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Venue and Date
MS Cap San Diego
Überseebrücke
20459 Hamburg, Germany
August 20–23, 2009

Conference Chair
Prof. Dr. Lars Steinstraesser
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Announcement

2nd EPSRC European Plastic Surgery Research Council
MS Cap San Diego
Hamburg (Germany)

Mark your calendar for end of August 2010!
Dear colleagues,

It is a great honour and pleasure to welcome you to the 1st Annual Meeting of the European Plastic Surgery Research Council on the cargo ship MS Cap San Diego in Hamburg, Germany. The programme offers the opportunity to enjoy a world class scientific conference in the beautiful setting of the Harbour of Hamburg. The goal of the European Plastic Surgery Research Council is to stimulate fundamental research in plastic, reconstructive and aesthetic surgery. Significant work on original laboratory or clinical research and selected ideas and innovations will be presented at the 1st meeting. Selecting the highest quality abstracts from more than 15 countries, our scientific programme committee has exerted tremendous judgement and effort to ensure the finest quality in basic science and clinical outcome research. This meeting is meant to be different than other more formal meetings. We feel there is a need for an affordable arena for young plastic surgeons and colleagues from related specialties to discuss current and future research in plastic surgery, including works in progress, in an atmosphere that is informal and friendly. This would allow both an opportunity to make new friends and gain potential partners in a genial environment. This platform would allow the flow of the knowledge and ideas across the European Union. The aim is not to insulate European research from the world but to proliferate our efforts internationally through union. As a symbol, we decided on a classical European lighthouse surrounded by the stars that represent the European nations.

The headquarters for this meeting is the MS Cap San Diego. The MS Cap San Diego is the last one of the classic cargo ships, referred to as the “White Swan of the South Atlantic,” and is a symbol of the great port city of Hamburg. Hamburg is one of the busiest harbours in Europe and is also a location for highly specialised industries. It is a leader in medical technology and biotechnology and is one of the world centres for aircraft construction: It is here that the wide-bodied A380 is being built. Hamburg is seven times bigger than Paris and two and a half times bigger than London. Hamburg has 2,302 bridges, more than Venice and Amsterdam combined. With over 90 consulates, Hamburg is second only to New York City in the world. As a trade centre, Hamburg has always been outward-looking, and this has shaped the mentality of the inhabitants of Hamburg.

The meeting will begin on the evening of Thursday, August 20, 2009, with the welcome reception in the captain’s cabin. The scientific meeting will formally begin on Friday, August 21, 2009, with a brief local programme. There will not be any concurrent sessions at any stage of the meeting. E-posters will be presented in the evenings of August 21 and 22, allowing the presenter the opportunity to discuss his work in a casual atmosphere.

It is truly a great honour for me to host this inaugural meeting of the 1st European Plastic Surgery Research Council. This has been a team effort and I want to acknowledge my colleagues who have assisted me every step of the way: Hans-Ulrich Steinau, Tobias Hirsch and Sammy Al-Benna and especially Isabelle Lärz from Conventus. I am looking forward to an outstanding scientific meeting and a thoroughly enjoyable four days onboard in Hamburg.

Lars Steinstraesser, MD
EPSRC Chairman, 2009
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Social evening
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<td><em>L. Steinstraesser</em> (Bochum/DE)</td>
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<td><em>G. Germann</em> (Ludwigshafen/DE)</td>
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<td><strong>Aesthetic/breast</strong></td>
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<td><em>E. Biemer</em> (Munich/DE)</td>
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<td>0900</td>
<td>The educative role of video-endoscopy for endonasal reshaping of bony nasal</td>
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<td><em>Y. Avsar</em> (Istanbul/TR)</td>
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<td>The “gluteal smas” in the lower body lift</td>
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<td><em>H. Beck</em> (Vienna/AT)</td>
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<td>How to successfully grow cartilage from discarded fat tissue</td>
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<td><em>M. Cherubino</em> (Pittsburgh/US, Palermo/IT)</td>
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<td>Characterisation of mesenchymal progenitor cells from processed lipoaspirates</td>
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<td><em>J.J. Vranckx</em> (Leuven/BE)</td>
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<td>Medium term upper limb function after use of the extended latissimus dorsi flap</td>
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<td><em>S. Thomson</em> (Glasgow/UK)</td>
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<td>Breast reconstruction with the septocutaneous perforator flap: the next frontier</td>
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<td><em>C.M. Chen</em> (New York/US)</td>
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<tr>
<td>1000</td>
<td>Coffee break with exhibitors</td>
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<tr>
<td>1030–1100</td>
<td><strong>Keynote lecture 1</strong></td>
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<td></td>
<td><strong>How to demystify plastic surgery</strong></td>
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<td></td>
<td><em>M.A. Lesavoy</em> (Los Angeles/US)</td>
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<tr>
<td>1100–1130</td>
<td>Scientific session 2</td>
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<td><strong>Clinical outcome/evidence based medicine</strong></td>
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<td><strong>Chairs</strong> <em>S. Al-Benna</em> (Bochum/DE), <em>M. Kesting</em> (Munich/DE), <em>M.W.J. Ferguson</em> (Manchester/UK)</td>
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<td>1100</td>
<td>Is the sentinel node biopsy a reliable prognostic factor in melanoma?</td>
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<td><em>A. Berners</em> (Brussels/BE)</td>
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<td>1110</td>
<td>Results of the precise abdominoplasty study: clinical outcomes with the peak</td>
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<td>plasmablade compared to scalpel and traditional electrosurgery</td>
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<td><em>J. Vose</em> (Palo Alto/US)</td>
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11:20 A 31 year review of the quality of evidence published in 5 plastic, reconstructive and aesthetic surgery journals
Y. Al Ajam (London/UK)

11:30–12:00 Keynote lecture 2
History and development in craniofacial surgery
S. Warren (New York/US)

12:00–12:30 Scientific session 3
Craniofacial surgery/developmental
Chairs S. Warren (New York/US), K.D. Wolff (Munich/DE), F. Kloss (Innsbruck/AT)

12:00 Outcomes of early V-Y push-back palatoplasty
A. Lafosse (Brussels/BE)

12:10 Vascularized osseous tissue engineering using novel multicellular flow-perfusion co-culture for repair of craniofacial defects
S. Warren (New York/US)

12:20 The multifunction tdap-sa free flap in the reconstruction of complex and 3-d midface defects
M.A. Dammacco (Paris/FR)

12:30 Lunch workshop
KCI Europe Holding B.V. (Amstelveen/NL)

Vacuum assisted closure, changing the life of a plastic surgeon
L. Teot (Montpellier/FR)

The physiological and biochemical mechanisms of action of V.A.C. Therapy®
T. Hauser (KCI Medizinprodukte GmbH, Wiesbaden/DE)

A randomized controlled study comparing protein profiling in chronic wounds treated with V.A.C. Therapy® system or moist wound therapy
L. Steinstraesser (Bochum/DE)

14:00–14:30 Keynote lecture 3
TGFβ3 for the reduction of scaring in the skin: from discovery to potential clinical therapeutic
M.W.J. Ferguson (Manchester/UK)

14:30–15:00 Scientific session 4
Wound healing/stem cells
Chairs L. Teot (Montpellier, FR), M.W.J. Ferguson (Manchester/UK), E. Eriksson (Boston/US)

14:30 Systemic erythropoietin treatment improves wound healing in microangiopathic mice depleted of apolipoproteine
D. Högger (Zurich/CH)
14:40 Visualisation of skin graft revascularisation in the modified dorsal skinfold chamber – new insights into the processes at the vascular interface
*N. Lindenblatt* (Zurich/CH)

14:50 Human blood outgrowth endothelial cells (hBOEC) improve dermal and epidermal wound healing both through reoxygenation and growth factor release
*B. Hendrickx* (Leuven/BE)

15:00 Why are some scars hyper-pigmented?
*C. Yip* (Manchester/UK)

15:10 Local p53 silencing changes cytokine profiles to improve diabetic wound healing
*S. Warren* (New York/US)

15:20 Signal transduction of the innate and adaptive immune system after transient cutaneous adenoviral gene delivery
*M. Schulte* (Bochum/DE)

15:30 Coffee break with exhibitors

16:00–16:30 Keynote lecture 4
New frontiers in microsurgery
*T.C. Teo* (East Grinstead/UK)

16:30–17:00 Scientific session 5
Microsurgery/ischemia reperfusion
Chairs *S. D’Arpa* (Sicily/IT), *W.M. Kuzon* (Ann Arbor/US), *P.Y. Milliez* (Rouen/FR)

16:30 Clinical-experimental study on the critical zone of the perforator flap
*E. Prousskaia Peregudova* (Bilbao/ES)

16:40 Pharmacologic preconditioning: hydrogen sulfide – protects against ischemia reperfusion injury *in vitro*
*D. Kadouch* (New York/US)

16:50 Network of the cutaneous perforators issued of radial artery – anatomical study about 20 cases
*B. Ayestaray* (Rouen/FR)

17:00–17:30 Keynote lecture 5
Nerve regeneration
*W.M. Kuzon* (Ann Arbor/US)
**Scientific Programme • Friday, August 21, 2009**

**17:30–18:00 Scientific session 6**  
Tissue engineering/reconstruction  
Chairs **W. Liu** (Shanghai/CN), **G. Germann** (Ludwigshafen/DE)  
**M.A. Lesavoy** (Los Angeles/US)

17:30  
**Repair of tendon defect with adipose derived stem cells engineered tendon in a rabbit model**  
**W. Liu** (Shanghai/CN)

17:40  
**The use of near-infrared spectroscopy (NIRS) to continuously monitor myocutaneous reconstructions**  
**S. Cairns** (Cardiff/UK)

17:50  
**Engineering human capillaries in vitro**  
**E. Reichmann** (Zurich/CH)

**19:30–21:00 E-poster session**

**21:00 Social evening**  
Pool deck MS Cap San Diego
0830–0900 Keynote lecture 6
Did I really present this for the first time?
H.-U. Steinau (Bochum/DE)

0900–0930 Scientific session 7
Cancer/reconstructive
Chairs T.C. Teo (East Grinstead/UK), H.-U. Steinau (Bochum/DE)

0900 A computational model to profile cytokine networks mediating acute rejection after composite tissue allotransplantation
D. Wolfram (Innsbruck/AT)

0910 Olfactory ensheathing cell-like differentiation of adipose-derived mesenchymal stem cells
C. Radtke (Hannover/DE)

0920 Protective role of i-NOS inhibition in ischemia-reperfusion injury
L.H. Evers (San Diego/US)

0930 Highlight session PSRC Pittsburgh 2009
Chair J.P. Rubin (Pittsburgh/US)

CNPASE expression in olfactory ensheathing cells
C. Radtke (Hannover/DE)
Awarded with the “J.K. Hardesty, MD Best Short Paper Award”.
The J.K. Hardesty, MD Best Short Paper Award: Presented to the author presenting the best short paper at the annual meeting of the Plastic Surgery Research Council.

A novel transgenic rat expressing green fluorescent protein (GPT) in peripheral nerve
A. Moore (St. Louis/US)
Awarded with the “Clifford C. Snyder, MD Past Chairman Award”.
Presented to the plastic surgery resident or fellow presenting the best paper at the annual meeting of the Plastic Surgery Research Council.

Development of a biosynthetic “living interface” with severed peripheral nerve
C. Frost (Ann Arbor/US)
Awarded with the “John F. Crikelair Research Award”.
John F. Crikelair Research Award: Presented to the high school or college student presenting the best paper at the annual meeting of the Plastic Surgery Research Council.

1000 Coffee break with exhibitors
10:30–11:00 Scientific session 8
Burns
Chairs J. Rawlins (Leeds/UK), V. Koljonen (Helsinki/Fl)

10:30 A dermal substitute (MATRIDERM®) is serving as a scaffold for adipose tissue engineering: first results of an in vitro study
M. Keck (Vienna/AT)

10:40 The neuroimmunologic background of burn-induced organ dysfunction: neuroimmunomodulation of cardio-depressive proinflammatory mediator generation
A.D. Niederbichler (Hannover/DE)

10:50 Exploiting innate wound healing for accelerated integration: development of the smart matrix scaffold
J.F. Dye (Middlesex/UK)

11:00–11:30 Keynote lecture 7
Basic science in plastic surgery in Asia
W. Liu (Shanghai/CN)

11:30–12:00 Scientific Session 9
Reconstructive/tissue engineering
Chairs A. Lee (Pittsburgh/US), R. Horch (Erlangen/DE)

11:30 Functional reconstruction after limb-sparing surgery for upper extremity sarcoma: assessment of functional outcomes and costs of surgery
G.S. Mundinger (Baltimore/US)

11:40 A microsurgical model for generation of axially vascularized bone tissue
U. Kneser (Erlangen/DE)

11:50 Host defense-like lytic peptide suppresses growth of human liposarcoma
C. Schubert (Bochum/DE)

12:00 Social programme
Harbour boat trip

13:15–15:00 Panel: Transplant immunology
Moderation P.M. Vogt (Hannover/DE)

Facial transplant
E. Eriksson (Boston/US)

Bilateral arm transplant
E. Biemer (Munich/DE)

Hand transplant
A. Lee (Pittsburgh/US)
1500–1530 **Keynote lecture 8**  
*Update in hand surgery*  
*M.W. Neumeister* (Springfield/US)

1530–1600 **Scientific session 10**  
*Hand*  
Chairs *M.W. Neumeister* (Springfield/US), *A. Bayat* (Manchester/UK)

1530 **Reconstruction of function in the spastic hand in patients with cerebral palsy, after brain stroke, brain injury and after encephalitis – a review of 120 patients after 5 years**  
*L. Fialova* (Vysoke Nad Jizerou/CZ)

1540 **Immunoinflammatory cells in posttraumatic tendon adhesions – an immunohistochemical study**  
*H. Koch* (Graz/AT)

1550 **Pediatric scaphoid nonunion: clinical and radiological mid-term-outcome of 21 patients undergoing operative treatment**  
*T. Lutz* (Bad Neustadt a.d. Saale/DE)

1600 **Coffee break with exhibitors**

1630–1700 **Keynote lecture 9**  
*Future perspective in plastic surgery*  
*P. Cederna* (Michigan/US)

1700–1730 **Scientific session 11**  
*Technology*  
Chairs *P. Cederna* (Michigan/US), *P.M. Vogt* (Hannover/DE), *M. Menger* (Homburg/DE)

1700 **Experiences with the novel 1st and 2nd fingertip support microsurgical technique in plastic and reconstructive surgery**  
*G. Pataki* (Budapest/HU)

1710 **Alternative approach to prosthesis infection: coating with a new antibiotic releasing polymer**  
*E. Olivares* (Madrid/ES)

1720 **Comparison of 2D-Schwann cell-neuron-culture with 3D-Schwann cell-neuron-spheroids – effect on neurite outgrowth and length**  
*V. Penna* (Freiburg/DE)

1730 **Business meeting**

1930–2100 **E-poster session**

2100 **Social evening**  
Luke 3 MS Cap San Diego
Mit einem ständig wachsenden Programm hat sich TapMed innerhalb weniger Jahre zu einem wichtigen Anbieter in der plastischen, ästhetischen und Wiederherstellungs-Chirurgie entwickelt. TapMed bietet dem Arzt hochwertige Produkte von führenden Herstellern, u.a.:

- Komplettes Instrumentarium von Stille
- Endoskopische Technik von Storz
- CHESS- Fixierung in der Handchirurgie von Canica
- PAL-650E Fettabsaugung von MicroAire
- Gefäß-Koppler von MCA-Synovis
- Neurotube, geführte Nervenregeneration von MCA-Synovis
- Kompressionskleidung von DesignVeronique
- activ'M, Narbenpflaster von M-Technologies
- HemaStrip, Chirurgische Kompresse zur effizienten kapillaren Blutstillung

TapMed Medizintechnik Handels GmbH
Gutshof 15-17 • 34270 Schauenburg-Hoof
Telefon 05601-9299-0 • Fax 05601-9299-44
Service: 0700 AESTHETIC oder 08000 TAPMED
info@tapmed.de • www.tapmed.de
P1 Viscoelastic properties of cross-linked hyaluronic acid dermal fillers and impact on distribution in the dermis  
J. Reinmüller (Wiesbaden/DE)

P2 Proving the effectiveness of the lip lift for the treatment of the aging lip – a morphometrical evaluation  
V. Penna (Freiburg/DE)

P3 The aging lip – a comparative histological analysis of age related changes in the upper lip complex  
V. Penna (Freiburg/DE)

P4 Vacuum assisted closure therapy  
M. Ahmad (Rehovot/IL)

P5 Prospective investigation of explanted breast implants – Can sonication detect subclinical infection?  
U. Rieger (Innsbruck/AT)

P6 Extracorporeal life support devices (ECMO, iLA) in severely burned patients: Bridging the gap?  
A.D. Niederbichler (Hannover/DE)

P7 Topical application of cerium nitrate prevents burn edema after burn plasma transfer in rats  
J.F. Hernekamp (Ludwigshafen/DE)

P8 The characterisation of biofilms within burn wounds, and tracheostomies in critically burn-injured patients  
S. Cairns (Cardiff/UK)

P9 Positive effects of early surgical treatment of burned children  
N. Fistal (Donetsk/UA)

P10 Definition of efficiency of Contactubex in preventive maintenance of formation burn scars  
N. Fistal (Donetsk/UA)

P11 Repair of grade III ulnar collateral ligament injuries at the metacarpophalangeal joints of the thumb with dual threaded suture anchors  
S. Al-Benna (Bochum/DE)

P12 Plastic and reconstructive surgery in the Scottish medical school curriculum  
S. Thomson (Glasgow/UK)

P13 Doctors online: the consequences of public private profiles  
A. Harb (Poole/UK)
P14 The mirror hand an extremely rare malformation of the upper limb – case report of the treatment of 2 children
H. Grunwald (Emmerich am Rhein/DE)

P15 Manual stimulation of the forearm to improve postoperative recovery after median nerve suture in rats
N. Sinis (Tuebingen/DE)

P16 Prefabrication of trachea for hemi-laryngeal reconstruction
J.J. Vranckx (Leuven/BE)

P17 Antibody targeted magnetic fluid hyperthermia for therapy in oral cancer
D. Marsh (London/UK)

P18 Planning exactness of bilateral sagittal split osteotomies (BSSO) of the mandible according to Obwegeser/DalPont
R.-D. Bader (Jena/DE)

P19 Host defense-like lytic peptide suppresses growth of human fibrosarcoma
J. Hauk (Bochum/DE)

P20 Effect of type 1 insulin-like growth factor receptor (IGF1R) signalling on sensitivity of melanoma cells to Temozolomide (TMZ)
R. Ramcharan (Oxford/UK)

P21 A causal role of C-reactive protein (CRP) in inflammation: conformational rearrangement in C-reactive protein is required for enhanced pro-inflammatory leukocyte activation and leukocyte adhesion in ischemia-reperfusion injury of the striated muscle
S.U. Eisenhardt (Freiburg/DE)

P22 Laser induced forward transfer (LIFT) of skin cell lines and human mesenchymal stem cells: investigation of vitality, proliferation and cellular behaviour after LIFT
H. Sorg (Hannover/DE)
P23  The role of apoptosis and its local/systemic intervention in burns  
_L.H. Evers_ (Luebeck/DE)

P24  Dose-dependant microvascular response following extracorporeal shock wave application in the striated muscle of the mouse dorsal skinfold  
_M. Waygood_ (Zurich/CH)

P25  Establishing the sheep AV-loop model for axial vascularisation of a clinically approved ceramic bone substitute  
_U. Kneser_ (Erlangen/DE)

P26  Gel, sponge or nano – new collagen based matrices for tissue engineering of skeletal muscle  
_J.P. Beier_ (Erlangen/DE)

P27  Digital callipers in the measurement of keloid scars – Is there a role?  
_D. Kulendren_ (London/UK)

P28  Guanylate-Binding Protein-1 (GBP-1) reduces the angiogenic properties of embryonal endothelial progenitor cells (EPC) in vitro and in vivo in the arteriovenous (AV) loop model  
_O. Bleiziffer_ (Erlangen/DE)

P29  Comparison of Schwann cell and olfactory ensheathing cell influence in peripheral nerve regeneration  
_V. Penna_ (Freiburg/DE)

P30  Gene therapy with proangiogenic plasmids to enhance vascularity of pedicled transverse rectus abdominis myocutaneous flaps in a rat model  
_T. Majewski_ (Warsaw/PL)

P31  Resorption rate assessment of adipose tissue engineered constructs by Intravital magnetic resonance imaging  
_N. Torio-Padron_ (Freiburg/DE)

P32  The vascular anatomy of the tensor fasciae latae perforator flap  
_M. Hubmer_ (Graz/AT)

P33  Technical advances in the use of the collagen-elastin dermal matrix (Matriderm) in reconstructive plastic surgery  
_J. Rawlins_ (Wakefield/UK)

P34  2.5-mms-osteosynthesis-plates in free flap mandible reconstruction  
_R.-D. Bader_ (Jena/DE)
P35  Nucleofection of fibroblasts is the most efficient ex vivo gene transfer strategy to a full thickness skin wound  
_S. Van den Berge_ (Leuven/BE)

P36  Improving angiogenesis in tissue engineered scaffolds using microchannels  
_A.J.P. Clover_ (Oxford/UK)

P37  A novel human skin chamber model to study wound infection ex vivo  
_M. Sorkin_ (Bochum/DE)

P38  Bioreactor controlled shear stress environment promotes osteogenic differentiation of adipose stem cells – a way for bone reconstruction  
_B. Weyand_ (Hannover/DE)

P39  Generation of vascularised adipose tissue for the coverage of soft tissue defects: Long-term results and transplantation  
_J.H. Dolderer_ (Tuebingen/DE)

P40  BOEC increase vascularity in a diabetic wound model  
_K. Verdonck_ (Leuven/BE)

P41  The use of blood outgrowth endothelial cells, keratinocytes and fibroblasts in an autologous skin construct: the millefeuille  
_S. Van den Berge_ (Leuven/BE)

P42  Dorsal skinfold chamber: studying vascular reaction to biomaterials by intravital microscopy  
_A. Ring_ (Bochum/DE)
KCI Europe Holding B.V. (Amstelveen/NL)

Kinetic Concepts, Inc. is a leading global medical technology company devoted to the discovery, development, manufacture and marketing of innovative, high-technology therapies and products for the wound care, tissue regeneration and therapeutic support system markets. Headquartered in San Antonio, Texas, KCI’s success spans more than three decades and can be traced to a history deeply rooted in innovation and a passion for significantly improving the healing – and the lives – of patients around the world.

