproportionally underrepresented in the plastic surgery research human capital. The extended investigated timeframe allowed us to grasp the marginal improvement in their representation. We hope our work has the potential to scale up initiatives at the stakeholder level to diversify the US human capital.

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Abstract No.: 27

Title : Women representation in plastic surgery across the globe: A cross-sectional study of human capital and research output using artificial intelligence

Abstract text :

The alarm of women under-representation in surgery has been going off for decades. Even in plastic surgery, women have been under-represented among researchers, faculty members, and invited speakers. This study documents country-level female representation among first authors and publications in influential research outlets in plastic surgery. We followed Karamitros and Goulas in deploying AI technology by means of a web-scrapping algorithm on PubMed to retrieve author names and affiliated country for each publication from 2015 to 2021 from the 10 most-cited plastic surgery journals based on the Google Scholar category for Â“Plastic and Reconstructive SurgeryÂ”. We identified the affiliated country and first authorÂ's gender for 92.5% of the extracted publications. We identified 30,374 publications and 17,095 first authors in 107 countries. On average, less than 25% of first authors are females and they publish half a paper less than their male counterparts. Most importantly, in half of the countries, females represent less than 20% of authors. Across all publications females are represented in 32.6% of first authors and 28.1% of publications, revealing substantial gender gaps in representation and research productivity. Our study expands the global evidence base for the barriers women face not only in entering plastic surgery but importantly in publishing as prolifically as men. The results show widespread female under-representation in authors and publications across the world. This suggests that resources, incentives, appetite for publications, and opportunities, which drive research productivity, the emblem of academic success, are unequal for men and women plastic surgeons. Policies and interventions aiming to attract qualified female candidates into plastic surgery research should be coupled with continued support and equitable access to training, mentoring, research networks, and development opportunities.

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Abstract No.: 19

Title : Silicone Leakage from Breast Implants Is Determined by Silicone Cohesiveness: A Histological Study of 493 Patients

Abstract text :

Silicone leakage from breast implants is a concern with potential implications for patient health. This study aimed to quantify and model silicone leakage from implants to the breast implant capsule and to investigate whether silicone cohesiveness affected the silicone leakage rate. Silicone content in the breast implant capsule was quantified histologically by measuring the area of silicone deposits. This was used to model silicone leakage over time based on the time of implantation. The effect of cohesiveness on silicone leakage was investigated across all implant brands with declared cohesiveness and in a subanalysis comparing only Mentor cohesive I implants with cohesive II and III implants. Furthermore, we aimed to analyze whether silicone cohesiveness affected silicone leakage in the case of implant rupture. The study included 493 patients with 872 breasts and a median time of implantation of 13.0 years (range 0.4 to 51 years). The modeling of silicone leakage from intact implants showed that leakage and the acceleration of the leakage rate were significantly higher in low-cohesive implants than in highly cohesive implants ($p<0.05$). This was confirmed when analyzing only Mentor implants ($p<0.05$) and in the case of implant rupture ($p<0.01$) where low-cohesive implants also leaked significantly more than highly cohesive implants. Our results suggest that highly cohesive implants are superior to low-cohesive implants in preventing silicone leakage. Due to the accelerating rate of silicone leakage especially found in low-cohesive implants, we propose that exchange of low-cohesive implants could be discussed with patients 10 to 15 years after implantation to minimize silicone leakage even in the absence of implant rupture.

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Abstract No.: 59

Title : Surface Topography, Microbial Adhesion, and Immune Responses in Silicone Mammary Implant-Associated Capsular Fibrosis

Abstract text :

Silicone, a prevalent medical implant material, presents challenges such as capsular fibrosis. Biomaterial implantation triggers an inflammatory fibrotic response. Surface characteristics impact immune reactions and biofilm formation. This study investigates the impact of silicone mammary implant surfaces on microbial adhesion, populations, and colonization, hypothesizing that altered surface topography induces a less inflammatory immune response immediately after surgery and during capsule formation in prophylactic expander-based reconstruction. To evaluate silicone mammary implant (SMI) surface impact on microbial colonization and biofilm formation, patches with diverse topographies (MENTORÂ® smooth, CPXÂ®4 textured, SmoothSilkÂ® micro-textured) and roughness (Ra 0 ÂµM, Ra 4 ÂµM, Ra 60 ÂµM) were inoculated in vitro. Bacterial colonization was quantified through cultivation, and biofilm formation was examined via electron microscopy. In a human study, ten patients received either SmoothSilkÂ® (Ra 4 ÂµM) or CPXÂ®4 (Ra 60 ÂµM) implants post-mastectomy, assessing immediate immune responses and microbial antigens for five days. To explore chronic inflammation, the nonspecific adhesive proteome and microbiome on implant surfaces were analyzed eight months after expander removal. Our in vitro experiments confirm microbial adhesion, colonization, and biofilm formation on SMI surfaces, positively correlating with surface roughness and eliciting an immune response. In vivo, acute and chronic inflammatory reactions were observed. Within three days post-implantation, 50 wound proteins exhibited antimicrobial defense, targeting S. aureus and topography-specific strains. 3 antimicrobial peptides adhered to both surfaces within 8 months, while Fillaggrin-2 adhered exclusively to the rougher surface (60 ÂµM). S. aureus traces were found adhered to both surfaces and integrated into implant-encapsulating tissue, with distinct topography-specific bacterial adhesion. Textured silicone implant surfaces enhance microbial colonization. Analyzing patients for the first time, we observe microbial adherence, integration into capsules, and an effective antimicrobial response. Reduced topography enhances immune compatibility, modifying microbial contamination and bolstering antimicrobial responses.

