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5th European Plastic Surgery Research Council

August 22–25, 2013
Hamburg/Germany



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PROGRAM

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Scientific Board

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ANNOUNCEMENT:

6th European Plastic Surgery Research Council

MS Cap San Diego

August 21-24, 2014 • Hamburg/Germany

Conference Organization

Conventus Congressmanagement & Marketing GmbH

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160

Editorial deadline

August 9, 2013

* Please find detailed information concerning arrival on page 5.



Venue

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

Date

August 22–25, 2013

Homepage

For latest information please visit www.epsrc.eu.

Arrival

Public transport
 From central station to the MS Cap San Diego

Line	Direction	Destination	Travel time
U3	Schlump–Barmbek	Baumwall	10 min
S1	Wedel	Landungsbrücken	6 min
S3	Pinneberg	Landungsbrücken	7 min

From Hamburg airport to MS Cap San Diego

Take line S1 to station "Ohlsdorf" and change to line U1 (direction "Farmsen"). Exit at station "Kellinghusenstrasse" and change to line U3 (direction Central Station "Süd-Warmbek"/"Wandsbek-Gartenstadt"). Exit at station "Baumwall".

By car

Navigation details: Vorsetzen • 20459 Hamburg

Parking

Parking is available at your own expense in the parking garages near the conference venue (Parkhaus Hafentor, Parkhaus Michel).

Please see page 9 for the exact location of the meeting venue (MS Cap San Diego is highlighted in red)!

Education Credits and Certification

The 5th 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 23, 2013	8 CME points	Categorie A
Saturday, August 24, 2013	8 CME points	Categorie A

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

Certification of Attendance

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

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. 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-In

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

Opening Hours	Thursday	Friday	Saturday
Check-In	17 ⁰⁰ -18 ⁰⁰	07 ³⁰ -19 ³⁰	07 ³⁰ -18 ³⁰
Media Check-In	17 ⁰⁰ -18 ⁰⁰	07 ³⁰ -19 ³⁰	07 ³⁰ -17 ⁰⁰
Cloakroom		07 ³⁰ -19 ³⁰	07 ³⁰ -20 ⁰⁰
Industrial exhibition		08 ⁰⁰ -18 ⁰⁰	08 ⁰⁰ -15 ⁰⁰

Internet

An internet pool on the upper deck with free access is provided for all participants.

Language

Official meeting language is English.

General Assembly

The General Assembly of the European Plastic Surgery Research Council will take place on Saturday, August, 24th at 18⁴⁵ hrs. All members of the EPSRC are requested to attend the meeting.

Abstract Publication

Abstracts of the long oral presentations (LOP01-41) have been published in the August issue of "Plastic and Reconstructive Surgery" (August 2013 – Volume 132 – Supplement 2S).

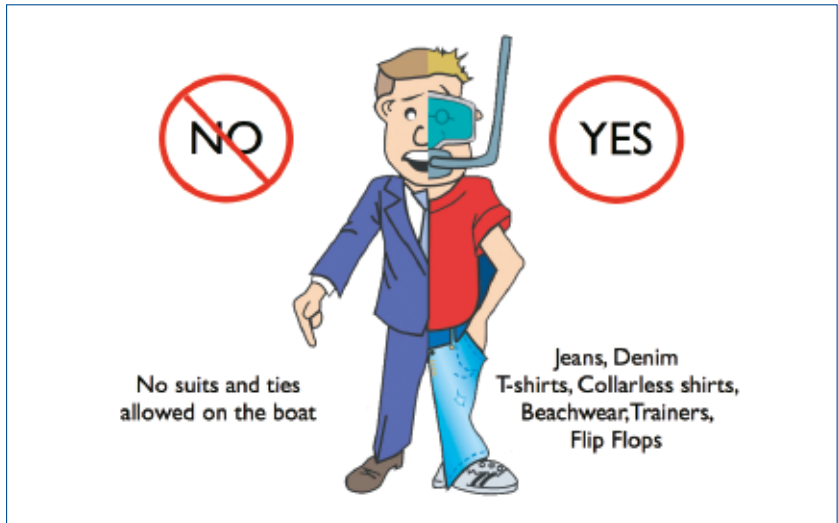
Industrial Exhibition

As part of the conference, an industrial exhibition will take place on the premises. Please find an overview and a map of all exhibitors on page 34 in the program. The exhibiting companies are looking forward to welcoming you!