KCI’s three primary businesses include:

Advanced Wound Care – Includes KCI’s proprietary Vacuum Assisted Closure (R), or V.A.C. (R) Therapy System, which has been clinically demonstrated to promote wound healing through unique mechanisms of action while reducing the overall cost of treating patients with complex wounds.

Regenerative Medicine – Represented by KCI’s LifeCell business and includes tissue-based products for use in reconstructive, orthopedic and urogynecologic surgical procedures to repair soft tissue defects.

Therapeutic Support Systems – Includes specialty hospital beds, mattress replacement systems and overlays designed to address pulmonary complications associated with immobility, to reduce skin breakdown and assist caregivers in the safe and dignified handling of patients of size.

Covidien Deutschland GmbH (Neustadt a.d. Donau/DE)

TapMed Medizintechnik Handels GmbH (Schauenburg-Hof/DE)

MEDA Pharma GmbH & Co. KG (Bad Homburg/DE)
Exhibitors
ABT Advanced Bio-Technologies Deutschland GmbH (Sundern/DE)

Covidien Deutschland GmbH (Neustadt a.d. Donau/DE)

Digitale Photographie GmbH (Kirchheim/DE)

EPM – Erich Pfitzer Medizintechnik (Bütthard/DE)

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Karl Storz GmbH & Co. KG (Tuttlingen/DE)

KCI Europe Holding B.V. (Amstelveen/NL)

LEA Medizintechnik GmbH (Gießen/DE)

MEDA Pharma GmbH & Co. KG (Bad Homburg/DE)

Mentor Deutschland GmbH (Hallbergmoos/DE)

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Spintec Engineering GmbH (Aachen/DE)

starMed GbR (Grafing/DE)

TapMed Medizintechnik Handels GmbH (Schauenburg-Hof/DE)

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Middle deck MS Cap San Diego

1. KCI Europe Holding B.V.
2. Covidien Deutschland GmbH
3. TapMed Medizintechnik Handels GmbH
4. LEA Medizintechnik GmbH
5. Minerva KG
6. Spintec Engineering GmbH
7. EPM – Erich Pfitzer Medizintechnik
8. MEDA Pharma GmbH & Co. KG
9. starMed GbR
10. Mentor Deutschland GmbH
11. Karl Storz GmbH & Co.KG
12. ETHICON Products
13. Digitale Photographie GmbH

Catering
Harbour Boat Trip

Welcome on the MS Hammonia! Get on board and depart for an unforgettable harbour boat trip on the river Elbe. The trip is set during lunch time and will be a welcome refreshing break. Enjoy having a relaxed lunch on board while glancing at the impressive Elbe riverbanks and listening to the sounds of an accordionist.

Date: Saturday, August 22, 2009
Time: 12:00–1:30 pm
Venue: MS Hammonia
fee: included

Hamburg Fish Market

Hamburg’s traditional open-air market on Sunday mornings is an absolute must for every visitor! Every Sunday morning customers come from near and far to bargain with vendors praising wares of virtually every type at Hamburg’s oldest, most traditional open-air market, dating back to 1703.

Let’s enjoy the spontaneous amusement on the street. You can watch the fishermen trade their catch while listening to music and chilling in the sunrise. Any world-weariness will soon be forgotten.

Date: Sunday, August 23, 2009
Time: 5:30–9:00 am
Venue: St. Pauli Fish Market/Große Elbstraße
**Venue and Date**
MS Cap San Diego
Überseebrücke
20459 Hamburg, Germany
August 20–23, 2009

**CME Points**
The 1st meeting of the European Plastic Surgery Research Council has been acknowledged for CME points at the Medical Chamber of Hamburg. Accreditation is valid for German participants only.

**Certification Medical Chamber**
Friday, August 21, 2009    6 CME Points
Saturday, August 22, 2009  6 CME Points
Please don’t forget to bring along the labels of the Medical Chamber for every-day registration into the lists of participation.

**Check-In (Opening Hours)**
Friday, August 21, 2009  7:30 am–9:00 pm
Saturday, August 22, 2009  7:30 am–9:00 pm

**Conference Language**
The official conference language is English.

**Catering**
Participants will be served with snacks and refreshments during the coffee and lunch breaks.

**How to arrive to Hamburg**

**Arrival by Plane**
Hamburg Airport is situated in a 25 minutes distance by public transports from the main train station. You will find the tram station directly in front of the terminals 1 and 2. You may take the tram S1 which circulates between Hamburg Airport and the train station every 10 minutes. Taxis are also at your disposal. The taxi parking lines are in front of the terminals 1 and 2.

**Arrival by Train**
It is easy and comfortable to reach Hamburg by train. Please see the homepage [www.bahn.de](http://www.bahn.de) for detailed information on schedules and itineraries. There are taxis in front of the train station to continue your ride to Hamburg Harbour.
**Arrival by Car**

**From East**
Please take the motorway A24 towards “Hamburg, Rostock, Kremmen”. Take the exit at “Arena, Horn, Centrum”. Crossing the roundabout “Horner Kreisel” you will turn onto “Sievekingsallee”. Then please follow the directions towards Hamburg Harbour.

**From South**
Please change from the motorway A7 onto A1 at the interchange “Horster Dreieck” towards “Hamburg, Lübeck, Berlin”, and change again onto A255. Take the exit at “Hamburg-Veddel” towards “Arena, Kiel, Hafen” and follow the directions towards Hamburg Harbour.

**From West**
Please take the exit on A7 at the interchange “Hamburg-Bahrenfeld” and go on until “Bahrenfelder Marktplatz”. Turn onto B4 (“Stresemannstraße”) and follow the directions towards Hamburg Harbour.

**Parking**
Unfortunately, there are no direct parking spaces available at the congress venue, but you can find a car park at “Hafentor” and a second one at “Schaarmarkt” Hamburg. It is recommended to use public transports. All hotels are within walking distance to the venue.

**Dress Code**

![Dress Code Image]

No suits and ties allowed on the boat

**Jeans, Denim**

**T-shirts, Collarless shirts, Beachwear, Trainers, Flip Flops**
St. Pauli Fischmarkt Hotel Hafentor
Hotel Empire Riverside Hotel Stella Maris
Hotel St. Annen Hotel/Hostel A&O City Hauptbahnhof
Hotel Hafen Hamburg

P1
P2
1
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7

1 St. Pauli Fischmarkt
2 Hotel Empire Riverside
3 Hotel St. Annen
4 Hotel Hafen Hamburg
5 Hotel Hafentor
6 Hotel Stella Maris
7 Hotel/Hostel A&O City Hauptbahnhof
MS Cap San Diego

Upper deck
Middle deck  Industrial exhibition, Catering
Lower deck  Lecture hall

Longitudinal section

Middle deck

Upper deck

Lower deck

Industrial exhibition
Lecture hall

Pooldeck
Luke 3

Map of Cap San Diego
The duration of the oral presentations has been restricted to **10 minutes including 3 minutes for discussion**. Due to the tight schedule all presentations will be interrupted after the indicated time limit of 7 minutes. All lectures are to be held in English.

Posters have to be presented in English within the e-poster sessions. The length of the lecture has been restricted to a maximum of 3 minutes. Allowed are 2–3 PowerPoint slides showing the essential facts of your work. Please discuss the details of your work after your talk.

The e-poster sessions will be held on:
- **Friday, August 21, 2009**  7:30–9:00 pm
- **Saturday, August 22, 2009**  7:30–9:00 pm

Primary support will be given to the following formats:
- PowerPoint (version 2007)
- PowerPoint/PDF presentations saved on CD or USB memory stick

Laptops and a data projector are available in the lecture hall and will be handled by an assistant for technical support. We recommend all lecturers to check their presentation in advance. Macintosh formats are not provided. In case a Macintosh is needed we kindly ask for prior notification.

Please submit your presentation at least 2 hours before your poster presentation begins. You are asked to clearly label your CD/memory stick and the file with your abstract code number and the name of the speaker. All presentations will be loaded onto our computers and will be deleted after the talks.
After registration you will receive an invoice/a formal booking confirmation. Only after crediting the registration fee by transferring the requested amount to the congress account, registration will be completed and the offer will be binding. Please also register any accompanying person by name.

Contracting partners to the participants are the organiser of the event as well as the organisers of any highlights of the social programme. Conventus merely acts as an agent to negotiate these agreements and does not, in any case, oblige itself to the participants.

Changes in programme are subject to the organiser. You will receive a formal booking confirmation for all booked programme items. Tickets and any congress documents will be delivered on site. Conventus only assumes liability in case of intention and gross negligence. Solely the organiser of the respective event will assume liability for performance of any engagement and for possible shortcomings.

Each party agrees to submit to the jurisdiction of the court having jurisdiction for Hamburg.
Abstracts

OP1: THE EDUCATIVE ROLE OF VIDEO-ENDOSCOPY FOR ENDONASAL RESHAPING OF BONY NASAL VAULT WITH POWERED MICRO SAW OSTEOTOMY
Avsar Y, Cherubino M
ESTE aesthetic surgery center (Istanbul, Turkey)

INTRODUCTION: Powered micro saw osteotomy for hump reduction and mobilisation of lateral nasal walls has not been discussed in aesthetic surgery literature. The author describes powered micro saw osteotomy as a novel technique for hump reduction, radix remodeling and lateral wall mobilisation. Otherwise this technique carries educational importance that can be realised by using the video-endoscopy.

MATERIALS AND METHODS: Between April 2005 and November 2008, the author performed powered micro saw osteotomy on 621 primary and secondary rhinoplasty and septorhinoplasty cases with endonasal approach. A surgical micro motor system of Bien Air Company (Bienne, Switzerland) and video-endoscopic system of the Storz Company (Tuttlingen, Germany) was used in all of the manipulations. Powered micro saw osteotomy was performed to reduce the bony hump and the edges of the open roof were softened with a powered reciprocating rasp. The dense bony areas along the lines of medial, intermediate and lateral osteotomies were cut with especially designed micro saws to mobilise the lateral nasal walls. Bone thickness measurements were discussed using CT-based 3D models by mimics software of Materialize Company (Leuven, Belgium) on 13 cases at the lines of osteotomies.

RESULTS: Satisfactory results were obtained in all of the cases. The rate of revision for focal bony prominences was 2.8 % in this study. There were no immediate complications such as rocker effect, step deformity, collapse, verticalisation of lateral walls or other skin-soft tissue complications. On average follow-up of 28 months (range, 6 to 37 months), there were no cases of bone regrowth or widening of bony vault. The mean nasal bone thickness was found 3.3 ± 0.72 mm at the medial osteotomy line, 2.5 ± 0.56 mm at the intermediate osteotomy line, 1.2 ± 0.33 mm at the medial canthus area, and 3.1 ± 0.67 mm at the lateral osteotomy line.

DISCUSSION: Powered micro saw osteotomy provides a precise approach to hump reduction and mobilisation of lateral walls. This is a professional technique in rhinoplasty that should be educated to aesthetic plastic surgeons, and video-endoscopy takes a major role in this training process.

OP2: THE “GLUTEAL SMAS” IN THE LOWER BODY LIFT
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INTRODUCTION: Bariatic Surgery offers the greatest degree of sustained weight loss to morbidly obese patients. Surgical correction of post-bariatric contour deformities of the trunk, buttocks and thighs after excessive weight loss requires skin lifting operations, combined in the lower body lift procedure. Extensive subcutaneous undermining and preservation of the superficial fascial system (SFS), originally described by Ted Lockwood, are essential to produce an aesthetically acceptable outcome. Lifting and augmentation procedures of the buttock region utilise the SFS similar to the SMAS in the face to obtain gluteal fullness. Whereas Scarpa’s and Colles’ fascia as part of the SFS are well-described structures, very little attention has been paid to the SFS of the gluteal region. In this anatomical study we aim to demonstrate the existence of the SFS in the gluteal region and its applicability as a SMAS-like suspension structure.

MATERIALS AND METHODS: Anatomical dissection of the gluteal region was performed on 10 fresh cadavers (5 male, 5 female). The SFS and its connections to Scarpa and Colles’ fascia were dissected and visualised. The thickness of the superficial and deep subcutaneous fat layers was measured on a cross section of the fresh and formalin fixated cadavers. The SFS was shown as a barrier between the superficial and deep subcutaneous fat layers and can be identified as part of the SFS. It is of lesser and unsteady thickness compared to Scarpa’s fascia. The superficial and deep subcutaneous fat layers show differences related to sex and region. As in the abdominal region, lobular fatty tissue can be found superficial, lamellar fatty tissue deep to the SFS. The relation of thickness of the
superficial fat layer compared to the deep is 1:3 in male, 1:2 in female for the cranial gluteal regions, and 1:1 for the caudal regions in both sexes. In the caudal regions the SFS faded to a more reticular collagen network.

**DISCUSSION:** A fascial layer analogous to the SFS could be identified in the gluteal region. It is less distinct than Scarpa’s or Colles’ fascia. Still, it is a clearly defined structure that can be prepared in lower body lift procedures and can be used as a suspension structure similar to the SMAS in the face.

**OP3: HOW TO SUCCESSFULLY GROW CARTILAGE FROM DISCARDED FAT TISSUE**

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**INTRODUCTION:** Adipose-derived stem cells (ASCs) are multi-potent adult stem cells obtained from discarded fat tissue that can be differentiated into cartilage when cultured under certain conditions. The objective of this study was to determine which specific bone morphogenetic protein (BMP), alone or combined with the transforming growth factor (TGF-b1), yielded the highest degree of chondrogenic differentiation.

**METHODS:** After isolation and expansion, human ASCs were trypsinised, counted and resuspended in a chondrogenic media. Aliquots of 2x10^5 cells were centrifuged to obtain pellets which were cultured under different conditions: no growth factors, TGF-b1 alone (10 ng/mL), BMP-2, -4 and -7 (different concentrations with or without TGF-b1) for 14 days. Alcian Blue staining, as well as Q-PCR for Collagen Type II and Aggrecan expression, were performed at the end of the experiment.

**RESULTS:** Results demonstrated that BMP-2 alone promoted less chondrogenesis of ASCs than the combination of BMP-2 and TGF-b1, which induced more chondrogenesis than TGF-b1 alone (4.5 fold more Collagen Type II and 2.5 fold more Aggrecan expression than TGF-b1 alone). BMP-4 alone promoted chondrogenesis at a similar degree as TGF-b1, but when combined with TGF-b1, BMP-4 promoted 2 fold more Collagen II expression and the same degree of Aggrecan expression as TGF-b1. BMP-7 alone promoted a larger extent of chondrogenesis than TGF-b1 alone, and more than the combination of TGF-b1 and BMP-7. The two most efficient combinations of growth factors to promote chondrogenesis in ASCs were: 1) 10 ng/mL of TGF-b1 combined with 100 ng/mL of BMP-2, and 2) 100 ng/mL of BMP-7.

**DISCUSSION:** Combination of TGF-b1 and BMP-2, as well as BMP-7 alone, yielded the highest degree of chondrogenesis in ASCs compared to TGF-b1 alone. These growth factors significantly increased the expression of articular cartilage markers such as Collagen type II and Aggrecan, thus demonstrating that ASCs combined with specific growth factors may become an important therapeutic approach in cartilage reconstruction.

**OP4: CHARACTERISATION OF MESENCHYMAL-PROGENITOR CELLS FROM PROCESSED LIPOASPIRATES**


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**INTRODUCTION:** As an alternative to bone-marrow-derived SC, processed liposapirates (PLA) are a source of adipose-derived SC, which are able to differentiate into mesenchymal cell lineages. Previously we checked the differentiation potential of our tissue sources and relevant cell surface molecules. Now different isolation and centrifugation protocols were investigated to obtain a viable, highly proliferative PLA cell population.

**MATERIALS AND METHODS:** PLA populations were retrieved by 7 different liposuction aspiration procedures and 1 abdominal fat resection technique and cultivated at 37°C under 5% CO2, MTT proliferation and viability assays were conducted. Pro-angiogenic cell surface markers, matrigel and cell differen-tiation capacity studies were setup.

**RESULTS:** PLA show a characteristic fibro-blastic spindle-shaped morphology and are capable of in vitro proliferation except for the PLA isolation from abdominal resection. PLA isolation, with mild centrifugation of the liposapped fat depots, showed highest viability. However, long centrifugation resulted in the most proliferative PLA cell type. Specific endothelial progenitor stem cell surface markers were retrieved (CD31, KDR) as well as...
DISCUSSION: PLA have specific (pro-angiogenic and adipogenic) characteristics with great potential for biological and clinical research in translational tissue engineering cell-based experiments. Clinical application in breast reconstruction protocols is likely to succeed.

OP5: MEDIUM TERM UPPER LIMB FUNCTION AFTER USE OF THE EXTENDED LATISSIMUS DORSI FLAP FOR BREAST RECONSTRUCTION
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INTRODUCTION: The extended latissimus dorsi myocutaneous flap (ELD) is becoming increasingly popular in breast reconstruction. Standard latissimus dorsi donor sites are generally accepted to offer minimal impact on upper limb function. After informal patient feedback functional limitations following use of the ELD flaps we embarked upon a study to formally assess the nature and extent to which patients perceived their upper limb function to be affected.

MATERIALS AND METHODS: 25 consecutive patients undergoing ELD flap breast reconstructions by a single surgeon were included. An independent, comprehensive, standardised, telephone questionnaire was carried out including details on specific personal, household, work, sport and leisure activities, comparing pre- to post-operatively. Patients were asked to comment on limitations, score their satisfaction (donor site) and if, with hindsight, they would undergo or recommend the procedure. Case-notes were reviewed retrospectively.

Independently, the team physiotherapist recorded pre- and interval post-operatively Disability of the Arm Shoulder and Hand (DASH) scores. This previously validated assessment tool provided an objective numerical indicator of degree of disturbance of upper limb function.

RESULTS: Questionnaire return was 100%, 9 of 25 had DASH evaluation. Mean post-operative period was 22 months. 40% of patients perceived no limitation in upper limb function. After informal patient feedback functional limitations following use of the ELD flaps we embarked upon a study to formally assess the nature and extent to which patients perceived their upper limb function to be affected.

DISCUSSION: Specific medium term upper limb sequelae are present following ELD breast reconstruction in 60% of patients in this study. These include restriction in overhead extension, tightness and increased fatigueability in the ipsilateral limb. These deficits are acceptable to patients, having minimal interference with everyday tasks.

OP6: BREAST RECONSTRUCTION WITH THE SEPTOCUTANEOUS PERFORATOR FLAP: THE NEXT FRONTIER
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INTRODUCTION: Breast reconstruction has advanced substantially since the rediscovery of the latissimus dorsi muscle flap in the 1970s. The development of TRAM flaps was the first improvement in autologous tissue breast reconstruction in the 1980s. Musculocutaneous (mc) perforator flaps represented the next stage in microvascular breast reconstruction in the 1990s. As the next logical step in the evolution of microsurgical breast reconstruction, we describe septocutaneous (sc) perforator flaps. Advantages of this new technique for microvascular breast reconstruction include larger vessels, easier and quicker flap elevation, and less potential donor site morbidity.

MATERIALS AND METHODS: A retrospective review was done of 16 consecutive septocutaneous perforator flaps performed since January 2008. Four donor sites were used: lower abdomen, upper buttock, lower buttock, and medial thigh. Preoperative imaging with CT angiography or MR angiography allowed visualisation of microvascular anatomy. When present, sc perforators were clearly identified and intra-flap vascular course could be seen.

RESULTS: Sixteen sc breast reconstructions were reported: sc-DIEP (n=10), sc-SGAP (n=4), sc-IGAP (n=1), and sc-TUG (n=1). Preoperative imaging with CT angiography or MR angiography demonstrated sc perforators in 22.2% of DIEP flaps, 38.4% of GAP flaps, and 16.7% of TUG flaps. Preoperative imaging confirmed preoperative imaging in every case. All flaps (n=16) were based on one sc perforator. Sc perforators were...
more common in superior gluteal vessels than in deep inferior epigastric vessels. The sc-SGAP territory was more superolateral than the typical SGAP, preserving buttock shape better. The sc-IGAP flap allowed a more lateral flap design by using the thicker trochanteric fat. The sc-TUG flap allowed the gracilis muscle to be preserved with its motor nerve. In this series, 16 out of 16 sc perforator flaps survived (100%). Complications were limited to one donor site seroma (6.25%) and one flap with fat necrosis (6.25%). As sc perforators were usually larger than mc perforators, one sc perforator was usually adequate for flap reconstruction. In addition, since the pedicle ran through an intermuscular septum, dissection was easier and faster than with mc perforators. Motor nerves were not at risk, making it possible to avoid muscle injury.

**DISCUSSION:** Septocutaneous perforator flaps offer advantages over other forms of microvascular breast reconstruction, including a larger perforating vessel, easier and quicker flap elevation, and less potential donor site morbidity. CT and MRI angiography are valuable tools that make it possible to identify the presence and location of sc perforators. In our view, septocutaneous perforator flaps are a simple, safe and reliable technique that represents the next advance in autologous tissue breast reconstruction.

**OP7: IS THE SENTINEL NODE BIOPSY A RELIABLE PROGNOSTIC FACTOR IN MELANOMA?**

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**INTRODUCTION:** Sentinel node biopsy (SNB) has become a standard procedure in malignant melanoma staging. In this retrospective study, we assess the prognostic value of SNB and its contribution to conventional histological prognostic factors in melanoma staging.

**MATERIALS AND METHODS:** Between January 1998 and December 2006, 243 SNB were performed among 301 melanoma patients. Forty-eight patients were excluded from SNB protocols for age and poor health reasons and used as control group. Ten more were excluded after lymphoscintigraphy failure. All patients had a primary melanoma with a Breslow thickness ≥ 1mm and/or a Clark ≥ 4. Signs of tumour regression or ulceration also were inclusion criteria. The absence of regional or systemic disease had been radiologically assessed before SNB. Patients with a positive SNB were offered a completion lymphadenectomy.