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Abstract No.: 30

Title : A comparison between immediate-delayed versus delayed autologous breast reconstruction using DIEP flaps

Abstract text :

Although a vast improvement in Quality of Life after delayed breast reconstruction is seen,the important psychological effect of a mastectomy cannot be underestimated.
This study is aimed to compare the complication rates at the recipient site (reconstructed breast) in two groups of patients who had autologous DIEP flap for breast reconstruction. In one group (immediate-delayed) a tissue expander was used at the mastectomy before converted to DIEP flap breast reconstruction. The other group had no tissue expander and a delayed breast reconstruction was performed using DIEP flap.
Furthermore, the QoL on physical-, social- and sexual wellbeing and satisfaction with the outcome was evaluated prior and after the delayed breast reconstruction. A retrospective study with inclusion of 263 DIEP flap breast reconstructions (135 delayed and 128 immediate-delayed, between January 2011 and March 2021) was performed to compare the complication rates at the recipient site.
Additionally, a prospective study was conducted in the last 32 patients by a QoL-questionnaire prior and 1 year after the DIEP flap breast reconstruction surgery. The questionnaire used was the breast-Q of which the sections on physical-, social- and sexual well-being and satisfaction with the outcome were evaluated preoperatively and one year postoperatively. Our findings showed no significant difference in complication rates between the two groups . Although, no significant difference was found in terms of QoL between the two groups at one year. However, a noticeable trend towards an improvement in QoL, prior to the breast reconstruction surgery in the immediate-delayed breast reconstruction group was seen. The findings of this study has shown that using an expander in immediate-delayed DIEP flap breast reconstruction didnÂ't result in higher complication rate as compared to delayed DIEP flap. Autologous breast reconstruction increased QoL in both groups, however, Immediate-delayed patients had higher QoL before converted to DIEP flap breast reconstruction.

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SESSION 5
MISCELLANEOUS 1

Abstract No.: 18

Title : Maximizing vascularized composite allograft survival by only targeting local immune response without impairing the host’s immune system

Abstract text :

The current standard treatment for preventing rejection in vascularized composite allotransplantation (VCA) involves systemic immunosuppression, which poses the host with risks like infections and lymphoproliferative disorders due to its systemic distribution. Despite some progress, development of immunosuppression regimens promoting graft survival with minimal side effects has been slow, for which an understanding of the mechanisms behind graft rejection is crucial. Here, we aimed to investigate the effect of a locally administered tacrolimus-loaded on-demand drug delivery system in a clinically relevant VCA animal model. After heterotopic pig limb allotransplantation, animals were either left untreated or received monthly intra-graft injections of a tacrolimus-loaded drug delivery system (DDS). Pigs were then followed up until postoperative day 90 (POD) or grade IV rejection. Skin and blood samples were collected at different time points to evaluate off-target toxicity, tacrolimus levels and the immune response. Treatment with a tacrolimus-based DDS allowed the grafts to survive up to POD90. In contrast, untreated animals rejected around POD 7. Interestingly, tissue levels of tacrolimus in treated animals were significantly higher in injected grafts compared to the contralateral side, indicating local release of tacrolimus, with no signs of systemic off-target toxicity in kidney and liver samples. Surprisingly, no effect in circulating levels of soluble complement, regulatory cytokines and T cell subsets was observed at endpoint when compared to baseline in both groups. Contrarily, a significant decrease in T-cell, B-cell and neutrophil infiltration was quantified intra-graft in animals treated with the DDS compared to untreated pigs. Our preliminary data suggest that by using a tacrolimus-based DDS, graft survival can be prolonged by only dampening the local immune response without impairing the hostÂ’s systemic immune system or inducing off-target toxicity. Thus, our developed DDS is a promising alternative to overcome the current challenges in VCA associated with systemic immunosuppression.

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Abstract No.: 25

Title : Bone Regenerative Effect of Injectable Hypoxia Preconditioned Serum-Fibrin (HPS-F) in an Ex Vivo Organotypic Bone Defect Model

Abstract text :

Biofunctionalized hydrogels have been widely used in tissue engineering for bone repair. This study examines the bone regenerative effect of the blood-derived growth factor preparation of Hypoxia Preconditioned Serum (HPS) formulated to fibrin-hydrogel (HPS-F) for the local injection into precision drilled defects of embryonic day (ED) 19 chick femurs which are cultured organotypically in ovo on a chorioallantoic membrane (CAM). We hypothesize that a single injection of HPS-F can considerably promote osteogenesis and accelerate bone repair. Proteomic analysis of HPS and non-hypoxia-preconditioned serum (NS) from 10 volunteers included 6 growth factors including Osteopontin (OPN), Osteoprotegerin (OPG), soluble RANKL (sRANKL), BMP-2/-7 and Osteocalcin. HPS and NS was activated by thrombin/calcium/fibrinogen to form a fibrin gel (HPS-F, NS-F). The growth factor release profile of HPS-F was assessed over 7 days. Precision drill defects in ED19 embryonic chick bones (n=5) were injected with HPS-F, NS-F and blank (no injection) and were cultured organotypically on the CAM of ED8 embryonic chicks for 7 days. Microcomputed tomography (µCT) analysis was performed and bone tissues were stained von Kossa, Alcian blue and MassonÂ's Trichrome. In HPS, the concentrations of pro-osteogenic OPN, OPG and regulatory sRANKL were higher than in NS. BMP-2/-7 and Osteocalcin was not detected in HPS and NS. Growth factor release rates from HPS-F were measurable for VEGF up to 7 days at a sustained cumulative concentration of 40-50% of pure HPS. The HPS-F injected chick femur defects showed an increase of 123.5 % of bone mass which was up to 3.3x higher than NS-F and blank, as demonstrated by µCT. Histology revealed higher calcification, proteoglycan and collagen fiber deposition in the defect area of HPS-F treated bone defects thank NS-F and blank. These findings suggest that HPS-F may offer a promising and accessible therapeutic approach to accelerate bone regeneration.