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.

Dress Code



General Terms and Conditions

Please refer to the conference website.

Technical Information

Please prepare your presentation in 4:3 aspect ratio.

A presentation notebook with a PDF reader and MS Office PowerPoint 2010 will be provided. The use of personal notebooks is possible upon agreement. However, it may interrupt the flow of the program in the lecture hall. Please provide an adapter for VGA if necessary.

A notebook, presenter and laser pointer are available at the speaker's podium in the lecture hall. A technical supervisor can help you.

Guidelines for short oral presentations (ePoster Sessions): Your presentation should not exceed more than 3 slides. Should you exceed your time limit, your presentation will automatically be stopped.

Please note: Certain encodings for video and audio files could lead to problems. Please visit our speakers preview.

Should you wish to use non-digital equipment, please contact us. We can be reached at epsrc@conventus.de.

Submitting your Presentation

Please submit your presentation at the Presentation Submission in the lecture hall on the day before your presentation, but no later than 2 hours before the presentation begins. You may view and/or edit your presentation.

For submission, please use a USB flash drive, CD or DVD disc which should not be protected with software.

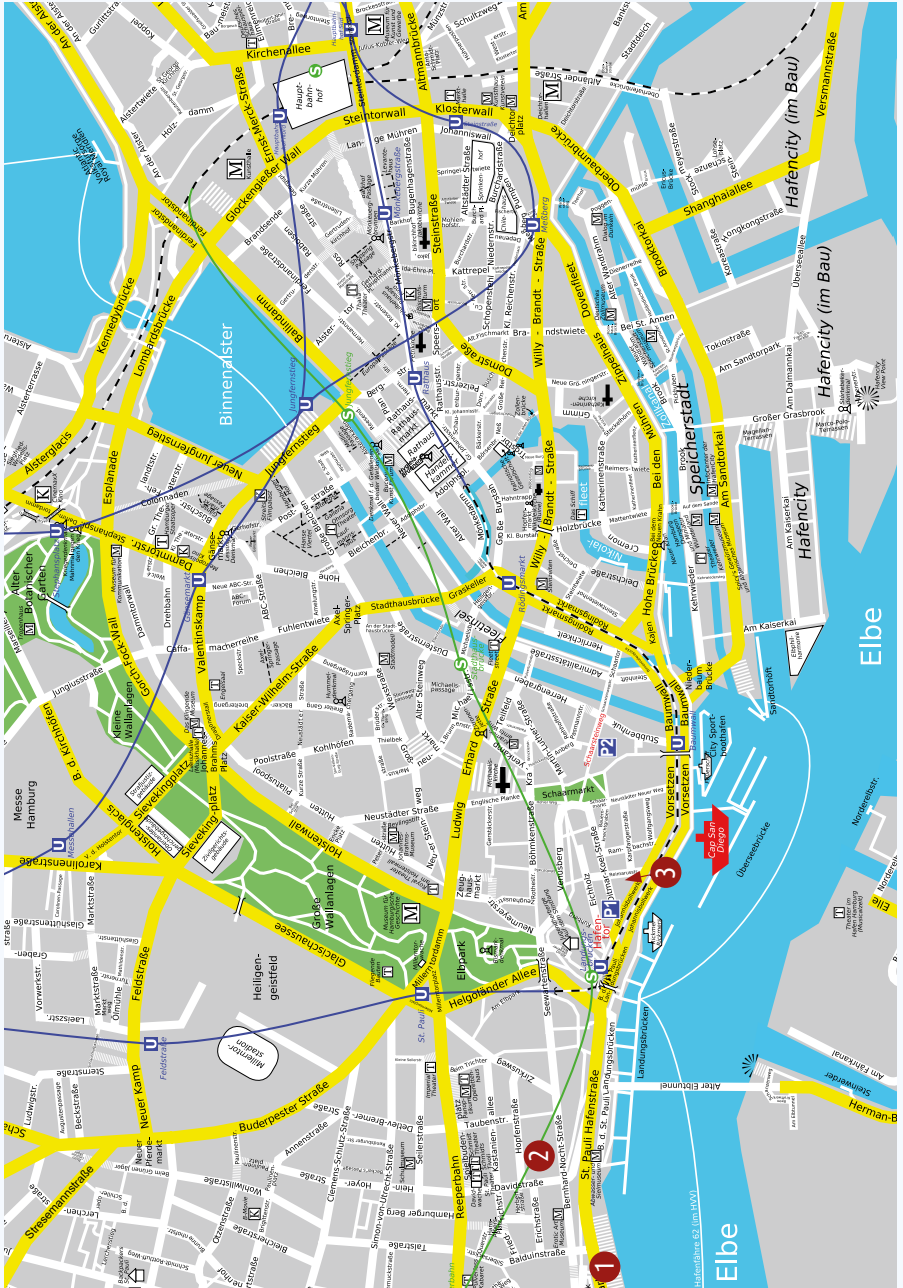
Speaking Time

Please prepare your presentation for the allotted amount of time. Should you exceed your time limit, your presentation will automatically be stopped. Speaking time is assigned as follows (speaking + discussion time):

Keynote Lecture	25 minutes (incl. discussion)
Panel Lecture	15 minutes (incl. discussion)
Long oral presentation (LOP)	7 + 3 minutes
Short oral presentation (SOP)	3 minutes

Prizes and Bursaries

Lecture prize	500 EUR
Poster prize	250 EUR



- 1 St. Pauli Fischmarkt
- 3 Hotel Empire Riverside

- 2 Hotel Stella Maris



Dear shipmates,

