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2nd European Plastic Surgery Research Council

August 26–29, 2010
Hamburg/Germany






PROGRAM

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Date
August 26–29, 2010

Venue
MS Cap San Diego
Luke 3
Überseebrücke
20459 Hamburg/Germany

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Announcement

3rd European Plastic Surgery Research Council
MS Cap San Diego
August 25–28, 2011 • Hamburg/Germany

4th European Plastic Surgery Research Council
MS Cap San Diego
August 26–29, 2012 • Hamburg/Germany

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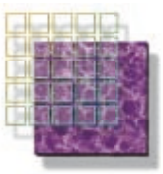

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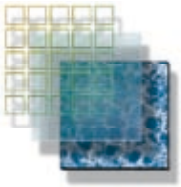

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Welcome note president of the EPSRC

Welcome Aboard Shipmates,

The European Plastic Surgery Research Council (EPSRC) was founded in 2009. The tremendous success of the 1st Annual Meeting of the EPSRC the following year and the overwhelming support from Europe, North America and Asia was reinforced by the high number of membership applications to the newly founded EPSRC.

I am proud to welcome you to the 2nd Annual Meeting of the European Plastic Surgery Research Council on the cargo ship MS Cap San Diego in Hamburg, Germany. The meeting is a platform for surgeons, researchers and scientists who are interested in high quality interaction on evidence-based studies and translational research in all technical disciplines of plastic and reconstructive surgery and its associated fields. As in 2009 it will offer an excellent opportunity for young researchers in plastic surgery to discuss their clinical outcome research and future challenges in basic science in an atmosphere that is informal and friendly. The EPSRC meeting is meant to provide a valuable means of disseminating information and ideas in a way that cannot be achieved through the usual channels of communication, such as publications and presentations at large scientific meetings. At the meeting attendees will not only be able to discuss the progress of unpublished research with leaders in their field, but they will also have the opportunity to network with scientists from around the world and to make new friends.

Distinguished Faculty from the American Plastic Surgery Research Council (PSRC), the American Society of Plastic Surgeons (ASPS) and the European Association of Plastic Surgeons (EURAPS) will attend to make this meeting exceptional.

The EPSRC aims to spread the flow of the knowledge and ideas across Europe and beyond. Last year Jan Vranckx from the Catholic University Leuven was elected as chairman of the 2nd European Plastic Surgery Research Council. As President of the EPSRC, I don't want to miss the chance to thank Jan for his commitment and his strong efforts to set up a scientific program of highest quality and support the aims of the EPSRC. This year's meeting will begin on the evening of Thursday, 26th August 2010, with the welcome reception on the "Achterdeck" of the MS Cap San Diego. The scientific meeting will formally begin on Friday, 27th August 2010, with a brief local program. There will not be any concurrent sessions at any stage of this meeting. Short oral presentations will be presented in the evenings of 27th and 28th August; allowing the presenter the opportunity to discuss his work in a casual atmosphere.

The EPSRC is constantly increasing its membership, particularly amongst young plastic surgeons. The enthusiasm, fervor and passion from faculty, speakers and attendees will undoubtedly make the 2nd meeting a great success. 14 keynote lectures, 2 keynote panels and 14 scientific sessions will offer you the opportunity to broaden your expertise. The continuing development and progress of the EPSRC is a team effort and I want to acknowledge those people who have assisted me every step of the way: Sammy Al-Benna, Tobias Hirsch, Marco Kesting, Frank Jacobsen, Gero Legner, Stefanie Becker, Isabelle Lärz and Hans-Ulrich Steinau.

Cosmopolitan and open minded – Hamburg, the Gateway to the World, as well as the old freighter MS Cap San Diego fit perfectly in the compass of this exceptional meeting. We expect an intensive exchange and fruitful conversations. I am looking forward to an outstanding scientific meeting and a thoroughly enjoyable four days onboard the MS Cap San Diego.

Ahoy,

Lars Steinstraesser, MD
President EPSRC

Welcome note chair of the EPSRC

Dear Colleagues,

The European Plastic Surgery Research Council was founded in Hamburg 2009 as a non-profit organisation managed by and for the benefit of the young plastic & reconstructive research community in Europe. Fundamental and clinical research in the various subdisciplines of plastic & reconstructive surgery has been paramount for the further development of novel strategies and techniques in the reconstruction of complex defects caused by ablative cancer surgery, radiotherapy, trauma, burns or aggressive infections.

Concepts such as, tissue transplantation, vascular delay and tissue engineering were born in plastic surgery research laboratories. In addition, plastic surgery clinical trials and anatomical studies have resulted in new techniques, which reduce donor site morbidity and optimise/refine donor tissues. Such clinical and basic research has changed clinical practice and improved patient care.

Despite the presence of many excellent plastic surgery research teams all over Europe, representing many promising projects, there has been a shortage in reporting results and progress in the European arena. One of the major reasons was the lack of a widely recognised, respected and esteemed European forum supported by all the European national societies of plastic and reconstructive surgery. The outstanding success of the first inaugural EPSRC meeting in Hamburg 2009, based upon the tremendous contributions from more than 200 delegates from all over Europe, North America and Asia, established this required forum. We were particularly thrilled by the support and motivation from many members of the American Plastic Surgery Research Council. We were honoured and fascinated by the inspiring messages of eminent keynote speakers that came from all over the world on their own expenses just to encourage young researchers at the inaugural EPSRC meeting. In addition, the unique informal and interactive format allowed dissemination of "hot off the bench" research on plastic, reconstructive and aesthetic surgery.

The combination of exciting keynote speakers, panels and scientific paper presentations will again make this 2nd Annual EPSRC Meeting a truly memorable experience. The EPSRC is once again very grateful to all the keynote speakers, all of whom are leaders in their fields, for coming to the 2nd Annual EPSRC Meeting at their own expense.

Any chairmanship is linked to a particular aim. The aim for the 2nd meeting is to expand the number of European and international EPSRC members, support high-level contributions from countries all over Europe and the world, particularly from areas where there are currently few or no members, and welcome our friends from all over the world to join and share their projects with us.

The atmosphere due to the unique informal and interactive format on board the cargo ship MS Cap San Diego in Hamburg creates the enthusiasm and ambition to overcome barriers of languages and countries. In this hosting role, Europe feels at its best.

Welcome on board,

Jan Jeroen Vranckx, MD, PhD, FCCP
Chair EPSRC 2010

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Program overview

Time	Thursday, August 26, 2010	Friday, August 27, 2010
8:00		
8:05		
8:10		
8:15		
8:20		
8:25		Opening ceremony J. Vranckx, L. Steinstraesser
8:30		
8:35		
8:40		
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8:55		Keynote lecture 1: The role of R&D for the future development (and existance) of plastic surgery as a specialty
9:00		
9:05		
9:10		
9:15		Scientific session 1: Stem cell biology I
9:20		
9:25		
9:30		
9:35		Keynote lecture 2: Paradigm of tendon adhesions
9:40		
9:45		
9:50		
9:55		Coffee break with exhibitors
10:00		
10:05		
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10:15		
10:20		
10:25		Scientific session 2: Hand/peripheral nerve
10:30		
10:35		
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10:50		
10:55		Keynote lecture 3: Novel perspectives in ear reconstruction
11:00		
11:05		
11:10		
11:15		Scientific session 3: Reconstruction I
11:20		
11:25		
11:30		
11:35		
11:40		
11:45		Lunch & industrial exhibition
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13:10		
13:15		Keynote panel 1 Update on limb reconstruction
13:20		
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Time	Thursday, August 26, 2010	Friday, August 27, 2010
14:15		Scientific session 4: Stem cell biology II
14:20		
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14:45		Keynote lecture 4: Fat grafts for the future
14:50		
14:55		
15:00		
15:05		Scientific session 5: Ischaemia & angiogenesis I
15:10		
15:15		
15:20		
15:25		
15:30		
15:35		Coffee break with exhibitors
15:40		
15:45		
15:50		
15:55		
16:00	Registration	
16:05		Keynote lecture 5: Research of blood flow in free flaps
16:10		
16:15		
16:20		
16:25		Scientific session 6: Ischaemia & angiogenesis II
16:30		
16:35		
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16:55		Keynote lecture 6: Novel techniques in head and neck surgery
17:00		
17:05		
17:10		
17:15		Scientific session 7: Head & neck
17:20		
17:25		
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17:45		Harbor boat trip
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18:55		
19:00	Welcome reception	Short oral presentations
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20:00		Social evening Luke 3, MS Cap San Diego
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22:00		

Program overview

Time	Saturday, August 28, 2010	Sunday, August 29, 2010
8:00	Scientific session 8: Reconstruction II	
8:05		
8:10		
8:15		
8:20		
8:25		
8:30	Keynote lecture 7: Perspectives on perineal and abdominal wall reconstruction	
8:35		
8:40		
8:45		
8:50	Scientific session 9: Clinical outcome	
8:55		
9:00		
9:05		
9:10		
9:15		
9:20	Keynote lecture 8: Microvascular surgery through R&D – the perforator concept	
9:25		
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9:40	Coffee break with exhibitors	Farewell brunch
9:45		
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10:00		
10:05		
10:10	Keynote lecture 9: Clinical research guiding the state of the art in reconstructive microsurgery	
10:15		
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10:30	Scientific session 10: Tissue biology	
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11:00	Keynote lecture 10: Prefabrication and prelamination: in vivo tissue engineering „avant la lettre“	
11:05		
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11:20	Keynote panel 2 Update on composite tissue allotransplantation	
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12:00	Lunch & industrial exhibition	
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13:10	Keynote lecture 11: tba	
13:15		
13:20		
13:25		
13:30	Scientific session 11: Wound healing I	
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Time	Saturday, August 28, 2010	Sunday, August 29, 2010
14:00	Keynote lecture 12: Cell engineering in wound repair	
14:05		
14:10		
14:15		
14:20	Scientific session 12: Wound healing II	
14:25		
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14:45		
14:50	Coffee break with exhibitors	
14:55		
15:00		
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15:15		
15:20	Keynote lecture 13: Perspectives and innovations in craniofacial and cleft surgery	
15:25		
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15:35		
15:40	Scientific session 13: Craniofacial	
15:45		
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16:00		
16:05		
16:10	Keynote lecture 14: Perspectives and innovation in neural regeneration & stimulation	
16:15		
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16:25		
16:30	Scientific session 14: Nerve	
16:35		
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17:00	Business meeting	
17:05		
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18:55		
19:00	Short oral presentations	
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20:00	Social evening Pool deck, MS Cap San Diego	
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22:00		

08^{25} **Opening ceremony**
J. Vranckx (Leuven/BE), L. Steinstraesser (Bochum/DE)

08^{55}–09^{15} **Keynote lecture 1**
The role of R&D for the future development (and existence) of plastic surgery as a specialty
W. Kuzon (Ann Arbor, MI/US)

09^{15}–09^{35} **Scientific session 1**
Stem cell biology I
Chair G. Gurtner (Stanford, CA/US), G. Germann (Heidelberg/DE), S. Schlosser (Bern/CH)

09^{15} Variable vascular carriers for neoangiogenesis and mutual seeding of bone marrow mesenchymal stem cells and osteocytes for advanced osseous tissue engineering
H. Engel (Taipei/TW)

09^{25} Endogenous stem cell therapy improves diabetic wound healing
A. Marchac (New York, NY/US)

09^{35}–09^{55} **Keynote lecture 2**
Paradigm of tendon adhesions
D. McGrouther (Manchester/GB)

09^{55} Coffee break with exhibitors

10^{25}–10^{55} **Scientific session 2**
Hand/peripheral nerve
Chair G. Deune (Baltimore, MD/US), D. McGrouther (Manchester/GB)
S. Carroll (Dublin/IE)

10^{25} Effect of PEDOT: polymerization methods on peripheral nerve regeneration
Z. Baghmanli (Ann Arbor, MI/US)

10^{35} An investigation of efficiency of gene delivery methods and time-course of transgene expression in injured tendons and tissue reactions caused by different vectors
C.H. Chen (Nantong/CN)

10^{45} An analysis of patient quality of life and morbidity due to hand and upper extremity trauma in Honduras
L. Tom (New Haven, CT/US)

10^{55}–11^{15} **Keynote lecture 3**
Novel perspectives in ear reconstruction
F. Firmin (Paris/FR)

11^{15}–11^{45} **Scientific session 3**
Reconstruction I
Chair F. Firmin (Paris/FR), S. Hofer (Toronto/CA), D.T. Bui (Stony Brook, NY/US)

11^{15} Free flap reconstruction in the elderly – Is it safe?
W. Moll (Bad Soden/DE)

11^{25} Clinical outcome comparison between free myocutaneous latissimus dorsi and free fasciocutaneous antero-lateral thigh flaps for soft tissue reconstruction of lower extremity traumatic open fractures
S. Al-Benna (Bochum/DE)

11^{35} Reconstruction of complex abdominal wall defects using bioprosthetic mesh material as fascia support within patients with severe immunodeficiency
O. Doebler (Berlin/DE)

11^{45} Lunch and industrial exhibition

13^{15}–14^{15} **Keynote panel 1**
Update on limb reconstruction
Chair H.-U. Steinau (Bochum/DE)

13^{15} Reconstructive surgery of the lower extremity
S. Levin (Philadelphia, PA/US)

13^{30} Perspectives and innovations in upper limb reconstruction
M. Neumeister (Springfield, IL/US)

13^{45} Perspectives on microvascular reconstruction of the limbs
G. Germann (Heidelberg/DE)

14^{00} Evolution of surgical treatment of extremity reconstruction particularly for extremity sarcomas
G. Deune (Baltimore, MD/US)

14^{15}–14^{45} **Scientific session 4**
Stem cell biology II
Chair M. Hedrick (San Diego, CA/US), A. Luttun (Leuven/BE)
D. Krijgh (New York, NY/US)

14^{15} Heterotypic cell-contacts between human endothelial cells and human osteoprogenitor-cells support osteogenic differentiation
F. Lampert (Freiburg/DE)

14^{25} Systemic application of mesenchymal bone marrow-derived stem cells improves microhemodynamics in critically ischemic murine skin
S. Schlosser (Bern/CH)

14^{35} Adipose-derived stem cells seeded on three-dimensional scaffolds of spider silk
J. W. Kuhbier (Hannover/DE)

14^{45}–15^{05} **Keynote lecture 4**
Fat grafts for the future
M. Hedrick (San Diego, CA/US)

15^{05}–15^{35} **Scientific session 5**
Ischaemia & angiogenesis I
Chair E. Tukiainen (Helsinki/FI), U. Kneser (Erlangen/DE), P. Grimm (Zurich/CH)

15^{05} Accelerated vascularisation and improved bone formation in critical-size bone grafts by VEGF-expressing BMSC in a rabbit model
R.D. Largo (Basel/CH)

15^{15} Hypoxia-inducible factor 1 (HIF-1α) expression as an indicator for hypoxia in endothelial progenitor cells (EPC) and the bioartificial tissue within the arteriovenous (AV) loop rat isolation chamber
O. Bleiziffer (Erlangen/DE)

15^{25} Wound bed vascularization by endothelial cells: differentiation status matters
B. Hendrickx (Leuven/BE)

15^{35} Coffee break with exhibitors

16^{05}–16^{25} **Keynote lecture 5**
Research of blood flow in free flaps
E. Tukiainen (Helsinki/FI)

16^{25}–16^{55} **Scientific session 6**
Ischaemia & angiogenesis II
Chair B. Hendrickx (Leuven/BE), O. Bleiziffer (Erlangen/DE)
M. Neumeister (Springfield, IL/US)

16^{25} Placental Growth Factor (PlGF) in part mediates the beneficial effects of hBOEC on wound healing
K. Verdonck (Leuven/BE)

16^{35} Pharmacologic pre- and post-conditioning with hydrogen sulfide significantly attenuates ischemia-reperfusion injury in diabetic tissue
S. Horbach (New York, NY/US)

16^{45} Platelet derived serotonin plays a critical role during skeletal muscle ischemia and reperfusion injury
P. Grimm (Zurich/CH)

16^{55}–17^{15} **Keynote lecture 6**
Novel techniques in head and neck surgery
S. Hofer (Toronto/CA)

17^{15}–17^{45} **Scientific session 7**
Head & neck
Chair J. Pribaz (Boston, MA/US), M.-H. Cheng (Taipei/TW), M. Kesting (Munich/DE)

17^{15} Free flap donor site morbidity in craniomaxillofacial reconstruction
R.-D. Bader (Jena/DE)

17^{25} Improving aesthetic outcomes in head and neck reconstruction with structural fat grafting
D. Baumann (Houston, TX/US)

17^{35} Mandible reconstruction using left free fibula osteocutaneous flap? Study of over 400 cases
P. Yadav (Mumbai/IN)

17^{45} **Social program**
Harbor boat trip

19^{00}–20^{00} **Short oral presentations** (see page 22)
Chair J.J. Vranckx (Leuven/BE), L. Steinstraesser (Bochum/DE)

20^{00} **Social evening**
Luke 3

08^{00}–08^{30} **Scientific session 8**
Reconstruction II
Chair C. Butler (San Antonio, TX/US), M. Kon (Amsterdam/NL), K.H. Hoo (Belfast/GB)

08^{00} Latissimus dorsi free flap harvesting may affect the shoulder joint in long run
S. Giordano (Vaasa/FI)

08^{10} The value of diffusion tensor tractography in the management of peripheral nerve tumors
M. Schmidt (Vienna/AT)

08^{20} The extended abdominal wall flap for CTA
S. Hollenbeck (Durham, NC/US)

08^{30}–08^{50} **Keynote lecture 7**
Perspectives on perineal and abdominal wall reconstruction
C. Butler (Houston, TX/US)

08^{50}–09^{20} **Scientific session 9**
Clinical outcome
Chair P. Blondeel (Gent/BE), G. Fabre (Leuven/BE), S. D'Arpa (Palermo/IT)

08^{50} Outcome after revision of microvascular free diep, siea and sgap flap for autologeous breast reconstruction: a retrospective analysis
G. Fabre (Leuven/BE)

09^{00} T-regulatory cells and TH17 cells in peri-silicone-implant capsular fibrosis
E. Rabensteiner (Innsbruck/AT)

09^{10} Intraoperative decision-making in autologous breast reconstruction: evaluation of zonal perfusion in DIEP and ms-TRAM flaps using a combined laser doppler spectrophotometry system
U. Kneser (Erlangen/DE)

09^{20}–09^{40} **Keynote lecture 8**
Microvascular surgery through R&D – the perforator concept
P. Blondeel (Gent/BE)

09^{40} Coffee break with exhibitors

10^{10}–10^{30} **Keynote lecture 9**
Clinical research guiding the state of art in reconstructive microsurgery
M.-H. Cheng (Taipei/TW)

10^{30}–11^{00} **Scientific session 10**
Tissue biology
Chair B. Lengelé (Brussels/BE), A. Bayat (Manchester/GB), P. Liu (Providence, RI/US)

10^{30} The innovative role of glandular-derived stem cells on dermal regeneration after thermal injury
L.H. Evers (Luebeck/DE)

10^{40} Effects of beta-catenin, LEF-1, c-jun and PEA 3 on osteopontin expression in malignant melanoma
K.H. Hoo (Belfast/GB)

10^{50} Tailoring the sequence and duration of conventional immunosuppressive drugs to induce CTA tolerance
M. Weinstock (Sao Paulo/BR)

11^{00}–11^{20} **Keynote lecture 10**
Prefabrication and prelamination: in vivo tissue engineering "avant la lettre"
J. Pribaz (Boston, MA/US)

11^{20}–12^{00} **Keynote panel 2**
Update on composite tissue allotransplantation

B. Pomahac (Boston, MA/US)

B. Lengelé (Brussels/BE)

12^{00} Lunch and industrial exhibition

13^{10}–13^{30} **Keynote lecture 11**
Reconstruction of hypopharynx and voice control
S. Mardini (Rochester, MN/US)

13^{30}–14^{00} **Scientific session 11**
Wound healing I
Chair M. Kon (Amsterdam/NL), L. Steinstraesser (Bochum/DE)
G. Gurtner (Stanford, CA/US)

13^{30} Promotion of wound healing by regulator proteins of the innate immune system
M. Kueckelhaus (Bochum/DE)

13^{40} Equol but not genistein improves early metaphyseal fracture healing in osteoporotic rats
L. Kolios (Goettingen/DE)

13^{50} A transgenic mouse model of age-related wound healing: characterization and therapeutics
P. Butala (New York, NY/US)

14^{00}–14^{20} **Keynote lecture 12**
Cell engineering in wound repair
R. Horch (Erlangen/DE)

14^{20}–14^{50} **Scientific session 12**
Wound healing II
Chair P. Vogt (Hannover/DE), P. Liu (Providence, RI/US), A. Bayat (Manchester/GB)

14^{20} Amphibian epidermal lipoxygenase AmbLOXe enhances mammalian wound healing in vivo
B. Menger (Hannover/DE)

14^{30} Linking reactive oxygen species and apoptosis: towards an understanding of diabetic wound healing
D. Knobel (New York, NY/US)

14^{40} Enhancement of flap survival and changes of angiogenic gene expression after AAV2-mediated VEGF gene transfer to rat ischemic flaps
X. T. Wang (Providence, RI/US)

14^{50} Coffee break with exhibitors

15^{20}–15^{40} **Keynote lecture 13**
Perspectives and innovations in craniofacial and cleft surgery
S. Warren (New York, NY/US)

15^{40}–16^{10} **Scientific session 13**
Craniofacial
Chair S. Warren (New York, NY/US), S. Mardini (Rochester, MN/US)
R. Reid (Chicago, IL/US)

15^{40} Expression of antimicrobial peptides in maxillofacial surgical site infections
N. Rohleder (Munich/DE)

15^{50} The differential effects of BMP-9 and BMP-2 in critical sized cranial defects
I. Seitz (Chicago, IL/US)

16^{00} Endogenous stem cell therapy improves calvarial bone healing
S. Warren (New York, NY/US)

16^{10}–16^{30} **Keynote lecture 14**
Perspectives and innovation in neural regeneration & stimulation
P. Cederna (Ann Arbor, MI/US)

16^{30}–17^{00} **Scientific session 14**
Nerve
Chair D. Baumann (Houston, TX/US), W. Kuzon (Ann Arbor, MI/US)
R. Horch (Erlangen/DE)

16^{30} The role of IL-10 and C3 Toxin in nerve regeneration in an end-to-side nerve repair model
M. Sakalidou (Freiburg/DE)

16^{40} Neuromodulation in functional-reconstruction through peripheral nerve transplantation into central nerve system in spinal cord injury in rats applying Cerebrolysin
T. von Wild (Luebeck/DE)

16^{50} Comparative gene expression analysis of repaired and unrepaired peripheral nerves during the early phase after nerve lesion
T. Manoli (Tuebingen/DE)

17^{00}–17^{30} **Business meeting**

19^{00}–20^{00} **Short oral presentations** (see page 24)
Chair J.J. Vranckx (Leuven/BE), L. Steinstraesser (Bochum/DE)

20^{00} **Social evening**
Pool deck

SP1 Obesity impairs Wound healing
S. Warren (New York, NY/US)

SP2 Hydrogen sulfide: A pharmacological therapy for preventing muscle ischemia reperfusion injury in vivo
D. Krijgh (New York, NY/US)

SP3 Axial vascularisation of parallel aligned electrospun nanofibers in vivo
J.P. Beier (Erlangen/DE)

SP4 Overcoming Ischemic Reperfusion Injury via Nitric Oxide Synthetases in Diabetes Type 2 models
H. Engel (Ludwigshafen/DE)

SP5 Risk stratification for Acellular Dermal Matrix use in Tissue Expander/Implant breast reconstruction
E. Wang (Stony Brook, NY/US)

SP6 Morphology, biomechanics and biocompatibility of microsurgical sutures based on spider silk
J.W. Kuhbier (Hannover/DE)

SP7 Evaluation of lymph involvement upon application of PrevenaTM Incision Management in a porcine model
D. Kilpadi (San Antonio, TX/US)

