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.

**10.50 BURN SCAR REGENERATION WITH THE ‘SUFA’ (SUBCISION AND FAT GRAFTING) TECHNIQUE. A PROSPECTIVE CLINICAL STUDY**

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**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 OSUFA 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
feasibility of a novel extracorporeal preservation method was explored aimed at minimizing tissue damage during ischemia time in free flap transfer. Initial results are presented.

**MATERIALS AND METHODS:** A modified heart-lung machine was assembled to allow semi-closed extra-corporal oxygenated perfusion of free flaps. Porcine rectus abdominis flaps pedicled on the superior epigastric artery were harvested. Different test groups were created aimed at testing various preservation methods of flaps: I continuous perfusion with normothermic oxygenated heparinized autologous blood; II continuous perfusion with cooled (7 degrees Celsius) and oxygenated histidine-tryptophan-ketoglutarate (HTK) or University of Wisconsin (UW) solution; III short flush (eight minutes) with HTK, UW or saline and heparin solution after which cooled (4 degrees Celsius) preservation. Muscle biopsies were taken for histological analysis at various timepoints during the 24 hour experiments.

**RESULTS:** Flaps from groups I and II were successsfully attached to the modified heart-lung machine while maintaining stable flow and pressure. After three hours flaps from groups I and III already showed signs of cell death (contraction band necrosis) increasing throughout the experiment. Flaps from group II showed minimal (UW) or no such signs (HTK) throughout the 24-hour experiments.

**CONCLUSIONS:** The use of a modified heart-lung machine to allow oxygenated perfusion of free flaps provides new possibilities to minimize tissue damage during ischemia time and further study of its use is warranted.