It gives me a great honor and pleasure to welcome you to the 5th Annual Meeting of the European Plastic Surgery Research Council on the cargo ship MS Cap San Diego, in Hamburg, Germany. The program offers the opportunity to enjoy a world-class scientific conference in the beautiful setting of the Harbor of Hamburg.

We are honored and thankful for the support of the editor in chief Rod Rohrich and the journal leadership that beginning with the February 2013 issue of *Plastic and Reconstructive Surgery*, the Journal became an official organ of the European Plastic Surgery Research Council (EPSRC). The “official organ” designation and the alliance that it represents developed over the last many years. *Plastic and Reconstructive Surgery* has been the official journal of the American Society of Plastic Surgeons since 1946 and is the official journal of other societies as well, including the following: American Association of Plastic Surgeons, American Society of Maxillofacial Surgeons and the Plastic Surgery Research Council. In August 2009, the first European Plastic Surgery Research Council annual meeting abstract supplement was published in *Plastic and Reconstructive Surgery* as an in-bound supplement. Every August since then, *Plastic and Reconstructive Surgery* has published the meeting abstracts for the European Plastic Surgery Research Council, and this year we did it again! Attending the conference is distinguished faculty from the American Plastic Surgery Research Council (PSRC), the American Society of Plastic Surgeons (ASPS), American Association of Plastic Surgeons (AAPS) and the European Association of Plastic Surgeons (EURAPS).

This burning wildfire of scientific interchange without political strings and the informal atmosphere fosters are one of the greatest strengths of this meeting. Within 5 years EPSRC has managed to become the premier research arena for Plastic Surgery in Europe with currently 190 members from 30 countries. Selecting the highest-quality abstracts from more than 18 countries, our standard Scientific Program Committee has exerted tremendous judgment and effort in ensuring the finest quality in basic science and clinical outcome research.