SP8 Restoring Function in Tetraplegia using Nerve Transfer - Literature Review, Anatomical Feasibility and Theoretical Concepts
A. Gohritz (Hannover/DE)

SP9 Why is there such a variability in clinical outcome of fatgrafting to the breast after 1 session?
S. van den Berghe (Leuven/BE)

SP10 Propeller Flaps Based on One Eccentric Perforator for Reconstruction of Trunk and Pelvic Defects
U. Kneser (Erlangen/DE)

SP11 Intraoperative hemodynamic evaluation of the latissimus dorsi muscle flap
S. Giordano (Vaasa/FI)

SP12 Venous Thromboembolism (VTE) Incidence in Outpatient Aesthetic Surgery: Risk Stratification and Implications for Future Prophylaxis
S. Khan (Stony Brook, NY/US)

SP13 The Effects of Balloon-Catheter Dilation on Healthy Rat Arterial Walls: A Potential Method of Increasing Muscle-Sparing Breast Reconstruction
B. Colebunders (New Haven, CT/US)

SP14 Improved vascularization of tissue substitutes after low-presure glow-discharge surface-modification
A. Schaffran (Bochum/DE)

SP15 An audit of the melanoma histopathology requests and reports- Are we complying with the guidelines?
D. Kulendren (Essex/GB)

SP16 Pedicle Autonomy in Muscle Flaps: Implications for Lower Limb Trauma
M. Wagels (Brisbane/AU)

SP17 Reconstruction of large abdominal wall defects with pedicled flaps from the anterolateral thigh. Can a functional abdominal wall restoration be achieved?
N. Thomas (Leuven/BE)

SP18 Noninvasive Venous Ablation via a Hand-Held, Battery-Operated, High Intensity Focused Ultrasound Device
A. Koppius (New York, NY/US)

SP19 Resolution of Intracranial Hypertension after cranial vault Reconstruction
L.H. Evers (San Diego, CA/US)

SP20 Comparative Review of Burns with Inhalation Injury in Ibadan, Nigeria
A. Iyun (Ibadan/NG)

SP21 Mesenchymal stem cells and BMP-2 for generation of axially vascularized bone tissue in the sheep AV-loop model
J.P. Beier (Erlangen/DE)

SP22 Quantifying Contraction of Muscles of Facial Expression Using Digital Image Speckle Correlation (DISC) Analysis
N. Conkling (Stony Brook, NY/US)

SP23 Expert proficiency levels of consultant plastic surgeons on five core plastic surgical tasks
A.-M. Kennedy (Dublin/IE)

SP24 Improving Outcomes of VRAM Flap Donor Sites with Component Separation
D. Baumann (Houston, TX/US)

SP25 An in vivo experimental investigation of effects of aav2-vegf gene delivery to enhance healing strength of injured tendons
Y.F. Wu (Nantong/CN)

SP26 Periorbital reconstruction with free flaps in the enucleated eye syndrome
R.-D. Bader (Jena/DE)

SP27 Identification of a causal role of monomeric C-reactive protein (CRP) in ischemia/reperfusion injury after free microsurgical tissue transfer
J.R. Thiele (Freiburg/DE)

SP28 Therapeutic effects of bFGF and VEGF165 after implantation of non-viral modified fibroblasts in an ischemic rat flap model
C. Hartog (Luebeck/DE)

SP29 A prospective review of 31 patients with primary breast sarcoma treated at a single centre
S. Al-Benna (Bochum/DE)

SP30 Closed Suction Drainage Duration is Associated with A Higher Infection Rate in Tissue Expander/Implant Breast Reconstruction Despite Antibiotic Prophylaxis
S. Lanier (Stony Brook, NY/US)

SP31 Benjamin Alcock and the Pudendal Canal
B. Colebunders (New Haven, CT/US)

SP32 Venous Malformation Associated Nerve Profiles are not Distinctive from Other Vascular Malformations; Implications for Clinical Management of Pain
V. Gokani (London/GB)

SP33 Extracorporeal shock wave treatment protects against ischemia/reperfusion injury
M.A. Reichenberger (Ludwigshafen/DE)

SP34 One-stage combined Gynaecoplastic risk-reducing surgery – A service review
M. Khadim (Belfast/GB)

SP35 Sensory changes and chronic pain following cosmetic breast augmentation
M.L. von Sperling (Aalborg/DK)

SP36 Injection of Micro-processed Cartilage picks in Augmentation Rhinoplasty
Y. Avsar (Istanbul/TR)

SP37 Versatility of right gastroepiploic and gastroduodenal artery for the arterial reconstruction in adult living donor liver transplantation in various situations
B.F. Seo (Seoul/KR)

SP38 Use of microbial cellulose dressing in the treatment of burns and donor sites
H. Gustke (Hamburg/DE)

SP39 Does preoperative radiation makes a difference in breast reconstruction – free TRAM?
J. Huang (Brisbane/AU)

Sponsors

B. Braun-Stiftung (Melsungen/DE)

Gold sponsor

BSN medical GmbH (Hamburg/DE)

Bronze sponsor

BATU Medical AG (Lörrach/DE)

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Sponsor name tags

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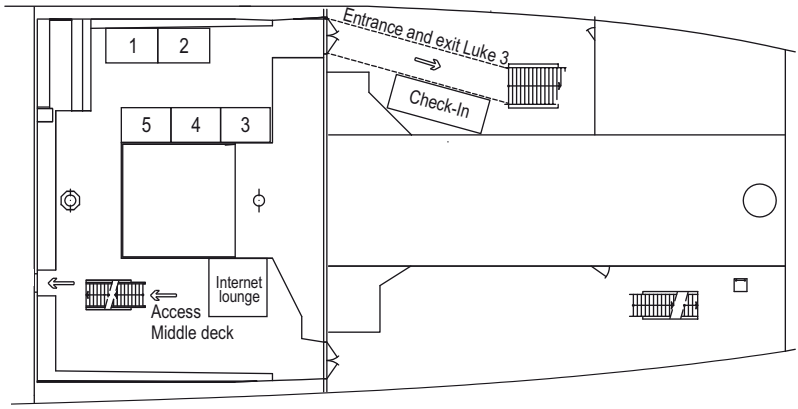
Sponsors and Exhibitors

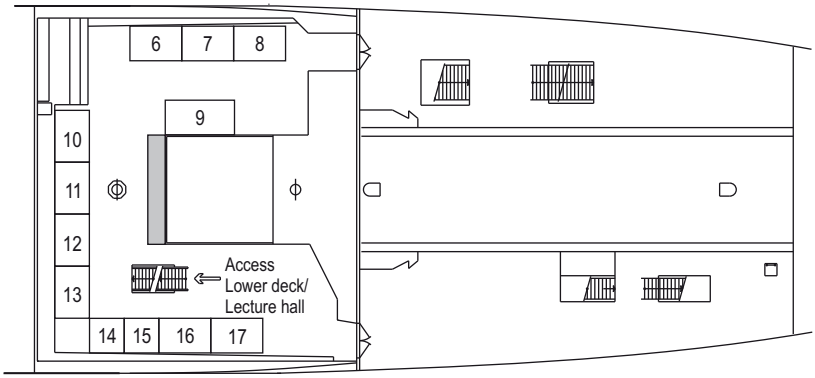
Media cooperations

MS Cap San Diego • Upper deck



MS Cap San Diego • Middle deck

Catering



Harbor boat trip

Enjoy the harbor of Hamburg during a traditional harbor boat trip on a Hamburg "Barkasse"! Get on board and depart for an unforgettable harbor boat trip on the river Elbe. Discover the Speicherstadt, a historic brick-built warehouse complex, where still today the smell of roasted coffee and exotic spices lies in the air. The trip is set in the early evening and offers you a welcome distraction from the conference program.

Date Friday, August 27, 2010
Time 17^{45}–18^{45}
Boarding will be arranged at the "St. Pauli Landungsbrücken" near the MS Cap San Diego.
Fee included

© photo: Glitscher Elbe- u. Hafentouristik GmbH

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 29, 2010
Time 05^{30}–09^{00}
Venue St. Pauli Fish Market/Große Elbstraße

Venue
MS Cap San Diego
Luke 3
Überseebrücke
20459 Hamburg, Germany

Date
August 26–29, 2010

Homepage
For latest information please visit www.epsrc.eu.

Education credits and certification
The 2nd 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:

Friday, August 27, 2010	8 CME points
Saturday, August 28, 2010	8 CME points

Please don't forget to bring along the labels of the Medical Chamber for every-day registration into the lists of participation

The conference is granted with 12 European CME credits by the European Accreditation Council for Continuing Medical Education (EACCME).

Attendance list
Please remember to sign up daily in the attendance lists which are displayed at the check-in (if necessary with bar code).

Certification of attendance
Certificates of attendance for the registered participants will be submitted at the check-in.

Prizes and bursaries
Lecture prize	500 EUR
Poster prize	250 EUR

The prizes are sponsored by MEDA Pharma.

Name tags
Participants and registered accompanying guests will receive a name tag with their registration. Admission to the meeting and exhibition area is only allowed with a valid tag. Tags must be worn visibly during the congress and at the social activities. Exhibitors' tag will be provided for the staff of the exhibition booths.

Evaluation
We appreciate your active participation by giving your feedback in our evaluation. With your feedback you help us to continue providing highest quality at conferences. Please hand in your completed evaluation at the check-in on your last congress day.

Check-in
You will find the check-in on the upper deck, entrance Luke 3.

Cloakroom
You will find the cloakroom on the upper deck, entrance Luke 3.

Media check
You will find the media check on the lower deck in the lecture hall.

Opening hours

	Thursday	Friday	Saturday
Check-in	16^{00}–19^{00}	07^{30}–20^{00}	07^{30}–20^{00}
Media-check	18^{00}–19^{00}	07^{30}–20^{00}	07^{30}–20^{00}
Cloakroom		07^{30}–20^{00}	07^{30}–20^{00}
Industrial exhibition		08^{00}–18^{00}	08^{00}–16^{00}

Internet
An internet lounge with free access is provided for all participants. It is situated on the upper deck. PCs with Windows XP operating system will be available for your convenience to check emails etc.

Language
Official meeting language is English. English is spoken in most of the hotels, restaurants and touristic areas.

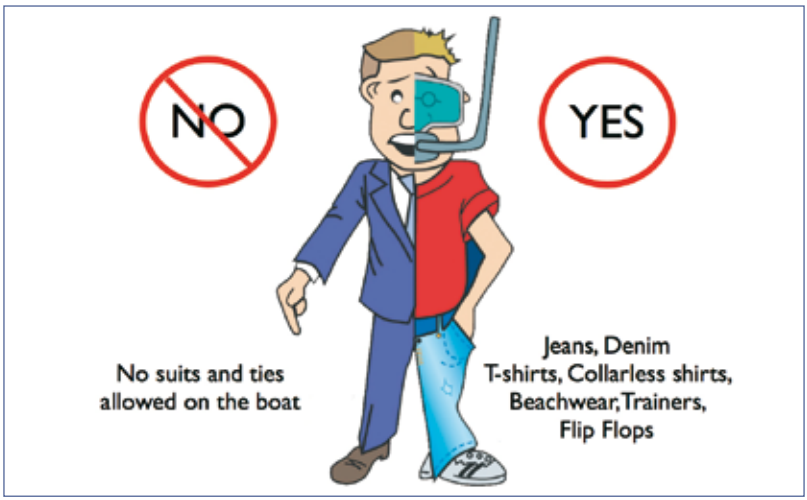
Abstract publication
Abstracts of the long oral presentations have been published in the August issue of "Plastic and Reconstructive Surgery" (PRS Journal - August 2010 - Volume 126 - Supplement 2S). Free download is possible under http://journals.lww.com/plasreconsurg.

Industrial exhibition
As part of the conference, an extensive industrial exhibition will take place on the premises. Please find an overview and a map of all exhibitors on page 29 in the program. The exhibiting companies are looking forward to welcome you!

Catering
Catering will be provided during the official breaks within the industrial exhibition premises.

Congress photographer
The entire congress will be documented by a photographer. You will have the chance to purchase single pictures or a complete picture CD of the congress. Please find the photographers booth within the industrial exhibition.
Contact: PHOTO: GRYSA • photogrysa@freenet.de • +49 (0)178 2 81 76 23

Dress code



Smoking

Smoking is not allowed inside the congress venue or at other venues for the social functions. Smokers are required to smoke outdoors and in the designated smoking areas.

Restrooms

Please follow the signage or ask at the check-in.

Information to oral lectures

Media check

Speakers are asked to submit their lectures at the media check-in. Please prepare your lectures either in PowerPoint format or as a PDF file. If you have special requirements (e.g. animations) please contact the media check-in counter in advance. Presentations should be well readable and should contain the e-mail address of the speaker on the first or last slide in case of questions/remarks. The internet lounge also provides free access to the internet.

Talk time

To ensure the smooth running of all lectures, the speakers are asked to keep the allocated speaking time. The chairs of each session are requested to interrupt the speakers in case of overrunning time. Please advise the chairs of your session in advance about any changes or special requests that might occur concerning your presentation. The speaking time of each long oral presentation is fixed to 7 minutes (additional 3 minutes time for discussion) and the speaking time of each short oral presentation is fixed to 3 minutes (no discussion). The screen will be turned off after indicated talk time.

Format of presentations

Preferred presentation format is PDF or PowerPoint. Open-Office formats will also be accepted. The required technology will be provided at the conference venue. If your presentation includes a video to your lecture, please ensure that it encloses the right CODEC to be played.

Submission of lectures

Presentations should be prepared as PDF or PowerPoint. The required hardware and software will be provided at the conference venue. The usage of Macintosh and Open-Office formats as well as the usage of your own laptop are not intended but might be possible if communicated in advance. In this case please write us to epsrc2010@conventus.de by August 20, 2010.

Video or audio data will only be accepted in the following formats: avi, wmv, and mpg which have to be provided separately. If your presentation includes a video, please ensure that it encloses the right CODEC in order to be played correctly.
Please make sure to submit your media in time (at least two hours before your lecture) at the media check-in (Please follow the signage on site!).

Note: When using an USB stick as storage medium, please do not protect it with any software. To be best prepared, we recommend submitting your presentation by Auguts 20, 2010 to epsrc2010@conventus.de or by mail to

Conventus Congressmanagement & Marketing GmbH
Isabelle Laerz
Markt 8 • 07743 Jena/Germany

You will have the opportunity to review and, if necessary, edit your presentation during the conference.

The presentation data of your lecture(s) will be collected and administeredcentrally before and during the conference. In the media-check you will find laptops with MS PowerPoint 2007 and a video projector at your convenience.

Lecture and poster prize

The prizes for the best long oral presentation and the best short oral presentation (e-posters) will be presented during the farewell brunch on Sunday from 09^{00}–11^{00}.

Practical information

Calling to and from Germany

The international area code for Germany is 49, and the local code for Hamburg city is 40. National calls: 0 + city code + telephone number. International calls: 00 + country code + city code + telephone number.

Climate

Most of Germany has a temperate seasonal climate in which humid westerly winds predominate. The climate is moderated by the North Atlantic Drift, which is the northern extension of the Gulf Stream. This warmer water affects the areas bordering the North Sea including the area along the Rhine, which flows into the North Sea. Consequently in the north-west and the north, the climate is oceanic; rainfall occurs year round with a maximum during summer. Summers tend to be cool, though temperatures can exceed 30 °C (86 °F) for prolonged periods.

Currency
The currency unit is the Euro (€). The Euro is convertible with all foreign currencies. You may exchange your money at the airport and banks at the daily announced current exchange rates. Traveler's checks can be cashed in banks.

Credit cards
Major credit cards (Mastercard, Visa and American Express) are widely used in almost all the hotels, restaurants, shopping malls and every kind of stores.

Electricity
The electric current in Germany is 220V AC. You have the chance to find and buy different types of current and plug converters at the airport and in electronic stores.

Health care
All cities in Germany have their own public and/or university hospital. Emergency ambulances of the hospitals operate 24 hours and 7 days. In most of the hospitals major health insurances are accepted.

Insurance
The organiser assumes no responsibility for accidents or damage to the private property of participants. Please make your own arrangements for health insurance and any other necessary insurance. (besser)

Letter of invitation
A letter of invitation will be sent to any individual requesting; after completion of registration and acceptance of application by the Organising Committee.

Time zone
Time is one hour ahead of Greenwich Mean Time (GMT+1) in Germany.

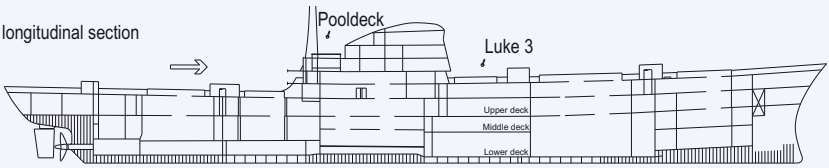
Visa
EU nationals do not require a visa to enter the Federal Republic of Germany. Generally speaking, all other foreigners require a visa for stays in Germany. A visa is not required for semi-annual visits of up to three months for nationals of those countries for which the European Community has abolished the visa requirement. Under German law (section 71 (2) of the Residence Act), responsibility for issuing visas lies with the missions of the Federal Republic of Germany, i.e. its embassies and consulates-general. In principle, the Federal Foreign Office is not involved in decisions on individual visa applications, nor does it have any knowledge of the status of individual applications being processed. Visas are issued by the mission responsible for the area in which the applicant has his/her ordinary residence or domicile.

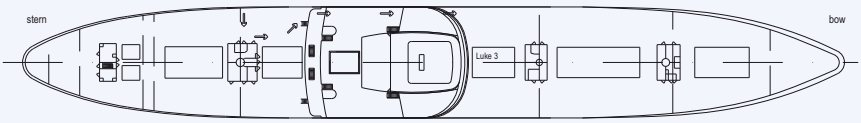
source: Auswärtiges Amt Germany

1 St. Pauli Fischmarkt
2 Hotel Empire Riverside
3 Hotel Stella Maris

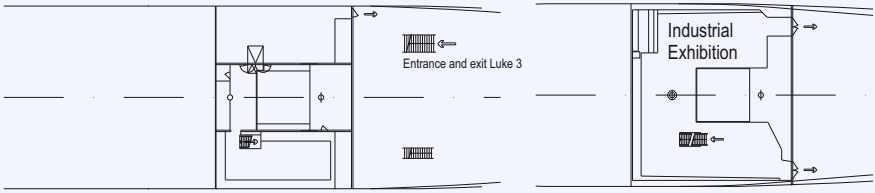
Upper deck	Industrial exhibition, Internet lounge, Check-In
Middle deck	Industrial exhibition, Catering
Lower deck	Lecture hall

longitudinal section

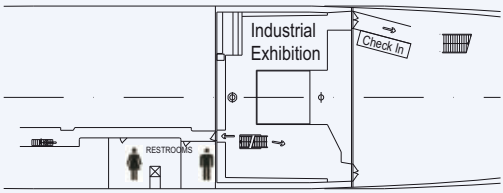




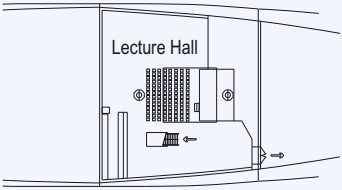
Middle deck



Upper deck



Lower deck



Registration and confirmation

Since capacity is limited, registrations will be considered on a first come, first served basis. It is important that registration includes the name of any accompanying person to ensure their inclusion in the planning for the social program. Registration is considered official with receipt of the invoice/confirmation from Conventus. This document will also serve as your VAT invoice for tax purposes.

Invoicing and due date for fees

The fees for the scientific part of the event are for account of the company Conventus and are exclusive of German VAT, which is currently 19% (as of 2010). The fees for the social evening and the social program are for account of Conventus, and are exclusive of German VAT, which is currently 19% (as of 2010).

All fees are due after receipt of the invoice/confirmation form. Transfer payments must include the name of the participant and the invoice number, otherwise they will not be accepted. All major credit cards accepted.

Scope of services

Event fee includes participation in the scientific part of the schedule only. In the fee included are documentation, program, abstracts and the social program, name tags and a certificate of participation. Those items will be handed out on-site generally.

Cancellations, changes, refunds

Cancellations must be made in written form only and will only be accepted if received by July 15, 2010. A cancellation fee of 25 EUR will apply. Same terms apply for cancellations regarding the social program but no cancellation fee will be charged. After the expiration of this period and/or in the event of non-attendance, the entire fee shown on your invoice/confirmation will be due. Any changes in booking, after booking confirmation has been issued, will result in a handling fee of 15 EUR. Any requested additions to existing reservations or reservations made during the event on-site, will be processed according to availability.

Event cancellation, refunds

There is limited capacity for all events. For certain events a minimum number of participants is required. If the minimum number of participants is not reached, the organizer reserves the right to cancel all or parts of the event on a short-term notice. If that case occurs all paid fees will fully be refunded.

Force majeure, disclaimer

The organiser is responsible for all changes to individual parts of the event. Compensation cannot be claimed if the whole event or parts of it have to be cancelled or impeded due to unforeseen incidents of political or commercial nature or an act of god. Same regulation applies in the event of cancellation of speakers or required changes to the schedule.

Hotel reservations, disclaimer

Conventus acts as an intermediary for hotel reservations and therefore assumes no liability for reservations. Changes and cancellations have to be addressed to the according hotels directly. The cancellation terms of the individual hotels apply.

Limitation of liability

Conventus acts as an intermediary for the program offered by the organiser and, therefore, assumes no liability whatsoever for the event. Any liability for services and possible problems with the services lies exclusively with the provider of the services. Participation in activities of the supporting program is exclusively at one's own risk.

Conventus otherwise assumes liability for death or injury to body or health, provided there has been negligence or an intentional breach of duties by the event organiser, its legal representatives, or vicarious agents.

In the event of any other damage, the liability of Conventus, its legal representatives and its vicarious agents is limited to intended and gross negligent conduct, provided that no essential contractual obligations have been breached.

Applicable law, place of performance and jurisdiction

The laws of the Federal Republic of Germany apply excluding the U.N. Convention on Contracts for the International Sale of Goods (CISG).

To the extend allowed by law, Jena is place of performance and jurisdiction for all claims.

Status: February 24, 2010

LP1: THE INFLUENCE OF LOCAL ANESTHETICS ON VIABILITY AND PROLIFERATION OF PREADIPOCYTES AND THEIR DIFFERENTIATION TO ADIPOCYTES

M. Keck[1], M. Zeyda[2], K. Gollinger[2], S. Burjak[1] L.-P. Kamolz[1], M. Frey[1], T. Stulnig[2]

[1]Medical University Vienna, Plastic and reconstructive Surgery Vienna, Austria

[2]Medical University Vienna, Clinical Division of Endocrinology and Metabolism, Department of Medicine III, Vienna Austria

BACKGROUND: Autologous fat transplantation is a well established technique in plastic surgery. Current efforts focus on identifying maneuvers that may minimize resorption and provide predictable late results. Aim of this study was to investigate the influence of different local anesthetics frequently used in clinical practice on the viability and proliferation of preadipocytes and their ability to differentiate into adipocytes.

METHODS: Human preadipocytes were isolated from subcutaneous adipose tissue of 15 patients and treated with bupivacaine, mepivacaine, ropivacaine, articaine/epinephrine, and lidocaine for 30 minutes. Viability was determined directly after treatment and during the following cultivation. Differentiation of preadipocytes was determined by expression of the adipocyte marker adiponectin.

RESULTS: While the immediate effects of mepivacaine and ropivacaine were only moderate, treatment with articaine/epinephrine and lidocaine strongly impaired preadipocyte viability. Cells normally attached to the culture dishes and proliferated irrespective of the previous treatment. During long-term cultivation, articaine/epinephrine-treated cell viability markedly decreased, while other local anesthetics had no impact. Despite normal phenotypical appearance of cells treated with bupivacaine, mepivacaine, ropivacaine, and lidocaine, all local anesthetics markedly impaired adipocyte differentiation as determined by adiponectin expression.