**RESULTS:** In the SNB group, 51/243 patients (21%) experienced metastatic recurrence. The sentinel node status, Breslow and age revealed to be significant prognostic factors of recurrence in multivariate analysis. The mean Breslow thicknesses of positive and negative sentinel node groups were 3.2 and 1.9 mm, respectively and the relapse rate increased with Breslow thickness, reaching 50% for > 4mm tumours. According to the sentinel node status, the relapse rate was 24/54 (44.4%) for positive and 27/189 (14.3%) for negative SNB. The estimated disease-free survival rates at 5 years were 46.8% and 80.4% respectively. At 5 years, the estimated disease-free survival according to AJCC Breslow ranking and to positive or negative sentinel node status were respectively: 80 and 93.2% in the ≤ 1mm group, 74.9 and 81.5% in the > 1 ≤ 2mm group, 35.4 and 75.8% in the > 2 ≤ 4mm group, 22.2 and 51.4% in the > 4mm group. The mean melanoma-specific mortality rate was 10.3% in the SNB group. In the control group, 19/48 patients (39.6%) relapsed. Mean Breslow thickness was 2.4 mm and the estimated disease-free survival rate at 5 years was 49.7%. The melanoma-specific mortality rate was 12.5% in the control group.

**DISCUSSION:** Out of 51 relapsing patients, only 24 (47.1%) had a positive SNB and 27 (52.9%) experienced recurrence in spite of a negative SNB. Therefore, we consider that a negative SNB has a limited prognostic value and despite the important prognostic information provided by a positive SNB, histological tumour features should always be taken into account.

**OP8: RESULTS OF THE PRECISE ABDOMINOPLASTY STUDY: CLINICAL OUTCOMES WITH THE PEAK PLASMA BLADE COMPARED TO SCALPEL AND TRADITIONAL ELECTROSURGERY**

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**INTRODUCTION:** Traditional electrosurgery (ES) is associated with significant thermal injury to surrounding tissue during cutting and coagulation.
This thermal necrosis has been shown previously to affect healing and post-operative course in large tissue-reduction surgeries. We present results of a prospective, randomised, patient-blinded study comparing clinical outcomes following abdominoplasty with the PEAK PlasmaBlade (PB) to scalpel (SC) and ES.

**MATERIALS AND METHODS:** Twenty patients were randomised to either the Standard of Care (SOC: SC & ES) or PB for abdominoplasty. At 6 and 3 weeks prior to surgery, comparison full-thickness skin incisions with SC (#10 Blade), ES (Cut mode, 30W), and PB (Cut 3) were made in the patient’s abdomen and closed in a running fashion. Following abdominoplasty, healed incisions were submitted for strength testing and histological analysis. Serous drainage, narcotic consumption, activity level, diet volume, and blood loss were assessed for 10 days post-operatively.

**RESULTS:** PB incisions demonstrated equivalent burst strength to scalpel at 3 (43.44±3.47 lbf/in vs. 43.14±3.32 lbf/in; p=0.95) and 6 weeks (59.32±4.93 lbf/in vs. 51.99±3.99 lbf/in; p=0.25) with 65% and 42% greater strength than ES incisions, respectively (26.28±1.91 lbf/in and 41.78±2.85 lbf/in; p<0.005). Histological analysis demonstrated PB incisions reduced thermal injury depth by 75% compared to ES (185±15µm vs. 731±26µm; p<0.005). Intra-operatively, PB patients demonstrated 37% less narcotic consumption compared to SOC (32.0±4.0mg vs. 50.7±4.3mg Morphine Sulfate IV equivalent; p=0.002) with equivalent operative time (96±4 min vs. 95±3 min; p=0.47). Post-operatively, PB patients demonstrated 49% less narcotic consumption through a 10 day monitoring period compared to SOC (Mean AUC 34.3±3.6 vs. 67.4±12.2; p=0.024). Serous drain output was 31% less in the PB group (Mean AUC 553.4±50.5; SOC 805.3±81.6; p=0.02). PB patients reached 80% of normal diet volume by post-operative day (POD) 6 (SOC>10 days; p=0.01), and averaged 10% of normal activity on POD 0 (SOC=1%; p=0.001) with greater than 50% of their normal activity level by POD 6 (SOC=10 days; p=0.03). Post-operative hemoglobin drop was 57% less for PB at POD 10 (0.4±0.2g vs. 2.0±0.7g; p=0.07). Skin scar width and quality were equivalent for SC and PB at 2 months following surgery (p<0.05).

**DISCUSSION:** Results indicate that abdominoplasty with the PlasmaBlade offers several significant clinical advantages over the standard of care and that this device has great potential in plastic and reconstructive surgery.

**OP9:** A 31 YEAR REVIEW OF THE QUALITY OF EVIDENCE PUBLISHED IN 5 PLASTIC, RECONSTRUCTIVE AND AESTHETIC SURGERY JOURNALS

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**INTRODUCTION:** Much of the information for “evidence based” clinical practice originates from publications in clinical journals. Assessing the quality of this evidence however can be challenging. In the hierarchy of research study designs, prospective randomised controlled trials (RCT) are considered to provide the highest quality of evidence. Other clinical trial designs such as controlled trials (CT) and comparative studies (CS) are more prone to bias and confounding factors. Weaker study designs include case reports/series (CR). The aim of this study was to evaluate the quality of articles published in prominent peer reviewed plastic, reconstructive and aesthetic surgical journals.

**MATERIALS AND METHODS:** The quality of clinical studies published in plastic, reconstructive and aesthetic surgery, over three decades was evaluated. Computerised search of the Medline database was undertaken to evaluate the articles published in 5 clinical journals (Plastic and Reconstructive Surgery (PRS), Journal of Plastic, Reconstructive and Aesthetic Surgery/ British Journal of Plastic Surgery (JPRAS), Annals of Plastic Surgery (AnPS), Aesthetic Plastic Surgery (AePS) and Clinics in Plastic Surgery (CPS)) from 1978 until 2008. The number of randomised controlled trials (RCTs), controlled trials (CT), comparative studies (CS) and case reports were noted.

**RESULTS:** From the 35,816 articles evaluated (17,102 PRS; 7223 AnPS; 5652 JPRAS; 2046 AePS; 1860 CPS), there were 301 (0.8%) randomised controlled trials, 79 (0.6%) controlled trials, 1594 comparative studies (4.4%) and 9197 (25.7%) case reports. For the proportion of randomised controlled trials, the rank order of the journals was JPRAS (65; 1.15%), PRS (159; 0.930%), CPS (1; 0.928%), AnPS (57; 0.79%) and AePS (19; 0.21%). For the proportion of controlled trials, the rank order of the journals was AePS (12; 0.59%) JPRAS (29; 0.51%), PRS (28; 0.16%), AnPS (10; 0.14%), and CPS (0; 0%). For the
proportion of comparative studies, the rank order of the journals was AnPS (389; 5.40%), PRS (924; 5.39%), AePS (79; 3.86%), JPRAS (186; 3.29%) and CPS (16; 0.86%). For the proportion of case reports/series, the rank order of the journals was JPRAS (2101; 37.17%); AnPS (2513; 34.79%), PRS (3916; 22.90%), AePS (438; 21.41%) and CPS (229; 12.31%). Overall, from 1978 to 2008, there were significant increases in the proportion of randomised controlled trials (1; 0.55% to 34, 5.37%; p<0.001) and comparative studies (6; 0.03% to 181; 3.31%; p<0.001), there was no significant change in the proportion of controlled trials (2; 1.1% to 2; 0.31%; p=0.331) and there was a significant reduction in the proportion of case reports (179; 98.90% to 500; 78.99%; p<0.001).

DISCUSSION:
Over the 31 years evaluated, clinical trials notably randomised controlled trials form only a small proportion of articles published in prominent journals from plastic, reconstructive and aesthetic surgery. This is notwithstanding the modest increases in the proportions of randomised controlled trials and comparative studies over the same period. Increasing proportions of randomised controlled trials would improve the evidence base for the clinical management of disease in plastic, reconstructive and aesthetic surgery.

OP10: OUTCOMES OF EARLY V-Y PUSH-BACK PALATOPLASTY
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INTRODUCTION: The objective of cleft palate repair is velopharyngeal competence without fistula. The general frequency of velopharyngeal insufficiency (VPI) remains at 10 to 20%. Our purpose is to assess two surgeon’s 15 years single institution experience with early V-Y push-back palatoplasty as judged by need for pharyngeal flap and fistula repair.

MATERIALS AND METHODS: We retrospectively reviewed 288 children with cleft palate operated by the same two surgeons between 1989 and 2005. Syndromic patients were excluded. The type of cleft palate was categorised according to the Veau classification: I (soft palate): 80, II (hard and soft palate): 20, III (unilateral complete cleft lip/palate): 132, and IV (bilateral complete cleft lip/palate): 56. The V-Y push-back technique (Veau-Wardill-Kilner) was used for palatal closure at the age of three months. The superiorly-based tailored pharyngeal flap was used to correct VPI and ideally scheduled before the age of six years in children who made no speech progress despite intensive speech therapy. We calculated fistula rate and VPI rate based on speech evaluation.

RESULTS: The fistula rate was 6.25% (18/288): Veau I= 6.25%, II= 15%, III= 2.27%, IV= 12.5%. Overall a pharyngeal flap was necessary in 26.3% (76/288): Veau I= 25%, Veau II= 20%, Veau III= 28% and Veau IV= 26.7%.

DISCUSSION: There was a relatively low incidence of fistula but a high frequency of VPI after palatoplasty for this large series of patients with non-syndromic cleft palate in ourpractise with two experienced surgeons These results are critically analysed to reduce the incidence of VPI. The criteria leading to VPI must be compared to criteria used in series with very low rate of VPI and where palatoplasty is performed with different timing.

OP11: VASCULARISED OSSEOUS TISSUE ENGINEERING USING NOVEL MULTI-CELLULAR FLOWPERFUSION CO-CULTURE FOR REPAIR OF CRANIOFACIAL DEFECTS
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INTRODUCTION: We hypothesise that vascularised osseous tissue can be constructed by co-culturing multiple cell types on 3D scaffolds in flow perfusion, avoiding the limitations of traditional autografts or allogeneic transplantation.

MATERIALS AND METHODS: Mesenchymal stem cells (MSCs), human umbilical vein endothelial cells (HUVECs) and normal human osteoblasts (NHOst) were co-cultured in 2D in various combinations and assessed for viability, proliferation and function (bone nodules, alkaline phosphatase, etc). Optimal culture conditions were tested with cell-seeded thick (>6mm) 3D HA-TCP scaffolds in a novel flow-perfusion bioreactor.

RESULTS: In 2D, proliferation and function were greatest when more-differentiated vasculogenic cells were cultured with less-differentiated osteogenic cells; co-cultured HUVEC/MSC formed more bone nodules (263,945µm²) than HUVEC/NHOst (179,840µm²) or NHOst alone (89,608µm²). In 3D, cellular function was enhanced in flow perfusion; flow-perfused MSCs had more alkaline
phosphatase activity (3.86±0.320mM/g) than static 3D cultured cells (0.909±0.460mM/g) (p=0.002)

**DISCUSSION:** This is the first demonstration of optimal co-culture combination for engineering vascularised osseous tissue. By expanding chemo-transportation boundaries using 3D flow-perfusion, we can develop composite tissue constructs for replacement and repair.

**OP12: THE MULTIFUNCTION THORACO-DORSAL ARTERY PERFORATOR-SCAPULAR ANGLE (TDAP-SA) FREE FLAP IN THE RECONSTRUCTION OF COMPLEX AND 3-D MIDFACE DEFECTS**

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**INTRODUCTION:** Complex and 3-D midface defects following oncologic resection of maxilla represent one of the most challenging problems in reconstructive surgery as they cause severe functional and aesthetic deformities. During these past two decades, the complex defects reconstruction of maxilla and palate have profited from the development of chimeric flaps. Among them, flaps raised in the scapulo-dorsal area are particularly suitable for midface reconstruction as they allow the raising of different tissue components on the same vascular pedicle. However, these flaps have limits and disadvantages for this indication, in particular with respect to the size of the defect and the patient’s corpulence, as there become issues with both bulk and lack of plasticity of the latissimus dorsi (LD) musculocutaneous flap. The perforator flap concept has made it possible to reconsider the basic harvesting technique of classical musculocutaneous flap, allowing the harvesting of independent cutaneous components from the muscle. This evolution enables the replacement of bulky LD musculocutaneous flap with a thin and flexible skin paddle named thoracodorsal (TD) artery perforator flap.

**MATERIALS AND METHODS:** Since 2004, this technical modification was used in a series of midface reconstructions using composite-flaps of the scapulodorsal region: the angle of the scapula vascularised by the angular branch of the TD vessels was used to restore the palatal vault, the thoracodorsal artery perforator (TDAP) flap was used to reconstruct the sinus-nasal wall. This study presents a retrospective case series of all patients who had a maxillary reconstruction procedure in the Plastic Surgery-Head and Neck Surgery Department Institut Gustave Roussy (Villejuif, France) between 1st January 2004 and 31st December 2008.

**RESULTS:** The were 11 midface reconstructions: 1 flap was composed of a single component, 8 flaps were composed of two components, and 2 flaps of three components. The angle of the scapula vascularised by the angular branch of the TD vessels was mainly used to restore the palatal vault. In particular cases the scapula restored the vertical branch of mandible. The TDAP skin flap closed the sinus-nasal communication and filled the sinus defect. These skin flaps were vascularised in two cases only by direct cutaneous vessels type A of Nakajima’s classification and in all other cases also by musculocutaneous perforators (type D of Nakajima’s classification). In the case of the three component flap, the TDAP skin paddle was used to restore the mucosal lining of the upper vestibule.

**DISCUSSION:** TDAP chimera flap is a reliable and useful technique in midface reconstruction that reduces the drawbacks of classic LD flaps and decreases the donor site morbidity by preserving the motor nerve functions. The thoracodorsal perforator flap is now an ideal procedure in the reconstruction of the maxilla defects, both in cases of small loss of substance, like subtotal maxillectomy, both in cases of muscular or obese patients in which the musculocutaneous component would be too bulky.

In conclusion, the TDAP-SA free flap is useful as a multifunction flap able to ensure different types of complex midface reconstruction.

**OP13: SYSTEMIC ERYTHROPOIETIN TREATMENT IMPROVES WOUND HEALING IN MICROANGIO-PATHIC MICE DEPLETED OF APOLIPOPROTEIN E**

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**INTRODUCTION:** Inadequate blood supply is the most common cause of altered wound healing representing a considerable source of morbidity in daily plastic surgery practice. Erythropoietin (EPO) is intensively investigated for its nonhematopoietic vasculoprotective effects. The present study demonstrates the potential of repetitive systemical EPO treatment to accelerate angiogenesis in hypercholesteremic and microangiopathic murine ischemic wounds.
**INTRODUCTION:** The exact process of skin graft revascularisation still remains unclear until today. Therefore it was the aim of this study to visualise the process of engraftment and its microvascular architecture in a new in vivo model.

**MATERIALS AND METHODS:** Preparation of the modified dorsal skinfold chamber including autologous skin grafting was performed in male C57BL/6j mice (n=8). This allowed to simultaneously study the microcirculation of both the wound bed and the skin graft by intravital microscopy in vivo over a time period of 10 days.

**RESULTS:** Revascularisation of graft capillaries occurred at 72 hours resulting in almost complete restoration of the original pattern of skin microcirculation after 120 hours. After 96 hours a formation of spherical protrusions was seen within the graft capillaries most likely representing a temporary angiogenic response. Immunohistochemistry indicated hypoxia-mediated angiogenesis. Corrosion casting showed the formation of capillaries in the wound bed connecting to the pre-existing capillaries the graft.

**DISCUSSION:** These data indicate an early onset of angiogenesis, resulting in revascularisation of the skin graft at day 5. The temporary angiogenic response of the graft capillaries is a completely novel finding enabled by use of the new model. This knowledge will aid significantly in the manufacturing on skin substitutes in the future.
probed for trophic interactions between hBOEC and hDFS or hKC by analyzing their in vitro growth factor expression profile by qRT-PCR and ELISA.

RESULTS: Culture of hDFS for 10 days in low (1%) O₂ significantly reduced collagen organisation compared to culture in 20% O₂. KC, preconditioned for 7 days in 1% O₂ migrated much slower in a scratch wound assay than those incubated at 20% O₂. hKC proliferation was also significantly lower in reduced O₂ conditions. Analysis of growth factor profiles in hBOEC and hDFS revealed similar levels of angiogenic factors VEGF and FGF. However, for many other angiogenic, inflammatory and KC-responsive factors, the expression pattern of hBOEC and hDFS was complementary, suggesting a potential synergistic effect on (epi-) dermal recovery.

DISCUSSION: Stimulatory effects of hBOEC on (epi-) dermal wound healing are both due to increased tissue oxygenation and secretion of trophic factors.

OP16: WHY ARE SOME SCARS HYPER-PIGMENTED?

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INTRODUCTION: Scar colour changes especially following burn injuries are common and can cause significant patient distress. In some communities, this may also lead to social isolation. In addition to the burn scars per se, patients who have undergone skin grafting may also experience dyspigmentation at either the donor or recipient sites. To date, scar re-pigmentation potential is difficult to predict and management of dyspigmented scars remains challenging. At a cellular level, we hypothesised that scars could be darker secondary to an increased number of melanin-producing melanocytes, changes in the packing density of the melanocytes along the basement membrane, or both.

MATERIALS AND METHODS: We investigated the process of re-pigmentation following the creation of 6 standardised partial-thickness excisional wounds on the backs of pigs (n=23). After removal of dressings (day 14), the healed donor site wounds were photographed and reflectance spectroscopy measurements performed every 4 days. At various times, post-wounding, one animal was killed and all the wounded areas excised, freshly frozen and stored at -80°C. Samples were serially sectioned at 7μm and various histological levels in the healed donor site were accurately referenced to the macroscopic pigmentation pattern on the photograph. Histochemical techniques (DOPA reaction) were performed to localise staining for tyrosinase activity within activated melanocytes. An image analysis programme was used to count the number of DOPA positively stained cells in the basal epidermis of the entire length of the donor site scar histological section. The length of the donor site scar histological section and the actual length of the basement membrane (including undulations caused by the rete ridges/dermal papillae) were measured and used as denominators to calculate the density and packing density of the DOPA positive melanocytes, respectively.

RESULTS: At early post-wounding time points (up to 35 days), areas of the scar, which demonstrated re-pigmentation had a higher density of tyrosinase-positive melanocytes compared to the surrounding non/less-pigmented areas, correlating with the macroscopic appearance of the scar. As the re-pigmentation progressed with time, the density of tyrosinase-positive melanocytes reduced to the basal level seen in normal skin when the scar was mature at day 70 and had returned to normal pigmentation. However, melanocyte tyrosinase synthetic activity remained elevated in hyper-pigmented scars. Although the undulations of the basement membrane changed with maturation of the scar, the macroscopic pigmentation pattern did not correlate with these changes i.e. with the packing density of the tyrosinase-positive melanocytes.

DISCUSSION: Re-pigmentation of scars macroscopically correlates initially with the numbers and location of melanocytes staining positive with the DOPA reaction for tyrosinase activity. As the scar matures, reduction of tyrosinase activity to levels seen in normal unwounded skin correlates with the restoration of a normal macroscopic pigmentation pattern. In hyper-pigmented scars elevated, prolonged tyrosinase activity is seen. Possible mechanisms underlying these changes in melanocyte activity are being investigated. Changes in the packing density of melanocytes due to changing basement membrane undulations, do not correlate with the macroscopic pigmentation pattern of scars.
**OP17: LOCAL P53 SILENCING CHANGES CYTOKINE PROFILES TO IMPROVE DIABETIC WOUND HEALING**


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**INTRODUCTION:** p53 is upregulated in diabetic wounds and has recently been shown to play regulatory roles in the vasculogenic pathway. We hypothesised that silencing p53 results in improved diabetic wound healing by promoting vasculogenesis.

**MATERIALS AND METHODS:** Paired 4mm stented wounds were created on diabetic db/db mice. Topically applied p53 siRNA or nonsense siRNA, distributed in an agarose matrix, was applied to wounds at post-wound day 1 and 7. Wound time to closure was photometrically assessed, and wounds were harvested for histology, immunohistochemistry, and immunofluorescence. Vasculogenic cytokine expression was evaluated via RT-PCR, and ELISA. T-test was used to determine significance (p<0.05).

**RESULTS:** Local p53 silencing resulted in decreased time to closure compared to controls (18 ±1.3 days vs. 28 ± 1d). The treated group showed a 7.63 fold increase in CD31 endothelial cell staining over controls. At day 10, VEGF ELISA was significantly increased in treated wounds (109.3 ± 13.9 pg/ml) versus controls (33.0 ± 3.8 pg/ml) while RT-PCR demonstrated a 1.86 fold increase in SDF-1 expression in treated wounds versus controls. This profile was reversed after treated wounds healed and prior to closure of controls (day 24).

**DISCUSSION:** Topical gene therapy with p53 siRNA improves diabetic wound healing and is associated with an augmented vasculogenic cytokine profile and increased endothelial cell markers.

**OP18: SIGNAL TRANSDUCTION OF THE INNATE AND ADAPTIVE IMMUNE SYSTEM AFTER TRANSIENT CUTANEOUS ADENOVIRAL GENE DELIVERY**

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**INTRODUCTION:** In any reconstruction using perforator flaps, the viability of the distal part is often the key to surgical success. The aims of this study are to define the factors that improve flap survival and to determine the maximum flap length.

**OBJECTIVES:** The aim of this study was to develop a new model of a unique perforator flap in the pig based on the deep circumflex iliac artery perforator and to define the relationship between perfusion limits of this flap, its blood flow and size of the perforator.

**MATERIALS AND METHODS:** Experimental study: 10 pigs each weighing 3.5 kg. Deep circumflex iliac artery perforator flap dissection with 5 days post-
operative observation. Determination of optimal length/width flap ratio, which is correlated with perforator artery diameter and flow rate. Pathological evaluation of the zone of necrosis.

**Clinical study:** 85 clinical cases of a perforator flap (the propeller flap) used in reconstruction of the upper and lower limb and trunk were retrospectively studied. The indications, size, complications and flap survival were analysed and correlated with flap length.