This meeting is meant to be different from other, more formal meetings. We believe there is a need for an affordable arena for young plastic surgeons and colleagues from related specialties to discuss current and future research in plastic surgery, including works in progress, in an atmosphere that is informal and friendly. Such an atmosphere would allow an opportunity to make new friends and gain potential partners in a genial environment. This arena would allow the flow of the knowledge and ideas across the European Union. The aim is not to insulate European research from the world but to proliferate our efforts internationally through union.

Hamburg has one of the busiest harbors in Europe and is also a location for highly specialized industries. It is a leader in medical technology and biotechnology, and is one of the world centers for aircraft construction; it is here that the wide-bodied A380 is being built. Hamburg is seven times bigger than Paris and two and a half times bigger than London. Hamburg has 2302 bridges, more than Venice and Amsterdam combined. With more than 90 consulates, Hamburg is second only to New York City in the world. As a trade center, Hamburg has always been outward-looking, and this has shaped the mentality of the citizens of Hamburg.

The meeting will begin in the evening on Thursday, August 22, 2013, with the welcome reception in the captain's salon. The scientific meeting will formally begin on Friday, August 23rd. No concurrent sessions will take place at any stage of the meeting. E-posters will be presented in the evenings on August 23rd and 24th and allow presenters to discuss their work in a casual atmosphere.

It is truly a great honor for me to have supported the European Plastic Research Council for the past 5 years. This has been a team effort, and I gratefully acknowledge the current chairman Lucian Jiga (Romania), previous chairmen: Jan J. Vranckx (Belgium), Ardeshir Bayat (Great Britain), Salvatore D'Arpa (Italy), our general secretary Sammy Al-Benna (Great Britain) and especially Isabelle Laerz from the organising agency Conventus. I am looking forward to an outstanding scientific meeting and a thoroughly enjoyable 4 days onboard the MS Cap San Diego in Hamburg.

Last but not least, I want to thank our sponsors and exhibitors who also contribute to the success of this meeting and enable us to meet for the 5th time on board the MS Cap San Diego. Hamburg, Germany's 'gateway to the world', is a city that never sleeps. It and the MS Cap San Diego encompass the atmosphere of the EPSRC Annual Meeting perfectly.

I hope that you will enjoy this years' meeting and contribute to our future programs. With your efforts, the Plastic Surgery Research Council shall continue to grow as the premier scientific body of our speciality.

Ahoi yours,



Lars Steinstraesser, MD
President EPSRC



Dear Mariners,

From the captain's deck of MS Cap San Diego, I say to you all Ahoi and welcome to the 5th Annual Meeting of the European Plastic Surgery Research Council (EPSRC).

This year we embark together on a new journey that will take us on high tides, towards new and exciting discoveries into the ever-developing realm of plastic and reconstructive surgery.

Following the trails of four tremendously successful past-meetings, in 2013 we aim to raise the level of scientific excellence to an entire new level in Europe. After peer-reviewing over 160 submitted abstracts from over 18 countries world-wide, the scientific committee has selected 41 long oral presentations which will represent the essential core of an outstanding scientific program, addressing topics spanning from neoangiogenesis, stem cell biology and tissue regeneration to composite tissue allotransplantation and reconstructive microsurgery.

Through the ongoing support of world-renowned experts, this year's organizing committee assembled a unique faculty lineup, which under the traditional EPSRC informal and friendly atmosphere will unveil their expertise and up-to-date information in a fruitful interaction with colleagues from every part of the globe.

Having four scientific panels aboard, we set sail to discuss the most relevant evolutions in fields from upper extremity reconstruction, perforator flaps and supramicrosurgery, lymphatic microsurgery and microsurgical education and training. In addition, distinguished keynote speakers will share their expertise on a wide range of "hot" topics such as counteracting failures in microsurgery, modalities to challenge complications or pediatric plastic surgery.