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Abstract No.: 67

Title : The Combined Effect of Intravenous and Topical Tranexamic Acid in Liposuction: A Randomized Double-Blinded Controlled Trial

Abstract text :

Tranexamic acid (TXA) use in surgical procedures due to its hemostatic effects has been gaining an increased
interest. In plastic surgery, the effects of TXA have been studied intravenously (IV), and there have been some
reports regarding local use. A comparative study examining the combined effect of IV and local TXA was conducted. A randomized double-blinded controlled trial was performed for patients undergoing breast reduction treatment
with liposuction and resection following the power-assisted liposuction mammaplasty (PALM) technique. All patients
received 5 mL IV of 0.5 g/5 mL TXA on induction. Before installation, one researcher prepared two solutions of 1 L normal
saline: one with 5 mL of 0.5 g/5 mL TXA associated with epinephrine 1:100,000 and the other with only epinephrine
1:100,000. These were randomly infiltrated in either the left or right breast. Clinical dermal bleeding was assessed for both
breasts after deepithelialization. The lipoaspirate from these breasts was then compared with each other. A postoperative
evaluation at 24 hours was performed to compare the ecchymosis rate. Ratios of decanted volume to total lipoaspirate was measured in bottles and compared between breasts. There
was a statistical difference (P = 0.0002) in the ratio of decanted to lipoaspirated volume when comparing the control group
(ratio: 0.21) with the treatment group (0.13). Video analysis revealed decreased dermal bleeding in the TXA group and postoperative
evaluation less ecchymosis. The combined use of IV and local TXA can help reducing blood loss in liposuction as measured by decantation in separate drain bottles and as assessed clinically preoperatively and postoperatively.

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Abstract No.: 16

Title : Platelet-rich Plasma: A Promising Bioscaffold for Enhancing Peripheral Nerve Regeneration

Abstract text :

Peripheral Nerve Injuries (PNIs) pose a significant clinical challenge despite tension-free microsurgical repair being the gold standard for their management. This experimental study focuses on exploring potential merits of topically applying platelet-rich plasma (PRP) alongside standard microsurgical repair to amplify peripheral nerve regeneration using a rat sciatic nerve model. Employing eight healthy female Wistar rats, this investigation adhered to ethical standards, designing a transected sciatic nerve model in both hindlimbs. The control group underwent standard microsurgical neurorrhaphy in left hindlimb, while experimental group had PRP topically applied in addition to conventional repair in right hindlimb. The 20-week postoperative recovery process was examined, calculating the Sciatic Static Index (SSI) and Sciatic Functional Index (SFI) at regular intervals. Histological examinations of sciatic nerve samples were conducted upon study completion, contrasting histopathological indices and parameters between groups. After a 10-week period, PRP-treated hindlimbs displayed significant improvements in both SFI and SSI compared to their untreated counterparts. Specifically, walking track SFI and video record SFI illustrated improvements of 26.4% (-40.8 Â± 7.7 vs. -55.5 Â± 9.6) and 36.4% (-53.5 Â± 5.8 vs. -84.5 Â± 5.4), respectively, while SSI evidenced a 26.7% (-55.9 Â± 9.8 vs.-76.4 Â± 8.9) enhancement for PRP-treated hindlimbs. Analysis over a 20-week period demonstrated analogous changes and dynamics across all indices. The AUC comparison highlighted a 31.2% improvement between
groups. Histopathological findings further supported PRPÂ's regenerative capabilities. PRP-treated hindlimbs showed reduced lymphocytes (F = 6.699, p = 0.021) and lower incidences of moderate (25%vs.50%, p = 0.037) and severe fibrosis (0% vs.25%), whereas macrophages were identified in untreated limbs. The compelling findings of this experimental study offer a promising precedent for employing PRP as a viable agent to foster regeneration. These promising results pave the way for further explorative research, optimizing PRP application techniques, and their impacts on functional recovery following PNIs.

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Abstract No.: 22

Title : Isolating satellite cells from adult muscle tissue of body donors

Abstract text :

Satellite cells (SC) are muscle stem cells that are essential for postnatal growth and regeneration of skeletal muscle. Cultured SC are an excellent in vitro model to study many of the complex changes that occur during postnatal muscle tissue development and regeneration. Obtaining fresh muscle tissue from biopsies or intraoperative specimens suitable for SC isolation is difficult and often ethically questionable or impossible. The use of tissue harvested from anatomical body donations, is a promising alternative for research purposes and may provide an alternative source to study musculoskeletal diseases. In this study, muscle tissue is collected from body donors 24, 48, and 72 h postmortem. Subsequently, SCs are isolated using a FACS based extraction protocol. Thereby, muscle stem cells are identified and separated by dissociation of muscle tissue using mechanical and enzyme-based disruption. For validation, all data from body donors are compared to biopsies extracted during surgery. For the first time we successfully applied our recently established SC isolation protocol to muscle tissue harvested from body donor tissue. Intraoperative muscle biopsies demonstrate feasibility of extraction of satellite cells. At a mean tissue weight of 402 mg per biopsy a mean of 500 000 live cells could be extracted. Around 2 % of which were identified and sorted as SCs. Subsequent cultivation demonstrated appropriate cell division and proliferation. This study successfully demonstrated the feasibility of isolating and cultivation satellite cells from muscle tissue obtained from surgical specimens. We critically evaluated the feasibility of SC isolation in human cadaver tissue and thereby provide novel data on the usability of this tissue for basic science and translational science purposes.