**RESULTS:** When the dimension was 4:1, usually 100% of the flap survived. Survival of a flap dimension up to 6:1 was possible when it had an axial vessel and the perforator artery diameter was greater than 1 mm with a flow rate of more than 1.5 ml/min but there was a higher risk of dermo-epidermal necrosis in the distal part of the flap but usually the deep fascia survived allowing successful coverage of the defect.

**DISCUSSION:** The survival of the distal portion depends on perforator artery size, flow rate and vascular pattern within the flap tissue. The propeller perforator flap is a good option for reconstruction using local tissues.

**OP20: PHARMACOLOGIC PRECONDITIONING: HYDROGEN SULFIDE – PROTECTS AGAINST ISCHEMIA-REPERFUSION INJURY IN VITRO**
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**INTRODUCTION:** Free tissue transfer (FTT) results in oxidative and inflammatory processes that can lead to ischemia-reperfusion injury (IRI). Hydrogen sulfide (H₂S) is capable of decreasing cellular metabolism in a reversible, non-toxic manner. This study evaluated whether pre-ischemic treatment with H₂S ameliorates IRI in an in vitro model of FTT.

**MATERIALS AND METHODS:** Human umbilical vein endothelial cells (HUVECs) and myotubes together constitute an in vitro model of muscle flaps. The cell lines were plated in separate chamber slides and treated with media containing NaHS (0, 1μM, 10μM, 100μM, or 1mM), then exposed to anoxia (0%) for 5h, followed by normoxia for 3h. Control slides were treated with NaHS and kept in normoxia throughout. A TUNEL assay was performed on all cells and the apoptotic index (AI) was determined.

**RESULTS:** In the absence of H₂S, 5h ischemia and 3h reperfusion resulted in AI of 32% and 38% in HUVECs and myotubes, respectively. Treatment with increasing doses of H₂S resulted in a dose-dependent decrease in apoptosis in both cell lines, with maximal protection at 10μM (3.8% and 0.3% apoptosis, respectively; p<0.05 for both). No apoptosis was observed in normoxic cells treated with any dose of H₂S.

**DISCUSSION:** H₂S significantly decreased IRI-induced apoptosis in vitro. The results of this study suggest that H₂S has potential as a therapy for improving tissue survival in FTT.

**OP21: NETWORK OF THE CUTANEOUS PERFORATORS ISSUED OF RADIAL ARTERY – ANATOMICAL STUDY ABOUT 20 CASES**
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**INTRODUCTION:** Serious complications have been reported with the forearm radial flap, such as ischemic necrosis, distal digital necrosis, decreased power grip, and pain and chronic oedema of the hand. This flap is essentially vascularised by septocutaneous perforators originated from the radial artery. The goal of this study was to explore the cutaneous territories vascularised by these perforators, with the idea that such radial perforators flaps could be applied in clinics, with no sacrifice of the radial artery.

**MATERIALS AND METHODS:** 20 arms of fresh cadavers were dissected after coloured latex injection of the radial artery. Characteristics of the cutaneous paddles injected were studied and their vascular networks dissected.

**RESULTS:** The septocutaneous perforators of the radial artery are vascularised by 2 networks: one proximal and the other distal. Some direct cutaneous branches participate to the proximal vascular network. The sub-dermal and supra-fascial anastomotic network must be considered as a shunt between these 2 perforators networks, permitting the perfusion of an intermediary angiosome.

**DISCUSSION:** The cutaneous paddle of the septal forearm radial flap can be raised only with the proximal and distal perforators of the radial artery. Our study obviously found a constant intermediary anastomotic vascular network, in a subdermal and intra-dermal situation. This intermediary network
is the support of perforators flaps authorised by a sub-dermal shunt. It does not seem to be necessary to cut off the radial artery for the forearm radial flaps because its septo-cutaneous perforators and direct branches are sufficient to supply the vascularisation of the cutaneous paddle. This improvement of perforator flaps in clinical practise will probably lead to reduced complications connected with the sacrifice of a main artery.

**OP22: REPAIR OF TENDON DEFECT WITH ADIPOSE DERIVED STEM CELLS ENGINEERED TENDON IN A RABBIT MODEL**

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**INTRODUCTION:** Tendon tissue engineering research has achieved significant progress recently but still faces the challenge of limited cell source. For example, harvesting autologous tenocytes for tendon engineering may cause secondary tendon defect at the donor site, bone marrow stem cells (BMSC) still cannot be differentiated into tenocytes with high efficiency, dermal fibroblasts (DFb) are limited to allogenic application. Adipose derived stem cells (ASCs) are an easily accessible cell source, which do not cause major donor site defect. No investigation of using ASCs for tendon engineering and repair has been reported. This study aimed to explore the possibility of using ASC as cell source for tendon engineering and repair.

**MATERIALS AND METHODS:** Autologous ASCs were acquired from rabbit nuchal subcutaneous adipose with collagenase digestion, cultured and expanded to second passage, then seeded on longitudinally arranged polyglycolic acids (PGA) fibers, which were rolled by PLGA network. Cell-scaffold constructs were cultivated in a special stretching bioreactor for 5 weeks to avoid parts of acids produced by PGA fibers (n=12 for each group) before in vivo implantation to repair the defect of Achilles tendon. Scaffolds only were used as control. Specimens were harvested at 12, 21, and 45 weeks, respectively post-operation for gross, histological, and mechanical analyses.

**RESULTS:** The cells attached well to PGA fibers post-seeding and produce abundant extracellular matrices when observed by both optic and electronic microscopy. After 5 weeks of dynamic cultivation, cell-scaffold constructs with good biomechanical properties (tensile stress ~50MPa, about 50% of normal tendon) were generated in experimental group, and parts of PGA fibers were degraded. At 12 weeks post-operation, most of PLGA networks remained visible grossly, but mechanically became much weaker (one thirds of original stress) probably due to scaffold degradation. Long term in vivo observation showed that engineered tendons were quite similar to normal tendon in their gross view, histology, and tensile strength. At 21 weeks, parallel collagen alignment was observed at both ends, but not in the middle in histology, with more cellular components than natural tendons, with tensile stress reaching 55% of normal tendon again. At 45 weeks, engineered tendons exhibited histology similar to that of natural tendon. Collagens became parallel throughout the tendon structure, and PGA/PLGA fibers were completely degraded. Furthermore, engineered tendons showed stronger mechanical properties with tensile strength about 80MPa, relatively mature collagen with fibril diameter around 100nm at 45 weeks. In addition, collagen fibers were longitudinally aligned, becoming more closed to native tendon structure with longer remodeling time. At 12 weeks in control group, neo-tissue was formed only at the peripheral area by host cells, and the formed tissue was histologically disorganised and mechanically weaker than cell-engineered tendons (p >0.05).

**DISCUSSION:** These results suggested that ASC could be considered as a practical cell source to replace tenocytes for in vitro tendon tissue engineering and possibly in vivo tendon repair.

**OP23: THE USE OF NEAR-INFRARED SPECTROSCOPY (NIRS) TO CONTINUOUSLY MONITOR MYOCUTANEOUS RECONSTRUCTIONS**

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**INTRODUCTION:** In the UK, following mastectomy patients are offered a choice of reconstruction, up to and including myocutaneous flaps. Approximately 3% of these flaps fail due to vascular embarrassment, and require re-exploration or leech
therapy. Early recognition of impending flap failure using a repeatable, non-invasive system that differentiates between arterial and venous occlusion is invaluable.

**MATERIALS AND METHODS:** 19 patients having myocutanous flap reconstruction, either as an immediate or delayed reconstruction were enrolled into the study. Measurements were made using the InSpectra™ StO2 monitor, measurements of tissue oxygen saturation (StO2) and total haemoglobin index (THI) were recorded. Measurements were taken prior to, during, and after the surgery; with post-operative monitoring occurring continuously for 72 hours. Data were correlated with clinical outcome measures.

**RESULTS:** Out of the nineteen patients, there were two complete flap failures and two complications requiring intervention. In these cases problems were identified by either a significant rise in the THI or drop in the StO2. One of these patient’s data were unrecordable in recovery, and the patient was therefore returned to theatre immediately for a salvage procedure, which was ultimately unsuccessful.

**DISCUSSION:** InSpectra™ StO2 monitor has proved to be a successful aid in the clinical setting. While not replacing the need for experienced and rigorous nursing care, we believe it can be a valuable and objective means of assessing flap viability.

**OP24: ENGINEERING HUMAN CAPILLARIES IN VITRO**
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**INTRODUCTION:** Initial take, development, and function of transplanted engineered tissue substitutes are crucially dependent on rapid and adequate blood perfusion. Therefore, the development of rapidly and efficiently vascularized tissue grafts is vital for tissue engineering and regenerative medicine. We were asking whether the construction of a network of organotypic capillaries in vitro was possible.

**MATERIALS AND METHODS:** We employed a 3D culture system consisting of human microvascular endothelial cells (HuMECs) and their progenitors. These were reproducibly expanded at high purity and subsequently seeded into biodegradable, fibrin-based hydrogels and then transplanted onto immuno incompetent rats. The resulting vascular structures were analysed using immuno fluorescence techniques, in situ hybridization and electron microscopy.

**RESULTS:** The process of capillary formation in vitro followed the principles of both angiogenesis and postnatal vasculogenesis. Capillary lumen formation in vitro was initiated by the deposition of a basement membrane and intensive pinocytosis, followed by the generation of intracellular vacuoles, successive fusion of these vacuoles, and finally the formation of a long, continuous lumen. After transplantation the vascular structures were stabilized by mural cells of the recipient animal.

**CONCLUSION:** Our findings suggest that the in vitro engineering of pre-vascularized (interstitial) matrices is within reach.

**OP25: A COMPUTATIONAL MODEL TO PROFILE CYTOKINE NETWORKS MEDIATING ACUTE REJECTION AFTER COMPOSITE TISSUE ALLOGRAFT REJECTION**
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**BACKGROUND:** Composite tissue allotransplantation (CTA) is a nascent field within the realm of reconstructive surgery. When autologous tissue is neither available nor sufficient to reconstruct complex defects of the human form, CTA may provide an alternative. However, skin rejection in composite tissue allotransplantation (CTA) is the pace-limiting obstacle for wider adoption in clinical practice. This study aims to identify a computational model of cytokine network dynamics that mediate acute rejection within the skin following CTA.

**METHODS:** Using a Brown-Norway to Lewis rat hind-limb allotransplant model, syngeneic [n=10], allogeneic transplants without immunosuppression [n=10] and allogeneic grafts [n=10] treated with Tacrolimus were examined. 180 skin and muscle biopsies were taken at defined time points between
day 0 and 11. Protein levels of 14 cytokines known to be relevant in cellular inflammatory responses were assessed by Luminex™. Differences in the cytokine network profiles of the three groups were observed and confirmed at POD 5 with a 14-dimensional unconstrained linear classifier (KNN).

RESULTS: In all transplants, IL-1α and IL-1β were expressed in skin throughout the observation period with average IL-1α >3x Δ from native controls (NC) (standard deviation (SD)=6.5%) and average IL-1β also >3x ΔNC (SD=18.5%). Allogeneic transplants also expressed IL-1β at 6029 pg/ml (>65.5x ΔNC, SD=21.96%), IL-6 at 3145 pg/ml (>19.41x ΔNC, SD=10.58%) and GRO/KC at 813 pg/ml (>15.8x ΔNC, SD=15.59%). Tacrolimus treated transplants exhibited a cytokine profile very similar to that of syngeneic and native controls. The most notable difference was an average expression of MCP-1 at 500 pg/ml.

DISCUSSION: Using a 14 dimensional unconstrained linear classifier (KNN) calibrated to the data set we were able to successfully distinguish between all three categories of transplant at POD 5 with > 90% accuracy. This analysis helps to differentiate between unspecific (surgery related) inflammatory responses and rejection and provides a basis for early detection of skin rejection in CTA.

OP26: OLFATORY ENSESHETING CELL-LIKE DIFFERENTIATION OF ADIPOSE-DERIVED MESC- 
ECHMAL STEM CELLS
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INTRODUCTION: Recent attention has focused on the potential use of bone marrow cells which contain mesenchymal stem cells to repair the CNS because it contains populations of precursors that are multipotent and can differentiate into a number of cell types including bone, cartilage and muscle cells. Mesenchymal stem cells can be isolated from adipose tissue of the adult rat. These cells have been shown to differentiate after appropriate induction into various cell lines, e.g. fat cells, muscle, cartilage and bone as mesenchymal stem cells from bone marrow. In addition, mesenchymal stem cells derived from bone marrow were able to transdifferentiate into glia-like cells. The question we asked was if adipose derived stem cells can also be differentiated and transdifferentiate into glia-like cells.

MATERIALS AND METHODS: Adipose-derived mesenchymal stem cells were isolated from adult rats, cultured and differentiation was induced by basic fibroblast growth factor and epidermal growth factor in vitro. Morphology and further immunochemical markers of differentiated cells and undifferentiated cells were compared.

RESULTS: Here, we demonstrate that adipose-derived mesenchymal stem cells form nestin-positive neurosphere-like structures after induction. Further differentiation leads to significant morphological changes and to expression of the characteristic Schwann cell marker S100 and p75 nerve growth factor receptor and the characteristic marker GFAP for astrocytes. The simultaneous expression of characteristic glia marker of the central nervous system and the peripheral nervous system is an exceptional feature of olfactory ensheathing cells with unique properties regarding remyelina-
tion and enhancement of axonal regeneration.

DISCUSSION: These results indicate that adipose-derived mesenchymal stem cells can differentiate morphological and functional into an olfactory ensheathing cell-like glia population.

OP27: PROTECTIVE ROLE OF I-NOS INHIBITION IN ISCHEMIA-REPERFUSION INJURY
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AIM: To investigate the role of apoptosis as a cell death mechanism following ischemia-reperfusion in a rat latissimus dorsi muscle flap model. To study the effects of i-NOS inhibition on apoptosis.

MATERIALS AND METHODS: 40 Wistar rats were divided into three groups. 10 - Controls: latissimus dorsi muscle flap based only on its vascular pedicle, no ischemia-reperfusion, 15 - Ischemia Reperfusion (IR) latissimus dorsi muscle flap elevation, 4 h ischemia, 24 h reperfusion. 15 - i-NOS Inhibition with S-Methylthiourea (SMT) 3 mg/kg at three different timepoints: a) 30 min before ischemia b) 30 min before end of ischemia c) 12 h after reperfusion. At the end of the surgical and IR protocol, operated muscle from the middle third were harvested. The muscle was fixed in formalin and paraffin sections
were prepared for apoptosis analysis with fluorescent TUNEL assay (Roche Applied Biosciences, USA). The apoptotic index (ratio of apoptotic nuclei and total nuclei in a unit area) was calculated with image analysis of digital photos.

**RESULTS:** Two sided Student’s test was utilised for statistical analysis. Control group showed lower apoptotic index when compared to IR (0.06 vs. 0.31, p< 0.05) and i-NOS inhibition group. Animals in IR group demonstrated higher apoptotic index when compared to i-NOS inhibition group and the difference was statistically significant (0.31 vs. 0.20, p<0.05).

**DISCUSSION:** Apoptosis is up-regulated following ischemia reperfusion injury. i-NOS inhibition protects against cell death following reperfusion injury. Future studies looking into molecular pathways of apoptosis induction and regulation in ischemia-reperfusion events are warranted.

**OP28: A DERMAL SUBSTITUTE (MATRIDERM®) IS SERVING AS A SCAFFOLD FOR ADIPOSE TISSUE ENGINEERING: FIRST RESULTS OF AN IN VITRO STUDY**

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**BACKGROUND:** Millions of plastic and reconstructive surgical procedures are performed each year in order to repair soft tissue defects that result from significant burns, tumour resections or congenital defects. Preadipocytes represent a promising autologous cell source for adipose tissue engineering. These immature precursor cells, that are located between the mature adipocytes in the adipose tissue, are much more resistant to mechanical stress and ischemic conditions than mature adipocytes. Aim of the present study, was to determine, if a bovine derived collagen matrix with an elastin component (Matriderm®) could serve as a carrier for preadipocytes under in-vitro conditions. We also investigated if there was any influence, caused by processing of preadipocytes prior to seeding, on the reconstructed adipose tissue formation.

**MATERIALS AND METHODS:** Human preadipocytes were isolated from human subcutaneous adipose tissue and divided into three groups. Group I was seeded onto the scaffold directly after isolation, cells of group II were proliferated for 4 days before seeding and group III was proliferated and induced to differentiate before seeded onto the scaffold. A three dimensional scaffold containing bovine collagen and elastin served as a carrier. 21 days after seeding all scaffolds were histologically evaluated, using hematoxylin and eosin as well as immunofluorescence labeling with Pref-1 antibody (DLK (C-19)) and DAPI (4’,6-diamidino-2-phenylindole).

**RESULTS:** Cells of all groups adhered to the scaffolds on day 21 after seeding. Cells of group I and II adhered well and penetrated into deeper layers of the matrix. In group III penetration of cells was primarily observed to the surface area of the scaffold.

**DISCUSSION:** The collagen-elastin matrix serves as a useful scaffold for adipose tissue engineering. Freshly isolated preadipocytes as well as proliferated preadipocytes show good penetration into deeper layers of the scaffold, whereas induced preadipocytes attached primarily to the surface of the matrix.

**OP29: THE NEUROIMMUNOLOGIC BACKGROUND OF BURN-INDUCED ORGAN DYSFUNCTION: NEURO-IMMUNOMODULATION OF CARDIO-DEPRESSIVE PROINFLAMMATORY MEDIATOR GENERATION**

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**INTRODUCTION:** The interaction of the CNS and the immune system is well known. The “inflammatory reflex”, a parasympathetic anti-inflammatory pathway, has been described recently. It was shown that either electrical or pharmacological parasympathetic stimulation greatly attenuates the production of proinflammatory mediators and induces survival after injection of lethal-dose bacterial endotoxin. We and others have shown that burn-injury induces bacterial proinflammatory cytokine generation, which prompted us to evaluate whether parasympathetic stimulation, electrical or pharmacological, after experimental burn injury leads to decreased mediator generation, which may consecutively have a positive impact on postburn mediator-induced organ dysfunction.

**METHODS:** We used a standardised, full-thickness rat burn model comprising 30% TBSA. For the
electrostimulation experiments, the cervical portion of the vagus nerve was microsurgically prepared, and stimulated for 12 minutes at time t=0 and t=60 min post-injury (5 V, 40 ms pulse duration, 1 Hz). At time t=3 hours after injury, serum was harvested and organ samples of the heart, liver, lung, kidney and spleen were homogenised in protease-protected RIPA buffer. For the pharmacologic stimulation experiments, transdermal nicotine was applied at time t=0 after injury and left in place for 6, 12 or 24 hours. Organ and serum samples were also harvested as described above. All samples were subjected to sandwich-ELISA specific for TNF-α, IL-1β and IL-6. Prior to sacrificing the animals, in vivo left ventricular function and pressure parameters were assessed using left ventricular microcatheterisation. Statistical analysis was done using analysis of variance (ANOVA) and Tukey’s post-hoc tests where appropriate.

RESULTS: Experimental burn injury induced a significant rise of TNF-α, IL-1β and IL-6 in organ homogenates and serum compared to sham control animals. After cervical electrostimulation and transdermal application of nicotine, the serum and organ homogenate levels of all three proinflammatory cytokines were significantly reduced compared to non-stimulated or non-nicotine-exposed burn controls. Left ventricular microcatheter assessment of various left ventricular pressure parameters demonstrated no cardiodepressive effect of the parasympathetic stimulation itself.

DISCUSSION: Our results demonstrate a novel therapeutic strategy for the immunomodulation of proinflammatory, cardiodepressive mediator generation after burn injury. In light of the multiple, organ-damaging effects (e.g. burn cardiomyopathy) of the assessed mediators, our results encourage further research to gain more insight into the neuroimmunologic background of burn injury which may lead to the development of a novel treatment option of burn-induced organ dysfunction and immunodisturbance.

INTRODUCTION: The use of synthetic dermal scaffolds for full thickness reconstruction is limited by slow take rate with susceptibility to infection, and poor long-term outcome. Understanding cellular integration mechanisms is important for developing biologically enhanced scaffolds. We have devised a new Smart Matrix (SM) material in order to optimise the intrinsic potential of endothelial cells or progenitors for ingress and vasculogenesis.

MATERIALS AND METHODS: Integration of prototype SM scaffolds, Integra (INT) and Matriderm (MD) were evaluated in a porcine full-thickness wound chamber model. Wound biopsy samples on d3, d7, d14 & d21 were analysed by histology (H&E) and immunostaining (vWF, CD31, VE-cadherin, VEGF, CD133, CD34, CD45). Statistical analysis was performed using 2-way ANOVA.

RESULTS: Optimised SM integration was near complete within 7 days. Neo-vascularisation into SM was both significantly faster than INT (2x) and deeper (7.6 x) (p=6; p<0.001). This correlated with vasculogenesis in SM and angiogenesis in INT, and persistently low capillary density. INT persisted over the regeneration period, and was fibrogenic. MD was resorbed rapidly during integration, functioning in-between a scaffold and a wound dressing. SM scaffold was substantially resorbed by the completion of tissue regeneration.

DISCUSSION: The rapidity of Smart Matrix integration in the porcine model may translate to clinical benefit for full thickness regrowth.

INTRODUCTION: Limb-sparing surgery has become the surgical treatment of choice for upper extremity sarcomas. Previous studies have not investigated functional outcomes and cost impact parameters for functional reconstruction performed after limb-sparing surgery for upper extremity sarcomas.

MATERIALS AND METHODS: Patients who underwent functional reconstruction surgery following upper extremity soft-tissue sarcoma resection between December 1998 and March 2004 were
retrospectively identified. Hospital lengths of stay, operative times, and total hospital charges were analyzed. Cost data was adjusted for 2008 US dollars. Functional outcomes and patient satisfaction were assessed via patient surveys and the Toronto Extremity Salvage Score (TESS).