CONCLUSION: Our results show that there is a marked influence of local anesthetics not only on the quantity of viable preadipocytes but also on their quality as determined by their ability to differentiate into mature adipocytes. Therefore these results should be considered in the context of autologous fat transfer as well as soft tissue engineering.

LP2: VARIABLE VASCULAR CARRIERS FOR NEOANGIOGENESIS AND MUTUAL SEEDING OF BONE MARROW MESENCHYMAL STEM CELLS AND OSTEOCYTES FOR ADVANCED OSSEOUS TISSUE ENGINEERING

H. Engel, J.J. Huang, H.-K. Kao, C.-K. Tsao M.-H. Cheng

Chang Gung Memorial Hospital Taiwan, Plastic and Reconstructive Surgery, Taipei, Taiwan

INTRODUCTION AND AIMS: The repair of large bone defects following trauma, infection and tumor resection remains a major clinical challenge. Theoretically, bone tissue engineering could solve the problem of limited donor tissue availability without any donor site morbidity. While progress has been made in the past years, our incomplete knowledge about the role of different vascular components influencing neovascularization, the correlation between osteoinductive periosteum and the optimal combination of stem cells and target cells limits the ability for further progress. This study was carried out to evaluate the role of different vascular components inside a tissue engineering chamber, the role of periosteum as an osteoinductive factor and the impact of different compounds of stem cells and osteocytes as target cells.

MATERIAL AND METHODS: Sprague-Dawley rats were used for a pedicled groin fat flap based on the inferior epigastric vessels. The pedicles, femoral artery and vein, were isolated and employed as vascular carriers inside a silicone tube as the tissue engineering chamber. PEG-PLLA was used as scaffold mixed with different amounts of bmMSC and osteocytes. The fat groin flap was wrapped around the silicone chamber. At different time points (3d, 1w, 3w and 12w) the TE chamber was harvested and histologic and molecular analysis, blood vessel density, immunohistochemistry and quantification of VEGF was performed.

KEY RESULTS/CONCLUSIONS: Neovascularization with vein and A/V shunting was superior compared to artery alone or artery and vein combined. Periosteum is a critical factor as an osteoinductive component inside a TE chamber. Different compounds of stem cells and target cells (80%/20%) improved osseous TE. (Complete Data available within 4 weeks)

LP3: ENDOGENOUS STEM CELL THERAPY IMPROVES DIABETIC WOUND HEALING

A. Marchac, R.J. Allen, O. Canizares, C. Lin
P. Nguyen, J. Levine, P. Saadeh, S. Warren
NYU Medical, Plastic and Reconstructive Surgery, New York United States

INTRODUCTION: Diabetes impairs wound neovascularization. We hypothesize that diabetic (db) wound healing can be improved by correcting endothelial progenitor cell (EPC) mobilization and homing using AMD3100 (progenitor cell mobilizing agent) and PDGF-BB (growth factor, chemoattractant), respectively.
METHODS: Full-thickness wounds were made on the dorsum of wild-type (wt) and type II Lepr$^{db/db}$ mice. Mice were randomized into 5 experimental arms (n=8/arm): untreated wt (WT), untreated db (DB), AMD3100-treated db (A^+), PDGF-BB-treated db (P^+), and AMD3100/PDGF-BB-treated db (A^+P^+). Treated mice received daily AMD3100 (10mg/kg; i.p.) and/or PDGF-BB (2μg; topical) beginning on post-wounding day 3 and continuing until wound closure. Wound closure was assessed photometrically. Circulating (c)EPC number was determined by FACS. Wound vascularity (vessels/hpf) was assessed by CD31 immunofluorescence. Wound fibroblast and EPC function were assessed in the presence of AMD3100 (5-50ng/mL).
RESULTS: Impaired DB wound healing was associated with decreased cEPC number, wound vascularity, and blood glucose levels >350mg/dl. AMD3100 treatment increased db cEPC levels (3.7±1.0-fold at 1 hour, $p<0.05$; 5.5±1.1-fold at day 7, $p<0.02$; and 13.2±0.5-fold at day 14, $p<0.02$). Of the 3 db treatment groups, A^+P^+ had the greatest improvements in wound healing (D7: 32.8±0.5.0% vs. 19.6±2.0%, $p<0.05$; D14: 94.1±0.1% vs. 37.1±9.0%, $p<0.01$; D21: 100±0.0% vs. 64.0±9.0%, $p=0.02$) and wound vascularity (D21: 431.8±19.3 vessels/hpf vs. 155.3±16.1 vessels/hpf, $p<0.001$) compared to DB mice. In the presence of AMD3100, EPC migration to SDF was decreased 25.1±2.8% ($p<0.05$), while EPC migration towards PDGF-BB was unaffected (8.4±3.4% fewer, $p>0.05$).
CONCLUSION: Combination AMD3100 and PDGF-BB therapy additively improves BM EPC mobilization and trafficking, resulting in significantly improved diabetic tissue repair.

LP4: EFFECT OF PEDOT POLYMERIZATION METHODS ON PERIPHERAL NERVE REGENERATION

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OBJECTIVE: Our objective is to develop a peripheral nerve interface (PNI) which provides motor and sensory capabilities to an artificial limb. Our PNI includes the electroconductive polymer 3,4-polyethylenedioxythiophene (PEDOT) to increase signal fidelity in chronic applications. We use two polymerization methods: conventional and electrochemical (EC). The purpose of this study is to evaluate the effect of PEDOT on peripheral nerve regeneration and compare polymerization methods.
METHODS: A 15 mm rat peroneal nerve gap was reconstructed with various materials (n=8 per group): Sham (nerve exposure), Autograft, Decellularized nerve (DN), conventionally polymerized PEDOT on DN (PEDOT), EC PEDOT polymerized DN (EC-PEDOT), No Graft (gap was not reconstructed). A small intestinal submucosa (SIS) cuff was placed circumferentially around all nerve gap reconstructions for stability. After 90 days of recovery, nerve conduction (NC) and muscle contractile force were recorded. Nerve specimens were taken from midgraft and examined with toluidine blue staining.
RESULTS: NC velocity (m/s) in the PEDOT (19.8±2.8) was significantly higher than Sham (13.4±2.7), Autograft (13.9±3.8), and DN

(9.3±1.5) groups. EC-PEDOT (5.7±0.9) revealed similar velocity as DN group. Recovered muscle forces (mN) in the PEDOT (66.3±142.3), EC-PEDOT (27.4±50.22), and DN (1204.0±1686.0) were lower than Autograft (1591.7±520.2) and Sham (2471.7±1278.3). Qualitative histologic examination of PEDOT group revealed extensively regenerating nerve fibers in some of the PEDOT grafts.

CONCLUSION: Peripheral nerve regeneration takes place in the presence of PEDOT. Increased signal conductivity with PEDOT compared to EC PEDOT favors future use of conventional PEDOT polymerization in interfaces between peripheral nerves and metallic wires.

LP5: AN INVESTIGATION OF EFFICIENCY OF GENE DELIVERY METHODS AND TIME-COURSE OF TRANSGENE EXPRESSION IN INJURED TENDONS AND TISSUE REACTIONS CAUSED BY DIFFERENT VECTORS

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INTRODUCTION: There are a number of ways to deliver gene into tissues. Comparison of different vector system for delivery of genes into injured tendon was not reported previously. We investigated efficiency of gene delivery to the injured tendons and tissue reactions caused by different vectors.

Methods: Different vectors, plasmid, adeno-associated viral (AAV), and adenoviral vectors, were used to transfect the injured tendon using 72 digital flexor tendons of bilateral toes of 18 white leghorn chickens. After transverse tendon cut, pCMV-EGFP, pCAG-EGFP, rAAV2-EGFP, and Ad5-EGFP were injected to the tendons. At 3, 7, 14, and 21 days, the tendons were subjected to examination for GFP expression to determine the efficiency of transgene delivery by different vectors under a fluorescence microscope. The tendons were also stained with hematoxylin and eosin to examine the inflammation caused by these vectors. Inflammatory cells were counted under microscope and were compared statistically.

RESULTS: Compared with normal tendons, the GFP expression was observed in tendons at 3, 7, 14 and 21 days post-injection, and was the highest at 7 days for all vectors. At 14 days, we observed a marked decrease in the GFP expression. The GFP expression in the tendons injected with rAAV2-EGFP and Ad5-EGFP were higher than those with pCMV-EGFP and pCAG-EGFP vector. No remarkable differences in the GFP expression were detected between rAAV2-EGFP and Ad5-EGFP vectors. Tissue reactions of the tendons caused by the liposome-plasmid vector (including pCMV-EGFP and pCAG-EGFP) were the most prominent. Inflammatory reactions of the tendons with AAV2 vector injected were the least severe.

CONCLUSIONS: Efficiency of gene delivery by the AAV2 and Ad5 vectors is the highest among 4 vectors tested. AAV2 vector causes the slightest tissue reactions in the tendons. The study suggests that the AAV2 vector is a promising gene delivery vector for tendon gene therapy.

LP6: AN ANALYSIS OF PATIENT QUALITY OF LIFE AND MORBIDITY DUE TO HAND AND UPPER EXTREMITY TRAUMA IN HONDURAS

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PURPOSE: The goal of this study is to demonstrate the necessity of surgical missions to San Pedro Sula, Honduras.

METHODS: During a 2010 mission to San Pedro Sula, Quick Disability of Arm, Shoulder and Hand (QuickDASH) and Short-Form Health Survey-12 (SF-12) were used to assess morbidity of Honduran patients with traumatic hand injuries. The mean scores of this cohort were compared with these from (1) published data for the general US population and (2) a comparable cohort of US hand trauma patients using a student t-test.

RESULTS: Twenty five Honduran patients were included in the study. The mean QuickDASH score for the Honduran patient cohort compared to the general US population was significantly higher ($p<0.0001$). Furthermore, the Honduran patient group also scored significantly higher

than the US hand trauma group (p<0.0001). The mean SF-12 scores for the Honduran patient cohort compared to the general US population were significantly lower on both the physical component (p<0.0001) and the mental component (p<0.0001). Moreover, when compared to the US hand trauma cohort, the Honduran cohort scored significantly lower on the physical component (p<0.0001) and following subgroups: role physical (p<0.05), bodily pain (p<0.05), and social functioning (p<0.05). However, the Honduran cohort scored significantly higher than the US cohort on the vitality subgroup (p<0.0005).
CONCLUSION Significantly greater morbidity and lower overall quality of life is demonstrated by the outcome measurements compared to the general US population and US hand trauma cohort. This is the first evidence of its kind to support the necessity for surgical missions to developing countries.

LP7: FREE FLAP RECONSTRUCTION IN THE ELDERLY - IS IT SAFE?

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INTRODUCTION: In the last decades refinements in microvascular surgery combined with progress in perioperative management led to more sophisticated treatment options in elderly patients. Aim of this study was the review of geriatric patients regarding outcome and complications after free tissue transfer.
PATIENTS UND METHODS: 28 patiens who underwent microvascular reconstruction between 2008 und 2009 were reviewed. The average age was 73 years. We evaluated the following terms: etiology of the defect, ASA-classification, type of free flap, postoperative complications, mortality, duration of stay, time at ICU and operation time.
RESULTS: There were 19 female and 9 male patients. The mean duration of stay was 26,2 days. ASA-classification showed: ASA-II 15 patients, ASA-III 10 patients, ASA-IV 3 patients. The etiology of the defect represented 10 carcinoma, 7 infection, 3 chronic ulcera, and 1 recurrent Dupuytren`s disease. 8 patients received an ALT-flap, 7 were reconstructed with latissimus dorsi or radial forearm flaps, 2 with rectus abdominis flaps. Other procedures were parascapular, serratus, gracilis or lateral arm flap. Only one flap was lost due to thrombosis (ASA IV). One upper leg was amputated due to a major occlusion of a bypass (also ASA IV). This is an overall major complication rate of 7,2%. Minor complications such as haematoma or infection occured in 15 cases. The mortality rate was 7,2% (ASA III/IV). Type of free tissue transfer, etiology of the defect, duration of surgery, hospital and ICU stay did not correlate with complication rate.
CONCLUSIONS: Despite major complications of 7,2% and a mortality rate of 7,2% free flap reconstuction in elderly patients can be sucessful. The ASA status correlates with the major complication and mortality rate (ASA III/IV). Thus, the ASA status not the age should be considered when performing an free flap in elderly patients. Free flap reconstuction in elderly patients can be safe, and should be offered when indicated.

LP8: CLINICAL OUTCOME COMPA-RISON BETWEEN FREE MYOCU-TANEOUS LATISSIMUS DORSI AND FREE FASCIOCUTANEOUS ANTERO-LATERAL THIGH FLAPS FOR SOFT TISSUE RECONSTRUCTION OF LOWER EXTREMITY TRAUMATIC OPEN FRACTURES

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INTRODUCTION: Skin defects for Gustillo grade IIIb/c fractures over the lower extremity are difficult to cover. Two types of free flaps used to cover such defects were studied: the myocutaneous latissimus dorsi (MC-LD) flap and the fasciocutaneous anterolateral thigh (FC-ALT) flap. The aim of this study is to compare the clinical outcome of primary free MC-LD flaps and free FC-ALT flaps used for reconstruction of lower extremity traumatic open tibial fractures.
METHODS: 158 patients received primary microsurgical free tissue transfers for Gustillo

grade IIIB/C fractures between 2004 and 2009. Patients were divided into two groups. In group I, 81 patients received free MC-LD flaps and in group II, 77 patients received free FC-ALT flaps.
RESULTS: There were no statistically significant differences between age, sex, body mass index, number of flap risk factors (age>70 y; smoker; diabetes;steroids/ immunosuppressants/ previous DXT; high energy transfer; neuropathy/ ASA≥3; BMI≥30), Gustillo grade, mangled extremity severity score or timing of closure (≤5 days or >5 days) between the two groups. The donor site was closed primarily in all cases. Donor site complications were minimal. Complete flap survival was 72.9% and 51.1% in groups I and II ($p<0.01$), respectively. Zero flap survival was 5% and 17% in groups I and II ($p<0.01$), respectively. Group II flaps needed more additional operations to the recipient site related to complications of the flap (48.9% vs 37.1%; $p<0.01$). Chronic osteomyelitis developed in 9% and 14% in groups I and II, respectively. The rate of primary bone union was 87% in group I and 82% in group II and the rate of overall bone union was 97% in group I and 98% in group II.
CONCLUSIONS: The authors achieved better outcomes with free MC-LD flaps than free FC-ALT flaps in soft-tissue transfers. We hypothesize that the MC-LD flap is more robust and effective for covering traumatic open tibial fractures due to its many advantages, including a long and large calibre vascular pedicle, which allows for vessel anastomoses further outside of the zone of injury than the free FC-ALT flap.

LP9: RECONSTRUCTION OF COMPLEX ABDOMINAL WALL DEFECTS USING BIOPROSTHETIC MESH MATERIAL AS FASCIA SUPPORT WITHIN PATIENTS WITH SEVERE IMMUNODEFICIENCY

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INTRODUCTION: Complex abdominal defects are often caused by extended general surgery procedures. Patients are immunocompromised by SIRS or secondary diagnosis. The lack of original fascia needs alternatives for reconstruction even in preparation for flap reconstruction. Prosthetic mesh placement is contraindicated in contaminated surgical fields. Bioprostethic meshes have been described to be successfully used even incomplicated wounds.
METHODS: In the year 2009, 8 Patients underwent abdominal wall reconstruction with crosslinked collagen mesh (Bard Inc., Colla Mend) as fascia support after extensive surgery procedures because of severe intraabdominal infection and need for necrotic abdominal wall tissue resection. Patient demographics, secondary diagnosis and preoperative risk factors, postoperative complications and clinical outcome were reviewed.
RESULTS: The patient's median age was 58 (31-69). All patients had immunocompromising and wound healing delaying risk factors All Patients underwent three or more surgical procedures after severe intraabdominal infection caused by bowel perforation after diverticulitis (4/8), peritonitis after incarcerated hernia (3/8) and iatrogenic bowel perforation after hernia repair (1/8). All patients developed a SIRS with organic complications and were treated in intensive care unit. 7 of 8 patients developed a postoperative wound complication including infection. All of the patients with infections required removal of the collagen mesh because of lack of incorporation of the collagen prosthesis. 6 of 8 patients abdominal wall could be closed by secondary suture after wall mobilization. One patients abdominal defect was reconstructed with a cutaneous groin flap another patients dehiscence was closed with component separation technique. 4 of the 6 patients closed by secondary suture developed an abdominal hernia within 6 till 9 months after surgery.
CONCLUSIONS: Porcine dermal collagen meshes are described to have the potential for reconstruction of complex abdominal wall defects. However we demonstrated that these biological prostheses show a lack of incorporation in immunocompromised patients and required a graft removal. For these kinds of patients biological meshes might be not an appropriate solution in fascia reconstruction. Alternative

reconstruction methods like components separation technique or myocutaneous flaps e. g. TFL-flap are necessary to stabilize the abdominal wall and prevent ventral hernia.

LP10: HETEROTYPIC CELL-CONTACTS BETWEEN HUMAN ENDOTHELIAL CELLS AND HUMAN OSTEOPRO-GENITOR-CELLS SUPPORT OSTEOGENIC DIFFERENTIATION

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INTRODUCTION AND AIMS: Angiogenesis is a fundamental process in bone formation, remodeling, and regeneration as well as a crucial step in bone tissue engineering applications. In this context, endothelial cells (ECs) were used in various in vivo studies in combination with primary osteoblasts to enhance neovascularization of bone grafts. In a previous study, we showed that cocultivation of human primary ECs and human primary osteoblasts (hOBs) leads to a cell contact-dependent up-regulation of alkaline phosphatase (ALP) expression in osteoblasts, indicating that cocultivated ECs may support osteogenic differentiation and osteoblastic cell functions. This effect was mediated by a p38-MAPK-dependent, cell-type-specific stabilization of ALP-mRNA. The present study aimed to analyse the underlying inter- and intracellular signalling mechanisms responsible for EC-mediated up-regulation of osteoblastic ALP expression, in particular the role of mRNA-binding proteins.
MATERIAL AND METHODS: The influence of different mRNA-binding proteins (HuR, AUF-1, TTP) on ALP-upregulation in hOBs co-cultivated with ECs was analyzed by Immunoprecipitation and subsequent TaqMan-Analysis. For interception of HuR-translocation from the cell nucleus to the cytoplasm we used Leptomycin B (LMB), an inhibitor of the nuclear export receptor CRM1. The effect on ALP-expression was measured on mRNA- and protein-level.
RESULTS: Immunoprecipitation of Lysates from hOBs co-cultured with ECs showed on average a 6.9-fold increase of ALP-mRNA compared to hOB-monoculture; for the other mRNA-binding proteins no influence on ALP-Regulation could be detected. On inhibition of CRM1 by LMB (0,2ng/ml), a virtually complete inhibition of the effect of EC-coculture on hOBs was observed.
CONCLUSIONS: We already reported on the p38-MAPK-dependent, cell-type-specific stabilization of ALP-mRNA in hOBs when co-cultivated with ECs. Here, we show that this effect is mediated by a CRM1-dependent pathway; most likely the mRNA-binding protein HuR, which will be subjected to further investigation.

LP11: SYSTEMIC APPLICATION OF MESENCHYMAL BONE MARROW-DERIVED STEM CELLS IMPROVES MICRO-HEMODYNAMICS IN CRITICALLY ISCHEMIC MURINE SKIN

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INTRODUCTION AND AIMS: New theories on vascular neoformation and vascular regeneration have emerged with the understanding of the role of adult stem cells. The aim of this study was to investigate morphological and hemodynamic effects of systemically administered mesenchymal stem cells (MSCs) in a critically ischemic murine skin flap model.
MATERIAL AND METHODS: A dorsal skin flap was created in mice. The flap was fixed into a skinfold chamber to allow for assessment of both morphology and hemodynamics in the microcirculation with intravital microscopy. Control animals (n=6) received FITC-dextrane only for visualization purposes (0.1ml). A second group (n=6) received fibroblasts, while a third group (n=5) received MSCs (250.000 cells/animal) systemically. Intravital microscopy was utilized for assessment of microhemodynamcis 1, 4, 7, 10 and 14 days after flap surgery.
RESULTS: Due to vasodilation and elongation of the proximal arteries during vascular remodeling the vascular resistance significantly increased to 516±31% over 14 days in the control group.

This increase of arterial vascular resistance was abolished after MSC administration ($p<0.01$ vs. control). On capillary level a strong angiogenetic response was found from day 7 on in the MSC group. Functional capillary density was upraised from 143±11cm/cm^2 to 168±12cm/cm^2 on day 14 ($p<0.01$ vs. day 1). No such strong effect could be observed in the fibroblast and control groups.

CONCLUSION: In conclusion, we were able to demonstrate early beneficial effects on vascular resistance by MSC administration. Moreover a strong angiogenetic response to MSC administration could be observed. MSCs were capable of augmenting vascular regeneration significantly in critically ischemic skin flaps.

LP12: ADIPOSE-DERIVED STEM CELLS SEEDED ON THREE-DIMENSIONAL SCAFFOLDS OF SPIDER SILK

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INTRODUCTION AND AIMS: Recent findings in connective tissue engineering indicate that early -implantation is advantageous; however, the scaffold requires a certain mechanical stability and especially a high breaking energy to replace the damaged tissue functionally. As spider silk is known as a natural high-performance material, we intended to seed spider silk with different cell types, and Adipose-derived Stem Cells (ASC) in particular, on two-dimensional (2-D) and three-dimensional (3-D) scaffolds.

MATERIAL AND METHODS: Native spider silk was reeled on miniature weaving frames to create 2-D scaffolds, spider egg sacs were used as 3-D scaffolds. Cells were seeded by microinjection. Scaffolds were analyzed qualitatively and quantitatively for cell viability, metabolism, and proliferation after 1, 2, 3, and 5 days.

KEY RESULTS: Morphological investigations revealed a dense seeding of all investigated cell types. Quantitative analysis showed proliferation in a time-dependent manner. Cells were still viable after 10 and 20 days. Immunofluorescence displayed metabolic activity, i.e. production of extracellular matrix. Cross-sectional SEM showed also a dense population of ASC in the central areas of three-dimensional scaffolds.

CONCLUSION: Our data presented here show that spider silk scaffolds were suitable for adhesion and proliferation of different cell types and ASC in particular, which allow differentiation in mesenchymal tissue cells. The common problem of bringing cells into the central parts of the scaffolds could be solved here by the technique of microinjection into spider silk scaffolds. As spider silk has a high mechanical strength and breaking energy, it could be used as scaffold for early implantation.

LP13: ACCELERATED VASCULA-RISATION AND IMPROVED BONE FORMATION IN CRITICAL-SIZE BONE GRAFTS BY VEGF-EXPRESSING BMSC IN A RABBIT MODEL

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INTRODUCTION: Insufficient vascu-larization is the main obstacle to the generation of bone constructs for critical-size defects. The combination of tissue engineering and flap pre-fabrication in a rabbit model led to bone growth to a depth of 1.8mm, but necrosis in the deeper core (Scheufler 2008). Here, we test the hypothesis that increased angiogenic stimulation from within constructs by VEGF can significantly accelerate vascular in-growth and improve bone formation.

METHODS: Bone marrow stromal cells (BMSC) from NZW-rabbits were transduced with a retroviral vector expressing rbVEGF$_{165}$ linked to a truncated version of rbCD4 as a cell surface marker. Cells were seeded in critical-size HA-scaffolds, which were wrapped in a panniculus carnosus flap and implanted ectopically. The kinetics of construct perfusion was assessed by angio-MRI at week 1, 4 and 8. Morphometric analysis of the induced bone tissue was performed by micro-CT on explanted constructs after 8 weeks. Bone formation and vascularization were quantified histologically.
RESULTS: Transduced BMSC were purified by FACS based on CD4 expression. Six rabbits were implanted with autologous BMSC-loaded scaffolds (naïve, VEGF-expressing or control vector-transduced). Angio-MRI demonstrated improved perfusion of VEGF-expressing constructs already 1 week after implantation compared with controls. Micro-CT showed 40.7% greater bone formation ($p<0.01$) and twice thicker bone ingrowth into construct core by VEGF-expressing BMSC 3.1mm versus 1.6mm).
CONCLUSIONS: VEGF expression by genetically-modified BMSC leads to accelerated vascularization of critical-size bone grafts and significantly thicker bone formation, suggesting that the combination of cell and gene therapy approaches is a promising novel strategy for efficient bone regeneration.