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Abstract No.: 51

Title : Anorectal transplantation: the first long-term success in a canine model

Abstract text :

Anorectal transplantation is a challenging procedure but a promising option for patients with weakened or completely absent anorectal function. We constructed a canine model of anorectal transplantation, evaluated the long-term outcomes, and controlled rejection and infection in allotransplantation. In the pudendal nerve function study, six dogs were randomly divided into two groups: transection and anastomosis, and were compared with a control using anorectal manometry, electromyography, and histological examination. In the anorectal transplantation model, four dogs were assigned to four groups: autotransplant, allotransplant with immunosuppression, allotransplant without immunosuppression, and normal control. Long-term function was evaluated by defecography, videography, and histological examination. In the pudendal nerve function study, anorectal manometry indicated that the anastomosis group recovered partial function 6 months postoperatively. Microscopically, the pudendal nerve and the sphincter muscle regenerated in the anastomosis group. Anorectal transplantation was technically successful with a three-stage operation: colostomy preparation, anorectal transplantation, and stoma closure. The dog who underwent allotransplantation and immunosuppression had two episodes of mild rejection, which were reversed with methylprednisolone and tacrolimus. The dog who underwent allotransplantation without immunosuppression had a severe acute rejection that resulted in graft necrosis. Successful dogs had full defecation control at the end of the study. We describe the critical role of the pudendal nerve in anorectal function and the first long-term success with anorectal transplantation in a canine model. This report is a proof-of-concept study for anorectal transplantation as a treatment for patients with an ostomy because of anorectal dysfunction.

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Abstract No.: 55

Title : Continuous NPWT Modulates the Pro-Fibrotic YAP/TAZ Pathway in Murine Diabetic Wound Healing

Abstract text :

Extensive scarring, a debilitating sequela of wounding and surgery, is a major clinical challenge associated with significant morbidity. Research has identified that skin fibrosis is mediated by a specific lineage of fibroblasts termed Engrailed-1 (En1)Â-positive fibroblasts (EPFs). At the same time, the mechanoreceptor Yes-associated protein (YAP) has been linked to EPFs, suggesting a correlation between fibrosis and mechanotransduction. In this animal study we investigated the effect of micromechanical forces exerted through Negative Pressure Wound Therapy (NPWT) on the fibrotic pathway. Twenty homozygous, genetically diabetic (db/db) mice received full-thickness excisional dorsal skin wounds and were treated for seven days either with continuous NPWT (-125 mmHg; NPWT) or simple occlusive dressing (Control). Tissue was harvested 10 days post-wounding for histological and molecular analysis. The group of mice treated with NPWT showed increased YAP ($p=0.04$), but decreased En1 ($p=0.0001$) and CD26 ($p<0.0001$). NPWT was associated with decreased levels of the pro-fibrotic factors Vimentin ($p=0.04$), α-SMA ($p=0.04$) and HSP47 ($p=0.0008$). Collagen deposition was lower with NPWT ($p=0.02$). Cellular proliferation ($p=0.002$) was increased with NPWT while apoptosis decreased ($p=0.03$). Western blotting verified that NPWT increased YAP ($p=0.02$), increased RhoA ($p=0.03$) and decreased Caspase-3 ($p=0.03$), a pro-apoptotic factor linked to keloid formation. In this study we elucidate for the first time the underlying mechanisms of NPWT on the fibrotic signaling pathways. NPWT is proven to downregulate Caspace-3. Furthermore, NPWT results in an increase in YAP but a paradoxical decrease in EPFs. This suggests that YAP is uncoupled from pro-fibrotic fibroblasts. Overall, as mechanotransduction through NPWT appears to decrease multiple pro-fibrotic factors, NPWT may hold promising potential as a scarring modulator.

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Abstract No.: 29

Title : HUMAN SPHEROIDS FROM ADIPOSE-DERIVED STEM CELLS (SASCS) ON IN-VIVO HIND-LIMB VASCULAR COMPOSITE ALLOTRANSPLANTATION: CAN THEY PREVENT REJECTION?

Abstract text :

The application of vascularized composite allotransplantations (VCAs) is limited due to adverse effects of lifelong administration of immunosuppressive agents. Research is very active in the field of immunomodulation and alternative methods for inducing tolerance and minimizing toxicity have been investigated. Although Adipose Stem Cells (ASCs) have emerged as promising therapies for immunomodulation, the immunomodulatory effect of human Spheroids from Adipose-derived Stem Cells (SASCs) has not been investigated yet. The aims of this study are to assess the in vitro and in vivo immunomodulatory properties of SASCs, comparing them to ASCs and evaluating whether they can provide transplant tolerance in a VCA rat model. Cytokines production was analyzed on adipose stem cells and T cells collected from healthy individuals. Ten Brown-Norway rats were used as donors and twenty Lewis rats as recipients. The VCA was transferred on recipient femoral vessels with microvascular anastomoses. After surgery, recipients were divided: Group I (SASC), Group II (ASC) and Group III (control). Transplantation was assessed clinically, and the distribution of pre-marked stem cells was evaluated with IVIS (In Vivo Imaging System). In in vitro studies, SASCs modulated cytokines production of T cells, increasing their anti-inflammatory expression. In vivo, VCA skin clinical analysis showed that group I had a lower rejection rate compared with other groups. IVIS analysis showed that marked SASCs were concentrated exclusively into the transplant in group I. Preliminary results provide that SASCs exert more biological immunomodulation compared to ASCs both in vitro and in vivo. We believe that further studies on stem cellsÂ’ immunomodulatory effect could revolutionize the clinical VCAs application.