RESULTS: 13 patients met inclusion criteria. Average age was 55 years, with a male to female ratio of 3 to 7. 11 cases were for primary resections. 2 cases were for local recurrence. Average follow-up was 43.3 months. Overall survival was 85% (n=11), and disease free survival was 69%. 77% of patients achieved local disease control. Average operative time was 643 minutes. Reconstructive methods included rotational innervated muscle flaps (n=6), free innervated myocutaneous flaps (n=1), and tendon transfers or grafts (n=6) with free or rotational non-innervated flaps for soft tissue coverage. 11 reconstructions were immediate. Average total cost of surgery was $25,700. Average length of stay was 6.8 days. Patients undergoing reconstruction for hand and forearm sarcomas had significantly longer hospital stays (8.7 days) than those undergoing reconstruction for elbow and upper arm sarcomas (4.8 days), p = 0.01. Survey response rate for living patients was 87% (n=9). Average TESS score was 76. No patient stated that they would have preferred amputation. 88% of patients returned to work post-operatively, and all patients who returned to work currently use their affected limb at work. Average recovery time was 2.6 months.

DISCUSSION: Patients achieved very good to excellent functional outcomes with quick recovery times and a high return-to-work rate, thus minimizing surgical cost impacts.

OP32: A MICROSURGICAL MODEL FOR GENERATION OF AXIALLY VASCULARIZED BONE TISSUE
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INTRODUCTION: Generation of bioartificial bone tissues using 3D scaffolds, osteoinductive factors and osteogenic cells has been demonstrated in many experimental series. However, transfer of larger volumes of engineered bone tissue is hampered by suboptimal initial perfusion. The combination of microsurgical concepts and principles of regenerative medicine might facilitate generation of large-volume bone substitutes with high initial cell viability and optimal engraftment for application in reconstructive surgery. In this study porous hydroxyapatite/beta-tricalcium phosphate (HA/TCP) scaffolds loaded with osteoblasts and BMP-s were axially vascularized using an arteriovenous (AV) loop.

MATERIALS AND METHODS: 1 cc of particulated HA/TCP matrix, filled with fibrin (10 mg/ml fibrinogen, 2 I.U./ml thrombin), was inserted into an AV loop between the femoral vessels of 54 syngenic Lewis rats (group A-C). The construct was encased in a custommade Teflon isolation chamber. 4 weeks later 5x106 CFDA-labelled fibrin gel-immobilized osteoblasts were injected into the matrix (groups A and B). In group B the fibrin of the matrix was also loaded with 2500 ng/ml BMP-2. Plain cell-free HA/TCP scaffolds served as control (group C). Specimens were subjected to histologic, morphometric and molecular-biological analysis and micro CT scan following Microfil injection after 1, 4 and 8 weeks.

RESULTS: Upon cell injection matrices were completely vascularized as evidenced by 3D imaging. There was no significant foreign body reaction detectable over the whole observation period. At week 1 after osteoblast injection CFDA positive cells were evident in high numbers in the peripheral and central regions of the matrix in groups A and B. After 4 and 8 weeks the number of CFDA-positive cells significantly decreased in both groups. Bone formation and expression of osteoblast-specific genes was only detectable in animals of group B (osteoblast transplantation + BMP) at 4 and 8 weeks after cell injection.

CONCLUSION: This study demonstrates for the first time the generation of axially vascularized bone tissue in the AV loop-isolation chamber model. In this experimental setting osteogenic cells and osteoinductive factors proved to be essential for generation of sufficient amounts of axially vascularized bone tissues. The lack of bone formation in group A (osteoblast transplantation without BMP) might be related to the very challenging experimental setting with a completely isolated construct lacking any biomechanical or osteoconductive stimulus. Improvement of vascularization as well as optimization of scaffolds and growth factor release systems might eventually help to grow large volumes of functional, transplantable bone tissues in a single stage surgical procedure.
OP33: HOST DEFENSE-LIKE LYTIC PEPTIDE SUPPRESSES GROWTH OF HUMAN LIPOSARCOMA
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INTRODUCTION: Soft tissue sarcomas are a rare and heterogeneous group of tumours but the response rate to chemotherapeutics is relatively poor. As effector molecules of the innate immune system host defense peptides might provide a more effective option for the treatment of this cancer entity.

MATERIALS AND METHODS: In vitro: The human liposarcoma cell line SW872 and primary human fibroblasts were exposed to [D]-K3H3L9, a 15-mer D,L-amino acid peptide. Anti-proliferative (BrdU test), apoptotic (TUNEL assay) and anti-metabolic (MTT test) effects were quantified and the IC50 was determined.

In vivo: SW872 cells were injected subcutaneously into athymic nude mice. [D]-K3H3L9 was administered intratumorally 3 times per week for a period of 3 weeks. Phosphate buffered saline served as negative control.

RESULTS: In vitro: [D]-K3H3L9 significantly inhibited cell metabolism and proliferation in a dose dependent manner. The IC50 was 44 µM. An apoptotic effect of [D]-K3H3L9 was detected at 12.5 µM.

In vivo: Compared to the tumour volume of the control group the tumour volume of the treatment group was almost 3 times smaller. Macroscopically full remission could be observed in one case.

DISCUSSION: [D]-K3H3L9 exerts very promising oncolytic activity on liposarcoma cells. This study demonstrates the potential of host defense peptides as a novel therapeutic option for the treatment of soft tissue sarcomas.

OP34: RECONSTRUCTION OF FUNCTION IN THE SPASTIC HAND IN PATIENTS WITH CEREBRAL PALSY, AFTER BRAIN STROKE, BRAIN INJURY AND AFTER ENCEPHALITIS – A REVIEW OF 120 PATIENTS AFTER 5 YEARS
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INTRODUCTION: The typical deformity of the upper extremity in the patients with cerebral palsy is a problem of function, hygiene and aesthetics. Proximal deformities, such as internal rotation and adduction of shoulder and flexion of elbow, cause difficulties in dressing, pronation of forearm in hygiene, flexion and ulnar deviation of wrist, flexion or swan-neck deformity of fingers, and flexion and adduction of thumb cause difficulties in grip. Improvement of function of spastic hand depends on severity of deformities, sometimes also on IQ of the patient and other neurologic diseases.

MATERIALS AND METHODS: A retrospective case series of 120 individuals with spastic hand treated from March 2004 to March 2009 were reviewed. Most of these patients were aged from 11 to 20 years old, the youngest one was 6 years old, the oldest one was 61 years old. Most of them had cerebral palsy - 85, after brain stroke 16, after brain injury 16, after operation of brain 3, after encephalitis 2.

In 2004, 2 patients were treated and 4 operations were performed, in 2005 4 patients were treated and 6 operations were performed, in 2006, 18 patients and 29 operations, in 2007, 41 patients and 56 operations, in 2008 42 patients and 62 operations, and in the first three months of 2009, 13 patients and 18 surgeries. More operations mean multiphase reconstructions of function.

After surgery we used static splinting in each patient, dynamic splinting only after rerouting of the pronator teres. The pronator teres was supinated only 3 times but mostly there were multiple transfers. One half of patients did not have release of flexors and the second half did. In each reconstruction of extension of elbow was performed Z plasty of biceps and release of brachialis.

Range of motion, video-documentation and Canadian Occupational Performance Measurement were measured/ performed pre- and post-operatively on all patients.

RESULTS: Extension of elbow was improved on average in 40 degrees. Better results are seen after the pronator teres was supinated than after release. Improvement of extension of wrist was on average 55 degrees, abduction of thumb 30 degrees and ulnar deviation of wrist was improved in all patients.

Wound healing complications occurred once, in two patients there was poor function after the first operation due to poor cooperation of patients with low IQ, but after a second reconstruction the results for both were improved.
DISCUSSION: In 90 percent of cases we aim to first reconstruct a good grip. The second stage is reconstruction of supination of forearm, the third stage is flexion of elbow. Sometimes, we change our plan when supination is significantly improved during the first stage. Rarely, we operate first on elbows with severe flexion contractures. All of our patients were satisfied as the procedures improved their quality of their life.

OP35: IMMUNOINFLAMMATORY CELLS IN POST-TRAUMATIC TENDON ADHESIONS: AN IMMUNOHISTOCHEMICAL STUDY
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INTRODUCTION: It is well known that T-lymphocytes and macrophages are significantly involved in the dysregulation of wound healing and the formation of pathological scars. Despite the development of advanced tendon suture techniques and special therapy concepts, tendon adhesions are still a significant clinical problem after surgery, trauma or infection. In this study we investigated whether or not these cell types also play a role in the formation of tendon adhesions.

MATERIALS AND METHODS: Tendon sheath tissue that was obtained from patients undergoing tenolysis after trauma or surgery was analysed. Control tissue was obtained from fresh human cadavers. Immunohistochemistry was done on cryo sections. The quantity of CD3+, CD4+, CD8+, CD25+ and CD68+ cells was evaluated under blinded conditions, by microscope based “manual” counting of the immuno-stained cells in the sections and by relating the absolute cell numbers to the tissue area defined by unspecific counterstaining. The tissue area of the section in mm² was determined using a computer-based automatic image analysing tool and a calibrated digital photo microscope.

RESULTS: A several-fold increase of CD3+ cells in patient tissue compared to control was observed. We also found a significant increase in CD4+ and CD8+ cells. The absolute numbers of CD4+ cells were higher; however, the relative increase of CD8+ cells appeared to be more impressive. We also recognised an increase of lymphocyte activation in patient tissue by analysing CD25+. Furthermore, there was an increase in CD68+ cells.

DISCUSSION: Our study suggests that immunological processes driven by T-lymphocytes and macrophages are involved in the formation of tendon adhesions after trauma and surgery. Further investigations on lymphocyte characterisation, cell-cell-interactions and on the role of dendritic cells and macrophages are conducted to clarify the role of the immune system in the process of fibrosis in these patients.

OP36: PEDIATRIC SCAPHOID NONUNION: CLINICAL AND RADIOLOGICAL MID-TERM-OUTCOME OF 21 PATIENTS UNDERGOING OPERATIVE TREATMENT
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INTRODUCTION: The Management of the exceedingly rare problem of scaphoid nonunion in children is essentially based on experience in adults and at least a few published pediatric cases. We studied history, pathology and mid-term results of 21 Patients who were operated on for pediatric scaphoid nonunion to evaluate the benefit of operative treatment and to suggest prognostic indicators in this setting.

MATERIALS AND METHODS: 21 Patients (19 boys, 2 girls) with mean age of 12.3 years (range 5-15) were treated operatively for scaphoid nonunion. Diagnosis was based on radiographic criteria such as cystic and sclerotic changes according to Herbert and Fisher. Standard posterior-anterior and lateral radiographs of the wrist joint were used to show evidence of scaphoid nonunion in all patients. Comparison views from both wrists were not routinely obtained. Additionally CT- or MR-Imaging were carried out in 12 patients. At time of primary operative treatment none of the 21 patients showed radiographic evidence of radiocarpal degenerative changes. The nonunion was localised at the waist in 12 patients, in the proximal third in 6 patients, and in 3 patients nonunion was localised in the distal third of the scaphoid. Avascular necrosis (AVN) was identified in two patients with initial multifragment fracture of the proximal pole. Diagnosis of AVN was made intraoperatively as recommended by Green. 18 patients were treated with bone grafting and Herbert-Screw fixation. Vascularised bone grafting, Matti-Russe-Procedure and resection of the proximal scaphoid pole was done each in
one patient. The mean follow-up was 71.9 month (range 12-180). Follow-up included clinical (range of motion, grip strength, DASH score) and radiographic evaluation. Radiographic evaluation was based on standard frontal and lateral views of the wrist and posterior-anterior views of the wrist joint with the wrist in maximal ulnar deviation. In four patients with persisting pain CT- and MR-imaging was additionally obtained at final follow up.

RESULTS: Bony healing was found in 17 patients. Nonunion persists in 4 patients. In 2 patients, there was evidence for advanced carpal collapse (SNAC). Radiocarpal osteoarthritis was seen in 3 patients. Dorsal intercalated segment instability (DISI) was found in 6 patients. The mean value for the DASH score was 8.3 points (range 0-59). The mean deficiency of range of movement compared with the opposite wrist amounts to 15° in the dorso-palmar plane and 10° radioulnar. There was no limitation found for pronation and supination. Measured with the Jamar© Dynamometer, grip strength averaged 37.9 kg for the injured hand and 43.0 kg at the opposite hand.

DISCUSSION: Operative treatment of paediatric scaphoid nonunion in children leads to good clinical and radiological results. The clinical and radiological results correlate with the morphology of the initiate fracture. Time between initial injury & operative treatment correlate with occurence of osteoarthritis. AVN occurs in children & leads to poor radiographical and clinical results. Vascula-rised bone graft from radius is even in children an option, if graft is harvested far enough from the active growth plate.

OP37: EXPERIENCES WITH THE NOVEL 1ST AND 2ND FINGERTIP SUPPORT MICRO-SURGICAL TECHNIQUE IN PLASTIC AND RECONSTRUCTIVE SURGERY

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INTRODUCTION: The elimination of the natural hand tremor of the plastic and reconstructive surgeon by certain techniques allows procedures to be performed more precisely, which leads to more effective revascularization, nerve repair or free flap transfer. The improvement of the accuracy in microsurgery enables working at a microscopic scale that has not been previously possible.

BACKGROUND: The physiological tremor, that may extend up to 0.4-0.6 mm in case of a skilled microsurgeon, may cause difficulties in any field of microsurgery, even when using different arm- and handrests. Current medical robots have a level of precision of 0.1 mm. However, the application of these machines is expensive and often inconvenient for surgeons because the direct touch via micro instruments with living tissues is impossible. Safety issues of medical robotics should to be considered as well.

METHODS: Our primary concept describes a very simple and cost-efficient microsurgical method called the 1st-2nd and 3rd instrument holding fingertip support technique (“robot hand technique”). We have further developed this microsurgical technique and demonstrate it’s possible application and perspectives in plastic surgery.

MEASUREMENTS AND RESULTS: The technique consists of a special support of the surgeon’s thumb’s and index finger’s distal phalanx on the crossing bridge above the operating (working) point by which the 0.1 mm precision of the surgeon’s hand could be reached at microsurgical procedures. This level of precision could not have been achieved by hand so far. The significant effect of the technique on the surgeon’s hands was proven by randomized analysis by exact measuring of the reduction of tremor by tremorometry and instrument displacement measurements in 3D.

CONCLUSION: We have further developed our instruments and techniques to match requirements in various anatomical regions accessed in plastic surgery, where we are able to use the technique with success. Our aim is to present the application of the technique in the fields of plastic and reconstructive surgery. Future clinical trials will assess which microsurgical procedures in the field of plastic surgery can be improved with the 1st and 2nd instrument holding fingertip support microsurgery technique.

OP38: ALTERNATIVE APPROACH TO PROSTHESIS INFECTION: COATING WITH A NEW ANTIBIOTIC RELEASING POLYMER

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BACKGROUND: Infection is one of the most
important complications following implantation of a prosthetic materials in reconstructive surgery. This study was designed to assess the efficacy of a new biodegradable polymer for local application of antibiotic. A polypropylene mesh (PP) was used as experimental model.

**MATERIALS AND METHODS:** Three groups were made: PP without coating, PP coated with copolymer (POL group) and PP coated with copolymer supplemented with vancomycin (VC group). Staphylococcus aureus ATCC 25923 strain was used. In vitro bioassays were performed by measuring zone of inhibition diameters on agar plates for 14 days. In vitro time kill assays in 10 ml of Mueller Hinton broth was made. Partially defects (5×3cm) created in the anterior abdominal wall of 48 New Zealand rabbits were repaired using the meshes. The repair site was previously inoculated with 10⁸ CFU/ml S. aureus. At 14 days specimens were examined by light (LM) and scanning electron microscopy (SEM).

**RESULTS:** Inhibition halos around VC group persisted for 14 days on agar culture plate. SEM revealed large numbers of bacteria on the PP filaments in meshes without antibiotic, whereas fragments of VC group showed no significant bacterial adhesion. In time kill assay an adequate bactericidal response was achieved at least at 24 hours. Animals inoculated with S. aureus in the PP and POL, but not VC groups, showed considerable abscess formation and clinical infection. Two animals from PP group and one from the POL group died during the period of the study. No animals from the VC group died.

**DISCUSSION:** S. aureus infection can be significantly reduced if the prosthetic graft used is a bioactive polypropylene mesh is coated with this antibiotic-releasing polymer.

**OP39: COMPARISON OF 2D-SCHWANN CELL-NEURON-CULTURE WITH 3D-SCHWANN CELL-NEURON-SPHEROIDS – EFFECT ON NEURITE OUTGROWTH AND LENGTH**

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**INTRODUCTION:** The 2D-co-culture of Schwann Cells (SC) with neurons leads to an increased outgrowth of neurites and an increase of neurite length. Both, the cell-cell contacts as well as the secretion of neurotrophic substances are important factors. This study aims to investigate whether the spheroidal 3D co-culture of SC and Neurons with its intensified cell-cell contacts leads to higher rates of neurite outgrowth and length compared to the 2D Co-culture.

**MATERIALS AND METHODS:** SC were cultivated from sciatic nerves of neonatal rats; the neural cell culture NG108-15, a hybrid cell line from mouse neuroblastoma and rat glioma was purchased. SC+NG spheroids were fabricated and embedded in collagen. 2D-Co-Cultures of SC and NG cells were cultivated on flasks. Using the microscope Axioplan (Zeiss) and the software Axiovision (Zeiss) both the 2D-culture and the 3D-culture were analyzed after 10 days of incubation in regard to neurite outgrowth and neurite length.

**RESULTS:** Both co-cultures (2D and 3D) showed considerable neurite outgrowth after 10 days of incubation. The direct comparison of both co-cultures revealed a significantly higher number of neurites and significantly higher neurite lengths in the SC-NG-spheroids. Furthermore myelinisation processes could be observed in the 3D co-cultures.

**DISCUSSION:** By simply transferring a 2D into a 3D culture with multiplication of cell-cell contacts a significant increase of neurite reaction can be achieved. This, together with the observed myelinisation processes could make the spheroidal co-culture a close-to-reality model for further studies of neuroregenerative mechanisms.

**P1: VISCOELASTIC PROPERTIES OF CROSS-LINKED HYALURONIC ACID DERMAL FILLERS AND IMPACT ON DISTRIBUTION IN THE DERMIS**

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**INTRODUCTION:** Restoring aging skin by augmentation with biomaterials is a frequent therapy in dermatology and plastic surgery. Preferred materials are chemical cross-linked derivatives of hyaluronic acid (HA). Half-life time of native HA in the dermis is about 24 hours. Therefore it is necessary to stabilize HA and to protect it from biological degradation. On cross-linking HA forms water insoluble gels which show an enhanced stability in biological tissues. Today more than 100 different preparations of HA based filler are available in the Europe, mostly based on cross-linked HA (XLHA). They differ in source, chain length and concentration of the HA and in the mode and kind of chemical agents used for the cross-linking
From the physical point of view HA and its cross-linked derivatives cannot be described by Hooke’s or Newton’s law. They exhibit viscoelastic properties.

**MATERIALS AND METHODS:** Viscoelastic data of different XLHA dermal fillers were taken from the literature. Distribution of the materials was visualized by microscopic examination of thin sections of dermal specimen.

**RESULTS:** The viscoelastic properties have a strong impact on the distribution of the filler materials in the dermis. Table shows some viscoelastic data of most frequent used XLHA preparations. It is evident that there is a binary division in more rigid and less rigid gels. In consequence, prior to injection of rigid gels through narrow needles they must be crushed to pieces and lubricated with water forming a so-called biphasic gel. In contrast, the less rigid gels can pass narrow needles without further processing and are called monophasic. Whereas monophasic gels are capable to spread in-between the tissue gaps the biphasic gels tend to form clusters. A review of data of safety and efficacy from clinical studies results in a comparable performance of both XLHA species.

**CONCLUSIONS:** The distribution of monophasic and biphasic gels in the dermis is different and can be assessed on the base of the viscoelastic properties.

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**P2: PROVING THE EFFECTIVENESS OF THE LIP LIFT FOR THE TREATMENT OF THE AGING LIP – A MORPHOMETRICAL EVALUATION**

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**INTRODUCTION:** Aging changes of the lip lead to apparent lengthening of the upper lip. Inadequate upper incisal display and thinning of visual lip red reinforces the senile facial expression. The upper lip lift has been described as an excellent option to address the aged lip by shortening the prolabium, but its effect has not been proven so far.

**PATIENTS AND METHODS:** In 22 patients aged 39-67 years (mean age: 55 years) an Austin type lip lift was performed. Pre- and postoperative standardized pictures were morphometrically analysed concerning the total upper lip length, prolabium, vermilion and nasolabial angle.

**RESULTS:** Statistical significant reduction was found in total upper lip length and prolabium length while vermilion height increases and the nasolabial angle decreases.

**CONCLUSION:** The upper lip lift effectively addresses the most striking changes of aging in the upper lip complex.

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**P3: THE AGING LIP – A COMPARATIVE HISTOLOGICAL ANALYSIS OF AGE RELATED CHANGES IN THE UPPER LIP COMPLEX**

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**INTRODUCTION:** Upper lip rejuvenation is achieved by a large variety of different treatment approaches clearly lacking a unified theoretical background of the aging processes of the upper lip complex. In this study the histological changes that occur in the aging upper lip are systematically evaluated for the first time.

**MATERIAL AND METHODS:** Histological cross cuts of the upper lip complex of 20 individuals in two age groups, young (< 40 years, n = 10) and old (> 80 years, n = 10), were analysed. The specimens were collected during autopsy of individuals without facial injuries. Hematoxylin-eosin and Elastica van Gieson stains were performed and the relevant anatomical structures measured and compared using a Student-t-test.

**RESULTS:** Histomorphometric analysis revealed statistically significant thinning of the cutis, thinning of the orbicularis oris muscle and an increase of the orbicularis oris muscle angle defining the vermilion border in the old lip group. Elastic and collagen fibers in the cutis undergo degeneration processes during aging. The orbicularis oris muscle is not subject to fatty or fibroblastic degeneration but shows signs of atrophy.