LP14: HYPOXIA-INDUCIBLE FACTOR 1 (HIF-1A) EXPRESSION AS AN INDICATOR FOR HYPOXIA IN ENDOTHELIAL PROGENITOR CELLS (EPC) AND THE BIOARTIFICIAL TISSUE WITHIN THE ARTERIO-VENOUS (AV) LOOP RAT ISOLATION CHAMBER

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QUESTION: Hypoxia-inducible factor 1 alpha (HIF-1α) induces chemotaxis of endothelial progenitor cells (EPC) to ischemic tissue and supports new blood vessel formation in response to hypoxia. Our aims were to investigate if EPC themselves express HIF-1α under hypoxia and to characterize HIF-1α expression and distribution of hypoxia in the arteriovenous (AV) loop rat isolation chamber.
METHODS: TI7b murine embryonal EPC were incubated in hypoxia followed by detection of HIF-1α expression by Western Blot analysis and VEGF secretion by ELISA. fibrin-suspended DiI-fluorescence labelled EPC were implanted in the AV loop separation chamber (n=4 per group) while EPC-free fibrin constructs served as negative controls. HIF-1α immunohistochemical staining was performed at different time points after implantation.
RESULTS: , EPC showed significant expression of HIF-1α as well as increased VEGF secretion as demonstrated by Western Blot and ELISA, respectively. HIF-1α was not expressed in normoxic controls. HIF-1α immunohistochemical staining demonstrated for the first time hypoxic areas within the AV loop on a molecular level as well as transplanted EPC displaying hypoxia by positive HIF-1α staining.
CONCLUSION: Our results confirm that EPC do not only respond to hypoxia by chemotaxis to ischemic tissue but express the hypoxia sensor HIF-1α themselves and . Distribution of hypoxic areas within the AV loop can be correlated with localization patterns of newly formed blood vessels. This may offer new insights into angiogenetic phenomena in the AV loop and blood vessel formation within bioartificial tissues.

LP15: WOUND BED VASCULARIZATION BY ENDOTHE-LIAL CELLS: DIFFERENTIATION STATUS MATTERS.

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INTRODUCTION: Fully differentiated endothelial cells have been used since long for vascularisation in wound healing. Due to their considerable expansion potential, Human Umbilical Vein Endothelial Cells (HUVEC) are a readily available source of cells that can be used for this purpose. We compared their effect

with that of an endothelial progenitor cell (EPC) type, human Blood Outgrowth Endothelial Cells (hBOEC), which have similar expansion characteristics but are adult blood derived.

METHODS: HUVEC and hBOEC were analyzed for trophic factor expression/production by qRT-PCR, ELISA or zymography and compared in a immune-deficient mouse full-thickness wound healing model. Wounds were analyzed histologically for cell engraftment, vascularisation, vessel maturation and dermal and epidermal healing.

RESULTS: Both HUVEC and hBOEC actively incorporated into the vasculature, but HUVEC were mostly found in cord-like structures that were not connected to host vessels. Unlike HUVEC, hBOEC also stimulated host angiogenesis (murine CD31$^+$ area fraction: 5±1 vs. 12±1, <0.05), vessel maturation (a-SMA$^+$ vessels/mm^2: 87±11 vs. 208±29, <0.05), dermal matrix organization (% red-birefringent collagen: 28±3 vs. 47±2, <0.05) and epithelial coverage (19±3% vs. 31±7%, =0.06). mRNA and protein analyses revealed significantly increased expression/production of VEGF-A, PlGF, PDGF-BB, Angiopoietin-2, MCP-1, bFGF, MMP-1, KGF and GM-CSF by hBOEC, compared to HUVEC (P<0.05 for all).

CONCLUSIONS: Both HUVEC and hBOEC actively form blood vessels and can therefore be used for wound bed vascularisation. However, unlike HUVEC, hBOEC exert a manifest trophic effect on host angiogenesis and wound healing. hBOEC are therefore preferable to HUVEC for skin tissue engineering purposes.

LP16: PLACENTAL GROWTH FACTOR (PLGF) IN PART MEDIATES THE BENEFICIAL EFFECTS OF HBOEC ON WOUND HEALING

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INTRODUCTION AND AIMS: We previously demonstrated that application of human blood outgrowth endothelial cells (hBOEC) into a full-thickness wound in mice significantly improved wound vascularisation, epithelialisation and collagen organisation both by short cutting hypoxia and by growth factor cross-talk with wound cells. However, we did not identify which growth factors may be involved in the beneficial effect of hBOEC on the healing parameters. Since placental growth factor (PlGF) is abundantly produced by hBOEC, we hypothesized that the effects of hBOEC were at least partially mediated by PlGF.

MATERIALS AND METHODS: hBOEC were transduced with a PlGF short hairpin (sh)RNA knockdown lentivirus (PlGF^{KD}-hBOEC) or a scrambled shRNA control lentivirus (scr-hBOEC). The effect of this manipulation was tested in vitro by qRT-PCR gene profiling, proliferation and migration assays and in vivo after seeding the genetically manipulated hBOEC in full-thickness wounds in immunedeficient mice.

RESULTS: While knocking down PlGF did not cause any significant change in expression level of endothelial markers (e.g. , ,) or growth factors (,), it did significantly lower their proliferation potential. Consistent with the expression of the PlGF receptor Flt-1 on keratinocytes, conditioned media (CM) from scr-hBOEC (containing high amounts of PlGF) or recombinant human PlGF protein increased keratinocyte migration and proliferation. However, this response was significantly reduced upon exposure to CM from PlGF^{KD}-hBOEC. Accordingly, when transplanted in full-thickness wounds, PlGF^{KD}-hBOEC were less efficient than scr-hBOEC in boosting wound vascularisation and accelerating epithelial coverage. In contrast, knocking down PlGF did not affect collagen organisation by fibroblasts.

CONCLUSION: We conclude that PlGF, secreted by hBOEC, mediates, at least in part, the beneficial effects on vascularisation and epidermal recovery during wound healing. However, factors other than PlGF are responsible for the effects of hBOEC on collagen organisation.

LP17: PHARMACOLOGIC PRE- AND POST-CONDITIONING WITH HYDROGEN SULFIDE SIGNI-FICANTLY ATTENUATES ISCHEMIA-REPERFUSION INJURY IN DIABETIC TISSUE

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BACKGROUND: Diabetic patients have a high incidence of ischemic events, due to alternations in vascular function and complement activation. Previous data from our lab have shown that exogenous hydrogen sulfide (HS) is cytoprotective against ischemia-reperfusion injury (IRI) in skeletal muscle in when delivered either before (pre-ischemic) or after (post-ischemic) the onset of ischemia. This study sought to determine whether HS has a similar effect in organisms.
METHODS: 9 diabetic (db/db) and 9 non-diabetic (C57Bl/6) mice underwent 3h unilateral tourniquet-induced hindlimb ischemia, followed by 3h reperfusion. Within each group, 3 received an injection of [10 uM] HS 20min prior to the onset of ischemia, 3 received [10uM] HS 20min prior to reperfusion, and 3 did not receive HS. After reperfusion, the gastrocnemius muscles were harvested and stained with H&E to evaluate cellular architecture and TUNEL to determine the apoptotic index (AI).
RESULTS: Both histology and AI demonstrated a high degree of cellular injury in non-HS-treated ischemic tissue from both diabetic and non-diabetic mice (Figure). Equally so in both diabetic and non-diabetic mice, pre-ischemic and post-ischemic HS delivery led to preservation of normal cellular architecture on histology, as well a statistically significant decrease in AI ($p<0.05$).
CONCLUSIONS: HS is as protective against IRI in skeletal muscle in diabetic organisms as it is in non-diabetic organisms. These findings significantly broaden the potential applicability of HS, given the high incidence of both anticipated ischemia (e.g. free tissue transfer) and unanticipated ischemia (e.g. acute vascular occlusion) in diabetic patients.

LP18: PLATELET DERIVED SEROTONIN PLAYS A CRITICAL ROLE DURING SKELETAL MUSCLE ISCHEMIA AND REPERFUSION INJURY

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BACKGROUND: Serotonin is discussed to play an essential role during skeletal muscle ischemia/reperfusion injury (SMIRI). Tryptophan hydroxylase 1 is rate limiting for the production of serotonin (5-hydroxytryptophan) in the gut, from where serotonin is taken up by platelets. Upon activation, platelets release serotonin which contributes to formation of stable clotts and reduction of blood flow. The aim of this study was to investigate the role of serotonin in capillary no reflow (CNR) and microvascular inflammation (MI) during skeletal muscle I/R.
METHODS: We used the mouse dorsal skinfold chamber to monitor microvascular function by fluorescence microscopy. C57BL/6J (wt) mice were subjected to 3 hours of ischemia and 3 days of reperfusion. To analyze the role of serotonin we performed pharmacological specific blocking of serotonin receptor by treating wt mice with ketanserin-tartrat i.v. Furthermore we analyzed tryptophan hydroxylase-1-deficient (tph1-/-) mice, where the formation of serotonin is blocked.
RESULTS: SMIRI significantly ($P<0.05$) reduced functional capillary density and enhanced venular leukocyte-endothelial cell interaction during reperfusion in vehicle treated wt mice. Pretreatment with ketanserin significantly ($P<0.05$) reduced capillary perfusion failure and microvascular hyperpermeability and attenuated the inflammatory response (not significant). Tph1-/- mice showed a highly attenuated SMIRI-induced leukocytic inflammation ($P<0.05$) and a marked increase of the number of patent capillaries ($P<0.05$).
CONCLUSION: Serotonin plays a critical role during SMIRI, since it is attenuated whilst under pharmacological specific blocking of serotonin receptors or in genetically modified tph1-/- mice. SMIRI, and particularly capillary no reflow might be mediated by the activation of platelets and therefore the distribution of

serotonin to the activated endothelium. Treatment with ketanserin might represent as a new potential therapeutic agent to counteract the deleterious microvascular effects of I/R.

LP19: FREE FLAP DONOR SITE MORBIDITY IN CRANIOMAXILLOFACIAL RECONSTRUCTION

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PROBLEM: Free flap reconstructions are well established in craniomaxillofacial surgery. Especially in cancer surgery they allow a direct defect reconstruction and hereby an increase of patient live quality. Considering the aesthetic and functional advantages, donor site morbidity is disregarded often. Aim of the study was a donor site morbidity analysis in craniomaxillofacial reconstruction. **MATERIAL AND METHOD:** Between April 2005 and August 2009 300 patients underwent a free flap reconstruction in our department (m=198/f=102). The average age was 58,2 years (median 57,0 years; 5 - 89 years, s=14,1). Altogether 134 scapula flaps, 127 forearm flaps, 12 upper lateral arm flaps, 15 latissimus dorsi flaps, 11 fibula flaps and 1 aurikulotemporal flaps were harvested. The patients' subjective limitations were collected via DASH-score preoperative, postoperative and 6 month postoperative. Further the flap success rate, wound healing disorders; physiotherapy application and skin sensibility were analyzed. **RESULTS*:*** The postoperative DASH-Score was significant worse than preoperative ($p<0,001$). Six month postoperative it was significant better than directly postoperative ($p<0,001$) but significant worse than preoperative ($p<0,001$). In 15 cases (5,0%) the flap failed. In this cases there were a non significant less advancement in the DASH-score 6 month postoperative ($p>0,05$). Wound healing disorders had no significant effect ($p>0,05$). Especially in scapula bone flaps patients with early physiotherapy had fewer disabilities in longtime outcome. In 7 cases (2,3%) we found disorders in sensibility. **CONCLUSION*:*** There is significant subjective donor site morbidity. In the postoperative course patients learn to live with these disabilities and sense them less than directly postoperative. An early physiotherapy can reduce disabilities in scapula bone flap longtime outcome.

LP20: IMPROVING AESTHETIC OUTCOMES IN HEAD AND NECK RECONSTRUCTION WITH STRUCTURAL FAT GRAFTING

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INTRODUCTION: Free tissue transfer provides large volume tissue replacement in complex head and neck resections, however post-radiation soft tissue atrophy can result in volume loss and contour deformity. We hypothesized that autologous fat grafting can improve aesthetic outcomes in patients who have undergone microsurgical head and neck reconstruction.
METHODS: We evaluated our experience with structural fat grafting as an adjunct in radiated head and neck reconstructions at M. D. Anderson Cancer Center between July 2006 and September 2009. Details of the surgical procedure, recipient site wound complications, and graft survival were recorded.
RESULTS: Fifteen patients were included in the study; 8 males and 7 females, mean age 45 years (range, 17-65 years). Mean follow-up was 16 months (range, 6-39 months). All patients were treated with external beam radiation therapy, mean dose 56 Gy (range, 50-70 Gy). On average 81% of the fat harvested was suitable for transfer and 56% was transferred based on recipient site volume requirements. A total of 24 fat grafting procedures were performed, with 7 patients (46%) undergoing multiple procedures. Aesthetic outcomes and volume preservation were assessed by review of postoperative photographs. At a minimum of 6 months follow-up, 34% of patients achieved a normal contour, 50% achieved an improved contour and 16% achieved subtle improvement, resulting in a satisfaction rating of > 80%.
CONCLUSION: Structural fat grafting can be performed with minimal morbidity as a valuable adjunct to free flap reconstruction. This technique may be considered a minimally

invasive alternative to defects that might otherwise require a second flap reconstruction for correction.

LP21: MANDIBLE RECONSTRUCTION USING LEFT FREE FIBULA OSTEOCUTANEOUS FLAP –STUDY OF OVER 400 CASES.

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OBJECTIVE: In composite oromandibular defects following resections of mandible, FFOCF reconstruction has become first choice. **MATERIAL AND METHODS:** From April 2005 a protocol was set for Mandible Reconstruction following extensive resections of mandible. Over 400 cases are performed till the date. Simultaneous harvesting of FFOCF is done. All the defects were reconstructed with single FFOCF from left leg. Neither in situ osteotomy nor proto type for shaping of fibula for mandible reconstruction was performed. **RESULTS:** Original occupation was possible within six months, after completion of complete therapy in most of cases. Complete flap survival in 92% cases, partial loss in 5% cases and complete loss in 3% cases. No substantial complication or defects at donor site. **CONCLUSION:** 1. Adjuvant therapy such as Radiation can be started earlier. 2. Extensive composite oro mandible defects can be reconstructed easily with single FFOCF. 3. Skin paddle of FFOCF is reliable. 4. There is no side specificity of fibular flap for reconstruction of oro mandible defects on any side. 5. Two team approach saves crucial surgical time.

LP22: LATISSIMUS DORSI FREE FLAP HARVESTING MAY AFFECT THE SHOULDER JOINT IN LONG RUN

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INTRODUCTION AND AIMS: The latissimus dorsi (LD) muscle flap is one of the most used flaps and is believed to result in minimal donor-side morbidity. The impact on shoulder function from LD removal is important due to the common nature of this procedure. Previous studies have been performed after relatively short follow-up time and mostly after breast reconstruction. The purpose of this study was to objectively evaluate shoulder function years after LD-procedure.

MATERIAL AND METHODS: Eight patients who underwent LD-free flap for lower limb (7) or head and neck (1) soft tissue reconstruction were enrolled in this study. Scar, shoulder pain, function, mobility, stability and strength were evaluated and measured by using the Patient Scar Assessment Questionnaire (PSAQ), the Scar Evaluation Scale (SES) score, the American Shoulder and Elbow Surgeons (ASES) form, goniometer and isokinetic tests. Measurements of the operated sides were compared to the non-operated sides.

KEY RESULTS WITH SUPPORTING STATISTICAL ANALYSIS: Mean age was 54±21 years and mean follow-up was 92.5±36 months after surgery. Mean PSAQ was 73 (65%), mean SES score was 2±1. When comparing the operated sides to the unoperated sides, ASES score was significantly lower in the operated side (76 versus 93, p=0.008); The range of motion in active and passive endorotation, active extrarotation and active forward elevation were significantly reduced after surgery. Operated side revealed a significant joint instability (3.6 versus 1.2, p=0.007) using the ASES form. Isokinetic tests revealed that only intra-rotation strength was significantly reduced (35.74 Newton-metre versus 42.7 Newton-metre, p=0.03) in the operated side.

CONCLUSIONS: LD harvesting can affect the function of the shoulder joint in the long run. Reduced mobility, instability and weakness could be obtained in objective measurements.

LP23: THE VALUE OF DIFFUSION TENSOR TRACTO-GRAPHY IN THE MANAGEMENT OF PERIPHERAL NERVE TUMORS

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INTRODUCTION: Diffusion tensor tractography (DTT) represents a recently developed non invasive MRI technique that has been successfully applied to visualize degeneration and regeneration of peripheral nerves. The purpose of this study was to examine the usefulness of DTT in the correct delineation of tumour and healthy nerve tissue and the value of this information in the preoperative planning for peripheral nerve tumours.

METHODS: In a prospective study patients with clinical suspicion of peripheral nerve tumor were investigated by using a DTT MRI scan. Intraoperatively the course and position of intact nerve fascicles in relation to the tumor were precisely documented by taking representative photographs. The clinical findings were then compared to the results of the DTT MRI scans by two independent investigators.

RESULTS: 10 Patients (mean age 42 years [16-68]) with peripheral nerve tumors underwent DTT MRI scans. In 8 Patients the tumor was resected. In 6 of these 8 patients the course of unaffected nerve fascicles as demonstrated by DTT highly correlated with the intraoperativ anatomy. In 2 of 10 Patients, due to very large, respectively small tumor mass, no fascicle visualisation was possible.

CONCLUSIONS: DTT proved capable of properly visualising nerve fascicles and their correct anatomic relation to peripheral nerve tumors. DTT represents a promising new method for preinterventional planning of nerve tumor resection. Limitations of DTT were encountered in extensive complex plexopathies, tumors in proximity to large vessels or smaller than 5mm. Further applications of this technique in peripheral nerve surgery are to be explored.

LP24: IMPROVING OUTCOMES OF VRAM FLAP DONOR SITES WITH COMPONENT SEPARATION

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INTRODUCTION: The Vertical Rectus Abdominis Musculocutaneous (VRAM) flap has numerous indications in pelvic reconstruction. However, flap harvest can result in abdominal wall morbidity including myofascial laxity (bulge), fascial dehiscence and incisional hernia. We hypothesize that Component Separation (CS) can be utilized when primary fascial closure (PFC) is impossible or results in excessive tension on the fascial closure.

METHODS: All patients at the M. D. Anderson Cancer Center between June 2006 and May 2009 who underwent VRAM donor site closure with CS were compared to a PFC control group. The indication for CS was the inability to approximate fascial edges or excessive fascial tension deemed at high risk for postoperative failure. Primary outcome indicators included wound complications, myofascial laxity and incisional hernia.

RESULTS: Seventy-four patients were included in the study; 15 CS and 59 PFC patients. Mean follow-up was 16 months (range 6-39 months). The incidence of seroma, infection, skin and fascial dehiscence; was higher in the PFC (39%) group vs. the CS (13%) group ($p<0.05$). There was a four-fold greater incidence of incisional hernia in the PFC (24%) vs. the CS (6%). There was also a non-statistically significant trend towards a higher incidence of myofascial laxity in the PFC (14%) vs. the CS (6%).

CONCLUSION: CS was effective in allowing closure of VRAM donor sites that were otherwise impossible to re-approximate or resulted in excessive fascial tension. CS closures resulted in fewer postoperative wound complications, hernias and bulges despite a more difficult closure and should be considered when fascial closure tension is excessive.

LP25: OUTCOME AFTER REVISION OF MICRO-VAS-CULAR FREE DIEP, SIEA AND SGAP FLAP FOR AUTO-LOGEOUS BREAST RECONSTRUC-TION: A RETRO-SPECTIVE ANALYSIS

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INTRODUCTION: During the past decade, adipocutaneous free flaps have become the standard procedure for breast reconstruction. This procedure favours superior clinical and aesthetic outcome. However, the ultimate fate of the flap after revision for microvascular thrombosis is still a matter of debate. The aim of this study was to review our experience in flap revision and outcome in deep inferior epigastric perforator (DIEP), superficial inferior epigastric artery (SIEA) and superior gluteal artery perforator (SGAP) flaps for breast reconstruction.

METHODS: From August 1997 to December 2005, 581 DIEP, 118 SIEA and 57 SGAP flaps were performed in 662 patients. A retrospective analysis of the clinical files was performed for microvascular revision,time to revision,cause of revision and final outcome of revision.All flaps that survived revision were examined clinically.

RESULTS: The overall microvascular revision rate was 3.04 % with a significant difference between the different flaps. Revision rate was 1.37 % in DIEP, 6.77 % in SIEA and 12.2 % in SGAP flaps. Average time to first revision was overall 62.6 hours.Time to revision was not correlated to ultimate flap failure. Revision of SIEA flaps (67.5 hrs) was performed later compared to DIEP (58 hrs) and SGAP (62.4 hrs). Cause of revision was mainly venous in DIEP (7/8) and SGAP (6/7) flaps,and arterial in all SIEA flaps. Revision failure rate was 62.5 % in DIEP, 87.5 % in SIEA and 57.1 % in SGAP and overall 69.5 %. Only 21.7 % of all revised flaps had no sequellae. All flaps with more than one revision failed, except for one SGAP. The total flap failure rate was 0.86 % in DIEP, 5.9 % in SIEA and 7 % in SGAP flaps.

CONCLUSIONS: This study shows the high failure rate of revisions (69.5 %) of microvascular DIEP, SIEA and SGAP flaps. The time of onset of microvascular problems is not a prognostic factor for revision outcome and the only prognostic significant factor defined was the type of flap. The SGAP was found to be a difficult but robust flap as reflected in its higher revision rate but fair clinical outcome with no fat necrosis. The SIEA flap however, not only showed a higher revision but also a higher failure rate compared to DIEP flaps and all occlusions were primarily arterial. Finally, multiple flap revisions are not useful in view of the poor outcome.

LP26: T-REGULATORY CELLS AND TH17 CELLS IN PERI-SILICONE-IMPLANT CAPSULAR FIBROSIS

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AIMS: The focus of this study are immunological mechanisms underlying extensive peri-silicone-implant capsule formation- the most frequent post-operative complication in patients receiving silicone mammary implants (SMI).

METHODS: We investigated on local activation of the immune response by phenotypical and functional characterization of lymphocytes accumulated within the peri-implant fibrotic tissue. Intracapsular lymphoid cells and peripheral blood mononuclear cells (PBMCs) were isolated and analyzed via flow cytometry. We examined the expression of surface markers ($CD4^+CD25^{high}Foxp3^+$), cytokine profiles, and T-cell-receptor (TCR) repertoire of these cells. Intracapsular Tregs were further analyzed by immunohistochemistry and functional suppression assays.

RESULTS: In comparison to peripheral circulation, the cellular composition of intracapsular lymphocytes showed a predominance of $CD4^+$ T-helper cells with a significant number of TCR gamma/$delta^+$ cells. Interleukin (IL)-17, IL-6, IL-8 transforming growth factor (TGF-beta)1 and

interferon (IFN)-gamma prevailed within the population of intracapsular T-cells, suggesting a TH17/TH1 weighted local immune response. Intracapsular T-cells also displayed a restricted TCR alpha/beta repertoire. We investigated Tregs in greater detail. Their suppressive potential was proven in autologous mixed lymphocyte reaction with peripheral T-cells, but they failed to suppress intracapsular T-cells. Interestingly, ratios of intracapsular Tregs were inversely proportional to the clinical degree of capsular fibrosis. Conclusion: Our results indicate that silicone implants trigger a specific, antigen driven local immune response through activated TH17/TH1 cells suggesting that fibrosis is promoted by the production of profibrotic cytokines, and controlled by the local Tregs.