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Abstract No.: 69

Title : Cartilage tissue engineering for facial reconstruction: Elucidating the biological impact of a Nanocellulose-based bio-ink for extrusion-based 3D-bioprinting

Abstract text :

Creation of precise structures with 3D-printing utilises bio-inks seeded with autologous cells. This offers the potential to mitigate limitations of current reconstructive options. Nanocellulose, alginate and hyaluronic acid(HA) are promising bio-ink materials for creating 3D-bioprinted cartilage constructs. This study used a systematic approach to evaluate the biological impact of these bio-ink components, individually and combined. Nanocellulose (pre-enzymatically treated(ETC), TEMPO-oxidised(TTC) and carboxymethylated(CTC); 20mg/ml), alginate (5mg/ml), HA (6+12mg/ml) and CaCl2(cross-linker) were investigated as to their ability to cause adverse biological impact to human chondrocytes C20A4(SCC041) and dermal fibroblasts HFF-1(SCRC-1041). Material sterility was determined via microbial growth assay, measuring optical density(OD) at 600nm. Cell-line characterisation, material exposure and cross-linker exposure was conducted over an acute (up to 24h) and chronic (up to 21days) timeframe. Cell viability, morphology, and pro-inflammatory mediator release were assessed. Subsequently, gelation behaviour of specific bio-ink formulations upon exposure to CaCl2 was determined by rheology. All materials tested maintained sterility over 21days(OD<0.1). Material exposures (chondrocytes: nanocelulose/alginate/HA; fibroblasts: alginate/HA) showed no significant ($p>0.05$) cytotoxic effects over the 21-day testing period. Pro-inflammatory mediator release by chondrocytes was lowest with ETC across all timepoints, with trends of CTC>TTC>ETC on D1-7 and TTC>CTC>ETC on D14-21 ($p<0.05$ on D7). Pro-inflammatory mediator (interleukin(IL)-8 and IL-6) release was limited between day 1-7. CaCl2(0.1/0.5M/1.0M) exposure on fibroblasts demonstrated a dose- and time-dependent loss in cell viability over 7days. Cell viability of chondrocytes exposed to 0.1M CaCl2 was maintained at >70% up to 5h, with limited IL-8 and IL-6 release. Rheological studies revealed a rise in storage modulus over time, plateauing after 6h for all bio-ink formulations. Results indicate ETC as a promising candidate, alongside alginate and HA, for a complete bio-ink formulation specific for 3D-bioprinted cartilage constructs for reconstructive purposes. Biological and rheological testing identified optimal cross-linker exposure parameters to achieve functional bio-ink solidification whilst limiting cytotoxic effects.

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Abstract No.: 2

Title : How porcine acellular dermal matrix influences the development of the breast capsule one-year after implantation: a histopathological analysis

Abstract text :

Prepectoral breast reconstruction is mainly performed placing ADM-wrapped prosthesis above the pectoralis major muscle. However, there is still more to know about the ADM integration mechanism and about its role in peri-implant capsule dynamics and evolution. The aim of this study is to histologically define the influence that ADM has on peri-implant capsules formation and stabilization after breast tissue expansion and analyzing in the long term potential differences between a capsule formed by Tissue Expander in presence of ADM and without the ADM. This is a prospective single-center study in which 50 patients who underwent mastectomy and breast reconstruction with prepectoral tissue expander and BraxonÂ® ADM (group A) and submuscular tissue expander (group B) were enrolled between January 2021 and January 2023. One-year post implantations Hematoxylin & Eosin (H&E) staining and immunohistochemistry analyses were done on capsule tissue samples and comparisons on cellularity and presence of vascular and lymphatic components were performed between the two groups. The analysis conducted on H&E-stained samples showed a significant reduction of cellular density and a decrease of the cellular infiltration in capsules of ADM-covered expanders compared to naked expanders capsules ($p<0,05$).
The immunohistochemical analyses showed that group A capsules present significantly less M1 CD68+ macrophages ($p<0,05$), lower alfa-SMA expression levels and a lower number of myofibroblasts ($p<0,05$) compared to Group B capsules. Presence of lymphatic vessels was minimally detected in both groups. The ADM presence around the prepectoral tissue expander influences the development of the peri-implant capsule, causing a significant reduction of the number of cells and inflammatory infiltrate, especially M1 macrophages and myofibroblasts at one-year post implantation. Interestingly, also the presence of a lymphatic component was observed. The ADM BraxonÂ® is therefore effective in creating a non-inflamed capsule around the implant and such environment is maintained in time.

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Abstract No.: 21

Title : CRYOPRESERVATION OF NANOFAT PRESERVES CELL VIABILITY AND REGENERATIVE CAPACITY FOR WOUND HEALING

Abstract text :

Nanofat is defined as mechanically processed autologous fat predominantly used for tissue regeneration. For this reason, cryopreservation of this biologically active graft might represent an interesting solution to avoid multiple surgeries for harvesting fat during chronic wounds management. Therefore, the present study aimed to evaluate the effects of cryopreservation on nanofat viability and regenerative potential. Adult C57BL/6J mice were randomly assigned to 2 groups: fresh nanofat + platelet-rich plasma (PRP) and cryopreserved nanofat + PRP used as a native carrier for nanofat. For in vitro analysis, pure nanofat was harvested from donor mice and cryopreserved at -20Â° for 7 days prior to wound creation to assess cellular viability by means of immunohistochemical analysis of cellular apoptosis and microvessel density. Results were compared to pure freshly generated nanofat. For in vivo analysis, a dorsal skinfold chamber was implanted, followed two days later by the creation of a 4mm full-thickness punch skin defect filled with a mix of fresh nanofat + PRP or cryopreserved nanofat + PRP. Wound healing rate and tissue microperfusion in vivo were analyzed using repeated stereomicroscopies and intravital fluorescence microscopies over a 14-day period. All values were expressed as means Â± SEM. Statistical significance was accepted for p<0.05. In vitro results were comparable in terms of cellular apoptosis rate (7,9Â±0,8 vs 9,7Â±0,1) and tissue vascularization (366,5Â±32,9mm-2 vs 352,2Â±18,1mm-2) between fresh and cryopreserved nanofat. In vivo wound healing rate at day 14 showed no significant differences between fresh (87,3Â±4,4%) and cryopreserved group (87Â±4,5%) and was associated with a similar functional microvessel density in both groups (119,3Â±16,7cm/cm2 vs 132,2Â±11,2cm/cm2). Overall, these results indicate that cryopreservation does not affect nanofat viability and its regenerative capacity. Hence, this procedure might represent a promising strategy to improve staged nanofat treatment of chronic wounds.