**CONCLUSION:** The performed histomorphometrical and histomorphological analyses shed light on the so far only unsystematically and episodically described process of upper lip aging on a histological level. The distinct changes add further evidence to the theory that the aged look is rather due to a loss of elasticity and resultant ptosis of the upper lip than to the often postulated but unproven total volume loss.
P4: VACUUM ASSISTED CLOSURE THERAPY
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OBJECTIVE: To determine the efficacy of vacuum assisted closure therapy
Design: Descriptive study
Settings: Private setup (Aesthetic Plastic Surgery), Rawalpindi, Pakistan

MATERIALS AND METHODS: The VAC therapy was used in 23 patients having open wound involving various anatomical areas. All the wounds had failed to heal after treatment with wound dressings and debridements. Before the application of VAC, surgical debridements removed all the devitalized necrotic tissue, and the wound was packed with povidone/iodine. VAC was applied after 24 to 48 hours. Tissue cultures for microorganisms were obtained before the application of VAC and at the end of VAC therapy. At each visit, wound dimensions were recorded and clinical photographs were obtained to objectively evaluate wound shrinkage and formation of granulation tissue. At the end of treatment, the wound coverage using skin graft of flap was performed.

RESULTS: A total of 23 patients were included in the study including 16 males and 7 females. The average age in male patients was 37.6 years as compared to 39.1 years in female patients. 26.1% of the patients were diabetic. The lower limb was the most frequently affected (78.3%). Satisfactory wound healing was obtained in all these cases in an average of 24.7 days in non-diabetics and 53.3 days in diabetics. Wound size decreased from 15.4×9.6 cm to 14.1×8.6 cm in non-diabetics and 13.8×8.5 cm to 12.2×8.0 cm in diabetic patients. None of the patients required amputations.

CONCLUSION: VAC is a useful adjunct to the standard treatment of chronic wounds. And it is an extremely simple modality and does not require expensive equipment.

P5: PROSPECTIVE INVESTIGATION OF EXPLANTED BREAST IMPLANTS – CAN SONICATION DETECT SUBCLINICAL INFECTION?
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INTRODUCTION: Capsular fibrosis is a severe complication after breast implantation with uncertain etiology. Microbial colonization of the prosthesis has been hypothesized as one of possible reasons for low-grade infection and subsequent capsular fibrosis. Until recently, no reliable method for detection of adherent bacteria growing in biofilms existed. Conventional cultures are false-negative in up to 30%. Sonication of removed implants has been shown by our group to improve the diagnosis of prosthetic joint infection by detachment of biofilms from the implant surface. We hypothesize that sonication can also improve the detection of microbial colonization in breast implants.

PATIENTS AND METHODS: In this multicenter study, explanted breast implants of patients after aesthetic and reconstructive implantation from February 2006 through December 2007 were prospectively analyzed. Implants were sonicated in Ringer solution at 40 kHz for 5 min. The resulting sonication fluid was cultured, followed by identification and enumeration of microorganisms. Patient demographics, underlying conditions, degree of capsular fibrosis according to Baker and implant characteristics were recorded.

RESULTS: 111 breast implants from 78 patients were included. The mean age was 51 years; 99% were females (1 gender adaption in genetically male subject). 65 implants (59%) were used for breast reconstructions, 46 (41%) for aesthetic procedures. The mean implant indwelling time was 9.3 years (range, 1 month - 32 years). At the time of explantation capsular fibrosis was present in 22 (grade I), 12 (grade II), 21 (grade III) and 39 cases (grade IV); 12 implants were temporary implant devices. Most implants contained silicone gel (61%) with a mean volume 260 ml (range, 110 – 750 ml). Surface structure was textured in 60%, smooth in 32% and polyurethane in 8% of implants. 59 implants were placed (partially) submuscular and 31 subglandular. The main reasons for explantation were capsular fibrosis grade III/IV (n = 49), cosmetic (n = 14), manifest infection (n = 7) and implant rupture (n = 6). Microorganisms were detected by sonication in 55 implants (49%), among which 29 grew significant numbers of microorganisms (>100 colonies/ml sonication fluid). Coagulase-negative
staphylococci (n = 25), *Propionibacterium acnes* (n = 19), *Candida albicans* (n = 4) and *Bacillus* spp. (n = 3) were most commonly isolated.

**CONCLUSION:** By sonication, 49% of explanted breast implants were colonized with microorganisms, predominantly belonging to normal skin flora. Sonication may replace conventional microbiological methods (periprosthetic swabs and biopsies) in the future. In addition, sonication may elucidate the role of subclinical infection in the pathogenesis of capsular fibrosis.

**Results:** The use of ELS devices improved the assessed cardiac functional and oxygenation parameters in all patients. Survival was noted in n=5 patients. Ventilator parameters could be decreased to the targets as outlined in the guidelines for protective lung ventilation in all patients.

**Conclusion:** The use of ELS devices can be beneficial in devastating clinical situations. Their use is associated with potential complications such as bleeding in case of catheter dislocation. Thromboembolism may occur when anticoagulation is not properly initiated and maintained. This study indicates that ELS devices can be a useful and potentially life-saving treatment option in burn patients suffering from cardiopulmonary dysfunction. Clinical algorithms for the use of ELS devices in burn patients need to be established - a proposal will be presented at the meeting.

**P7 Die topische Therapie mit Cerium-Nitrat verhindert eine Verbrennungskrankheit im Rattenmodell**

Hernekamp JP, Kremer T, Peter C, Gebhardt MM, Weihrauch M, Heitmann C, Walther A

**Introduction:** Severe burn injury is frequently accompanied by cardiopulmonary dysfunction. Inhalation injury may lead to adult respiratory distress syndrome (ARDS). Preexisting pulmonary or cardiac diseases are additive complicating factors. Organ failure, disability and death may result. Extracorporeal life support techniques such as extracorporeal membrane oxygenation (ECMO) or interventional lung assist devices (iLA, Novalung®) can be used to both ensure adequate tissue oxygenation and decrease cardiac stress. Depending on the clinical situation, various methods such as veno-venous, veno-arterial (VV-VA) ECMO or the iLA can be used.

**Methods:** A systematic, retrospective chart review (2001-2009) of burn patients treated in our unit as well as a literature review using evidence-based medicine (EBM) criteria was performed. From 2001 to 2009, a total of n=8 patients who underwent extracorporeal life support (ELS) after having sustained severe burn injury either with or without concomitant inhalation injury were identified. Clinical outcome was measured by various parameters such as overall survival, improvement of oxygenation parameters and cardiac function parameters. Cardiac function was measured by a transpulmonary thermodilution and pulse contour analysis system (PiCCO®). Data analysis was done using descriptive statistical analysis and Student’s t-Test where applicable.

**Results:** The use of ELS devices improved the assessed cardiac functional and oxygenation parameters in all patients. Survival was noted in n=5 patients. Ventilator parameters could be decreased to the targets as outlined in the guidelines for protective lung ventilation in all patients.

**Conclusion:** The use of ELS devices can be beneficial in devastating clinical situations. Their use is associated with potential complications such as bleeding in case of catheter dislocation. Thromboembolism may occur when anticoagulation is not properly initiated and maintained. This study indicates that ELS devices can be a useful and potentially life-saving treatment option in burn patients suffering from cardiopulmonary dysfunction. Clinical algorithms for the use of ELS devices in burn patients need to be established - a proposal will be presented at the meeting.

Statistik: ANOVA mit Bonferroni - Korrektur, T-Test. 

ERGEBNISSE: 
- Es bestehen keine signifikanten Unterschiede zwischen den einzelnen Gruppen in Bezug auf makrohäodynamische und mikrohämo-dynamische Parameter. 
- Verbrennungsplasmatransfer induziert in gesunden Tieren einen signifikanten Anstieg der Albuminextravasation nach 120 min (p<0.001) 
- Auch Tiere der Negativkontrolle zeigten eine zunehmende Ödembildung. Diese war aber im Vergleich zu Positivkontrolltieren signifikant geringer (p<0.05). 
- Die topische Therapie der Spendertiere mit Ceriumnitrat reduziert sowohl nach 10 min als auch nach 2 h die Plasmaextravasation auf das Niveau der Shambuminfusion. 
- Alle Gruppen zeigen einen deutlichen Anstieg der adhärenten Leukozyten, wobei Ceriumnitrat die Zahl der Sticker reduziert. 


Die Ödembildung im Rahmen der Verbrennungskrankheit scheint zumindest teilweise unabhängig von einer gesteigerten Leukozytenendothelinteraktion zu sein, da die topische Therapie mit Ceriumnitrat zwar die Plasmaextravasation signifikant reduziert aber keinen signifikanten Einfluss auf die Leukozytenaktivierung hat. 

P8: THE CHARACTERISATION OF BIOFILMS WITHIN BURN WOUNDS, AND TRACHEOSTOMIES IN CRITICALLY BURN-INJURED PATIENTS 
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INTRODUCTION: Burn injured patients are uniquely susceptible to infection, both from the burns themselves, and from the devices used to treat them. Biofilm related infection is thought to be responsible for up to 80% of healthcare acquired infections. The biofilms within endotracheal tubes have been implicated in the formation of ventilator associated pneumonia, causing significant morbidity and mortality. Tracheostomy patients in a burns unit suffer from the same risks. Current treatment modalities in critical care settings are becoming more focused on the control of endotracheal tube biofilms. However, the biofilm composition within the tracheostomies of burn-injured patients has not been previously elucidated. 

Accurate identification of the structure and composition of biofilms within airway devices will allow more focused treatment modalities. 

MATERIAL AND METHODS: We present the data from a series of tracheostomies taken from a regional burns unit. The biofilms were identified using classical culture techniques, molecular DNA analysis and fluorescent in-situ hybridisation microscopy. Giving information of microorganisms present their densities and their three-dimensional orientation. 

The same techniques were applied to burn wounds which had previously been treated with silver based dressings for a period of three weeks. 

RESULTS: The tracheostomies showed high
densities of common healthcare related pathogens *Pseudomonas aeruginosa* and *Staphylococcus aureus*, but also the presence of fungal elements such as *Candida albicans* intimately related to the walls of the medical devices.

Burn wounds showed a preponderance of Pseudomonads, but with *Enterococci* and other faecal pathogens contributing to the biofilm.

**CONCLUSION:** An understanding of the relationship between different microorganisms and their role in biofilm formation, whether as a *Persister* or as a mediator of initial attachment, can help in the development of new treatment modalities, and subsequently reduce patient morbidity.

**P9: POSITIVE EFFECTS OF EARLY SURGICAL TREATMENT OF BURNED CHILDREN**

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**INTRODUCTION:** The treatment of severe burn requires a complex surgical procedure. The aim of this study was to found an effect of early surgical treatment for dermal burns in children.

**MATERIALS AND METHODS:** Between 2006 and 2008 160 children with a partial thickness burns were enrolled in two groups. Both of them were comparable according to age, sex, etiology, burn depth and affected TBSA. 140 children with TBSA 16.8% were treated by early surgical debridement with acellular porcine dermice in 2-5 hours after the trauma at burn shock period. 20 children with TBSA 16.1% were hospitalized in 24-36 hours after trauma so surgical treatment was delayed.

**RESULT AND DISCUSSION:** Duration of treatment in first group was 6.5 days, in second - 19.3 days. No skin grafting procedures were performed at first group, in second - grafting was done in 6 cases. No visible scars formations in first group were found. In second group scars were defined in skin grafting areas - 6 cases, and in 3 cases without grafting.

**CONCLUSION:** Early surgical treatment with using porcine dermis in children with partial thickness burns minimizes the duration of treatment. Also the fact of less scarring is observed after early surgical treatment.

**P10: DEFINITION OF EFFICIENCY OF CONTACTUBE IN PREVENTIVE MAINTENANCE OF FORMATION BURN SCARS**

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**INTRODUCTION:** Burn scars are huge aesthetic and functional problem. The aim of this study is improving of scars treatment methods.

**MATERIAL AND METHODS:** Definition of efficiency Contactubex in preventive maintenance of formation burn scars at 45 adult patients after wide dermal superficial burns was done. The skin site after burn were red, with keratosis; neogenic epidermis were thin and easily injured, parameters of microcirculation have averaged 8.4±1.22 perfusion units, that exceeded normal more than in 2 times. All appoints carrying pressure garments and Contactubex. Contactubex with ultrasound have been appointed to 25 patients after dermal superficial burns on area after wounds. 20 patients with an identical trauma used Contactubex in the traditional way.

**RESULT AND DISCUSSION:** Repeated research was spent every month: if clinical and LDI parameters were stable or their minor alteration was marked – the same scheme of treatment proceeded. At significant strengthening parameters with clinical displays of a progression scars (condensation and an eminence of scar, the redness, an itch, a pain, sensation of burning) was required change of the scheme of treatment. Repeated researches were spent within 6 months with correction of the scheme of conservative treatment depending on clinical displays and parameters of LDI. Using of Contactubex with ultrasound get to normalization of color of skin, its physical parameters, and also parameters of microcirculation (6.7 ± 1.95 perfusion units) within the first month of treatment. At traditional way of Contactubex use such results have been reached at 17 patients on the average through 2.6±0.4 month. Besides 3 patients have cancelled traditional use of Contractubex, having appointed it with ultrasound, and other methods, in connection with absence of positive dynamics and threat of formation scars.

**CONCLUSION:** After 6 months at all patients absence scars, full restoration of functional activity were diagnosed. Thus, Contactubex is modern means of preventive maintenance of burn scars. The preparation is more effective with ultrasound.
Parameters LDI may be using as criteria of efficiency of the conservative treatment of scars, to promote duly correction of the scheme of rehabilitation actions.

**P11: REPAIR OF GRADE III ULNAR COLLATERAL LIGAMENT INJURIES AT THE METACARPOPHALANGEAL JOINTS OF THE THUMB WITH DUAL THREADED SUTURE ANCHORS**

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**INTRODUCTION:** Injuries to the metacarpophalangeal joint of the thumb frequently cause complete or partial tears of the collateral ligaments, resulting in marked instability of the involved joint. The ulnar collateral ligament is often torn from its insertion site and reattachment is difficult. The aim of this study was to evaluate the clinical outcome after repair of Grade III ulnar collateral ligament injuries at the metacarpophalangeal joints of the thumb with the with dual threaded metal suture anchors.

**MATERIAL AND METHODS:** 39 acute grade III ulnar collateral ligament injuries (complete ulnar collateral ligament disruptions) were treated by using dual threaded metal suture anchors to reattach the avulsed ligament to bone in its anatomical position. Tendon advancement or graft reinforcement was not used in conjunction with the repair. Final follow-up examination ranged from 4.5 to 13 months.

**RESULTS:** A Stener lesion was found in 56.4% patients. X-ray films demonstrated accurate placement of the bone anchor with protraction of the metallic wings within cancellous bone. At the last postoperative follow-up, 92.3% patients had good to excellent results subjectively. All patients exhibited a full return to activities of daily living within 6 weeks and return to their original work or sports activities within 14 weeks. Pain was completely relieved in 84.6% patients. In all joints the postoperative valgus stress angle was within 13 degrees of that of the contralateral digit. Range of motion revealed a 9.7% loss of metacarpophalangeal flexion-extension and a 23.5% loss of interphalangeal motion. Grip strength was 94.1% of the uninjured hand. Pinch strength in apposition averaged 95.8% and in opposition 91.3% of the uninjured hand.

**DISCUSSION:** A stable thumb metacarpophalangeal joint was achieved in each case with no recurrent instability at final follow-up. This study supports the use recommend dual threaded metal suture anchors as a simple and effective method of repairing the acute ulnar collateral ligament injury.

**P12: PLASTIC AND RECONSTRUCTIVE SURGERY IN THE SCOTTISH MEDICAL SCHOOL CURRICULUM**

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**QUESTION:** Discussion with colleagues highlighted the fact that exposure to teaching in plastic and reconstructive surgery as an undergraduate is very variable and is under-represented in some Scottish Universities curriculums. This study asks are students at Scottish medical students being provided with sufficient education in preparation for their medical career on the topic of plastic and reconstructive surgery as outlined by the guidelines provided by the General Medical Council, Tomorrows Doctors Curricular Outcomes?

**MATERIAL AND METHODS:** All junior doctors working in Glasgow Royal Infirmary were asked to complete a two part questionnaire. Part one evaluated their knowledge on a number of clinical scenarios they may be faced with from day one of their medical career. Scenarios were generated based on the information on British Association of Plastic, Reconstructive and Aesthetic Surgeons (BAPRAS) patient information section - which provides brief accounts of the common conditions treated by plastic surgeons. These included breast enlargement, pectus excavatum, rheumatoid arthritis of hands, malignant melanoma, head and neck cancer, osteoarthritis of base of thumb, burns and breast cancer. Junior doctors were asked whether a National Health Service plastic surgeon could be involved in the care of each of the patients and which other specialists, if any, may be involved in their care. Questions were peer reviewed for clarity and understanding. Junior doctors were then asked what undergraduate education they received on plastic and reconstructive surgery and if they felt satisfied that sufficient education is being provided as is necessary to meet the clinical outcomes detailed in Tomorrows Doctors and adequately prepare them for work.
Teaching received on the topic of plastic and reconstructive surgery by graduates of each of the medical schools was evaluated. Level of knowledge/satisfaction of graduates was compared and results analysed to determine if knowledge/satisfaction correlated with level of teaching received.

**RESULTS:** 32 junior doctors completed the questionnaires. 17 University of Glasgow graduates, 5 University of Dundee graduates, 5 University of Edinburgh graduates, 5 University of Aberdeen graduates.

4 of the 32 graduates are considering a career in plastic and reconstructive surgery.

Of the 8 scenarios, specifically designed from the BAPRAS website as those which a plastic surgeon may manage an average of 4 of the 8 clinical problems were recognised by junior doctors as patients that may be treated using plastic surgery.

Aberdeen graduates recognised the potential for plastic surgical input in the highest number of scenarios (mean = 5.75 out of 8 clinical scenarios), compared to Glasgow graduates who recognized only 3.4 out of the 8 clinical scenarios may be treated by a plastic surgeon. Clinical scenarios will be presented and graduate knowledge discussed.

Glasgow and Edinburgh graduates received no formal teaching on plastic and reconstructive surgery as part of their undergraduate medical curriculum.

All Aberdeen and all Dundee graduates, apart from one, remembered receiving formal teaching on plastic and reconstructive surgery. Teaching formats included brief formal lectures, small group, consultant led hospital teaching and computer assisted learning packages.

Of those who did not receive any formal teaching nine used textbooks to gain knowledge on the role of plastic surgeons, nine stated that the media was their primary source from which they gleaned their knowledge on the role of plastic surgeons and six from unscheduled teaching opportunities on hospital placements.

Of the 24 graduates that did not receive formal teaching all felt that they lacked adequate knowledge as to which of their future patients may benefit from input from plastic and reconstructive surgeons, 21 (87.5%) would like their medical school to introduce more formal education on the role of plastic surgeons in the NHS.

**CONCLUSIONS:** The current understanding of the role of an NHS plastic and reconstructive surgeon is varied among Scottish junior doctors. 94% of graduates from the Glasgow and Edinburgh Universities feel they do not know enough about the role of an NHS plastic surgeon and that undergraduate education provided on the topic of plastic and reconstructive surgery does not meet the outcomes described in Tomorrow’s Doctors. Graduates from the other Scottish medical schools are more satisfied.

There is great variation in the undergraduate teaching provided, with some graduates relying predominantly on the media for information on the role of a plastic surgeon. Of those who received no formal teaching 87.5% of those questioned feel they would benefit from this being introduced into the undergraduate curriculum.

Plastic surgery is recognised as a surgical sub-specialty. However, a basic understanding of the role of an NHS plastic surgeon is important, whether it be to make appropriate referrals to plastic surgeon colleagues or to instill an early interest in a competitive sub-specialty and encourage young doctors to consider a career in plastic surgery with realistic expectations.

The authors feel that a formal introduction to the role of the plastic surgeon in the NHS, as is currently provided by some Scottish medical schools, would be of benefit to all undergraduate medical students.

**P13: DOCTORS ONLINE: THE CONSEQUENCES OF PUBLIC PRIVATE PROFILES**

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**INTRODUCTION:** The use of social and professional networking websites has meant that doctors are sharing personal details and information, which may be considered inappropriate by patients and could cast doubt on their integrity, professionalism. A survey was designed to determine the proportion of patients that viewed doctors’ online profiles, and the proportion that considered the viewed material inappropriate or offensive.

**MATERIAL AND METHODS:** A questionnaire survey was conducted to evaluate the proportion of patients viewing doctors’ online profiles and the proportion that had found inappropriate material within those profiles. The effects that such material had on confidence in the doctor and confidence in the medical profession as a whole were evaluated.

**RESULTS:** Out of 200 patients surveyed, 27 had viewed internet profiles of doctors. Half of these
patients considered the material that they found to be inappropriate or offensive. The majority of offense was caused by photographic material involving alcohol and lewd behaviour. 62% of patients who had viewed inappropriate material, thought that these activities would impact on the doctor’s ability to practise while 77% believed that this material would affect their trust in the profession.

**CONCLUSION:** This study demonstrates that a proportion of patients are indeed viewing doctors’ public profiles and many are reporting inappropriate and offensive material posted on those profiles. Patients thought that such material would affect a doctor’s ability to practise, and a number reported that such behaviour would affect their trust in the medical profession.

**P14: THE MIRROR HAND AN EXTREMELY RARE MALFORMATION OF THE UPPER LIMB - CASE REPORT OF THE TREATMENT OF 2 CHILDREN**

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The mirror hand is one of the rarest malformations of the hand and upper limb. A polydactyly is mostly combined with duplication of the ulna, missing or hypoplastic radius with deficient muscular structures of the radial forearm, especially extensor muscles together with other anatomical changes. Therefore the function of the hand and arm is lacking. We treated 2 juvenile patients and describe the therapy, diagnostics and cosmetic and functional results.

**P15: MANUAL STIMULATION OF THE FOREARM TO IMPROVE POSTOPERATIVE RECOVERY AFTER MEDIAN NERVE SUTURE IN RATS**

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Transection and re-anastomosis of the purely motor facial nerve leads to poor functional recovery. However, we have recently shown in rat that manual stimulation (MS) of denervated vibrissal muscles reduces the number of polyinnervated motor endplates and promotes full recovery of whisking. Here, we examined whether MS of denervated rat forearm muscles would also improve recovery following transection and suture of the mixed (sensory and motor) median nerve (median-median anastomosis, MMA). Following MMA of the right median nerve, animals received no postoperative treatment, daily MS of the forearm muscles or handling only. An almost identical level of functional recovery, measured by the force of grip in grams, was reached in all animals by the sixth postoperative week and maintained till 3 months following surgery regardless of the postoperative treatment. Also, we found no differences among the groups in the degree of axonal sprouting, the extent of motor endplate polyinnervation and in the soma size of regenerated motoneurons. Taken together, we show that while MS is beneficial following motor nerve injury, combined strategies will be required for functional recovery following mixed nerve injury.