LP27: INTRAOPERATIVE DECISION-MAKING IN AUTOLOGOUS BREAST RECON-STRUCTION: EVA-LUATION OF ZONAL PERFUSION IN DIEP AND MS-TRAM FLAPS USING ACOMBINED LASER DOPPLER SPECTROPHOTOMETRY SYSTEM

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INTRODUCTION: DIEP and msTRAM flaps are considered as gold standard for autologous breast reconstruction. Although DIEP flaps have lower donor site morbidity than TRAM flaps, a higher rate of flap complications is reported by several authors. Inclusion of more than one perforator or in-flap anastomoses increases reliability in certain cases. Aim of this study was to evaluate whether a combined laser doppler spectrophotometry (CLDS) system might support the surgeon in the process of intraoperative decision-making.
METHODS: 20 consecutive unilateral abdominal flaps were included in this prospective study. CTA was performed prior to surgery. Postcapillary oxygen saturation, relative haemoglobin content and relative blood flow were assessed at different time points and in different configurations (selective clamping of different perforators or SIEV/SIEA) in 4 standardized zones (I-IV) using CLDS. Results were correlated with clinical findings.
RESULTS: 95% of the flaps survived. 2 flaps required surgical revision. Significant fat necrosis was not observed. While there was a high correlation between clinical findings and CLDS results, CLDS was more sensitive in identification of venous congestion of DIEP flaps. CLDS helped to identify the dominant perforator(s) in flaps where perfusion patterns were unclear. CLDS influenced intraoperative decision-making in 4 cases (2 venous, 1 arterial in-flap anastomosis, 1 inclusion of medial and lateral perforators).
Conclusion: Intraoperative use of CLDS helps to objectively determine perfusion patterns in abdominal flaps. CLDS might be applicable in „complex abdominal flaps (e.g. after previous abdominal surgery or when preoperative CTA does not provide conclusive results) and supports in these cases intraoperative decision-making.

LP28: THE INNOVATIVE ROLE OF GLANDULAR-DERIVED STEM CELLS ON DERMAL REGENERATION AFTER THERMAL INJURY

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INTRODUCTION: Recently glandular derived stem cells had shown their promising potential as a source of pluripotent stem cells as an alternative to embryonic origin. Adult glandular stem cells derived from sweat glands (SSCs) are able to differentiate spontaneously in vitro into various somatic cell types, such as skin. Yet, their potential role in skin regeneration especially after thermal injury remains to be elucidated.
METHODS: Glandular stem cells from human axillary sweat glands were generated. A burn mouse model was created. 20 mice (nu/nu) were anesthetized and received a 20 % TBSA partial thickness dorsal scald burn. Control group (n=10) received application of PBS in the zone of stasis in the burn wound, study group (n=10) received application of PBS and sweat gland stem cells [5x10(5 cells]. 7 and 14 days (subgroups) after injection, wound areas were harvested and analyzed with respect to

epithelialization, vascularization, apoptosis and wound closure.

RESULTS: Survival and proliferation were tested showing the survival of the cells and their homogenous distribution. The healing area and regeneration rate were increased in the group used the SSCs-seeded wound area. Vascularization rate showed a significant increase in the SSCs-wound area. Morphology and immunohisto-chemistry showed new skin-like structures in the healing wound bed. SSCs were detected in the regenerated tissues, apoptosis was reduced.

CONCLUSIONS: This study showed for the first time that sweat gland stem cells are able to improve the dermal regeneration after thermal injury. These results could form a base for further clinical applications for devastating burned patients.

LP29: EFFECTS OF BETA-CATENIN, LEF-1, C-JUN AND PEA 3 ON OSTEOPONTIN EXPRESSION IN MALIGNANT MELANOMA

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INTRODUCTION AND AIMS: Malignant melanoma (MM) is one of the most aggressive cancers and its incidence worldwide is increasing faster than other cancers. Early MM is curable by resection but metastasis confers a poor prognosis. In previous studies, overexpression of the pro-metastatic gene Osteopontin (OPN) has been associated with increase invasiveness of MM. OPN is not typically activated by a gain function mutation during tumourgenesis. Instead, various responsive elements in its promoter regulate OPN expression

MATERIALS AND METHODS: We test the effects of OPN overexpression and inhibition on B16-F1 weakly metastatic murine melanoma cells by stable transfection of OPN and OPN-antisense constructs. Using OPN-luciferase constructs, we test the effects of OPN transcriptional regulators (beta-catenin, LEF-1, c-jun and PEA 3) individually and in combination, on OPN-promoter activation. Using immunohistochemistry we assessed the expression of OPn and its transcriptional regulators in human archival melanoma samples against pathological prognostic factors.

KEY RESULTS: We have found that the OPN transcriptional regulators up-regulate OPN promoter activity and there is a stepwise increase when transfected in combination. Immunohistochemical analysis shows a strong correlation between OPN and PEA3, and also OPN and tumour thickness.

CONCLUSION: We have identified PEA3 as a significant regulator of OPN which also directly correlates with tumour thickness in MM.

LP30: TAILORING THE SEQUENCE AND DURATION OF CONVENTIONAL IMMUNOSUPPRESSIVE DRUGS TO INDUCE CTA TOLERANCE

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INTRODUCTION: Clinical composite tissue allotransplantation (CTA) has become an important reality in reconstructive plastic surgery. However as most CTA recipients do not suffer from a life threatening diseases, the requirement of risky chronic immunosuppression for sustaining a CTA is ethically debatable, and the ideal solution would be to induce CTA tolerance. Since regulatory mechanism plays important role in transplant tolerance, and current immunosuppressive drugs, such as FK 506 and rapamycin, have different effects on IL-2 dependent immunoregulation, in this study we sough to develop a novel strategy by tailoring the sequence and duration of conventional immunosuppressive drugs to induce CTA tolerance.

METHOD: Hind-limb transplant was performed from BN to Lew rats. The recipients were threated with a novel strategy consists of anti-lymphocyte serum (ALS) (day -4 and +1) and FK-506 (day 0-7), followed by rapamycin (day 8-21). Blood were

harvested at 21 and 45 days post-transplantation and T-cells (CD3,CD4,CD8,CD45R,FoxP3) were analyzed by FACS.

RESULTS: The novel strategy permits long-term hind limb allograft survival in the MHC mismatched BN to LEW strain combinations (>100, >100, >50, >50, >45 days post-op). In contrast, all control recipients receiving ALS plus CsA, ALS plus RPM, acutely reject hind-limb allografts. There were significant increase of CD4+CD25+Foxp3+ T cells at 45 days post-transplantation in the blood of the recipients receiving novel therapy.

CONCLUSION: We have developed a novel strategy by tailoring the sequence and duration of conventional immuno-suppressive drugs to induce CTA tolerance. The enhanced regulatory mechanism may play a role in the tolerance induction.

LP31: PROMOTION OF WOUND HEALING BY REGULATOR PROTEINS OF THE INNATE IMMUNE SYSTEM

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INTRODUCTION: Innate Defense Regulator Peptides (IDRPs) were designed to exert regulating influence on innate immunity. In contrast to the known antimicrobial activity of Host Defense Peptides (HDPs), it has been preseumed that they do not have direct antimicrobial activity. Prior studies have demonstrated that IDRPs can modulate innate immunity by influencing the expression of monocytic chemokines and pro-inflammatory cytokines and enhancing chemotaxis of human neutrophil granulocytes. Although, the modulatory mechanisms of IDRPs has not yet to be fuly defined, their indirect immunomodulatory, antiinflammatory and chemotactic roles in addition to their potential antimicrobial activity may accelerate wound healing. The aim of this study is to evaluate the effect of IDRPs on wound healing on the basis of and experiments.

METHODS: , different IDRPs were tested in proliferation- (BrdU) and vitality- (MTT) assays using fibroblasts and the HaCaT cells. , a dose respose study in murine and porcine inoculated wound models (non-diabetogenic and type 2 diabetogenic) was performed. Measured parameters included, time to wound closure, quantitative bacterial colonisation, histological and immunhistochemical tissue analysis.

RESULTS: , IDRPs did not demonstrate cytotoxicity or negative effects on proliferation. , IDRs significantly accelerated wound closure in murine non-infected and in inoculated wounds, though not in the type-II diabetogenic models. IDRs significantly accelerated wound closure In both porcine wound models and there was a significant decrease in wound secretion.

CONCLUSIONS: As there is no evidence of direct antimicrobial activitiy of IDRPs, the acceleration in wound healing may be due to its immunomodulatory mechanisms. Further studies looking at the effect of IDRs in a human full thickness skin model and in type I diabetogenic murine wound model and pathway-analysis are in progress.

LP32: EQUOL BUT NOT GENISTEIN IMPROVES EARLY METAPHYSEAL FRACTURE HEALING IN OSTEO-POROTIC RATS

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Healing of predominantly metaphyseal fractures in postmenopausal osteoporosis is delayed and comparatively poor. Hormone replacement therapy could improve fracture healing, but, because of its potential side effects, natural alternatives are more appealing. The aim of this study was to determine if the soy metabolite equol and the native isoflavone genistein, in comparison to 17beta-estradiol, improve metaphyseal fracture healing in ovariectomy-induced osteoporotic bone of the rat. Forty-eight 12-week-old female rats developed severe osteoporosis ten weeks after ovariectomy. After metaphyseal tibial osteotomy and standardized stable internal fixation, changes in callus morphology

were evaluated biomechanically, qualitatively and quantitatively in fluorochrome-labeled histological sections and microradiographs in ovariectomized rats (C) and under standardized 17beta-estradiol (E), equol (EQ) and genistein (G) supplemented rats over a period of five weeks. Estrogen and equol were able to improve the elasticity of callus formation significantly in postmenopausal osteoporotic bone (stiffness of C: 121.40 +/- 47.08 N/mm, E: 147.90 +/- 39.38 N/mm, EQ: 167.8 +/- 59.90 N/mm). The effects of estrogen were more anabolic than those of equol and were visible in changes to the trabecular bone (N.Nd of E: 6.47 +/- 7.68, EQ: 4.25 +/- 3.96). However, in terms of the whole body, equol seemed to induce less of an adverse reaction than estrogen (body weight of C: 342.20 +/- 19.91 g, E: 280.25 +/- 12.05 g, EQ: 308.75 +/- 24.28 g). Genistein as an osteoclast inhibitor influenced callus stiffness (G: 144.50 +/- 61.52 N/mm) and negatively impacted trabecular structure (N.Nd of G: 0.59 +/- 1.01) in severely osteoporotic bones. Estrogen and equol were able to improve fracture healing in ovariectomy-induced osteoporotic bones, and the extent of callus formation played only a minor role. Genistein rather negatively influenced fracture healing. The metaphyseal osteotomy model in ovariectomized rats allows an accurate study of the therapeutic effects of antiosteoporotic substances on the fracture healing process.

LP33: A TRANSGENIC MOUSE MODEL OF AGE-RELATED WOUND HEALING: CHARACTERIZATION AND THERAPEUTICS

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INTRODUCTION: Impaired wound healing in the elderly increases biomedical burden. We introduce the Hutchinson-Gilford Progeria Zmpste24 knockout mouse as a model of senescent wound healing, investigate mechanisms underlying impairment and introduce therapeutic targets.

METHODS: 24 8-week Zmpste24-/- mice and age-matched C57/B6J underwent 6mm cutaneous wounding. Twelve additional Zmpste24-/- mice were treated with the progenitor cell mobilizing agent AMD3100 (10mg/kg i.p. daily for 14 days) and all wounds followed until closure. Wounds were harvested for immunohistochemistry, ELISA, and quantitative RT-PCR at day 10.

RESULTS: Zmpste24 mice displayed healing impairment, obtaining closure at day 40 +/- 2.5. RT-PCR demonstrated increased pro-apoptotic factors BAX and p53 (fold change 1.8 +/- 0.2, $p<0.06$; 2.6 +/- 0.17, $p<0.05$) and significant decreases in VEGF (fold change 0.3 +/- 0.16, $p<0.05$). ELISA for VEGF and p53 corroborated RT-PCR findings; CD31 immunohistochemistry demonstrated less vascularity among and PCNA showed decreased uptake compared to controls. Epidermal thickness was decreased in knockouts (4.9µm +/- 0.44 vs. 8.5µm +/- 0.95, $p<0.04$). Treatment with AMD3100 accelerated wound healing with wounds closing by day 20 +/- 2.0. RT-PCR of treated animals at day 10 demonstrated decreased p53, BAX, and PUMA (fold change 0.22 +/- 0.2, 0.24 +/- 0.3, and 0.29 +/- 0.3, $p<0.05$) and increased HIF1-α, VEGF, SDF-1, and CD31 with normalization of epidermal thickness.

CONCLUSIONS: This is the first demonstration of a transgenic mouse model of senescent wound healing. We highlight a vasculogenic dysfunction rescued with progenitor cell mobilization. The Zmpste24-/- mouse can serve as a model for the investigation of therapies in age-related wound healing.

LP34: AMPHIBIAN EPIDERMAL LIPOXYGENASE AMBLOXE ENHANCES MAMMALIAN WOUND HEALING *IN VIVO*

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INTRODUCTION AND AIMS: The Mexican axolotl is capable to regenerate even whole limbs in succession of amputation. In our recent works we cloned and characterized an amphibian

epidermal lipoxygenase (AmbLOXe) from axolotl regenerating tissue and showed its influence on human wound healing (1). In this work we intend to evaluate its effect on mammalian wound closure .

MATERIAL AND METHODS: C57/BL6 mice received a full-thickness skin wound (50 mm²). Murine embryonic fibroblasts were transfected with vector constructs encoding for AmbLOXe, human epidermal lipoxygenase 12R or an empty vector, respectively (n=8). On group received no treatment. 0,2 ml of cell suspension (10^5 cells/ml) was injected into the wounds on day 1 and 3. The wounds were documented via digital photography and planimetry. Histologic analysis was performed to evaluate wound contraction and cicatrization. Statistical analysis was done with t-test with Bonferroni correction.

KEY RESULTS WITH SUPPORTING STATISTICAL ANALYSIS: On day 7 after surgery, digital planimetry revealed a mean reduction of wound area within the AmbLOXe-group of 95,11 % versus 74,72 % within the 12R-group. Empty vector and sham control displayed limited reduction of wound area up to 69,39 %. Histological findings showed less wound contraction and fibrosis in the AmbLOXe-group.

CONCLUSION: In this work, the influence of AmbLOXe on mammalian wound healing could be shown leading to an increase of wound reduction, with less contraction and fibrosis compared to the 12R-group and controls. This raises hope for a future exploitation of amphibian healing mechanisms in a clinical setting.

LP35: LINKING REACTIVE OXYGEN SPECIES AND APOPTOSIS: TOWARDS AN UNDERSTANDING OF DIABETIC WOUND HEALING

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BACKGROUND: The diabetic hyperglycemic state elevates p53 expression and subsequently end-organ injury. Previously, we demonstrated that topical silencing of p53 with short-interfering RNA (siRNA) improves diabetic wound healing. Here, we investigate whether the p53-reactive oxygen species (ROS)-apoptosis pathway described in cancer literature is present and active in diabetic wound healing by inhibiting the p53-upregulated modulator of apoptosis (PUMA), a pro-oxidant gene that links p53 to ROS. In addition, we utilize N-acetylcysteine (NAC), a ROS scavenger, to mitigate the effects of the ROS pathway.

METHODS: Paired 6-mm stented wounds were created on diabetic db/db mice on three treatment groups. NAC and short interfering RNA (siRNA) to PUMA were topically applied starting post-operative day 1. Nonsense siRNA served as control for the siRNA PUMA arm; matrix-gel alone served as control for the NAC arm. Wound closure time was photometrically assessed, and wounds were harvested on day 10 for histology, immunohistochemistry (IHC), RT-PCR, western blot and ELISA. ANOVA/t-test was used to determine statistical significance ($p<=0.05$).

RESULTS: Treatment with PUMA siRNA and NAC consistently accelerated wound closure (18±1.5 day, 17±1 vs. 27±1 day in control). Hematoxylin-eosin staining showed evenly formed new epithelium including keratinocyte coverage of the wound in treated animals. In the PUMA siRNA and NAC-treated groups, IHC demonstrated decreased p53, caspase-3, and the oxidative DNA damage marker, 8-OHdG staining. DNA damage secondary to ROS (8-OHdG ELISA) decreased almost in half in each treated group ($p=0.03$). p53 levels decreased by 40% on ELISA (PUMA 6.1±0.12, NAC 4.38±0.08 vs. 8.8±0.42 pg/mL). VEGFa ELISA expression increased by average fold change of 2.5 in the treated groups (PUMA 3.37±0.44, NAC 4.89±0.47 vs. 1.06±0.18 pg/ml). RT-PCR confirmed near complete knockdown of pro-oxidant genes PUMA, POX and NQO-1 and increases in fold change of the anti-oxidant gene MnSOD. In, addition, RT-PCR demonstrated a 3.5-fold increase in SDF-1 expression in treated wounds.

CONCLUSIONS: In conclusion, using topical siRNA to silence PUMA resulted in decreased ROS levels and improved wound healing. It also decreased the positive feedback from ROS and resulted in decreased levels of p53 and other pro-oxidant genes. Pharmacologic treatment of

the wounds with NAC produced similar results. Our study shows that the p53-ROS-apoptosis pathway is active in diabetic wounds and that NAC holds promise for the treatment of these wounds.

LP36: ENHANCEMENT OF FLAP SURVIVAL AND CHANGES OF ANGIOGENIC GENE EXPRESSION AFTER AAV2-MEDIATED VEGF GENE TRANSFER TO RAT ISCHEMIC FLAPS

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BACKGROUND: Necrosis of surgically transferred flaps due to ischemia is a common and serious problem. Gene therapy approaches have been attempted experimentally to combat this problem. We evaluated the flap survival and angiogenic gene expression profiles after recombinant adeno-associated virus type 2 (AAV2) mediated VEGF gene transfer to rat ischemic flaps.
METHODS: Thirty Sprague-Dawley rats were divided into one experimental group, one AAV2-GFP group, and one saline control group. 3 x 10^{10} AAV2-VEGF or AAV2-GFP viral particles were injected intradermally into the dorsum of each rat in AAV2-VEGF or AAV2-GFP group. In the saline group, saline was injected. A 3 x 10 cm flap was raised two weeks post-injection. Flap viability was evaluated one week after surgery. The flap tissue was harvested for histological analysis and RNA extraction. Real-time PCR array was performed to analyze the expression of a total of 84 angiogenesis-associated genes.
Results: The AAV2-VEGF treatment significantly improved the survival of the flaps ($p < 0.05$). Immunohistochemical staining showed increased VEGF expression in AAV2-VEGF treated flaps. Real-time PCR array identified remarkable changes of 6 genes out of a total of 84 angiogenesis-associated genes in AAV2-VEGF treated flaps. Typically, the EGF, PDGF-A and VEGF-B genes were up-regulated in the treated flap. In contrast, FGF2 gene expression was down-regulated.
CONCLUSIONS: AAV2-VEGF improves flap survival and affects expression of a series of endogenous growth factor genes relating to angiogenesis and wound healing. These genes likely play critical roles in enhancement of survival of ischemic flaps.

LP37: EXPRESSION OF ANTIMICROBIAL PEPTIDES IN MAXILLOFACIAL SURGICAL SITE INFECTIONS

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INTRODUCTION AND AIMS: Increasing numbers of antibiotics have lost efficiency because of bacterial resistance. Consequences can be severe when surgical wounds become infected during postoperative care. Natural peptide antibiotics, the so-called host defence peptides (HDP), have been investigated since the 1990s in a search for alternative treatment strategies. HDP build up a protection shield against pathological microorganisms, especially in human epithelia. The use of HDP is currently being discussed as a new antimicrobial therapy strategy. Accordingly, a profound knowledge of the quantitative relationships of the effectors is essential. The objective of this study was to assess differences in HDP expression between postoperatively inflamed (from surgical site infections) and healthy skin epithelium.
METHODS: Expression profiles of the genes encoding HDP human beta-defensin (hBD)-1, -2, and -3 and psoiasin (S100A7) were assessed in samples of surgical wound healing disorders (n=27) and healthy epithelium (n=16) by using real-time polymerase chain reaction. Immunohistochemical staining was performed in the same samples.
RESULTS: A significant overexpression of hBD-2 ($p<0.001$), hBD-3 ($p=0.001$), and psoriasin ($p<0.001$) was found in cutaneous surgical site infections. Immunohistochemistry revealed intensely elevated protein levels of psoriasin in infected wounds, and differences in distribution

with respect to the epithelial layers.
CONCLUSIONS: The study demonstrates up-regulated mRNA expression and protein levels of host defence peptides in postoperatively inflamed epithelium. The results may be a starting point for novel pharmacological treatments.

LP38: THE DIFFERENTIAL EFFECTS OF BMP-9 AND BMP-2 IN CRITICAL SIZED CRANIAL DEFECTS

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INTRODUCTION: Bone Morphogenic Proteins (BMPs) play a pivotal role in bone differentiation. Only BMP-2 and -7 are FDA approved for clinical use, and limited information is available about the osteogenic capability of other BMPs. We aim to assess the osteogenic effects of BMP-9 and BMP-2 in vitro and in an in vivo mouse model of critical-sized calvarial defects.
METHODS: Non-suture associated 4mm parietal defects were created in adult CD1 mice (age >8 weeks, n=19). Adenoviral vectors encoding BMP-9 (n=6), BMP-2 (n=5), or GFP alone (control, n=5) were impregnated into collagen sponges, filling the defects (0.5 x 10^6 pfu/defect). One group (n=3) was treated with collagen sponge alone. MicroCT scans of live subjects permitted serial defect survey (3, 6, 12, 16-weeks post craniotomy) at a threshold of 400 Hounsfield units. Immortalized mouse calvarial cells (iCALs) were also infected in vitro with BMP-9, BMP-2 and GFP to assess for markers of late and early osteogenesis.
RESULTS: MicroCT imaging (Figure 1) showed increased bony regeneration in BMP-9 and BMP-2 groups by week 3. BMP-9 had a significant percent change in defect intensity from baseline (240.0%±65.0%) vs GFP controls (63.0%±26%) by 6 weeks (p=0.04), whereas, a significant change was seen by 16 weeks in the BMP-2 group (336.7%±194.0% vs 72.0%±25.9%, p=0.03) (Figure 2). The BMP-9, BMP-2, and GFP groups had greater intensity changes than the sponge only control ($p<0.05$). Significant elevations in alkaline phosphatase activity compared to GFP treated cells were observed in the BMP-9 group by day 3, and bone nodule formation was evident by day 21 via alizarin staining. Levels of osteocalcin mRNA were elevated at Day 8 in BMP-9 treated iCAL cells.
CONCLUSION: BMP-2 and BMP-9 are potent osteogenic agents. Further studies should be performed to evaluate the potential clinical utility of BMP-9.