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SESSION 6
MISCELLANEOUS 2

EURAPS Research Council

Abstract No.: 17

Title : A Novel Approach for the Prevention of Biofilm Formation on Various Breast Implant Surfaces: Bacteriophage Therapy

Abstract text :

Capsular contracture is a common problem of breast implant related operations. There are several factors in etiology, but recently subclinic bacterial inflammation is more accused. Traditionally, local antibiotic treatments have been used to prevent capsular contracture, however antibiotic resistance of bacterial strains has been an increasing problem in recent years. Bacteriophages, which prevent biofilm formation and cause bacterial death. are natural enemies against bacteria; and have regained interest in literature. The purpose of this study is to demonstrate that local bacteriophage therapy is at least as effective as local antibiotherapy solutions on breast implant surfaces. Fifty-four Wistar Albino rats were divided into three groups, including control, antibiotic and bacteriophage groups. Three different implant surfaces (smooth, textured, polyurethane) were implanted on dorsum of each rat after being inoculated in biofilm-forming S.Epidermidis strain for 24 hours. In experimental groups, implants were additionally soaked in antibiotic and bacteriphage solutions for 5 minutes. Samples were collected at 6, 24 hours and 30 days and were processed for colony counting, mRNA analysis for ses1 gene with real time PCR, and biofilm formation was measured by optical densitometry. Bacteriophage and antibiotic solutions reduced the number of colonies and mRNA expression comparing to control group in all time periods. ($p<0.05$) This decrease was observed after 24 hours in the control group but started after 6 hours in bacteriophage and antibiotic groups. There is no statistical difference between bacteriophage and antibiotic groups. Textured and polyurethane surfaces demonstrated superiority in reducing bacterial load and biofilm formation comparing to smooth surfaces in all treatment groups. ($p<0.05$) This study pioneers the use of bacteriophages on breast implants. We demonstrated that bacteriophage solutions can be an alternative to antibiotic solutions to reduce biofilm formation on contaminated implant surfaces. Cost-effectiveness and absence of side effects justifies the use of bacteriophages.

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Abstract No.: 26

Title : Anti-CTLA4 immunomodulation can significantly reduce lymphedema development by increasing Treg-mediated immunosuppression

Abstract text :

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 critically influences lymphedema onset and development, with the underlying mechanisms remaining elusive. In our study, we evaluated retrospectively lymphedema risk in a dedicated patient cohort receiving anti-CTLA4 and anti-PD1 immunomodulatory treatment and explored the mechanism of action. 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. 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 only lymphadenectomy, 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 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 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. Anti-CTLA4 reduces lymphedema risk in patients upon lymphedenectomy and significantly improves experimental lymphedema, via a Treg-induced immunosuppression. Thus, anti-CTLA4 treatment presents a very promising drug-repurposing approach to prevent or even treat lymphedema.

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Abstract No.: 8

Title : Perioperative intermittent fasting protects ischemic musculocutaneous flap tissue from necrosis

Abstract text :

It has previously been shown that dietary restriction, such as intermittent fasting (IF), protects various tissues from ischemia-induced necrosis. We have evaluated the tissue-protective effects of IF in a murine musculocutaneous flap model for the first time. C57BL/6N mice were randomly assigned to an IF group (n = 8) and a control group with unrestricted access to standard diet (n = 8). IF animals were put on a perioperative feeding schedule with 8h unrestricted access to standard diet per day starting 7 days before flap elevation up to 3 days after surgery. Random pattern musculocutaneous flaps were elevated and mounted into a dorsal skinfold chamber. On days 1, 3, 5, 7 and 10 after surgery intravital fluorescence microscopy was performed for the quantitative analysis of flap necrosis, nutritive perfusion and angiogenesis. After the last microscopy the flaps were harvested for histological and immunohistochemical analyses. IF animals exhibited a significantly lower rate of flap tissue necrosis (24 Â± 7%) on day 10 when compared to controls (47 Â± 7%; p<0.05). This was associated with a higher functional capillary density and more newly formed microvessels within the flap tissue. Immunohistochemical detection of inflammatory cell subtypes revealed fewer invading myeloperoxidase (MPO)+ neutrophilic granulocytes in IF-treated flaps. The suppression of neutrophilic granulocyte invasion was particularly pronounced in the transition zone from vital to necrotic tissue, where we detected a significantly lower number of 125 Â± 37 MPO+ cells/high power field (HPF) in IF-treated mice when compared to controls (254 Â± 35 MPO+ cells/HPF). The present study shows that perioperative IF protects ischemic flap tissue from necrosis by suppressing ischemia-induced inflammation and maintaining nutritive perfusion. Different from other conditioning strategies, IF may bear the advantage that it can be easily implemented into standard clinical procedures without causing additional costs or inducing severe side effects.

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Abstract No.: 52

Title : Reconstruction of the Facial Nerve in Pigs with Facial Nerve Allografts Wrapped in a Fibrin Scaffold Containing Fibroblasts Transduced with Adenovirus Encoding VEGF 156

Abstract text :

Nerve allografts, which are nerves transplanted between genetically non-identical individuals of the same species, have been studied in experimental and clinical works and seem to be an effective method for nerve reconstruction. We aim to evaluate the effects of VEGF-secreting scaffold holding fibroblasts transduced with an adenovirus on the survival of facial nerve allografts in a model developed in pigs. We operated on 10 white large pigs using one of the following surgical protocols: protocol I, 5 subjects receiving nerve allografts wrapped with a fibrin scaffold holding fibroblasts; and protocol II, 5 subjects with nerve allografts wrapped in a scaffold containing fibroblasts transduced with adenovirus encoding VEGF 156. Statistically significant differences were found by the MannÂ–Whitney test between protocols I and II for the number of neurofilaments, the number of vessels per field, the number of nerve bundles, and the percentage of neural tissue, with the scores higher for protocol II subjects (p= 0.008 for the above variables). There were no differences in the diameter of the nerve between the protocols. When StudentÂ’s t was used, the number of neurofilaments and the percentage of neural tissue were significantly different (p= 0.002). This experiment showed that in pigs receiving a 4-cm facial nerve allograft, conditioning with adenovirus-mediated VEGF-secreting heterologous fibroblasts embedded in a fibrin scaffold, improved axonal passage throughout the nerve allograft and helped to maintain the continuity and structure of the new facial nerve.