**P16: PREFABRICATION OF TRACHEA FOR HEMILARYNGEAL RECONSTRUCTION**

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**INTRODUCTION:** Currently the surgical treatment of advanced unilateral glottic cancer consists of a total laryngectomy with permanent tracheostome and radiotherapy. Every attempt should be made to avoid total laryngectomy for patients where the cancer is amenable to partial resection of the larynx, because loss of speech and the need for a permanent stoma drastically alters quality of life. We restored the hemilarynx with a prefabricated trachea segment.

**MATERIAL & METHODS:** We performed an extended hemilaryngectomy in first stage along with the harvest of a compound radial forearm fascia-and fasciocutaneous (FC) free flap. The proximal FC paddle closes the hemilaryngeal remnant while the distal fascia is wrapped around 4 cm of trachea. After 4 months the prefabricated trachea is sutured as a vascularised patch into the defect. The tracheostome is removed after 1 month.
RESULTS: In 78 patients the hemilarynx was restored with prefabricated trachea. Mean time to oral intake for solids and liquids was 8.2 days (SD = 5.2 d) and 16.6 days (SD = 6.3 d). After closure of the tracheostome, (27.0 d /SD = 5.8 d) in all patients hand-free speech was possible. The voice sounds moderately hoarse.

CONCLUSIONS: In this 2-stage reconstructive procedure, the combination of the prefabricated tracheal patch and the compound radial free flap successfully restores the phonatory, sfincteric and respiratory function.

P17: ANTIBODY TARGETED MAGNETIC FLUID HYPERThERMIA FOR THERAPY IN ORAL CANCER.
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INTRODUCTION: Oral squamous cell carcinoma is an aggressive disease, refractive to current therapies and there have been no significant improvements in patient prognosis over the past 25 years. Magnetic fluid hyperthermia (MFH) is a novel concept in cancer therapy using the unique properties of superparamagnetic iron oxide nanoparticles (SPIONs) to generate heat when placed within an external alternating magnetic field (1). MFH has previously safely been used as therapy in prostate cancer via direct intratumoural injection(2,3). We propose that MFH can be delivered more effectively using antibody targeting.

METHODS/RESULTS: The αvβ6 integrin is an exciting new target in OSCC, over-expressed in 80% of OSCC with minimal expression in healthy mucosa (4). We have recently developed a single chain antibody fragment (scFv) specific for αvβ6 which blocks αvβ6 mediated cell-cell adhesion and shows high ligand affinity on ELISA and FACS analysis (5). Further, we have conjugated the αvβ6 specific scFv to several commercially available SPIONS and demonstrated successful targeted cell kill in-vitro using OSCC cell lines.

CONCLUSION: These data give rise to the possibility of using antibody targeted MFH as a novel therapy in OSCC and recent advances in the application of MFH will be discussed.

P18: PLANNING EXACTNESS OF BILATERAL SAGITAL SPLIT OSTEOTOMIES (BSSO) OF THE MANDIBLE ACCORDING TO OBWEGESER/DALPONT
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AIM: Presurgical planning is an important precondition for bilateral sagittal split osteotomies. It was observed clinically by several surgeons that with increasing shift asymmetry or shift distance the planning becomes more inexact. The purpose of our retrospective investigation was a metrical objectifying.

MATERIAL AND METHODS: Between April, 2005 and October, 2008 361 patients underwent osteotomies. Thereof 125 cases were enclosed. Criteria were the finished surgical and orthodontic treatment, an unequivocal assessment of the x-ray and an orthograde image of the osteosynthesis plates. Patients were divided in a matrix of shift distance (V1 <3 mms; V2 <6 mms; V3 ≥6 mms) and side difference (S1 <2 mms; S2 <4 mms; S3 ≥4 mms). In the orthopantomography 3 independent measurements of the gap and the length of the osteosynthesis plates were performed. The real gap and difference between planning and real shift was calculated by the rule of three.

RESULTS: With rising shift distance as well as with rising asymmetry the planning exactness decreases. In the symmetric groups the difference is significant, in the shift groups highly significant.

CONCLUSION: Subjective perception of an increasing planning inaccuracy with increasing shift or asymmetry can be proved for the described planning and surgical procedure. In spite of planning inaccuracy the model operation is an important step for the surgeon. From the authors view, the determining successful criterion isn’t the achievement of the planned shift distance, but the achievement of a class I occlusion with a save bite in the operation split.

P19: HOST DEFENSE-LIKE LYTIC PEPTIDE SUPPRESSES GROWTH OF HUMAN FIBROSARCOMA
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**INTRODUCTION:** Soft tissue sarcomas are derived from connective tissue and comprise less than 1% of all malignancies. As effector molecules of the innate immune system Host Defense Peptides (HDP) may have the opportunity to be a new class of therapeutic agents for this cancer entity.

**MATERIAL AND METHODS:** *In vitro* the human fibrosarcoma cell line (HT1080) was exposed to [D]-K₃H₃L₉, a short 15mer D,L-amino acid peptide. The antiproliferative (BrdU-assay), apoptotic (TUNEL-assay) and antimetabolic (MTT-assay) effects were quantified and the IC₅₀ was analysed.

*In vivo* HT1080 cells were injected subcutaneously into athymic nude mice. The generated tumor was treated intratumorally with [D]-K₃H₃L₉ 3 times per week for a period of 3 weeks. Mice were treated either with 1 mg/kg, 2 mg/kg, 8.5 mg/kg and 15 mg/kg peptide or with PBS (phosphate buffered saline).

**RESULTS:** [D]-K₃H₃L₉ significantly inhibits cell metabolism and proliferation in a dose dependent manner. An apoptotic effect could be detected at a peptide concentration of 50µM. In comparison to the control group (PBS) the tumor volume of the treatment group (15mg/kg) was almost four times smaller. Lower dosages did not affect tumor growth.

**CONCLUSION:** In summary, [D]-K₃H₃L₉ exerts promising oncolytic activity on HT1080 cells. The study demonstrates the potential of HDP as a novel therapeutic option for treatment of soft tissue sarcomas.

**P20: EFFECT OF TYPE 1 INSULIN-LIKE GROWTH FACTOR RECEPTOR (IGFIR) SIGNALLING ON SENSITIVITY OF MELANOMA CELLS TO TEMOZOLOMIDE (TMZ)**

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**INTRODUCTION:** Metastatic melanoma is highly chemoresistant. We showed that depletion of IGFR1, a potent survival factor, enhances melanoma sensitivity to TMZ, a DNA methylating agent with limited clinical activity. TMZ resistance can be associated with high levels of the DNA repair protein, O6methylguanine-DNA methyltransferase (MGMT).

**METHODS:** We screened for proteins showing altered expression after IGFR1 depletion in human breast cancer cells, by antibody array and multiplex and conventional immunoblotting. MGMT expression and activity were assessed in melanoma cells by immunoblotting, real time PCR, and oligonucleotide-based activity assays.

**RESULTS:** MGMT was identified as one of the few proteins upregulated by IGFR1 depletion in breast cancer cells. Similar upregulation was induced by IGFR1 depletion in 4 human melanoma cell lines, affecting protein levels in the cytosol rather than nuclear lysate. There was modest but significant increase in MGMT activity in whole cell extracts, but no change in MGMT mRNA levels.

**CONCLUSION:** IGFR1 depletion sensitises to TMZ, but paradoxically up-regulates MGMT at the protein level. We are testing effects of IGFR1 inhibitors on base adduct formation and removal, and on the stability and subcellular localisation of MGMT. These studies may inform the evaluation of IGFR inhibitors in melanoma treatment.

**Support:** CR-UK and NIHR BRC programme.

**P21: A CAUSAL ROLE OF C-REACTIVE PROTEIN (CRP) IN INFLAMMATION: CONFORMATIONAL REARRANGEMENT IN C-REACTIVE PROTEIN IS REQUIRED FOR ENHANCED PRO-INFLAMMATORY LEUKOCYTE ACTIVATION AND LEUKOCYTE ADHESION IN ISCHEMIA-REPERFUSION INJURY OF THE STRIATED MUSCLE**

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**INTRODUCTION:** C-reactive protein (CRP) is a pentameric plasma protein and consists of 5 identical non-covalently linked subunits and its plasma levels are a reliable marker for inflammatory processes. Recently it has been proposed that CRP is not only a marker, but also a mediator of inflammatory diseases. The relevance of CRP-mediated pro-inflammatory effects in ischemia/reperfusion injury remains unknown. We investigated the influence of the conformational change from pentameric CRP (pCRP) to its individual subunits (monomeric CRP: mCRP) on the pro-inflammatory properties of CRP.

**MATERIAL AND METHODS:** We examined muscle
tissue after ischemia/reperfusion injury following free microsurgical tissue transfer for the deposition of p- and mCRP by immunohistological staining with conformation specific antibodies. We further investigated the impact of native, pentameric CRP and mCRP on the activation of the monocyte integrin Mac-1 (CD11b/CD18), a key regulator of monocyte adhesion to endothelial cells in the microcirculation of inflamed tissues and investigated the effect of different CRP isoforms on monocyte adhesion to fibrinogen under static and to human endothelial cells under shear flow conditions. Specific blockers were used to assess the signal transduction pathways involved.

RESULTS: We show that CRP is deposited in its monomeric conformation in reperfused free muscle flaps (n=15). mCRP leads to significantly increased monocyte adhesion to fibrinogen and human endothelial cells under shear-flow conditions via Mac-1 activation by signal-transduction pathways involving PI3- and src-kinases. Low concentrations of mCRP (5µg/ml) significantly increase monocyte activation and adhesion, whereas pCRP does not exert pro-inflammatory properties.

CONCLUSION: These results suggest that mCRP deposition might be a causal event in the pathophysiological cascade of ischemia-reperfusion injury and that the loss of the pentameric symmetry in CRP, resulting in formation of mCRP, enhances its pro-inflammatory properties. Our data identify mCRP as a potential therapeutic target in inflammatory diseases, such as ischemia/reperfusion injury.

P22: CELLS: INVESTIGATION OF VITALITY, PROLIFERATION AND CELLULAR BEHAVIOUR AFTER LIFT

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INTRODUCTION: The engineering of tissues and organs is of central interest in plastic surgery and regenerative medicine. In the here presented study we evaluated a new technique of biological laser printing based on laser induced forward transfer for the in vitro production of distinct cell patterns in a 3D arrangement as well as the positioning of the respective cell fraction in a high purity and without contamination.

MATERIAL AND METHODS: By laser induced forward transfer (LIFT) fibroblasts (NIH3T3), keratinocytes (HaCaT) or human mesenchymal stem cells (hMSC) have been transferred. After LIFT we analysed the survival rate, the proliferation (CelliteterBlue, WST-1; cell counting), the rate of apoptosis (ApoOne, TUNEL), as well as the DNA-damage (Comet assay) of the cells.

RESULTS: Cells could be arranged in specific and precise patterns by LIFT. Cell survival directly after LIFT showed vitality by more than 88% in all used cell types. Proliferation behaviour as well as the apoptosis rate have not been impaired or increased of LIFTed and control cells. In addition, cells did not show any DNA damage after LIFT.

CONCLUSION: The different cell types used for LIFT survive the transfer and were not affected in their behaviour by the laser printing process. Thus, the biological laser printing technique appears to be suitable for the generation of defined complex arrangements using different kinds of living cells and biomaterials for applications in tissue engineering and regenerative medicine.

P23: THE ROLE OF APOPTOSIS AND ITS LOCAL / SYSTEMIC INTERVENTION IN BURNS

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INTRODUCTION: The role of apoptosis in thermally injured tissue is established due to reperfusion injury. Nitric oxide (NO) plays a significant role in the initiation of the inflammatory cascade, notably from increased expression of macrophage inducible nitric oxide synthase (i-NOS) and is pertinent to burn pathophysiology. In 2007 we showed a local protective role of i-NOS inhibition in a burn mice model after sustaining a partial thickness burn wound. Now we are interested in the potential systemic effects.

METHODS: 40 mice (C57BL/6) received a 40 % TBSA dorsal scald deep partial thickness burn at the transition to full thickness burn wound. Control group (n=20) received no interventional medicines besides standard resuscitation with normal saline and analgesic agents. Study group (n=20) received 4 mg/kg i.p. S-methylisothiourea (SMT), a specific
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i-NOS inhibitor every 12 hours. 10 animals in each group were sacrificed at 24 h and 48 h. Lung and gut were biopsied for histological review. TUNEL assay, M30 Cytodeath assay, PARP assay and measurement of apoptotic index were carried out on these specimens.

**RESULTS:** Mean apoptotic index (AI) for control group in gut were 0.298 (± 0.04 SE) and 0.197 (± 0.02 SE) respectively at 24 and 48 hrs, for lung 0.223 (± 0.03 SE) and 0.199 (±0.03 SE). The AI for the i-NOS inhibitor group in gut was 0.198 and 0.151 at 24 and 48 hrs respectively, in lung 0.171 and 0.161. The AI for control and i-NOS inhibitor groups were compared using ANOVA test. The difference between the groups is statistically significant (p <0.05).

**CONCLUSIONS:** This murine scald model provides a standardized and reproducible methodology for studying tissue injury, apoptosis as well as possible therapeutic interventions. Our results suggest a protective systemic role beyond its local effects for i-NOS inhibition in deep partial thickness burn wounds. This protective effect may be due to modification in NO induced vascular permeability as well as free oxygen radical inhibition. This therapeutic intervention may have clinical application for tissue preservation in the thermally injured wound.

**P24: DOSE-DEPENDANT MICROVASCULAR RESPONSE FOLLOWING EXTRACOR-POREAL SHOCK WAVE APPLICATION IN THE STRIATED MUSCLE OF THE MOUSE DORSAL SKINFOLD**

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**INTRODUCTION:** Shock wave energy generated for medical purposes is characterized by a biphasic pressure pulse, whereby a cavitation phenomenon is induced causing the formation of tiny vesicles. As these microvesicles collapse a multidirectional fluid stream is induced within the tissue. Recently the application spectrum of extracorporeal shock waves (esw) has been widened from treatment of urinary calculi and bony non-union to soft tissue pathologies such as chronic wounds and flap ischemia. The aim of this study was to assess the effects of esw energy on normal microcirculation.

**MATERIAL AND METHODS:** The mouse dorsal skinfold chamber model was used to study quantitatively the microhemodynamics by intravital fluorescence microscopy 1h, 2h, 6h and 24h after esw impact. The study comprised one treatment group (n=5) and one untreated control group (n=5). Animals were once treated with a dose of 500 impulses at an energy flux rate of 0.08 ml/mm2. Quantitative analysis of microvascular perfusion and leukocyte-endothelial cell interaction was assessed after contrast enhancement with 5% FITC-dextran. We used topical bisbenzimyde and immunohistochemical staining of caspase-3 to assess tissue apoptosis.

**RESULTS:** Esw energy caused a significant increase of functional capillary density (fcd) after1h to 125% ± 2, after 2h to 129% ± 5, reaching a maximum after 24h to 140% ± 2 of baseline (p<0.01, all time points). We observed a slight increase (~2-fold, p<0.05) of rolling leukocytes in postcapillary venules. We didn’t find any significant changes in arteriolar, venular and capillary diameters and red blood cell velocities. In line with this, arteriolar and venular wall shear rates didn’t show any changes. In vivo analysis of nuclear condensation showed a 2.6 fold (p<0.05) increase of apoptotic cell count which was verified by an increased expression of caspase-3.

**CONCLUSION:** Our data suggests that esw application induces a slight and transient inflammatory reaction. Of interest we observed a significant increase of capillary perfusion which may be caused by the recruitment of nonperfused capillaries and might have therapeutic significance in future.

**P25: ESTABLISHING THE SHEEP AV-LOOP MODEL FOR AXIAL VASCULARISATION OF A CLINICALLY APPROVED CERAMIC BONE SUBSTITUTE**

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**QUESTION:** In order to facilitate transplantation of vascularised tissue in plastic and reconstructive surgery axial vascularisation is mandatory. Hence the small animal model of the AV loop in rats has been translated to the large animal sheep model earlier. In this study we aimed to induce axial vascularisation in a large volume of a clinically approved biphasic calcium phosphate ceramic by applying the sheep arteriovenous (AV) loop model.
METHODS: In a Teflon isolation chamber total volumes of 16 ccm HA/ß-TCP granula mixed with fibrin gel were incorporated together with an arteriovenous loop. Implantation was performed into the groins of merino sheep. By sequential noninvasive MR imaging tools we assessed ongoing vascularisation process over time. After 6 and 12 weeks chambers were explanted and after perfusion of the pedicle with contrast agent, specimens were subjected to micro-computed tomography (µ-CT) scan and histological analysis.

RESULTS: By sequential MR imaging a significant increase of perfusion in the HA/ß-TCP matrices over time could be visualized. Analysis Micro CT scans and histology confirmed successful axial vascularisation of HA/ß-TCP constructs.

CONCLUSIONS: This study demonstrates for the first time successful axial vascularisation of a clinically approved bone substitute with a significant volume by means of a microsurgically created AV loop in a large animal model, thus paving the way for the first microsurgical transplantation of a tissue engineered, axially vascularised bone with clinically relevant dimensions.

P26: GEL, SPONGE OR NANO - NEW COLLAGEN BASED MATRICES FOR TISSUE ENGINEERING OF SKELETAL MUSCLE


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QUESTION: One promising method for the treatment of soft tissue defects in reconstructive surgery could be the engineering of vascularised skeletal muscle tissue. Here we evaluated the potential of newly developed three-dimensional collagen and fibrin matrices for tissue engineering of skeletal muscle. Besides biocompatibility and biodegradability we focussed on primary rat myoblast proliferation and differentiation as well as functionality of the matrices, e.g. parallel alignment of cultured cells.

METHODS: The characteristics of novel hybrid collagen-I-fibrin-gels were analyzed in regard to myoblast cultivation. Electrospin collagen I nanofibers newly developed by the Department of Chemistry of the Philippius-Universit Marburg were used for 3D myoblast cultivation. We also evaluated commercial collagen sponges and OPLA-scaffolds in comparison. Genipin was tested as an antifibrinolytic gel component stabilizing substitute for commonly used aprotinin. As rapid lysis and contraction of pure collagen I- or fibrin-matrices had been major obstacles in the past we tried overcome this limitation by combining both materials. Evaluation was performed by immunohistochemistry, light-cycler RT-PCR, TUNEL-assay and scanning electron microscopy.

RESULTS: A significant proliferation of cultivated primary rat myoblasts was observed in collagen-I-fibrin matrices as well as on collagen nanofibers. Myogenic phenotype as judged by molecular biology and immunocytochemistry assessment was maintained. Seeding these cells on parallel orientated biocompatible collagen nanofibers induced growth of parallel aligned myoblasts, whereas common collagen sponges and OPLA-scaffolds induced less cell proliferation. In collagen sponges even an increased apoptosis rate of cells was found. The use of genipin even caused deleterious effects on primary myoblasts.

CONCLUSIONS: Collagen I-fibrin mixtures as well as collagen nanofibers induce good proliferation rates and myogenic differentiation of primary rat myoblasts in vitro. Furthermore the use of parallel orientated collagen nanofibers might represent the most promising step towards successful engineering of skeletal muscle tissue due to induction of parallel aligned cell layers.

P27: DIGITAL CALLIPPERS IN THE MEASUREMENT OF KELOID SCARS – IS THERE A ROLE?

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METHODS: We trialled the use of digital electronic Vernier callipers(Trojan Digimatic callipers 150mm, UK) with specifications: Resolution - 0.01mm (.0005”), Measuring range - 0.01-150mm ,Instrumental Error - +/- 0.03mm ,Repeatability - 0.01mm,Response speed - Up to approx 1600mm/s. The callipers was used to serially measure the maximum length, maximum width and max height of the keloid lesion. If the keloid was extremely irregular then these parameters were measured in relation to an arbitrary defined points which was marked on the photograph.

RESULTS: The calliper was trialled by three independent practitioners-a plastic surgery registrar, a keloid specialist nurse and an occupational
therapist. To validate the instrument 21 individual measurements were performed. The results are tabulated below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean(mm)</th>
<th>Standard Deviation(SD)(mm)</th>
<th>Range(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>1.20</td>
<td>0.99</td>
<td>7.90-98.8</td>
</tr>
<tr>
<td>Width</td>
<td>0.73</td>
<td>0.55</td>
<td>6.30-77.24</td>
</tr>
<tr>
<td>Height</td>
<td>0.51</td>
<td>0.40</td>
<td>0.54-4.04</td>
</tr>
<tr>
<td>Overall</td>
<td>0.73</td>
<td>0.30</td>
<td>0.54-98.8</td>
</tr>
</tbody>
</table>

**CONCLUSION:** An electronic callipers seems to provide an objective, cheap and reliable method for assessment of keloid scars. Although the measurements are easily and objectively assessed in 2 dimensional plane, an objective measurement of height could also be measured. Drawing from the findings of our study, the measurements become less reliable when measuring heights which are usually in the range of 0.5-1cm. We recommend the use of electronic callipers as a basic tool for objective measurement of scars.

**P28: GUANYLATE-BINDING PROTEIN-1 (GBP-1) REDUCES THE ANGIOGENIC PROPERTIES OF EMBRYONAL ENDOTHELIAL PROGENITOR CELLS (EPC) IN VITRO AND IN VIVO IN THE ARTERIOVENOUS (AV) LOOP MODEL**

**CONCLUSION:** Our results confirm that GBP-1 reduces EPC angiogenic properties in vitro and in vivo as well as vascular network morphology, indicating potential implications in cellular gene therapy in tissue ischemia as well as tumor blood vessel formation.
and OEC in fibrin matrix BC,F,OEC, biogenic conduit and SC in fibrin matrix BC,F,SC. Survival time was 4 and 16 weeks. Regeneration was clinically tested using the sciatic functional index. The number of axons per cross section and the axon myelin ratio were determined on semi thin sections.