LP39: ENDOGENOUS STEM CELL THERAPY IMPROVES CALVARIAL BONE HEALING

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OBJECTIVES: Although cranio-maxillo-facial bone healing is a relatively rapid and efficient process, significant portions of patients fail to heal cranial defects, either caused by trauma or secondary to surgical interventions such as cranial vault remodeling in craniosynostosis. Recent advances in stem cell research have shown that progenitor cells participate actively in vasculogenesis. Furthermore, using an already approved stem cell mobilizer (AMD3100 /Plerixafor), progenitor cells can be forced to exit their bone marrow niche, traffic in the circulation and reach an ischemic osseous defect. Therefore, we hypothesize that augmenting neovascularization by increasing the number of circulating progenitor cells (cPC) will improve cranio-maxillo-facial bony healing.
MATERIAL AND METHOD: 3-mm circular bony defects were created on the parietal bones of wild-type (wt) mice. 2 treatments groups were devised: group A (AMD3100 (5mg/kg; daily from day 3 to 18, n=33), group B (sterile saline; daily from day 3 to 18, n=33). cPC number was quantified by FACS. Bony regeneration was assessed with µCT. Immunofluorescent CD31 and osteocalcin staining was performed on calvarial defects at weeks 1, 2, and 4 to

assess for vascularity and osteoblast density, respectively.
RESULTS: AMD3100-treatment increased cPC levels (11.33±0.64% vs. 6.07±1.25% at day 7, p<0.01; and 8.03±1.50% vs. 3.23±1.33% at day 14, p<0.05) and significantly improved bony regeneration at weeks 8 (34.78±11.49% vs. 50.28±11.47%, p=0.017) and 12 (36.01±5.66% vs. 61.85±11.45%, p<0.001) compared to controls. Calvarial defects of AMD3100-treated mice harvested at 1, 2, and 4 weeks demonstrated increased vascularity (3.49±1.19% vs. 6.02±2.06%, p<0.01; 2.70±1.14% vs. 5.70±2.0%, p<0.01; and 3.07±0.91% vs. 5.44±1.89%, p<0.01, respectively) and osteoblast density (1.80±0.52% vs. 3.21±1.19%, p<0.01; 2.49±0.84% vs. 3.75±1.32%, p<0.01; and 1.96±0.54% vs. 3.36±0.52%, p<0.01) compared to controls.
SUMMARY: Improved bony regeneration in this calvarial defect model was associated with elevated cPC number and subsequently improved neovascularization and osteogenesis. These findings highlight the importance of cPCs on bony healing and may provide a novel therapy for bony regeneration in the clinical setting.

LP40: THE ROLE OF IL-10 AND C3 TOXIN IN NERVE REGENERATION IN AN END-TO-SIDE NERVE REPAIR MODEL

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QUESTION: The role of IL-10, an anti-inflammatory cytokine and C3 fusiontoxin, a Rho-GTPase inhibitor, was investigated in an end-to-side peroneal nerve lesion model of the rat.
METHODS: Thirty rats were used and divided into 3 groups : (1) Control group, end-to-side nerve repair of the peroneal nerve onto the tibial nerve; (2) intrafasciculary injection of 0,125 µg/100 µl IL-10; or (3) 1 µg/100 µl C3 fusiontoxin into the repair site. After 8 weeks, the outcome was assessed. Motor function of the nerves was evaluated using the walking track test and by calculating the Peroneal Functional Index (P.F.I.). For the electrophysiological evaluation, the nerve conduction velocities (NCVs) were analyzed. Histomorphological evaluation consisted of measurement of the collagen levels using picrosirius red staining and evaluation of myelination using methylene blue staining.
RESULTS: There weren't any statistical significant differencies in the P.F.I. and NCV measurements. Histologic studies revealed a thicker myelin sheath and a lower G-ratio in the IL-10 group, indicating a better myelination with differencies being respectively statistically significant among all groups (p<0,001). In the C3 Toxin group, a significant higher number of axons compared to the other two groups was found. Morphologic analysis demonstrated significant lower collagen levels in the IL-10 group (p<0,001), suggesting lower scar formation.
CONCLUSION: These results suggest that a low dose of 0,125 µg/ 100 µl IL-10 has a favorable effect in the nerve regeneration process in an end-to-side neurorrhaphy and reduces scar formation. This finding could help to enhance clinical nerve surgery.

LP41: NEUROMODULATION IN FUNCTIONAL - RECONSTRUCTION THROUGH PERIPHERAL NERVE TRANSPLANTATION INTO CENTRAL NERVE SYSTEM IN SPINAL CORD INJURY IN RATS APPLYING CEREBROLYSIN

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INTRODUCTION AND AIMS: Recovery of function following spinal cord injury is generally limited by the lack of regenerative capacity in the central nervous system (CNS). The aim of the present proposal is to investigate motor re- innervations and the influence of FPF 1070 (Cerebrolysin EBEWE) in cell- protection, plasticity and regeneration after transplantation of a peripheral nerve into the lateral white matter of the spinal cord in rats.

MATERIAL AND METHODS: 30 rats were transplanted, 10 of which as a control group as each 10 double-blinded for Cerebrolysin vs Placebo. After laminectomy and an incision in the lateral funiculus of the right T11-T12 spinal cord (SC) a stump of the sural nerve was inserted into the cord incision. The motor nerve innervating the right internal obliquus abdominis muscle was transected and the distal stump was anastomosed to the grafted nerve. Three months after graft rats were monitored for compound muscle action potentials (Nicolet USA). The co-adapted PN transplant was dissected and retrogradly traced by fast blue (EMS-Grivory) for another 10 days before animals were deeply anesthetized and sacrificed.

KEY RESULTS: Recordings of electrophysiological activity after three month confirmed muscle re-innervation in rats. Outstanding histo- neuropathological and immuno- histochemical results concerning origin and type of outgrown cells, position of the implanted transplant in the CNS, size and number of muscle-cells, as type of transmitter will be presented.

CONCLUSION: First functional results of re-innervation could show potential in direct transplantation of PN into the cortico-spinal tract with neuromuscular co-adaptation because of induced neuromodulation and central neuroplasticity. This means a remarkable increase in microsurgical reconstruction after brachial plexus avulsion accompanied with SC damage in humans. Regenerative potential and plasticity might be positively be influenced by neuromodulating and neuro- protecting substances like Cerebrolysin.

LP42: COMPARATIVE GENE EXPRESSION ANALYSIS OF REPAIRED AND UNREPAIRED PERIPHERAL NERVES DURING THE EARLY PHASE AFTER NERVE LESION

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INTRODUCTION: Elucidating the molecular mechanisms occurring during peripheral nerve regeneration after axotomy and microsurgical coaptation, remains a challenging research field. On the one hand the investigation of regenerative procedures could lead to the discovery of specific "regenerative" nerve factors to be applied to the lesion area. On the other hand a thorough molecular examination of scarring

effects at the suture area, as well as of neuroma genesis and peripheral nerve degeneration when no nerve repair occurs, could give us important hints towards eliminating these hindering factors. In this study normal median nerve tissue was compared to median nerve probes after transection and suture or gap lesion at two different time points (10 hours and 4 days) using DNA-microarray technologies.

MATERIALS & METHODS: Fifteen young female adult Wistar rats were divided into 5 groups, each consisting of three animals. The first one was untreated and served as the control group. The second and third groups were subjected to a bilateral transection and microsurgical suture of both median nerves. Finally, the fourth and fifth groups were subjected to a bilateral 5mm gap lesion of both median nerves. Probes were extracted 10 hours after the operation from the second and fourth groups and 4 days after the operation from the third and fifth groups. mRNA was isolated from nerve probes extracted proximal to, from and distal to the lesion sites (after nerve coaptation or gap lesion) as well as from intact nerves and was then used for hybridization to Affymetrix Rat Genome 230 2.0 Arrays. Statistical analysis of the produced microarray data was performed using SAS Scientific Discovery Solutions.

RESULTS & CONCLUSION: Significant changes in the regulation of genes known to play a role in nerve regeneration have been obtained by our microarray data analysis. Additionally, we identified several novel genes, which may have regulatory functions and would be interesting to study further. Our data suggests that nerve regeneration processes already take place proximal to the suture and to neuroma zone 10 hours after operation, while massive inflammation and cell differentiation/activation processes occur at the lesion sites and distally to them during the 4 days after operation. Interestingly, these processes begin later in the segment distal to the suture after microsurgical nerve repair than in the distal stump after gap lesion.

SP1: OBESITY IMPAIRS WOUND HEALING

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BACKGROUND: Obesity has recently been described as the new pandemic for the new millenium. As surgeons, we often appreciate that wound healing is impaired in obese patients. However, little basic science research has been performed to investigate the mechanisms behind this phenomenon. We hypothetized that diabetic wound healing is impaired through a vasculogenic mecanism and an impaired balance between pro-apoptotic/anti-apoptotic and anti-oxydant/pro oxydantgenes.

METHODS: We created 6-mm circular, full-thickness stented wounds on non-diabetic, obese mice (TallyHo/JngJ, n=30) and non-obese controls mice (SWR/J, n=30). Wound healing was assessed photometrically on days 0, 7, 10 and 14. Murine peripheral EPC counts were quantified with FACS analysis at day 0, 7, 14 and 21. Wound tissue was CD31 stained for endothelium, and blood vessel density calculated. Elisa for VEGF, SDF and p53 has been performed for each time point as well as western blot for Puma, POX, NQO-1, Bax, Bcl-2 and RT-PCR analysis for 18S, p52, Bax, Bcl-2, Puma, Pox, NQO-1, HIF-1 and SDF-1. Additional immunohistochemistry has been performed.

RESULTS: Obese mice wound healing was delayed by 41%. EPC numbers were decreased in obese mice during the acute ischemic timeframe of day 7-day 14. Wounds of obese mice demonstrated decreased new blood vessel formation (276.3 ± per LPF vs. 453.7 ± per LPF). As expected, higher levels of pro-apoptotic genes and pro-oxydant genes were measured in the obese mice group.

CONCLUSIONS: Our data implicate EPC dysfunction and inbalance between pro-apoptotic/anti-apoptotic and anti-oxydant/pro-oxydant genes as possible mechanisms behind impaired wound healing in obesity.

SP2: HYDROGEN SULFIDE: A PHARMACOLOGICAL THERAPY FOR PREVENTING MUSCLE ISCHEMIA REPERFUSION INJURY *IN VIVO*.

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BACKGROUND: Ischemia-reperfusion injury (IRI) is an unavoidable consequence of reperfusion following ischemic episodes. Our laboratory has previously shown that hydrogen sulfide (HS) significantly protects myocytes from IRI-induced apoptosis. We sought to determine whether HS confers similar protection to skeletal muscle . Furthermore, we investigated the timing of HS administration in relation to the start of ischemia.

METHODS: Six C57Bl/6 mice underwent 3hr tourniquet-induced hindlimb ischemia; 3 received intravenous NaHS sufficient to raise the bloodstream concentration of HS to [10uM] 20min prior to the onset of ischemia (3.3hr prior to reperfusion), and 3 received saline. Following reperfusion, the bilateral gastrocnemius muscles were harvested, and sections underwent TUNEL assay to calculate the apoptotic index (AI). Eighteen additional mice received NaHS at various times relative to the onset of reperfusion, namely -5hr, -3hr, -1hr, -0.3hr, 0hr, and +1hr).

RESULTS: HS afforded statistically significant reduction in AI when delivered 20min prior to the onset of ischemia (2.6±1.0%), compared to the non-HS-treated ischemic tissue (17.2±5.0%, p=0.015). Furthermore, a significant reduction was also seen at -4hr and -0.3hr ($p<0.05$ for both). No protection was seen at -5hr, -3hr, -1hr, 0hr, or +1hr (p=NS).

CONCLUSION: HS is capable of protecting skeletal muscle against IRI-induced apoptosis . Furthermore, the timing of HS administration is crucial for attenuating protection against IRI, suggesting the presence of both a pre-ischemic and post-ischemic window of protection. We believe that HS has the potential to be an important adjunct to operative revascularization in both anticipated and unanticipated ischemic episodes.

SP3: AXIAL VASCULARISATION OF PARALLEL ALIGNED ELECTROSPUN NANOFIBERS IN VIVO

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QUESTION: For Tissue Engineering of skeletal muscle nanofibers could open a complete new perspective. Besides adapting the chemical and physical parameters of the electrospinning process and the matrix composition itself, parallel aligned fiber orientation may introduce functionality for engineering skeletal muscle tissue. Despite many in vitro studies, vascularisation behavior as a critical issue for in vivo application has not been characterized. The aim of this study was to apply differently spun PCL/collagen matrices in the rat AV-loop model to assess quantitatively the process of axial vascularisation in this highly standardized microsurgical in vivo model.

METHODS: Randomly aligned PCL/collagen blend and parallel aligned PCL/collagen blend/PEO matrices were implanted in the rat AV-loop model with explantation after 4 and 8 weeks (5 animals / group / time point). All explants were analyzed for number and pattern of sprouting vessels by micro-CT scans and newly developed algorithms for vessel tree calculations. For statistical analysis two-tailed unpaired student's t-test was used ($p < 0,05$). Explants were subjected to H&E staining, transmission electron microscopy (TEM, stained with uranylacetate and lead citrate) scanning electron microscopy (SEM, sputtered with gold).

RESULTS: Randomly aligned matrices appeared relatively dense as compared to parallel aligned matrix. However, the parallel aligned nanofiber matrix showed a significantly lower total number of new vessels than the randomly aligned matrix. In contrast the distribution of the vessels was more even in the parallel aligned matrix, especially in the centre of the parallel aligned constructs vascularisation was detected considerably earlier than in the randomly aligned matrix.

CONCLUSION: Parallel aligned 3D PCL/collagen blend/PEO nanofibers not only show good in vitro compatibility, but they also gain axial vascularisation including the center of such matrices. Hence application of parallel aligned 3D-nanofiber matrices will be a promising next step towards in vivo skeletal muscle Tissue Engineering.

SP4:OVERCOMING ISCHEMIC REPERFUSION INJURY VIA NITRIC OXIDE SYNTHETASES IN DIABETES TYPE 2 MODELS

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INTRODUCTION AND AIMS: Ischemic reperfusion injury (IRI) leads to transplant failures not only for autologous or composite tissue allotransplantations in healthy patients but even more in those with vascular diseases or diabetes. Nitric oxide synthetases (NOS) could be used to overcome IRI via pharmaceutical preconditioning, however, they have not been used under diabetic conditions. The aim of this study was to establish a diabetic type 2 rat model with all major side effects evaluating the effectiveness of NOS to overcome IRI.
MATERIAL AND METHODS: 128 male wistar rats were divided into 16 experimental groups (n=8) after inducing a diabetic type 2 model over 3 months with high fat diet and streptozotocin. An extended epigastric adipo-cutaneous flap model (n=64) based on the left superficial epigastric artery and vein was used for evaluation of flap survival rates . A cremaster muscle model (n=64) was used for in vivo investigation of microcirculatory effects.
KEY RESULTS: Flap survival rates improved significantly compared to the control group with NOS and L-Arginine. (Control group 4,7%, with L-Arginine solely 32,4%, iNOS 24%/40,3% w/o /with L-Arginine, nNOS 20.5%/38,7%, eNOS 27,9%/48,6%)
Interestingly, no statistical differences could be found evaluating the microcirculatory effects in the cremaster model flap group.
CONCLUSION: Pharmaceutical preconditioning with 3 Isoforms of NOS and L-Arginine improves flap survival rates significantly even under diabetic conditions thus overcoming IRI in rat flap models. In contrast, these findings could not be found and further clarified through evaluating the microcirculatory effects.

SP5 RISK STRATIFICATION FOR ACELLULAR DERMAL MATRIX USE IN TISSUE EXPANDER/ IMPLANT BREAST RECONSTRUCTION

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QUESTION: Acellular Dermal Matrix (ADM) in 2-stage Tissue Expander/Implant (TE/I) breast reconstruction remains clinically useful despite early reports of associated complications. Our study investigates the effect of ADM on expansion dynamics and complication rates in TE/I breast reconstruction.
METHODS: Design: Retrospective single-institution review of 266 consecutive TE/I reconstructions Outcomes: Expansion dynamics (outpatient visits, time to second-stage procedure, fill ratio - intraoperative fill volume: expander size), Complications (seroma, skin necrosis, infection, hematoma, reoperation, explantation).
Statistical Analysis: Student's t- and Fisher's Exact tests.
RESULTS: 105 expanders were placed with an ADM sling, 161 with only submuscular coverage. The ADM group had greater mean BMI (28.1 v 24.1 kg/m^2 $p< 0.001$) and breast size (890 v 601g $p< 0.001$). ADM was associated with higher fill ratio (52.3% v 14.5% $p<0.001$), fewer outpatient visits (4.5 v 5.7 $p< 0.001$), fewer days to second stage (192 v 231 days $p=0.01$), and more complications (42.9% v 23.6% $p=0.001$). Stratification for breasts <600 grams demonstrated that ADM was associated with both improved expansion dynamics (46.0% v 16.0% fill ratio $p<0.001$; 4.2 v 5.6 outpatient visits $p<0.001$) and no difference in complication rates (23.7% v 24.3% $p=1.0$). In breasts >600 grams, ADM was associated with significantly improved expansion dynamics

(55.8% v 15.3% fill ratio p<0.001; 4.8 v 6.1 outpatient visits p<0.001), but a significantly higher complication rate (54.7% v 26.8% p=0.008).
CONCLUSION: ADM use in TE/I breast reconstruction improves expansion dynamics. In large breasts (>600g), these benefits must be weighed against an increased risk of complications.

SP6: MORPHOLOGY, BIOMECHANICS AND BIOCOMPATIBILITY OF MICROSURGICAL SUTURES BASED ON SPIDER SILK

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INTRODUCTION AND AIMS: A major problem in microsurgical nerve repair is neuroma formation due to inflammation, fibrosis, and foreign body reaction caused by sutures. Nevertheless, few innovations have been made concerning suture materials. As native spider silk has been shown to promote nerve regeneration , we aimed to manufacture a microsurgical suture of braided spider silk fibres.
MATERIAL AND METHODS: With a miniature braiding machine, sutures of either 3 x 10 or 2 x 15 single spider silk fibres harvested natively were manufactured followed by morphological analysis with scanning electron microscopy (SEM). Tear force, tensile strength, and elasticity were compared to a commercially available nylon suture of a USP 10-0 thickness. Additionally, spider silk sutures were tested in a cell culture of Schwann cells for cytocompatibility concerning cell adhesion and viability.
KEY RESULTS: SEM revealed 20 to 30 µm thick braided spider silk sutures with strands entwining each other in a regular and harmonic twist. Concerning the biomechanical attributes, tear force as well as tensile strength were significantly more than two-fold higher than nylon suture ($p < 0.05$). Schwann cells adhered to spider silk sutures and were still viable after 5 and 7 days.
CONCLUSION: With the method we developed the difficult handling of native spider silk was possible. We could manufacture suture material with favourable mechanical attributes superior to nylon sutures. Additionally, cytocompatibility to glial cells could be revealed, indicating spider silk as a promising alternative concerning suture materials in nerve repair.

SP7: EVALUATION OF LYMPH INVOLVEMENT UPON APPLICATION OF PREVENA™ INCISION MANAGEMENT IN A PORCINE MODEL.

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INTRODUCTION: Hematomas/seromas are undesirable surgical consequences. Immediate application of negative pressure therapy (NPT) on porcine sutured incisions over subcutaneous voids can significantly decrease hematoma/seroma levels 4 days post-surgery compared to control, without fluid being externally removed.[1] The goal of this study was to determine if these observations can be explained, in part, by greater involvement of the lymph system.
MATERIALS AND METHODS: In each of 8 domestic swine, 2 sets of ventral contralateral subcutaneous voids (8x8 cm^2) with overlying sutured incisions (5 cm) were created. Uniquely labeled 30 nm nanospheres were introduced into each subcutaneous void. Each set of contralateral incisions were assigned randomly to Prevena™ Incision Dressing (NPT; KCI, San Antonio, TX) with continuous -125 mmHg negative pressure (simulating Prevena™ Incision Management) and standard-of-care (SOC; 3M™Tegaderm™ Dressing, 3M, St. Paul, MN), respectively. After 4 days of therapy, hematoma/seroma were harvested and weighed (reported previously)[1] and the axillary, superficial inguinal, and cranial mediastinal lymph nodes were processed to quantify nanosphere content. A paired-difference t-test was used for evaluating statistical significance.
RESULTS: The mean difference between nanosphere content from NPT sites and SOC sites was 60 ± 27 (SE) µg (p=0.04). There were 54%

more nanospheres in the lymph nodes from Prevena- compared to SOC-treated incisions (Prevena: 170 ± 37 µg, SOC: 111 ± 36 µg).
CONCLUSIONS: Increased lymph clearance may explain, in part, the previously reported 63% decrease in hematoma/seroma with Prevena compared to a non-NPT-SOC, even when fluid was not removed from the subcutaneous void into the negative pressure canister.[1]
[1]Kilpadi DV, Evaluation of Prevena™ Incision Dressing on the Mitigation of Hematoma/Seroma. Symposium on Advanced Wound Care/ Wound Healing Science meeting, Orlando, FL, USA, April 17-20, 2010.

SP8: RESTORING FUNCTION IN TETRAPLEGIA USING NERVE TRANSFER - LITERATURE REVIEW, ANATOMICAL FEASIBILITY AND THEORETICAL CONCEPTS

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INTRODUCTION: Nerve transfers are successfully used after peripheral nerve injury (PNI), yet only rarely after spinal cord injury (SCI).
OBJECTIVE: To review techniques and test anatomical feasibility by own cadaver dissections regarding nerve transfers in tetraplegia.
RESULTS: These nerve transfers would be available in C6 SCI:
• 1. Brachialis nerve branch (C5/6) to extrinsic forearm muscle branches / median nerve using selective neurotization (Kiwerski et al. 1991, Zheng et al. 2008)
• 2. Supinator nerve branches (C6) to posterior (Bertelli et al. 2009, 2010) or anterior interosseus nerve (Gohritz et al. 2010) for thumb / finger function
• 3. Axillary nerve or coracobrachialis muscle branch of musculocutaneous nerve (C5/6) to triceps branch of radial nerve (C7) (Gohritz et al. 2010)
• 4. Spinal accessory nerve from dorsal approach for shoulder or arm function (Vathana et al. 2007)
• 5. Superficial radial nerve (C6) or lateral antebrachii cutaneous nerve (C5/6) for sensory restoration of the median nerve in patients with numb 1st web space (Brown and Mackinnon 2008) Theoretically, nerve transfers in SCI may be highly effective, because:
1. Recipient muscles with intact lower motoneuron preserve reflex arcs and do not become refractory to stimulation after 18-24 months as in PNI, 2. axon transfer may be possible using selective neurotization by intraoperative fascicle stimulation of intact recipient nerves, 3. thus minimizing the distance between donor and recipient and regeneration time.
CONCLUSION: Innovative nerve transfer could improve arm and hand function after SCI. Further research should be directed at combining them with traditional algorithms.

SP9: WHY IS THERE SUCH A VARIABILITY IN CLINICAL OUTCOME OF FATGRAFTING TO THE BREAST AFTER 1 SESSION ?

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INTRODUCTION: The revival of fatgrafts for reconstructive and aesthetic use is remarkable. However, there is large variability in outcome depending on the technique (and cells) used and few is known about working mechanisms. In this study we analysed the impact of aspiration and processing techniques on cell harvest, number of mesenchymal stem cells, cell proliferation, matrix remodelling and angiogenic parameters in order to find answers why fat grafts soften zones of scarring and improve vascularisation.
M&M: Fatgrafts were retrieved from 8 patients using 17 different conditions for liposuction and processing and further cultivated. MTT viability and proliferation assays were conducted. Cell differentiation potential was analysed by rtPCR and immunostaining. Stainings with fibronectin, collagen and aSMA were used to determine formation of matrix elements. Pro-angiogenic

growthfactors, cell surface markers, matrigel and AcLDL uptake assays for endothelial cell(EC) analysis were performed. Immunoregulatory markers (IDO) and inflammatory cytokines were analysed. To quantify the average number of MSCs per harvest, 14 fatgraft donor samples were obtained from female patients using one single protocol and migration and proliferation profile plotted till P5.

RESULTS: PLA isolation after using 3mm aspiration cannula's and short (3 min) centrifugation of the fat tissue showed highest viability with a characteristic fibroblastic spindle-shaped morphology. Matrix elements fibronectin, collagen and aSMA stained most in these groups. Matrigel and acLDL uptake assays confirm the presence of mature ECs in the PLA, but also endothelial progenitor stem cell surface markers (CD31, KDR,Tie1,2) were found. IDO-staining suggests an immunoregulatory impact. A significant variation existed in number of MSCs in 14 PLAs.

CONCLUSION: Different harvesting conditions led to distinct quantification of mature fat cells and MSCs. A short 3 min. centrifugation protocol led to MSC cultures with highest differentiation, matrix formation and angiogenic potential. High variability exists in number of fatcells and MSCs using one selected protocol. These parameters may explain the significant variability in clinical outcome using fat grafting for reconstructive and aesthetic procedures.