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Abstract No.: 42

Title : Osteo-cutaneous Perforator Free Flap On A Murine Model by Tissue Engineering for Mandible Interrupting Bone Defects Reconstruction

Abstract text :

The management of loss of bone and skin bi-tissue substances in the mandible remains complex. It requires a combination of methods that do not spare the donor areas, and are likely to add to the sometimes significant sequelae. A preliminary anatomical study of the perforating vessels of the rat, enabling vascular mapping of 140 vessels in 10 rats, led us to create a superficial inferior epigastric perforating flap combined with 3D-printed bone reconstruction using the in vivo bioreactor principle in the 10-week-old male Fischer rat. After validation of the flap vascularization by isolation of the skin paddle on its vascular pedicle, 3D-printed implants to the dimensions of a critical mandibular defect (10x7mm) were incorporated.
Four groups of eight rats were seeded with different implants (control, total bone marrow, Rh-BMP2 concentration 3ug/mL and 30ug/mL) to assess in situ secondary ossification of the implant. Analyses included clinical, radiological (micro-CT, barium sulfate angiography), histological and mechanical strength studies. The final stage (N=6 rats) consists of a proof-of-concept microsurgical transfer of the bi-tissue construct to the mandible. Our work has allowed us to determine the best method for promoting ossification of our revascularized implants. This method spares both bone (3D bone printing) and soft tissue (perforator flaps) donor sites. Rh-BMP2 30ug/mL helps to promote ossification without adverse effects from higher rh-BMP2 concentration (anarchic ossification, tumoral adverse effect, osteolysis).
There are currently no data in the literature reporting osteocutaneous reconstruction of the mandibular region using the bioreactor principle in vivo with microsurgical transfer. Our innovative research project presented enables the management of complex bone and skin substance losses in the mandibular region. Donor site sparing is maximized, and a secondary application in limb reconstruction is envisaged.

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Abstract No.: 37

Title : Comparison of Cromolyn Sodium, Montelukast, and Zafirlukast Prophylaxis for Capsular Contracture

Abstract text :

Capsular contracture is the most common complication following breast augmentation. Recently, prophylaxis studies aiming to inhibit the release of profibrotic substances to prevent capsular contracture have gained in importance. This study investigated the effects of cromolyn sodium, montelukast, and zafirlukast on capsular contracture in a rat model. Thirty female Wistar albino rats were randomly divided into five groups: control, sham, cromolyn sodium, montelukast, and zafirlukast. Intraperitoneal injections were administered daily to the sham (1 ml per day), cromolyn sodium (10 mg/kg per day), montelukast (10 mg/kg per day), and zafirlukast (1.25 mg/kg per day) groups 1 month before surgery. Miniature breast implants were then placed on the backs of the rats in each group. Injections were continued for the next 3 months. The rats were subsequently killed, and the capsules were harvested and assessed histopathologically. The histopathologic outcomes were acute inflammation status, inflammation sever- ity, synovial metaplasia, foreign body reaction, mast cell count, and capsular thickness. The cromolyn sodium, montelukast, and zafirlukast groups had less acute inflammation and lower mean inflammation severity scores, foreign body reaction occurrence, mast cell counts, and capsular thickness than the control and sham groups ($p < 0.05$). These parameters were better in the cromolyn sodium group than in the montelukast and zafirlukast groups ($p < 0.05$). Cromolyn sodium appears to inhibit capsular contracture more efficiently than montelukast and zafirlukast. This report may be a pioneer study for the prophylactic use of cromolyn sodium in capsular contracture.

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Abstract No.: 10

Title : NANOFAT EFFECTIVELY ACCELERATES VASCULARIZATION AND HEALING OF FULL-THICKNESS SKIN WOUNDS

Abstract text :

Previous studies have shown a high regenerative potential for nanofat. Due to the contained growth factors and stem cells, this mechanically processed fat derivative exhibits potent anti-inflammatory, anti-apoptotic, and immunomodulatory effects. Based on these promising findings, the present study investigated the potential beneficial effects of nanofat on wound healing. Inguinal fat of C57BL/6J/GFP+ donor mice was excised and processed into nanofat (NF) by emulsification and filtration. Subsequently, 3 ÂµL nanofat suspended in 5 ÂµL thrombin-activated murine platelet-rich plasma (PRP) as a carrier were transferred into 4mm full-thickness skin wounds within dorsal skinfold chambers in C57BL/6J mice (n=8). Saline-treated wounds (n=8) and PRP-treated wounds (n=8) served as controls. Wound healing and vascularization were analyzed using repeated stereomicroscopy and intravital fluorescence microscopy respectively over a 14-day observation period. Overall cellular density within the wounds was assessed by means of histological analysis. Values were expressed as means Â± SEM. Statistical significance was accepted for $p<0.05$. PRP proved to be a suitable native carrier to fix the nanofat inside the full-thickness skin defect. PRP + NF-treated wounds showed a significantly increased healing rate on day 14 (89Â±5%) when compared to PRP-treated (65Â±4%) and saline-treated (60Â±5%) wounds. This was associated with a significantly higher functional microvessel density in the PRP + NF group on day 6 (19Â±5cm/cm2 vs. 6Â±2cm/cm2 and 3Â±2cm/cm2) and day 10 (88Â±5cm/cm2 vs. 59Â±9cm/cm2 and 22Â±6cm/cm2), indicating an accelerated neo-vascularization at the defect site. Additionally, histological analysis revealed a significantly higher number of nucleated cells in the PRP + NF group compared to the other groups (3437Â±351mm-2 vs. 2474Â±310mm-2 and 2418Â±199mm-2), indicating an increased proliferative activity of the tissue. These findings demonstrate that nanofat significantly improves wound healing by boosting tissue microperfusion. The application of nanofat may therefore be beneficial for the management of chronic wounds in future clinical practice.