RESULTS: The axon myelin ratio of the operated sides of all groups showed significant worse myelinisation than the healthy control group after 4 and 16 weeks. The SC myelinisation was significantly better than the OEC myelinisation. The axons in the fibrin filled conduit showed better myelinisation than the SC and OEC groups. Clinical function after 16 weeks showed identical results for the fibrin filled and cell filled conduits.

CONCLUSION: Biogenic conduits for gap bridging are a suitable alternative to artificial conduits. Paradoxically the results demonstrate an advantage of only fibrin filled conduits compared to cell filled conduits, while the use of OEC showed no advantage to the use of SC.

P30: GENE THERAPY WITH PROANGIOGENIC PLASMIDS TO ENHANCE VASCULARITY OF PEDICLED TRANSVERSE RECTUS ABDOMINIS MYOCUTANEOUS FLAPS IN A RAT MODEL

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BACKGROUND: The vascularity of pedicled transverse rectus abdominis myocutaneous (TRAM) flaps used for breast reconstruction may be unreliable. We assess the value of gene therapy with proangiogenic plasmids encoding vascular endothelial growth factor, VEGF165 (pVEGF) and basic fibroblast growth factor, bFGF in a rat model of TRAM flap.

MATERIAL AND METHODS: TRAM flap island (2.5x6 cm) was incised over the right rectus abdominis muscle of Lewis rat, and raised to the midline from left side and to the lateral margin of rectus muscle on the right. Both left and right superior epigastric vessels, and left inferior epigastric vessels were divided, thus leaving the entire flap vascularized by the right inferior epigastric pedicle alone. The muscle was left in situ in its sheath. Six groups of Lewis rats (7 animals in each group) were used. TRAM flap in group I was injected with pVEGF intramuscularly (i.m.), in group II - with pVEGF intradermally (i.d.). Group III received bicistronic plasmid (pVIF) encoding VEGF165 and bFGF i.m., group IV - pVIF i.d., group V - double dose of pVIF i.d., and group VI served as a control. Rats were sacrificed on day 7. TRAM flaps were photographed and drawn on a transparent foil, with exact marking of necrotic area. The drawing was scanned, and the area of healthy (no macroscopic signs of necrosis) part of skin island was assessed in percentages by a graphic computer program.

RESULTS: Mean area of healthy skin island in the control group was 48%. Best results were obtained by injecting pVEGF i.m. - 79% of healthy skin, and pVIF i.d. - 67.1%. Injection of pVEGF i.d and pVIF i.m. resulted in obtaining 56.6% and 56.1%, respectively. Double dose of pVIF i.d. gave no effect: 48.6%; histopathology examination showed signs of intense fibrogenesis in this group, indicating competitive stimulation of fibroblasts against epithelial cells.

CONCLUSIONS: Gene therapy is very promising in enhancing the vascularity of experimental pedicled myocutaneous island flaps. Further experiments are needed to assess its potential value in clinical application.

P31: RESORPTION RATE ASSESSMENT OF ADIPOSE TISSUE ENGINEERED CONSTRUCTS BY INTRAVITAL MAGNETIC RESONANCE IMAGING

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A method allowing to accurately determine the resorption rate of adipose tissue constructs has not been described to date. One purpose of this study was to determine whether a noninvasive and nondestructive technique of Magnetic Resonance Imaging (MRI) could be used to assess the resorption rate of adipose tissue substitutes. Additionally, we intended to evaluate the reproducibility of an adipose tissue engineering approach, consisting of the injection of human preadipocytes within fibrin into athymic nude mice.

Different concentrations of undifferentiated preadipocytes were injected within fibrin into athymic nude mice (n=8 per group). At two days, three months and six months post-implantation, the
mice were anaesthetized and an MRI was performed using a 9.4 tesla device in order to determine both volume and resorption rate of the implants. Subsequently, the specimens were explanted and qualitative analysis of adipose tissue formation was performed by histological examination. After implantation, a progressive resorption of all constructs was macroscopically observed. Implants could be easily visualized and delimited from the surrounding tissues by MRI. Magnetic resonance analysis demonstrated a resorption rate of the implants of 99 to 100% at six months. Histological analysis confirmed the high resorption of the constructs, the most of them could not be identified any more. In the remaining implants, formation of human adipose tissue could be immunohistologically confirmed.

MRI provides an efficient and non-invasive method for the assessment of implant resorption in adipose tissue engineering. We had previously reported that injection of preadipocytes within fibrin into athymic nude mice would lead to the formation of stable adipose tissue in vivo. However, the resorption rate observed in the current study was considerably higher compared to the results previously reported. This confirms that the reproducibility of this approach still remains elusive.

P32: THE VASCULAR ANATOMY OF THE TENSOR FASCIAE LATAE PERFORATOR FLAP
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BACKGROUND: The principles of perforator flap surgery have also been applied to the TFL flap. However, the number of reported TFL perforator flaps in the literature is small. These reports also do not describe the location and the size of the perforators and lack the differentiation between septocutaneous and musculocutaneous perforators. The purpose of our study was to differentiate between musculocutaneous and septocutaneous perforators of the TFL perforator flap, to evaluate their number, size and location, and to provide landmarks to facilitate flap dissection. An additional injection study estimated the skin area of a TFL perforator flap.

METHODS: The anatomical study was performed on 23 fixed and injected cadavers. The perforators of the tensor fasciae latae were identified and classified as septocutaneous or musculocutaneous. Diameter, location and numbers were measured and the perforators were dissected up to their origin. The injection study was performed on 10 fresh cadavers. On one side, the ascending branch of the lateral circumflex femoral artery was injected with methylene blue; on the other side, the septocutaneous perforators were injected selectively. The size, location and borders of the stained skin were measured.

RESULTS: Forty-five thighs were included in this study. All perforators emerged from the ascending branch of the lateral circumflex artery. The average number of musculocutaneous perforators was 2.3 (range 0 - 5), the distance from the anterior superior iliac spine (ASIS) was 10.9 cm (range 4.5 - 16.1), and the diameter was 0.9 mm (range 0.2 - 2 mm). Four specimens had no musculocutaneous perforator. The average number of septocutaneous perforators was 1.8 (range 1 - 3), the distance from the ASIS was 10.9 cm (range 6.2 - 15.7), and the diameter was 1.5 mm (range 0.5 - 3 mm). Seventy-six percent of the septocutaneous perforators emerged between 8 - 12 cm from the ASIS. The possible pedicle length of a flap based on these vessels is 8.1 cm (range 6.5 - 10 cm).

Nine of the ten fresh cadavers could be included in the injection study. The average skin area of the nine cadavers stained with methylene blue was 19.4 cm (range 10 - 24) by 13.4 cm (range 7 - 17) in the ascending branch group. In the perforator group, the average skin area was 19.2 cm (range 15 - 22) by 13.7 cm (range 12 - 16).

CONCLUSIONS: We could show that the number of septocutaneous perforators for the tensor fasciae latae flap is more constant and that their diameter is greater than that of musculocutaneous perforators. The location of these perforators on a line extending from the ilium to the greater trochanter facilitates planning and dissection of a flap.

P33: TECHNICAL ADVANCES IN THE USE OF THE COLLAGEN-ELASTIN DERMAL MATRIX (MATRIDERM) IN RECONSTRUCTIVE PLASTIC SURGERY
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INTRODUCTION: As plastic and reconstructive surgeons we strive for excellent functional and
aesthetic reconstruction in all our patients. Burns and other soft tissue trauma may leave the patient needing skin cover which may require skin grafts, flaps or tissue engineered matrices. We have experience in using one such collagen/elastin dermal matrix (Matriderm) as a single-stage technique for acute and reconstructive wound cover in all areas of plastic surgery.

METHODS: We have collected data for all our patients who have undergone Matriderm resurfacing at our institution since 2007. In addition, we have noted and developed technical refinements in the use of the matrix with our growing experience.

RESULTS: 17 patients have undergone Matriderm resurfacing at our institution. In four patients the Matriderm was used for early burn wound cover and in 12 patients the matrix was used for delayed reconstructions and scar resurfacing. In one case the matriderm was used to cover a defect resulting from necrotising fasciitis. Patient age ranged from 10 to 54 years. Five cases involved head and neck placement, five cases involved the trunk and axilla, and eight cases involved the extremities. Technical refinements we have developed include application of the matrix to the wound-bed in its dry state and then hydrating it in-situ, applying fibrin glue to both the wound-bed and to the Matriderm, and the addition of negative pressure vacuum dressings in certain areas. Initial complications included submatrix haematoma and graft loss, but progressively over the period we have experienced fewer complications with Matriderm and have achieved good wound resurfacing and reconstruction.

CONCLUSIONS: Dermal substitutes have revolutionised the treatment of many plastic surgical and burn wounds. With the use of Matriderm ‘full-thickness’ reconstructions are now possible with ‘split-thickness’ donor sites in a single-stage. As our experience has grown and by refining our techniques, use of the collagen-elastin matrix has become easier and complications are fewer. Our experience of using Matriderm in acute and reconstructive plastic surgery has allowed us to use the matrix on all areas of the body with good results.

P34: 2.5-MMS-OSTEOSYNTHESIS-PLATES IN FREE FLAP MANDIBLE RECONSTRUCTION
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AIM: There is a great deal of discussion regarding the principles of the mandibular reconstruction. The osteosynthesis is performed with different plate types. Unlike an fracture, in mandibular reconstruction mostly a gap between graft and remaining bone occurs. Aim of the project was the evaluation of suitability of 2.5-mms-MedArtis-Osteosynthesis-plates.

MATERIAL AND METHOD: Between April 05 and March 09, 116 patients in the age of 26 to 84 underwent a micro vascular osteocutaneous free flap (n=33 women, n=83 men, fibular flap n=19; scapula flap n=107). In 5 cases a maxillary reconstruction was performed, in 111 cases a mandibular reconstruction. Thereof 57 cases were enclosed. Criteria were an unequivocal assessment of the postoperative orthopantomography and the performed displacement of the osteosynthesis-material 6 month after reconstruction.

RESULTS: A total of 133 osteotomy gaps were analysed. The average gap width was 1.9 mms (with an range from 0.25 to 8.9 mms and a median of 1.7 mms). In 116 gaps a bone union took place (87.2%), in 17 gaps there was a non-union (12.8%). Altogether in 45 cases (78.9%) an total. In 8 cases (14.0%) a partial and in 4 cases (7.0%) no bone healing was reached after 6 month. No significance between the gap width and bone union was found even though in 2 non-union-cases the gap width was bigger then 5 mms. In 3 non-union-cases a preoperative radiatio was performed.

CONCLUSION: Even if there are non-union-cases, the 2.5-mms-Medartis-osteosynthesis-plate offers a stable reconstruction of the mandible by using free microvascular flaps.

P35: NUCLEOFECATION OF FIBROBLASTS IS THE MOST EFFICIENT EX VIVO GENE TRANSFER STRATEGY TO A FULL THICKNESS SKIN WOUND.

INTRODUCTION: In search for the most accurate non-viral gene transfer technique in epidermal and dermal supportive extracellular matrix studies, we investigated the efficiency of late generation liposomal reagents and nucleofection for the transfection of endothelial progenitor cells (EPC), keratinocytes (KC) and fibroblasts (FB), as essential representatives of the healing skin wound.
MATERIAL AND METHODS: EPC, KC and EPC were grown under serum-reduced conditions and manipulated according to the optimized manufactory protocols in vitro. Fugene HD, Effectene, PEI, and Lipofectin were compared to Amaza Nucleofection. A GFP reporter plasmid was incorporated and visualized by FACS.

RESULTS: Normal cell morphology was observed after transfection or nucleofection. For KC cell cultures, Fugene HD resulted in highest transgene expression in human (41%) and porcine (42%) KC. For EPC, Effectene was most successful for human derived cells (42%) whereas for porcine cells Nucleofection was optimal (32%). However for FB, Nucleofection resulted in highest transfection rates in human (50%) and porcine (60%) derived FB.

CONCLUSION: For specific epidermal cell studies Fugene HD seems preferable as gene transfer strategy, whilst Effectene seems the most optimal agent for pro-angiogenic studies. When transfected with Nucleofection, FB are the best gene carriers for overall ex vivo gene transfer strategies in wound healing or skin tissue engineering.

P36: IMPROVING ANGIOGENESIS IN TISSUE ENGINEERED SCAFFOLDS USING MICRO-CHANNELS

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INTRODUCTION: Tissue engineering has great potential to transform reconstructive surgery by prefabricating tissue. It is currently held back as it is not able to produce viable large volume constructs. Microchanneled scaffolds have been developed to increase the ingrowth of angiogenic cells into the scaffold mass.

METHODS: Porous 3-D collagen scaffolds were used as a cell vehicle to promote angiogenesis. In vitro non- channeled and channeled scaffolds were seeded with endothelial cells and vascular smooth muscle cells, individually and in co-culture. In vivo, similar scaffolds were subcutaneously implanted in mice.

RESULTS: In vitro the scaffolds channels improved the depth of penetration of cells into the scaffold, with cells residing mainly around the channels (figure 1: A)and migrating along the channels (figure 2: B). In vivo, samples showed a clear branched vascular network of microvessels after 2 weeks in the channeled samples (figure 1: C). This structure was not apparent in the non-channeled samples.

CONCLUSIONS: Ingrowth of blood vessel cells is increased in these collagen scaffolds in the presence of channels. Microchannels could aid production of tissue engineered constructs. The channels offer the possibility of rapid blood vessels infiltration into material from host anastomosing with a preformed network. This has potential use in constructing scaffolds for use in reconstructive surgery.

P37: A NOVEL HUMAN SKIN CHAMBER MODEL TO STUDY WOUND INFECTION EX VIVO

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INTRODUCTION: Wound infections increase morbidity and mortality and are of considerable socioeconomic impact. They can lead to impaired wound healing, resulting in rising treatment costs. This study proposes an ex vivo human full thickness skin model in order to establish a standard strategy to advance wound care and infection research.

METHODS: Human full-thickness skin is fixed into the BO-Drum. Full-thickness skin was implanted into the BO-drums and cultivated for 7 days. On day 8, the skin was inoculated with P. aeruginosa and S. aureus [10^5 cfu, n=3] and was compared to non-infected drums. 3 days after inoculation the bacterial numbers in the tissue and in the media were counted.

RESULTS: A reliable and reproducible wound infection could be established for 72h after inoculation. At this timepoint, 2x10^8 cfu/g tissue of P. aeruginosa and 2x10^7 cfu/g tissue of S. aureus were detected. Only a marginal contamination of the culture medium could be detected in the S. aureus group. In contrast, a bacterial count in culture medium of P. aeruginosa inoculated group was measured on the same level of the tissue.

CONCLUSION: The BO-drum® is a robust, easy-to-use, sterilisable and reusable wound chamber system. To investigate wound infection, treatment and healing, the BO-drum® presents a convenient
P38: BIOREACTOR CONTROLLED SHEAR STRESS ENVIRONMENT PROMOTES OSTEO-GENIC DIFFERENTIATION OF ADIPOSE STEMCELLS – A WAY FOR BONE RECONSTRUCTION

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INTRODUCTION: Bioreactors for tissue engineering permit improved performance of cell-matrix constructs by cell mass transport mechanism and exposure to mechanical stresses such as flow or pressure. We have recently designed and developed a novel model of a laminar flow reactor based on computer based simulations1,2. The purpose of this study was to evaluate the effect of controlled three-dimensional shear forces during cultivation of cell-matrix constructs.

MATERIAL AND METHODS: Primary human adipose mesenchymal stem cells were expanded and cultured in non-differentiating culture conditions. Cell-seeded macroporous ceramic scaffolds were cultured inside a laminar flow bioreactor for up to 3 months and analyzed by surface microscopy, grinding sectioning, extracellular matrix staining and electronmicroscopy.

RESULTS: Cell-seeded matrices cultured under laminar flow demonstrated uniform cell distribution, tissue growth inside the porous structure and deposition of extracellular matrix components within the scaffold and into the media which stained positive for minerals, calcium derivates, proteoglycans and collagen. XR-diffraction analysis of released particles showed hydroxyapatite as well as organic components.

CONCLUSION: Controlled laminar shear forces promote osteogenic differentiation of adipose mesenchymal stem cells grown on a porous ceramic matrix without addition of stimuli such as dexamethasone. We propose that the laminar flow reactor has potential for growing bone substitutes in vitro for bone tissue engineering.

P39: GENERATION OF VASCULARISED ADIPOSE TISSUE FOR THE COVERAGE OF SOFT TISSUE DEFECTS: LONG-TERM RESULTS AND TRANSPLANTATION

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AIM: A high demand exists for soft tissue reconstruction with adipose tissue. Especially tissue engineering of complex three-dimensional tissue, in particular for breast reconstruction, requires vascularisation for its survival, with a view to transplanting it into the in vivo situation.

The aim was to establish a technique for the de novo generation of large amounts of vascularised, stable and transplantable adipose tissue using a growth chamber in an animal model.

METHODS: We examined the use of an vascularised adipose tissue flap (4% of the chamber volume) and a matrix scaffold in a growth chamber in the rat (1.7ml). Subsequently, we used the method in the pig with a growth chamber of 78ml volume and following pedicled transplantation of the new generated adipose tissue to simulate in-situ breast reconstruction. Magnetic Resonance Angiography (MRA) assessed tissue growth and vascularisation within the chamber.

RESULTS: At 12 weeks post-insertion, the entire chamber was filled with new tissue and the adipose tissue was grown up to 60% of the chamber volume. The MRA was capable of monitoring vessel patency. Histology could confirm true hyperplasia and adipose precursor cell stimulation. No pathological changes have been seen. After pedicled transplantation, the newly generated tissue stayed stable in volume after 22 weeks.

CONCLUSION: The study demonstrated a promising method of producing significant amounts of vascularised, stable and transferable adipose
Abstracts

P40: BOEC INCREASE VASCULARITY IN A DIABETIC WOUND MODEL
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INTRODUCTION: Impaired wound healing is a complication of diabetes mellitus (DM). We compared two immunodeficient diabetic mouse models and characterized the healing process with or without transplantation of human endothelial progenitors.

MATERIALS & METHODS: Two groups of Streptozotocin (STZ) induced DM athymic mice were compared to normoglycemic (NG) mice. Group1 (DM1) was injected with 60mg/kg STZ 18 days before surgery with following doses at day 2,3,8 and 13. Group2 (DM2) received STZ 21 days before surgery, with next doses at day 1,2 and 4. Wounds were applied on the back and compared for closure/contracture, matrix organization and vascularity.

RESULTS: In DM mice, there was fewer granulation tissue, collagen was less organized and less blood vessels were found in the wound centre compared to control mice. In DM2, wound size was bigger and contraction rate slower, representing a better diabetic wound model than DM1. When administering BOEC (blood outgrowth endothelial cells) to DM2 wounds, reepithelialisation rate was similar to NG mice. However, BOEC increased the number of blood vessels, without altering their distribution in the wound bed. Better distribution was found when adding fibroblasts.

CONCLUSION: STZ mice provide a good pathological wound model. BOEC can be used to revascularize such wounds. Future studies will compare the current acute DM model with a chronic DM model.

P41: THE USE OF BLOOD OUTGROWTH ENDOTHELIAL CELLS, KERATINOCYTES AND FIBROBLASTS IN AN AUTOLOGOUS SKIN CONSTRUCT: THE MILLEFEUILLE
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INTRODUCTION: The aim of this study was to investigate an entirely autologous skin construct, made up of multilayers of epidermal and dermal cells, and its potential for vascularisation through the addition of endothelial stem cells.

MATERIALS AND METHODS: Porcine fibroblasts and keratinocytes were isolated from small skin fragments and expanded in vitro. After 3-4 passages, the cells were left to proliferate and form multi-layers for 3-4 weeks in a differentiation medium consisting of a DMEM/Ham’s F12 mixture, supplemented with various nutrients and growth factors. In the meantime, blood outgrowth endothelial cells (BOECs), a subset of endothelial progenitor cells (EPCs) were harvested from peripheral blood samples, isolated and cultured into stable cell lines.

RESULTS: Wounds treated with the laminated sheets had reepithelialization rates of 70% or higher vs. 35% in controls, and demonstrated the highest fibronectin deposition (32%), hence a more pronounced proangiogenic extracellular matrix. Millefeuille-treated wounds suffered significantly less wound contraction (19% vs 68% in controls). The BOEC-treated wounds displayed more, and more regularly arranged vessel-like structures (CD31, Lectin, aSMA).

The BOECs we’ve used have been extensively characterized. Their identification will be discussed. Furthermore, some of the intelligent cross-talk between the different cell types in the Millefeuille has been elucidated, showing the potential it may have in speeding up the healing of recalcitrant wounds.
INTRODUCTION: Here, we analyzed the influence of novel degradable synthetic skin substitutes on blood vessel growth in vivo.

MATERIAL AND METHODS: Lacto-capromer terpolymer matrix with pore size of 5–50 μm (group 1=Suprathel®) and matrix of the same chemical composition with pore size of 50–400 μm (group 2=Suprathel Plus®) were placed into the skinfold chamber of balb/c mice (n=10/group). The microvascular reaction was analyzed. The functional vessel density (FVD) was quantified by means of fluorescence microscopy on days 1, 5, and 10 after implantation.

RESULTS: Perfused, newly developed microvessels were already detected within the border zones on day 5. Quantitative analysis showed significant change for FVD on days 5 and 10 within the border zones of both matrices. FVD of group 1 was found elevated from 173 ± 4 cm/cm² on day 5 to 204 ± 7 cm/cm² on day 10. Also, the FVD of group 2 increased from 188 ± 5 cm/cm² on day 5 to 225 ± 6 cm/cm² on day 10 (ANOVA, p < 0.05). Whereas a vascular transformation to perfused neoformed microvessel network within the border zones was observed, the FVD of the surrounding host tissue did not change significantly.

CONCLUSION: The skinfold chamber is an excellent tool for study on vascular reaction to biomaterials. Both lacto-capromer terpolymeric matrices demonstrated a significant angiogenic effect. No reduction of vessel density was observed during the implantation time of ten days.
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