SP10: PROPELLER FLAPS BASED ON ONE ECCENTRIC PERFORATOR FOR RECONSTRUCTION OF TRUNK AND PELVIC DEFECTS

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INTRODUCTION: The propeller design with eccentric perforators is currently mainly used for reconstruction of defects at the extremities. In this study our institutional experience with large propeller flaps for reconstruction of trunk and pelvic defects is presented.

METHODS: 20 patients with 22 flaps were retrospectively analyzed. Defects were localized at the back (6), abdomen (1), and pelvic region (13). Defects were caused by malignant tumors (7), pressure ulcers (7), burn scars (2) and others (4). Free-style perforator flaps (16.1±5.3 x 7.3±1.6 cm) were taken from the thoracic (5), lumbar (2), gluteal (8) and thigh (7) region. 2 patients received two independent flaps. One dominant perforator was localized by Doppler ultrasound, skeletonised and the flap was transferred into the defect. Donor sites were directly closed in all patients.

RESULTS: 19 defects were successfully reconstructed. One flap was lost due to venous congestion. No partial flap loss was observed. Three flaps developed transient venous congestion which resolved after opening of one suture line and temporary application of VAC. One wound infection and 1hematoma required surgical revision and 3 donor defects healed partially by secondary intention.

CONCLUSION: Perforator-Propeller flaps are an efficient and safe procedure for reconstruction of defects at the trunk and pelvic region. The propeller design allows the transport of healthy tissue into the defect region without significant functional impairment at the donor site. Propeller flaps are a useful alternative to random pattern or myocuanteous flaps and should be considered as a standard procedure for reconstructive surgery not only at the extremities.

SP11: INTRAOPERATIVE HEMODYNAMIC EVALUATION OF THE LATISSIMUS DORSI MUSCLE FLAP

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INTRODUCTION AND AIMS: The latissimus dorsi (LD) muscle flap is one of the most used flaps. The aim of this study was to assess intraoperatively the haemodynamic changes in the donor vessel of the LD flap before and after denervation and how it affects the recipient artery blood flow after the transfer of the flap.

MATERIAL AND METHODS: Twenty-seven patients underwent LD muscle microvascular reconstruction for lower limb soft tissue defects. Direct measurements of blood flow were performed intraoperatively by using 2-5mm probe ultrasonic transit-time flow-meter around the dissected vessels. Registrations were made in the thoracodorsal artery before and after harvesting the flap; after compressing and cutting the motor nerve and after anastomosis. In 18 patients also the recipient artery (anterior or posterior tibial or popliteal artery) before and after transplantation (proximally to the end-to-side anastomosis) was measured. The artery of the flap was anastomosed end-to-side either to the femoral, popliteal artery, or anterior or posterior tibial artery.

KEY RESULTS WITH SUPPORTING STATISTICAL ANALYSIS: Mean blood flow of thoracodorsal artery was (mean±SD) 16.6±11 ml/min and significantly increased after raising the flap to 24.0±22 ml/min (Friedman's test: $p<0.05$), while it was 25.6±23 ml/min after compressing the motor nerve and significantly increased after cutting the motor nerve to 32.5±26 ml/min ($p<0.05$). A significant increase of the blood flow to 28.1±19 ml/min was also detected in the thoracodorsal artery after flap transplantation with end-to-side anastomosis ($p<0.05$).

CONCLUSIONS: Blood flow increases in a free LD muscle flap which helps the microanastomosis and explains the positive effects of the flap on wound healing and chronic infections. This phenomenon is mainly because of motor nerve denervation which decreases vascular resistance.

SP12: VENOUS THROMBOEMBOLISM (VTE) INCIDENCE IN OUTPATIENT AESTHETIC SURGERY: RISK STRATIFICATION AND IMPLICATIONS FOR FUTURE PROPHYLAXIS

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INTRODUCTION AND AIMS: VTE prophylaxis in outpatient cosmetic surgical patients lacks clear guidelines. The purpose of this study was to determine outcomes, specifically DVT/PE incidence, as well as risk stratify these patients to determine adequacy of VTE prophylaxis.

METHODS: Retrospective chart review of prospectively collected data was performed on 2579 consecutive patients who underwent aesthetic surgical procedures by a single group during a 5-year period. Demographic, procedural, and outcome data were collected. Patients were risk stratified utilizing an established thromboembolism risk assessment model. Statistical analysis was conducted using SAS Software version 9.1.3 (SAS Institute Inc., Cary, NC, USA).

RESULTS: The incidence of confirmed deep venous thrombosis and pulmonary embolism was 1 in 2579 patients (0.04%). Prophylaxis for all patients consisted of pneumatic compression device and early ambulation. Mean American Society of Anesthesiologists (ASA) physical status classification system score was 1.4 (range of 1-3). Mean DVT Risk Factor Score was 3.96 with a standard deviation of 2.65. Using a devised thromboembolism risk assessment score, 173 (6.7%) patients were considered low risk, 607 (23.4%) were considered moderate risk, 1018 (39.5%) were considered high risk and 781 (30.0%) were considered very high risk.

CONCLUSION: Although the risk of DVT and PE was found to be relatively low, prevention remains the best method for ensuring patient safety. The majority of patients in our study were considered high risk. Plastic surgery, as a specialty, must adopt the use of existing validated risk factor scoring systems and identify and target patients at risk for VTE and adopt guidelines for DVT/PE prophylaxis.

SP13: THE EFFECTS OF BALLOON-CATHETER DILATION ON HEALTHY RAT ARTERIAL WALLS: A POTENTIAL METHOD OF INCREASING MUSCLE-SPARING BREAST RECONSTRUCTION

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INTRODUCTION AND AIMS: The free superficial inferior epigastric artery (SIEA) flap is an attractive option for breast reconstruction. Since the rectus muscle and fascia are left undisturbed in this flap, a theoretical advantage can be expected compared to the deep inferior epigastric

perforator (DIEP) flap, being a lower incidence of abdominal wall weakness, hernia and bulge. Unfortunately, it is impossible to guarantee that the vascular pattern and size of the superficial inferior epigastric artery are amenable to performing this procedure. Our hypothesis is that balloon angioplasty of the inferior epigastric vessels should increase vessel diameter and facilitate microvascular anastomosis. In this study we aim to describe the change in diameter and the immediate histologic effects of balloon-catheter dilation in a rat aorta model.

MATERIALS AND METHODS: Ten adult, female Sprague-Dawley rats were sacrificed by injection of chloral hydrate followed by cervical dislocation. The aortas of the rats were transected and dilated using a Boston Scientific 1.5 mm balloon-catheter.

Histologic analysis of the aortas was performed.

RESULTS: Ten rat aortas were successfully cannulated and balloon-dilated. An increased vessel diameter by 0.6-1.0 mm was achieved which represents a 60 to 125% increase over the original external diameter. Dilation was performed without significant injury to vessel intima or media.

CONCLUSION: Balloon dilation of rat aortas can be achieved up to a 125% increase of the original diameter without vessel damage. Further investigation of this technique in live animals could potentially lead to clinical applications for microvascular surgery in humans.

SP14: IMPROVED VASCULARIZATION OF TISSUE SUBSTITUTES AFTER LOW PRESURE GLOW-DISCHARGE SURFACE-MODIFICATION

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QUESTION: The use of tissue substitutes in surgical reconstruction continues to gain in importance. A sufficient and expeditious vascularization of these substitutes is essential for their functionality. We investigated whether cold low-pressure plasma is able to enhance the vascularization of two tissue substitutes. Thereto, the microvascular reactions to gasplasma surface-activated substitutes were analyzed in-vivo

MATERIALS AND METHODS: Dermal substitutes (Matriderm®) and bone substitutes (Tutoplast®) were used. (n=40) The analyses were made by means of intravital fluorescence microscopy using the skinfold chamber model. A low-pressure plasma reactor was designed to activate the biomaterials. Untreated substitutes served as controls. The microscopic analyses were carried out on days 1, 5 and 10 after implantation. Microcirculatory parameters (functional vessel density (FVD) red blood cell velocity (RBCV), microvascular permeability (MVP) or endothelium-leukocyte interactions) were evaluated.

RESULTS: A continuous development of a microvessel network within the border zone of the substitutes could be observed, as reflected by an increase of FVD from days 1 to 10. The FVD of gasplasma-treated substitutes was found significantly higher on days 5 and 10. The quantification of RBCV and MVP indicated undisturbed endothelial integrity of the developing microvessels over the entire observation period. A noticeable reduction of adherent leukocytes from days 1 to 10 could be detected.

CONCLUSION: Due to the cold gasplasma treatment, an intensified vascularization of the substitutes was observed. The results indicate that cold gasplasma surface activation is a promising technique to improve biointegrity of tissue substitutes

SP15: AN AUDIT OF THE MELANOMA HISTOPATHOLOGY REQUESTS AND REPORTS- ARE WE COMPLYING WITH THE GUIDELINES?

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INTRODUCTION: The national minimal dataset for reporting of cutaneous malignant melanoma was published by the Royal college of Pathologists in February 2002. Guidance regarding the

clinical information to be provided is alluded to in literature from Royal college of pathologists and in guidelines from other countries eg -Melanoma management guidelines from Australia and New Zealand. In the current paper we present the results of an audit on the requests and reporting of cutaneous melanomas against the proposed guidelines.

METHODS: 153 specimens were reported as cutaneous melanomas in the period between March 2008 and February 2009 by the Histopathology department as Mid-Essex NHS Trust. Of these 30 reports were randomly chosen retrospectively and audited for clinical and Histological information provided.

RESULTS: 20% of the reports were structured and the mean time taken to obtain information from structured report was 2 min while that from non-structured report was 5.5 min. The other data is as follows:

Clinical information To be provided	% times provided	Histological Information to be reported as per Minimum Dataset	% times reported
Suspected clinical Diagnosis	83	Gross description and morphology	100
		Tumour thickness (Breslow)	93
Nature of specimen Eg-Punch/ Excision	43	Clarks Level	93
		Peripheral margin of clearance	87
Excision record Eg-Primary/ Wide Excision	13		
		Deep margin of clearance	87
		Insitu/Invasive component	63
		Mitotic rate	73
Relevant History	23	Ulceration	87
Orientation markers	60	Lympho-vascular invasion	87
		Growth Phase	73
Site of lesion	97	Peri-neural invasion	70
		Micro-satellites	57
		Regression	67
		Associated Benign lesions	50
		Histological Diagnosis	100

CONCLUSION: The relevant clinical information was deficient (<50%) in 3 of the 6 audited criteria. Overall Histological reporting was very good with more than 70% compliance with the minimum dataset on all the audited criteria. Structuring of the reports would make the reports easy and faster to be analysed. A rubber stamp with the 6 clinical points is proposed for future requesting of suspected melanoma lesions and re-audit in 6 months.

SP16: PEDICLE AUTONOMY IN MUSCLE FLAPS: IMPLICATIONS FOR LOWER LIMB TRAUMA

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INTRODUCTION AND AIMS: The ability of a muscle flap to develop vascular connections with surrounding tissues has never been investigated. It is important in lower limb trauma. Up to 70% of reconstructed cases require secondary procedures, which threaten flap viability. We aim to demonstrate vascular connections between muscle and a wound bed.

MATERIALS AND METHODS: We undertook an experimental study using a rodent muscle flap model, the vascular pedicle of which was ligated after a variable period. Perfusion was assessed clinically before and after ligation, and 48 hours later. Flaps were injected with contrast and radiographed.

KEY RESULTS - All flaps survived when the pedicle was ligated 21 days or more after inset. Flap survival is described by a logarithmic curve. The difference between groups is significant ($p=0.017$, Fisher's Exact Test). Clinical signs do not predict flap survival. New vessels are most dense distally in the flap ($p<0.01$, ANOVA) but the total number dose not change with time ($p=0.82$, ANOVA). They always and exclusively anastomose with skin.

CONCLUSIONS: - Muscle flaps develop vascular connections with surrounding skin. We favour the gradient ischaemia theory of neovascularisation. Neovessels from early but may not function adequately to perfuse the entire flap. The skin inset is important and should be protected.

SP 17: RECONSTRUCTION OF LARGE ABDOMINAL WALL DEFECTS WITH PEDICLED FLAPS FROM THE ANTEROLATERAL THIGH. CAN A FUNCTIONAL ABDOMINAL WALL RESTORATION BE ACHIEVED ?

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INTRODUCTION: Reconstruction of large abdominal wall defects is still considered a major difficulty.The components separation technique is most often used but leads to high percentage of reherniation and wound complications due to wide skin and subcutaneous tissue undermining. The technique also destabilizates the outer layer of the abdominal wall in relation to the underlying myoaponeurotic tissues and its application in patients with enterostomies is difficult. The anterolateral thigh region offers well vascularised fasciocutaneous tissues, wide fascia lata and muscle that can be harvested rooted on one or more perforators which all drain into the descendens branch of the Lateral femoral circumflex pedicle. These tissues can be used separately or combined to restore the abdominal wall with like-with-like tissues. Using a segment of vastus lateralis muscle, the rectus femoris muscle can be restored dynamically by leaving the femoral nerve branches to the harvested muscle segment intact.
M&M: In retrospective clinical study we analysed data from 12 patients in whom an abdominal wall defect had been reconstructed with a pedicled innervated anterolateral thigh flap with vastus lateralis and tractus iliotibialis. Impact on donor and recipient sides were assessed with cybex dynamometry 6 weeks and 6 months postop.
RESULTS: The dynamometric results indicated a significant loss of function in the donor thigh ($p<0.05$) and abdomen ($p<0.02$) in the immediate postop situation. After specific physiotherapy, subjective patient's outcome was documented good to very good ; dynamometry showed a favorable ratio left/right for the donor area, while videoscopy confirmed a dynamic response in the abdominal wall.
CONCLUSION: A semi-dynamic reconstruction of the abdominal wall can be obtained with pedicled flaps from the anterolateral thigh. These donor tissues allow for an like-with-like restoration of the different layers of the abdominal wall. Donor site is minimal as percieved by patients. The restoration of abdominal muscles by vastus lateralis muscle allows for dynamic movements of the abdominal wall.

SP18: NONINVASIVE VENOUS ABLATION VIA A HAND-HELD, BATTERY-OPERATED, HIGH INTENSITY FOCUSED ULTRASOUND DEVICE

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PURPOSE: The limitations of currently available treatment modalities for varicose veins and other vascular malformations (e.g. varying degrees of invasiveness, subsequent risk of thrombophlebitis and skin ulceration) led the authors to develop a novel, hand-held, battery-powered, high-intensity focused ultrasound (HIFU) device that may, for the first time, allow for entirely transcutaneous venous ablation.
METHODS: The 9cm x 14cm HIFU-device has an intensity of 2000-2500W/cm^2, and is powered by 4 rechargeable lithium-ion batteries. An testing platform consisting of sequentially layered skin, fat, and blood-filled vein was treated with HIFU, and histologic cross-sections of treated and non-treated vein were measured and compared. , a custom-designed cover allowed harvested rat skin to be secured adjacent to the HIFU transducer, which allowed HIFU to be applied directly to the exposed inferior vena cava through an intervening segment of skin in 3 Sprague-Dawley rats.
RESULTS: In both andseries, HIFU treatment resulted in venous narrowing and coagulation necrosis at the focal point. Furthermore, there

was no evidence of damage to any of the adjacent tissues in either model. The luminal cross-sectional area of HIFU-treated vein was 0.46 ± 0.25 mm^2, compared to 3.96 ± 0.30 mm^2 in untreated vein (P<0.001).
CONCLUSION: This hand-held, portable, and inexpensive HIFU-device achieves effective transcutaneous venous ablation both and . Once diagnostic imaging capabilities are incorporated, this novel therapeutic HIFU-device has the potential to significantly reduce the morbidity and cost of treating these common pathologic conditions.

SP19: RESOLUTION OF INTRACRANIAL HYPERTENSION AFTER CRANIAL VAULT RECONSTRUCTION

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INTRODUCTION: Premature closure of cranial vault sutures may be related to chronically elevated intracranial pressure (ICP). It may impose severe restrictions on brain growth and intellectual development.
METHODS: We studied the role of cranial vault remodeling surgery in reducing increased ICP. Out of 190 patients who underwent surgery for craniofacial deformities (2002-2006), 16 patients had raised ICP diagnosed clinically and/or with invasive monitoring. Twelve of the patients were evaluated solely by clinical signs, such as papilledema, and 4 patients were evaluated with the addition of ICP monitoring.
RESULTS: Of the 16 patients experiencing intracranial hypertension, all showed clinical improvement following cranial vault surgery as evidenced by resolution of papilledema and pre-operative symptoms such as headache.
CONCLUSIONS: A well-planned cranial vault reconstruction can significantly reduce pathologic ICP and prevent its attendant permanent neurological sequelae.

SP20: COMPARATIVE REVIEW OF BURNS WITH INHALATION INJURY IN IBADAN, NIGERIA

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INTRODUCTION AND AIM: Inhalation injury is an acute respiratory tract insult caused by direct thermal injury, carbon monoxide poisoning or toxic chemical inhalants, such as fumes, gases and mist. The aim of this study is to review our experience in a regional burn unit in a developing country.
METHODS: The records of burn patients seen in the University College Hospital, Ibadan from January 2001 to December 2009 were analyzed using SPSS version 16 software.
RESULTS: There were five hundred and seventy nine patients in all, 68% had cutaneous burns only, while 32% had associated inhalation injury. Sixty eight percent were males, 32% females (2:1) in both groups. The mean ages were 24±17.7 years (inhalation injury) and 21±18years (cutaneous burn only). The mean total body surface area (TBSA) burn in the patients were 55% (inhalation injury) and 24% (cutaneous burn only) (p<0.05). Burn injury occurred most frequently between 19.00hrs and 24.00hrs of the day, 56% of burn injury during this time was associated with inhalation injury (p<0.05). The most common place of occurrence was the home in both groups. Major causes of burns were kerosene flames (33%), gasoline flames (32%) and scald (19%). Mortality was 78% in patients with inhalation and 33% in patients with cutaneous burns only (p<0.05).
CONCLUSION: The association of inhalation injury with cutaneous burns portends a very grave condition. An upgrade of expertise and infrastructure in the management of these patients is necessary in order to improve outcomes.

SP21: MESENCHYMAL STEM CELLS AND BMP-2 FOR GENERATION OF AXIALLY VASCULARIZED BONE TISSUE IN THE SHEEP AV-LOOP MODEL

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QUESTION: Axial vascularisation is a prerequisite for microvascular tissue transplantation. Hence AV-loop sheep model was developed. We previously could demonstrate axial vascularisation of a clinically approved biphasic calcium phosphate ceramic. Here we aimed at inducing bone formation in the sheep animal model by applying either directly auto-transplanted mesenchymal stem cells (MSC), in vitro expanded MSC or BMP-2.

METHODS: MSC were isolated from bone marrow aspirates and directly auto-transplanted or expanded in vitro and characterized using FACS and rtPCR analysis before subcutaneous implantation (s.c.) in combination with BMP-2 and β-TCP/HA granules. Directly auto-transplanted MSC were then implanted in the AV-loop chamber +/- BMP-2. Serial MRI-scans were performed on AV-Loop sheep. Constructs were explanted after 1 to 12 weeks for histology and rtPCR.

RESULTS: MSC were CD29, CD44 and CD166 positive after selection by ficol gradient centrifugation, while directly auto-transplanted MSC-populations expressed CD29 and CD166 at lower levels. Directly auto-transplanted MSC induced bone formation s.c. in β - TCP/HA matrix comparable to the application of BMP-2 only or implantation of expanded MSC s.c.. Bone matrix proteins were upregulated in all s.c.-groups. In AV-loop specimens, directly auto-transplanted MSC with BMP induced significantly more bone formation than without BMP-2. Increasing vascularisation was detected by serial MRI-scans, dense endpoint vascularisation was evidenced by CD31-immunohistology and micro-CT.

CONCLUSIONS: Ectopic bone formation can be induced by directly auto-transplanted or expanded MSC with β-TCP/HA granules only. Thus BMP-2 stimulation might become dispensable in the future, thus providing an attractive, clinically feasible approach to bone tissue engineering.

SP22: QUANTIFYING CONTRACTION OF MUSCLES OF FACIAL EXPRESSION USING DIGITAL IMAGE SPECKLE CORRELATION (DISC) ANALYSIS

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INTRODUCTION: Objective measurement of the force and magnitude of contraction of facial muscles may be clinically useful, but has not yet been achieved. In our study, we analyzed the biomechanics of facial expression by Digital Image Speckle Correlation (DISC) analysis.

METHODS: Photos were taken of normal volunteers using a high-resolution digital camera at a standardized distance and head position, first with the face at rest and then during a slight smile. DISC software was then used to integrate the photographic information and generate vector diagrams to objectively study facial muscle contraction.

RESULTS: Using the photographs and Young's modulus for the deformation of skin, the DISC software determines the magnitude of displacement of skin pores, which demonstrates the degree of muscle group movement (Figure 1). The software then creates contour lines corresponding to lines of stress on the skin, which can be extrapolated to the vectors of muscle contraction (Figure 2). In the analysis presented, we can identify superiolateral and lateral vectors corresponding to the insertion and action of the zygomaticus and risorius muscles. We do not see the recruitment of orbicularis oculi expected in a more intense smile.

CONCLUSIONS: DISC analysis is a sensitive, non-invasive measure of the dynamics of the

muscles of facial expression, and has the potential for wide application in plastic surgery. Although further study is required, this method may enhance the clinical judgment of physicians and removes the potential of observer bias. Potential applications include refinement of Botulinim toxin dosing and quantification of muscle recovery following reinnervation or facial transplant.

SP23: EXPERT PROFICIENCY LEVELS OF CONSULTANT PLASTIC SURGEONS ON FIVE CORE PLASTIC SURGICAL TASKS

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INTRODUCTION: Post graduate surgical training relies on the clinical setting to teach and assess trainees' technical skills. However, setting a fixed number of procedures or number of training hours is not an optimal approach to learning. Proficiency based progression (PBP) training is a curricular approach to surgical education. In this training paradigm, surgeons train to a particular, pre-defined level of proficiency. Trainees should achieve these proficiency levels in the skills laboratory before operating on patients.
MATERIALS & METHODS: To determine if basic plastic surgical tasks exhibit construct validity i.e., reliably differentiate between the performance of expert and junior surgeons. Eleven consultant plastic surgeons and seventeen trainee surgeons participated in the study. All participants performed 5 core plastic surgery tasks on low fidelity inanimate models.
RESULTS: Consultant surgeons performed statistically significantly better than trainee surgeons. They also demonstrated a more homogenous performance. The tendon repair and anastomosis tasks were the best discriminators of performance.
CONCLUSION: For the first time, the proficiency level of expert plastic surgeons has been quantified and construct validity has been established for 5 core surgical skills. This is the basis of the implementation of a PBP training programme. The next step is to establish if a PBP training paradigm results in improved intra-operative performance.

SP 24: IMPROVING OUTCOMES OF VRAM FLAP DONOR SITES WITH COMPONENT SEPARATION

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INTRODUCTION: The Vertical Rectus Abdominis Musculocutaneous (VRAM) flap has numerous indications in pelvic reconstruction. However, flap harvest can result in abdominal wall morbidity including myofascial laxity (bulge), fascial dehiscence and incisional hernia. We hypothesize that Component Separation (CS) can be utilized when primary fascial closure (PFC) is impossible or results in excessive tension on the fascial closure.
METHODS: All patients at the M. D. Anderson Cancer Center between June 2006 and May 2009 who underwent VRAM donor site closure with CS were compared to a PFC control group. The indication for CS was the inability to approximate fascial edges or excessive fascial tension deemed at high risk for postoperative failure. Primary outcome indicators included wound complications, myofascial laxity and incisional hernia.
RESULTS: Seventy-four patients were included in the study; 15 CS and 59 PFC patients. Mean follow-up was 16 months (range 6-39 months). The incidence of seroma, infection, skin and fascial dehiscence; was higher in the PFC (39%) group vs. the CS (13%) group ($p<0.05$). There was a four-fold greater incidence of incisional hernia in the PFC (24%) vs. the CS (6%). There was also a non-statistically significant trend towards a higher incidence of myofascial laxity in the PFC (14%) vs. the CS (6%).
CONCLUSION: CS was effective in allowing closure of VRAM donor sites that were otherwise impossible to re-approximate or resulted in excessive fascial tension. CS closures resulted in fewer postoperative wound complications, hernias and bulges despite a more difficult closure and should be considered when fascial closure tension is excessive.