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Abstract No.: 9

Title : Lymphatic brain decongestion in Alzheimer’s disease (AD): experimental pilot study

Abstract text :

AD is characterized by progressive cognitive function incline and neurodegeneration. Accumulation of amyloid-beta peptides forms plaques leading in brain inflammation and neuronal cell death.
Glymphatic and meningeal lymphatic system regulate brain fluid homeostasis and affect neurodegeneration by transferring amyloid-beta peptides from the brain to the cervical lymph nodes.
We aim to assess the feasibility of a surgical procedure in a rat model, in order to enhance the meningeal lymphatic system and consequently increase the clearance of amyloid-beta peptide. Twelve 12-months-old rats divided in 2 groups. Group A underwent collagen scaffolds implantation between the subdural space above hippocampus and the right submandibular lymph node, to achieve guided lymphangiogenesis of the meningeal lymphatic system. Group B (control) had no intervention.
Animals were weighted and examined for behavior tests preoperatively and 4, 8 and 12 weeks postoperatively, including Novel object recognition, Novel object location recognition, Neuroscale and Modified open field tests. At the end of the experiment, brain parenchyma was histologically examined. One animal of group A died 2 days after the procedure. The remaining rats had no complications, maintained or increased their weight and showed no signs of infection or neurological impairment.
Behavioral and cognitive evaluation tests in Group A showed progressive improvement at 12 weeks post-op. In comparison of the 2 groups there was a positive correlation but not statistical significant.
Preliminary histology results comparing amyloid plaque formation, immunohistochemical stains (GFAP, Iba-1 and NeuN) for the study of astrogliosis, microglial cell formation and brainÂ’s neurodegeneration were in favor of Group A. The proposed surgical procedure proved the feasibility, while the primary results determined as improved brainÂ’s lymphatic function. Expansion of the study in sample size as well as in 12-month-old TgF344-AD genetically modified rats has already started in order to examine the hypothesis of the study.

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Abstract No.: 4

Title : The effect of host tissue and radiation on fat graft survival: a comparative experimental study

Abstract text :

Lipofilling is often associated with various reconstructive procedures, especially breast reconstructions; therefore, improving fat-graft retention remains a major concern for plastic surgeons. We conducted an experimental protocol simulating an autologous breast reconstruction method using the fat-augmented latissimus dorsi myocutaneous (LDM) flap, in a rat model. Our study aims to compare the survival rates of autologous adipocytes when injected subcutaneously and intramuscularly, and to evaluate the role of recipient host tissue, volume of the injected fat, and postoperative radiation on fat-graft retention. Thirty rats were used and divided into five groups (A,B,C,D, and E), of six rats each. All animals underwent a pedicled LDM flap transfer to the anterior thoracic wall; different volumes of autologous fat were injected into three recipient areas, namely the pectoralis major and latissimus dorsi muscles, and the subcutaneous tissue of the flapÂ's skin island, as follows: 1ml of fat was injected in total in group A, 2ml in groups B and D, and 5ml in group C. Group D animals received postoperative radiation (24Gy), while group E animals (controls) did not undergo any fat grafting procedure. Eight weeks after surgery, adipocyte survival was assessed using histological and immunochemistry techniques, in all groups. Our results showed that the pectoralis major muscle was the substrate with the highest adipocyte survival rates which were proportional to the amount of fat injected, followed by the latissimus dorsi muscle, and finally the subcutaneous tissue. Increased volumes of transplanted fat into the subcutaneous tissue, did not correspond to increased adipocyte survival. Irradiation of host tissues resulted in a statistically significant decrease in surviving adipocytes in all three recipient sites ($p<0.001$). Our study strongly suggests that muscle ensures optimal fat graft retention, whereas postoperative radiation negatively affects adipocyte survival following fat transplantation.

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Abstract No.: 44

Title : The Effect of Adipose-derived Stem Cell on Each Breast Cancer Subtype

Abstract text :

Research on regenerative medicine is largely based on adipose stem cells(ASCs) in plastic surgery. Many oncologic surgeries which can bring soft tissue defect can be reconstructed using fat tissue. In the present, free flap that contains fat and skin is used such as deep inferior epigastric artery perforator(DIEP) flap in breast reconstruction. To overcome shortcomings of this method such as long scar and donor complications, many researchers investigate new methods using ASCs to regenerate soft tissue. However. there are much concerns about using ASCs for cancer patients. In this study, we investigated the effect of ASCs on proliferation of each breast cancer subtype. In the microarray, there are 5 subtypes of breast cancer including luminal A, B, HER2, basal, molecular apocrine, Claudin low. In a BALB/C nude mouse model, the ASC and subtype of the breast cancer are mixed and transplanted for experimental group. Each breast cancer subtype-only cells also injected for the control group to check the presence or absence of tumor maintenance, growth, and metastasis. After administration of ASCs for each breast cancer subtype, we can compare with each other about proliferation, migration, Ki-67, and apoptosis change. In animal experiments, tumor development, growth, and metastasis are confirmed when administered in combination with ASCs by each breast cancer subtype. After 8 weeks of co-transplantation, volume and weight of tumor mass were measured. In all breast subtypes, the experimental group showed statistically significant reduced volume and weight compared to the control group. There were no distant metastasis. In H&E staining, the experimental group showed more differentiated character compared to the control group. Ki67 was decreased and apoptosis was increased in the experimental group. ASCs seems to have inhibitory effects in all breast cancer subtypes. This maybe due to competitive environment between two cells. Further researches are necessary to unveil mechanism.

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