impaired wound healing. Recently, stem/progenitor cell transplantation has emerged as an approach for lymphatic regeneration, however, it remains undetermined whether this is effective on different anatomical levels of the system.

MATERIALS AND METHODS: We used a complement of mouse models to test the potential of mouse and human multipotent adult progenitor cells (MAPCs) for lymphatic growth from the lymphatic capillary to the precollector level.

RESULTS: MAPCs differentiated into lymphatic endothelial cells (LECs) and trophically supported LEC proliferation, migration and sprouting in vitro. In vivo, in addition to supporting blood vessel growth, MAPC transplantation significantly induced lymphatic capillary regrowth in wounds and functionally restored lymph drainage across skin flaps by stimulating capillary and precollector vessel growth mostly through paracrine effects.

CONCLUSIONS: MAPC transplantation represents a powerful remedy for lymphatic growth at different anatomical levels and hence an appealing approach to treat wounds and lymphedema.

10.30 INTRATISSULAR EXPANSION AND LAYERED FAT GRAFTING IN AUTOLOGOUS BREAST RECONSTRUCTION

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INTRODUCTION: Breast reconstruction involves the use of autologous tissue or implants. However, fat grafting seems the ideal technique because of its minimally invasive character but the challenge is to reconstruct a 3D, homeostatic tissue construct using a liquefied tissue (liposapirate) as building blocks.

MATERIALS AND METHODS: Total breast reconstruction (n=7) was performed with intratissular expansion and serial lipofilling sessions. Mean age of the patients was 41 years old (22–53). A prepectoral positioned expander created skin expansion and induced the formation of a peri-prosthetic capsule with boundary conditions between the outer skin envelope and the well-vascularized capsule. The vascular plexus in the outer layer of the capsule functioned as a vascular source. Serial deflation and fat grafting sessions were initiated at 8 weeks with an interval of three months until the desired volume was obtained. The expander was removed during the last session. The fat grafting procedure consisted of manual liposuction and processing following the Coleman protocol. An average of 644cc (range 415–950cc) of liposapirate material was injected to reconstruct the breast with an average of 4 (range 3–5) fat grafting sessions. Average follow-up was 14 months (range 9–29 months).

RESULTS: All patients completed the treatment successfully with a pleasing, stable, prepectoral breast reconstruction. Magnetic resonance imaging examination showed a mean breast volume of 378cc (range 218–557cc) and retained no tissue necrosis. One infection occurred which necessitated temporary removal of the expander. There were no adverse effects related to the lipofilling procedures.

CONCLUSIONS: In a selected group of patients we have been able to reconstruct an aesthetically pleasant and stable breast mound with intratissular expansion and fat grafting with rather predictable results. Further refinements include the incorporation of a nutritional matrix to enhance the survival rate of fat grafts and reduce the number of fat graft sessions.

10.40 PARACRINE FACTORS FROM HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS IMPROVE WOUND HEALING, SCAR QUALITY, AND ANGIOGENESIS IN A PORCINE BURN MODEL

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INTRODUCTION: Burn injuries are a serious threat to patients and often require surgical treatment. Split-thickness skin grafting aims to achieve rapid wound closure but requires a well-vascularized wound bed. The cell-free secretome
of peripheral blood mononuclear cells (PBMCs) _ comprising all secreted factors produced over 24 hours _ has been shown to improve wound healing and angiogenesis in previous studies. We used human PBMC secretomes in an in vivo model that resembles the clinical setting to investigate its potential to improve the quality of regenerating skin, increase angiogenesis, and reduce scar formation after burn injury and skin grafting.

MATERIALS AND METHODS: Human PBMC secretomes were harvested after 24 hours under standard cell culture conditions. Gamma irradiation was used to induce apoptosis and create an additional stimulus. Standardized full-thickness burn injuries were created on the back of female pigs. After 24 hours, the necrotic areas were excised and the wounds were covered with split-thickness mesh skin grafts. Wounds were treated repeatedly with either the secretome of cultured PBMCs (SecPBMC), apoptotic PBMCs (Apo-SecPBMC), or controls. Wounds were analysed and wound biopsies were taken on days 2, 5, and 10.

RESULTS: We found a markedly increased mean epidermal thickness in wounds treated with either SecPBMC (116.7 μm ± 34.7) or Apo-SecPBMC (133.2 μm ± 37.6) compared to the medium (78.3 μm ± 29.2) and NaCl groups (79.3 μm ± 13.7). Epidermal differentiation (expression of keratin-10) was more advanced in the treated wounds compared to controls. Apo-SecPBMC treatment induced a two-fold increase in CD31+ cells (p<0.05 vs. all other groups), indicating more angiogenesis. The parameters of early scarring were improved in secretome-treated wounds.

CONCLUSIONS: These data suggest that the repeated application of PBMC secretomes significantly improves wound healing, skin quality, and scar formation in a porcine model of burn injury and skin grafting.

INTRODUCTION: Treatment of burn scars with traditional surgical techniques is challenging due to recurrent contractures. The use of fat grafting in thermal injury has been previously reported only in small clinical series and results are often biased by simultaneous surgical procedures and lack of scientific methods of validation.

MATERIALS AND METHODS: Our study prospectively evaluates outcomes in 9 patients treated with the OSUFAÓ technique (Subcision and Fat Grafting) for debilitating contracted burn scars limiting range of motion. Results are evaluated clinically with the Vancouver scale and by range of motion through the affected joints at 1, 3, 6 and 12 months. Scientific validation of the outcomes is performed evaluating dermal thickening and scar remodeling by high definition ultrasound and histology examination with hematoxylin-eosin and monoclonal antibodies staining.

RESULTS: Results show clinical improvement, thickening of dermis and redistribution and reorientation of the collagen fibers within the dermis. Statistical significance (p<0.05) has been obtained for all analyzed data. Fat reabsorption occurred with a mean of 40%.

CONCLUSIONS: Our study gives scientific validation of the efficacy of subcision and fat grafting in contracted scar. New surgical and diagnostic techniques are illustrated. Our clinical and diagnostic outcomes suggest dermis regeneration secondary to the new fat grafting technique.

11.00 OXYGENATED PERFUSION OF FREE FLAPS USING A MODIFIED HEART-LUNG MACHINE TO MINIMIZE TISSUE DAMAGE DURING ISCHEMIA TIME: A FEASIBILITY STUDY IN A PORCINE MODEL AND INITIAL RESULTS

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INTRODUCTION: At the moment there is no reliable method to minimize tissue damage occurring during the ischemia time in free flap reconstructive surgery. In the current pilot study the