SP 25: AN IN VIVO EXPERIMENTAL INVESTIGATION OF EFFECTS OF AAV2-VEGF GENE DELIVERY TO ENHENCE HEALING STRENGTH OF INJURED TENDONS

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INTRODUCTION: Delivery of growth factor genes into tissues may enhance the healing strength. We have found that bFGF gene transfer can increase the strength of the healing tendon. In this study, we investigated efficiency of human recombinant VEGF gene delivery to the injured tendons in promoting the tendon strength. Methods: Sixteen flexor digitorum profundus tendons of 16 chickens were divided into two groups: AAV2-VEGF injection group and non-injection control group. In the experimental group, AAV2-VEGF (2 X 10^9 viral particles/ tendon) was injected into 4 sites of the tendon stump immediately after complete transection of the tendon in zone 2 area. The tendon was subsequently repaired with modified Kessler method. In the control group, the tendon was cut and repaired similarly, without injection of vectors. Four weeks later, the tendons were harvested and were subjected to load-to-failure test in an Instron tensile testing machine, and the tendon samples were analyzed for expression of transgene and extracellular matrix genes by real-time PCR.
RESULTS: Compared with the controlled tendons, the tendons injected with AAV2-VEGF had a significantly greater tensile strength; the increase in the strength was drastic, to 220% of that of the controls. Since the transgene is of the human origin, we could detect the presence in all tendon samples. Real-time PCR analysis showed increased expression of tissue inhibitor of metalloproteinase (TIMP) gene.
CONCLUSIONS: AAV2-VEGF can effectively improve the healing strength of the injured digital flexor tendon in an in vivo animal model. However, morphologically adhesions still formed around the tendon. TIMP may serve to decrease the activities of metalloproteinase and ensure accumulation of tendon collagen. Whether this gene therapy strategy significantly increases peritendinous adhesions requires further investigations.

SP26: PERIORBITAL RECONSTRUCTION WITH FREE FLAPS IN THE ENUCLEATED EYE SYNDROME.

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PROBLEM: There is a great deal of discussion regarding the periorbital soft tissue reconstruction. Beside regional flaps, fat or skin grafts and alloplastic materials are in use. The long time success is affected by change of dimension, volume and surface. Aim of the study was an analysis of suitability of free connective tissue flaps for periorbital reconstruction in the enucleated eye syndrome.
MATERIAL AND METHOD: Between September 2005 and February 2006 in 7 patients in an average age of 54 years (M=3; F=4; 35 - 65, Median age 57 years) underwent a free flap periorbital augmentation. In every case the patients had problems wearing their eye prosthesis and previous grafts and local flaps were not successful. All flaps were connected to the temporal vessels. Success of the anastomosis was evaluated by duplex sonography. The soft tissue thickness was investigated by sonography. The donor site morbidity was evaluated with the DASH-score. Further pre- and postoperative photo documentation and inpatient time were analyzed. Follow-up examination took place postoperative, 6 month postoperative, 12 month postoperative and afterwards once a year until yet.
RESULTS: In every case flap perfusion was proven by duplex sonography. After resolution of swelling the soft tissue thickness was stable. Comparison of pre- and postoperative photo documentation shows a profile harmonization. After resolution of swelling no further periorbital atrophy was detected. The average inpatient time was 12 days (9 - 16 days). Initial donor site disabilities were well tolerated in every case. There was no case of disability wearing the eye prosthesis.

CONCLUSION: The illustrated concept offers a stable reconstruction of the hypodermic face tissue at a comparatively moderate surgical complexity, moderate inpatient time and low donor site morbidity. According to this free connective tissue flap reconstruction provides an opportunity to the initially mentioned procedures.

SP27: IDENTIFICATION OF A CAUSAL ROLE OF MONOMERIC C-REACTIVE PROTEIN (CRP) IN ISCHEMIA/REPERFUSION INJURY AFTER FREE MICROSURGICAL TISSUE TRANSFER

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C-reactive protein (CRP) is a pentameric plasma protein consisting of 5 identical non-covalently linked subunits. Recently CRP has been proposed to be not only a marker but also a mediator of inflammatory disease. We identified a dissociation process of pentameric CRP (pCRP) to its monomeric subunits (mCRP) in inflammation. Here we investigated the role of these isoforms in the inflammatory sequelae of ischemia/reperfusion injury of human muscle tissue after free tissue transfer and the effects of p-and mCRP in an model of inflammation.

Using immunohistochemistry, we examined biopsies of free muscle flap tissue that were taken before clipping of the pedicle and 5 days after ischemia for CRP deposition with conformation specific antibodies and co-localization with inflammatory cells. We investigated leukocyte rolling and adhesion in answer to p- and mCRP in the microcirculation of the cremaster muscle of the rat by means of intravital microscopy.

Deposition of mCRP was detected in human muscle tissue after tissue transfer and co-localized with complement C3 and inflammatory cells. Leukocyte adhesion and rolling was significantly increased in the rat cremaster muscle after intravenous injection of 25 µg/ml mCRP but not pCRP ($p<0.05$). These results suggest that mCRP formation and 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, thus identifying mCRP as a potential therapeutic target in ischemia/reperfusion injury after free tissue transfer.

SP28: THERAPEUTIC EFFECTS OF BFGF AND VEGF165 AFTER IMPLANTATION OF NON-VIRAL MODIFIED FIBROBLASTS IN AN ISCHEMIC RAT FLAP MODEL

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BACKGROUND: Protein delivery from transfected cells can induce expression of tissue inductive factors to stimulate the cellular processes required for regeneration. We established a cell-based, non viral gene-transfer method using fibroblasts to temporarily produce bFGF and $VEGF^{165}$, as a form of pharmacological local preconditioning before tissue ischemia occurs.

MATERIAL AND METHODS: The eukaryotic expression vectors harboring VEGF and bFGF cDNAs were transfected into rat primary skin fibroblasts mediated by Amaxa Nucleofector and optimized by our own laboratory protocol. To determine an improvement in ischemically challenged tissue, a genetically modified cell pool was injected into the target tissue 1 week before inducing an ischemic flap model. Cells were implanted into 40 rats. Gene expression and protein production in vivo and in vitro were measured by real time PCR and immunoassay (BioPlex) respectively at different time points. Clinical outcome was demonstrated by immunohistology and planimetric measurements.

RESULTS: Temporary protein expression of bFGF and $VEGF^{165}$ in the target tissue of the ischemic flap model increased significantly compared to controls after injection of genetically modified cells. A highly significant improvement of tissue

survival and endothelial cell counts was observed after the transfected cell administration. A reduction of flap necrosis after one week by more than one-third was detected using digital planimetric measurements if transfected cells were applied 1 week before ischemia.
CONCLUSION: In our work we showed that temporary expression of bFGF and $VEGF^{165}$ induces therapeutically relevant effects after local preconditioning with non-viral transfected fibroblasts in the ischemic rat flap model. Our standardized high efficiency non-viral bFGF and $VEGF^{165}$ transfection technology is now used in preclinical research.

SP29: A PROSPECTIVE REVIEW OF 31 PATIENTS WITH PRIMARY BREAST SARCOMA TREATED AT A SINGLE CENTRE

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INTRODUCTION: Primary breast sarcomas are rare and comprise <1% of all breast neoplasms. The aim of this study was to determine the disease-free survival (DFS) of primary breast sarcomas treated at a single centre.
METHODS: A prospective study of 31 patients with primary breast sarcoma treated between 1996 and 2010. To investigate treatment and prognostic factors influencing DFS. Histology, tumour size, tumour grade, nodal status, age, extent of surgery, resection margins, and radiation therapy were each examined as potential prognostic factors by regression analysis.
RESULTS: Mean age of the patients was 47.9 years (29-73 years). The histopathological diagnoses included fibrosarcoma, angiosarcoma, malignant fibrous histiocytoma, stromal sarcoma and others. 21 patients (67.8%) were graded as having high-grade (grade III/IV) and 10 patients (32.2%) were graded as having low-grade (grade I/II) sarcoma. The 5-year DFS rate was 41.9%. Low sarcoma grade predicted DFS in patients with primary breast sarcoma (p=0.047). There was no evidence that the other risk factors contributed to DFS.
CONCLUSIONS: The mainstay of treatment for primary breast sarcomas is excision to clear margins. The 5-year DFS rate was 41.9%. Low sarcoma grade was the only significant prognostic predicator of disease-free survival.

SP30: CLOSED SUCTION DRAINAGE DURATION IS ASSOCIATED WITH A HIGHER INFECTION RATE IN TISSUE EXPANDER/IMPLANT BREAST RECONSTRUCTION DESPITE ANTIBIOTIC PROPHYLAXIS

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INTRODUCTION: It is common surgical practice to continue postoperative oral antibiotics following tissue expander/implant (TE/I) breast reconstruction until drain removal. Our null hypothesis was that there is no association between drainage duration and complications in patients that received postoperative antibiotics until drain removal.
METHODS: 207 breasts that underwent two-stage TE/I reconstruction following mastectomy at a single institution from 2005 to 2008 were retrospectively identified. Of these, 183 received postoperative antibiotics until drain removal and comprise our study cohort. Each breast had two JP or Blake closed-suction drains placed intraoperatively and removed when drainage was less than 30 cc per 24-hour period. Outcome measures included infection and seroma following TE placement. Each breast was assigned to one of four cohorts based on number of drainage days: 1-7, 8-14, 15-21, and greater than 21. Statistical analysis employed Fisher's exact test and linear regression.
RESULTS: Of 183 breasts, infection occurred in 22 (12.1%) and seroma formed in 25 (13.7%). Mean drainage duration was 16.4 days (SD = 6.1, R= 5-40). A small positive correlation was observed between drainage duration and breast size in grams ($R^2 = 0.17$, $P < 0.001$). A statistically significant association was not observed between drainage duration and seroma formation. Greater than 21 days of drainage was associated with a significantly higher rate of infection as

compared to 15-21 days of drainage (31.1% v. 10.6%, RR = 2.50, CI =1.02-6.04, P = 0.04) and 8-14 days of drainage (31.1% v. 6.5%, RR = 3.90, CI = 1.42-10.69, P = 0.007). No complications occurred in breasts with less than 7 days of drainage. The association between infection and drainage held independent of acellular dermal matrix use.

CONCLUSIONS: Closed suction drainage for more than 21 days is associated with an increased infection rate in TE/I breast reconstruction, despite concurrent antibiotic administration. Prospective studies are needed to determine the optimal drainage and antibiotic protocol for TE/I breast reconstruction.

SP31: BENJAMIN ALCOCK AND THE PUDENDAL CANAL

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INTRODUCTION AND AIMS: Benjamin Alcock was the first to describe the pudendal canal in 1836. He described the canal, which bears his name, while writing about the course of the internal pudendal artery without mentioning the pudendal nerve. Since Alcock's canal often is cited as a potential origin for pudendal nerve entrapment, knowledge of the exact topography of the pudendal nerve in relation to this canal is important in order to identify potential entrapment sites.

MATERIALS AND METHODS: We analyzed the region of Alcock's canal in 5 formalin fixed cadavers (4 males, 1 female). Dissections were carried out using different approaches: posterior, anterior and a medial approach after sagittal hemisection of the pelvis.

RESULTS: We identified 7 potential entrapment sites of the pudendal nerve: 1) proximal to the sacrotuberous ligament 2) between the sacrotuberous ligament and the sacrospinous ligament 3) at the entrance of Alcock's canal 4) within the sheat of the obturator fascia 5) at the exit of the Alcock's canal 6) along the pathway beneath the corpora cavernosa 7) at the pubic symphisis.

CONCLUSION: The present study places Alcock's canal into historical perspective, and provides the opportunity to outline sites of entrapment for the pudendal nerve that can be approached surgically with the goal of relieving specific symptoms as they relate to the known anatomic regions of potential entrapment sites.

SP32: VENOUS MALFORMATION ASSOCIATED NERVE PROFILES ARE NOT DISTINCTIVE FROM OTHER VASCULAR MALFORMATIONS; IMPLICATIONS FOR CLINICAL MANAGEMENT OF PAIN

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INTRODUCTION: More than 90% of venous malformations (VM) are associated with pain, which is presumed related to phlebolith formation and subsequent nociceptive mediator release. Increasing evidence supports a link between angiogenesis and nerve patterning. Since vascular malformations are aberrations of angiogenesis, it was hypothesized VM pain may be due to differences in nerve profiles associated with these lesions.

METHODS: Immunohistochemical staining was performed on retrospective archival paraffin embedded samples of arteriovenous (AVM; n=9), capillary (CM; n=4), lymphatic (LM; n=29) and VM (n=14). Antibodies to three nerve markers, neurofilament, S100 and protein gene product 9.5 were employed. Light microscopy was used to assess the density of intersitial nerves and nervi vasorum, and assessments were validated by a second investigator. Significance testing was performed using Mann-Whitney U and Fisher's exact tests.

RESULTS: There was no significant difference in nerve profile between VM and AVM or CM. LM and normal control skin each exhibited a lower nerve density compared to VM ($p<0.0075$). The presence of nervi vasorum was found to be lower in VM than normal cutaneous controls

when immunostained with S100 antibody (p=0.044).

CONCLUSION: VM-associated pain is unlikely to be due to simple anatomical differences in nerve structure in this condition. As the nerve profile between VM and normal cutaneous control appears to be distinct, further work may elucidate common neurogenic/angiogenic mediators in the pathogenesis of vascular malformations which could prove targets in treating these conditions. In the meantime, current regimes of compression and non-steroidal anti-inflammatory drugs should be continued.

SP33: EXTRACORPOREAL SHOCK WAVE TREATMENT PROTECTS AGAINST ISCHEMIA/REPERFUSION INJURY

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BACKGROUND: In this article, the authors examine whether extracorporeal shock wave treatment (ESWT) can protect from ischemia-reperfusion injury in a rat flap model.

METHODS: An extended epigastric adipocutaneus flap based solely on the deep inferior epigastric vessels was raised on 24 rats. In the ischemic-control group microvascular clamps were used to create 3-hour flap ischemia. In the ESWT group the flaps were then treated with ESWT after clamp removal. Another group served as non-ischemic controls, whereas the flap was raised and sutured back with no period of ischemia. Five day postoperatively, flap survival (photometrique size), perfusion (indocyanine green fluoroscopy) and microvessel- density (CD31) were assessed.

RESULTS: Treatment with ESWT after reperfusion significantly increased flap survival (70.9 ± 11.3 percent versus 33.3 ± 10.7 percent; $p < 0.001$) , flap perfusion (80.8 ± 8.7 percent versus 34.2 ± 7.7 percent; $p < 0.001$) and microvessel- density (36.3 ± 11.0 percent vs. 19.0 ± 6.0 percent; $p = 0.003$) when compared to the ischemic control group.

CONCLUSION: The data show that ESWT increase tissue survival in ischemia-reperfusion injuries. The ability to protect tissue when given after ischemia-reperfusion injury enables a broader clinical applicability.

SP34: ONE-STAGE COMBINED GYNAECOPLASTIC RISK-REDUCING SURGERY – A SERVICE REVIEW

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The hereditary breast/ovarian cancer syndrome in pre-menopausal women has strong relation with BRCA1/2 gene mutations. Major breast and gynaecological surgery is recommended for risk reduction in BRCA1/2 careers and patients with strong family history of such cancers. In the UK, such risk-limiting operations are performed by surgeons in multiple stages. Hence, on top of the psychological stresses these young females are subjected to multiple surgical traumas one after another. It poses monetary burden on the National Health Service too. In Belfast, since 2005, we have combined prophylactic mastectomy/immediate implant based reconstruction with laparoscopic salpingo-oophorectomy with or without hysterectomy as one-stage procedure. A five-year service review of this new one-stage approach is presented. Twenty young females were operated successfully and safely during this period. Referral and recruitment procedures, patient's demographics, family history, gene testing results, type of procedure, complications, inpatient stay and on-table theatre time with cost evaluation and patient satisfaction are recorded and discussed. We found this combined approach safe, efficient, cost effective and recommendable for units in the UK and elsewhere.

SP35: SENSORY CHANGES AND CHRONIC PAIN FOLLOWING COSMETIC BREAST AUGMENTATION.

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Sensory changes and chronic pain are common following surgery. We examined the prevalence and character of sensory changes and chronic pain following cosmetic breast augmentation (CBA). In September 2009, a questionnaire was mailed to all 142 patients who had underwent CBA at Viborg Private Hospital from 2004-2009. All patients were operated by the same surgeon. The response rate was 66.9% (n=95). Of the total population 72 patients (75.8%) had sensory changes. Sixty-six patients (69.5%) had decreased sensation and 29 patients (30.5%) had increased sensation over the breast, typically located to the nipple-areola complex or inframammary fold. Fifty-seven patients (60%) were bothered by decreased sensation and 24 patients (25.3%) were annoyed by increased sensation. Forty-two percent of the patients reported having pain as a consequence of the operation. A statistically significant association between sensory changes and chronic pain was seen; 50.7 % of patients with sensory changes reported pain compared to 21.7% of patients without sensory changes ($p = 0.017$ Fisher´s exact test). Conclusion: Sensory changes and chronic pain are common following CBA and may have an impact on daily activities and satisfaction after surgery. Neuropathic pain caused by nerve damage should be considered in patients with persistent pain. Information about the risk of developing sensory changes and chronic pain after CBA is important.

SP36: INJECTION OF MICRO-PROCESSED CARTILAGE PICKS IN AUGMENTATION RHINOPLASTY

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INTRODUCTION: Autologous augmentation rhinoplasty is a professional challenge to enhance the nasal skeleton and the cartilaginous tissue is the primary source for grafting procedure. Reconstruction of the aesthetic line between the nasal tip and the eyebrows with micro-processed cartilage is a novel, simple and effective technique. It is possible to introduce micro-processed cartilaginous picks through the skin with no incisional necessity. This technique is a part of artistic rhinoplasty and it is also important in the case of revision rhinoplasties where it is needed to augment the nasal skeleton for better aesthetic and functional needs.
MATERIAL AND METHODS: Between April 2006 and March 2009, the author performed micro-processed grafting technique on 73 primary and 144 secondary rhinoplasty cases. A block of cartilage was harvested from the nasal septum through a small unilateral trasfixation incision. Arranging the micro-grafts was performed under 4x magnification with considering the architectural details of the recipient area. These grafts are cartilage micro-picks with different lengths that can be introduced through 18 or 21 G needle into the subcutaneous plane. The direction of grafted micro-picks was determined depending on the artistic plan, defects anatomy, natural nasal lines or the mechanism of the functional need.
RESULTS: Satisfactory results were obtained in all of the cases. There was no immediate complications such as bleeding or rejection. At average follow-up of 28 months (range, 6 to 37 months), there was no cases of graft loss, deformity or bending.
CONCLUSION: Micro-processed cartilage grafting is a novel technique that provides a precise approach to fine line augmentation in artistic or secondary rhinoplasty. This technique eliminates the need for incisional approach and so facilitates the recovery period after surgery.

SP37: VERSATILITY OF RIGHT GASTROEPIPLOIC AND GASTRODUODENAL ARTERY FOR THE ARTERIAL RECONSTRUCTION IN ADULT LIVING DONOR LIVER TRANSPLANTATION IN VARIOUS SITUATIONS

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PURPOSE: In cases when there is severe intimal dissection in the recipient hepatic artery, or if hepatic artery has been used already and additional operations are needed due to graft rejection or arterial occlusion, an alternative to hepatic artery is necessary. Traditionally, arterial reconstruction has been performed using interposition grafts or splenic artery, but they have their own limitations. We used the right gastroepiploic and gastroduodenal artery in seven cases of arterial reconstruction in LDLT in which the recipient hepatic artery was not suitable for anastomosis.
METHOD: From January 2002 to February 2010, 438 patients underwent primary adult to adult LDLT. Among them, seven patients developed intraoperative or postoperative complications in which alternative vessels required. Severe intimal injury due to transarterial chemoembolization was found in three patients. Two patients with hepatic artery thrombosis underwent salvage two days after transplantation,and two patients needed retransplantation due to chronic rejection. The right gastroepiploic artery was used in five patients and the gastroduodenal artery was used in two patients. The diameter of the recipient arteries was 2.2~2.5 mm. An end to end microvascular anastomosis was performed in all patients
RESULTS: Four patients had no further complications during long term follow up (mean follow up : 28 months).
Postoperative doppler ultrasonography and three dimensional CT angiography showed patent arterial flow. Three patients died within 3 months after reoperation. The causes of death were acute respiratory distress syndrome, hypovolemic shock, and multiple organ failure, respectively.
CONCLUSION: The right gastroepiploic and gastroduodenal artery can be good alternatives to hepatic vessels. Their diameter is similar to that of the adult hepatic artery and mobilization is relatively easy even when there is severe adhesion caused by previous operations around porta hepatis. They also have advantages over conventional interposition graft which necessitates two microvascular
anastomoses.

SP38: USE OF MICROBIAL CELLULOSE DRESSING IN THE TREATMENT OF BURNS AND DONOR SITES

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INTRODUCTION AND AIMS: Skin wounds such as burns and split-thickness skin graft donor sites are very complex injuries, causing extensive damage to skin tissue. The healing process involves the regeneration of the epidermis and the repair of the dermis. Because of its unique properties, microbial cellulose has been shown to be a highly effective wound dressing material. The dressing consists of pure cellulose film derived from the micro-organism . To evaluate the clinical efficacy of a microbial cellulose dressing for the treatment of burns and donor sites.
MATERIAL AND METHODS: Clinical investigations were performed at Elbe Hospital Stade. Ten patients with burns and donor sites were treated with microbial cellulose dressings. Assessment of re-epithelialisation and cosmetic appearance was evaluated as main parameters. Wound pain, wearing comfort, complications and dressing performance were additionally recorded.
RESULTS: The average time to complete re-epithelialisation was 15 days (range 11-21 days). Cosmetic appearance was evaluated as very good by the healthcare professionals and patients. The patients reported no or very mild pain during application and wearing. Wearing comfort evaluated by the patients showed high values of satisfaction for the dressing. Complications like excessive exudate were identified in one case of the ten cases. Ultimately patients and healthcare

professionals were extremely satisfied with the dressing performance.
CONCLUSION: In this clinical investigation, the microbial cellulose dressing demonstrated that it is effective in the treatment of burns and donor sites. Our results have demonstrated superior performance in terms of re-epithelialisation, cosmetic appearance, and patient satisfaction.

SP39: DOES PREOPERATIVE RADIATION MAKES A DIFFERENCE IN BREAST RECONSTRUCTION - FREE TRAM?

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AIM: To determine whether preoprative radiation therapy increases the complication rates in free TRAM breast reconstruction
METHODS AND MATERIAL: Retrospective review 1998–2006, 52 consecutive patients, single surgeon Parameters Conversion to use axillary vessels, flap related complications, wound related complications
RESULTS: 23 patients had preoperative radiation, 29 patients without preoperative radiation, 0 conversation to use of axillary vessels, 0 flap loss, 1 mastectomy flap loss in radiated group, no vascular complication, wound problems
CONCLUSION: Radiation therapy is not related to unusable vessels, increased flap loss, increased mastectomy flap loss or wound related complications

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1 Time Motion Study – Comparison of wound closure time using conventional techniques and knotless, self anchoring surgical sutures in ex-vivo porcine model for both single layer and double layer closure in all closure techniques. Royal College of Surgeons, London, UK; Covidien V-Loc™ 180 Absorbable Wound Closure Device Time Study, Robert T. Grant, MD, MSc, FACS, New York-Presbyterian Hospital, Argent Global Services.

2 Utilization of a Porcine Model to Demonstrate the Efficacy of an Absorbable Barbed Suture for Dermal Closure, UTSW, S. Brown

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