The joyful summer atmosphere on three decks of the freighter will provide a good occasion for all participants to make new friends and further develop and strengthen their worldwide scientific network. In order to further enhance European interchange, the EPSRC Lighthouse Endowment Fund has been successfully established in 2011. This year we have initiated the EPSRC Cruise Fellowship, aiming to promote clinical and scientific exchange of ideas in Europe for a dedicated young European surgeon.

As the captain of this year's conference I am proud and honored that since the first EPSRC meeting in 2009, the Journal of Plastic and Reconstructive Surgery (PRS) continues to publish an EPSRC supplement of the annual meeting for the accepted long oral presentations. In addition I am very happy to announce that PRS became the official organ of the European Plastic Surgery Research Council – as you might have noticed on front cover of the February issue of the journal.

I would like to take this opportunity to express my deepest appreciation and thanks to Lars Steintraesser for his tireless efforts and determination, which have taken EPSRC into the highest hierarchy on the world scientific-arena in Plastic and Reconstructive Surgery. Last but not least, I would like to acknowledge the scientific board and conference organization for their ongoing support and invaluable suggestions, which were pivotal for the organization of this exciting meeting.

I am looking forward to welcome you on board the MS Cap San Diego, for an unforgettable scientific event in flip-flops.

A handwritten signature in blue ink, appearing to read 'Lucian P. Jiga', with a long horizontal line extending to the left.

Lucian P. Jiga, MD, PhD
Chair, EPSRC 2013

PROGRAM OVERVIEW

Friday, August 23, 2013		Saturday, August 24, 2013	
08:00	Opening Ceremony p. 16	08:00	Session VI Tissue biology and burns p. 21
08:30	Session I Ischaemia and angiogenesis p. 16	08:40	Keynote IV How to demystify hand surgery p. 21
09:15	Keynote I Challenging complications ... and what you can learn from them p. 16	09:05	Microsurgical corner p. 32
09:35	Microsurgical corner p. 34		Coffee break
10:20	Session II Stem cell biology and tissue engineering p. 17	09:50	Session VII Regeneration and reinnervation p. 21
11:10	Panel I Microsurgical education and training p. 17	10:30	Panel III Lymphatic microsurgery p. 22
12:10	Microsurgical corner p. 32	11:30	Microsurgical corner p. 32
	Lunch break		Lunch break
13:00	Session III Tissue regeneration with fat p. 18	13:00	Session VIII Scaffolds for tissue engineering p. 22
13:50	Keynote II Update paediatric plastic surgery p. 18	14:00	Panel IV Perforator flaps p. 23
14:15	Session IV Head and neck/Craniofacial p. 18	14:30	Microsurgical corner p. 32
15:00	Microsurgical corner p. 32		Coffee break
15:30	Panel II Upper limb reconstruction p. 19	15:00	Keynote V My worst cases in plastic surgery: What did I learn? p. 23
16:00	Session V Composite tissue transplantation and wound healing p. 19	15:25	Session IX Reconstructive microsurgery p. 23
16:40	Keynote III Microenvironment of wound healing p. 19	17:00	E-Poster-Session II (SOP28 – SOP54) p. 28
17:05	PSRC Highlight Session p. 20	18:45	Business Meeting
18:00	E-Poster-Session I (SOP01 – SOP27) p. 24		

- Session
- Microsurgical corner
- Panel
- Keynote
- PSRC Highlight Session
- Coffee break
- Business Meeting

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1. DRG case value (J088) = cost weight (1.979) × base rate (2.991,53 € BFM2012) (Germany)
2. Die Rolle eines Proteasen Schnelltests in der Wunddiagnostik. [2012] Wund Management.

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08⁰⁰–08³⁰

Opening Ceremony

Welcome from the EPSRC President
Lars Steintraesser (Oldenburg/DE)

Welcome from the Chairman and Captain of the Boat
Lucian P. Jiga (Timisoara/RO)

Welcome from the Chair of the 59th Annual Meeting of the Plastic Surgery
Research Council (PSRC)
Peter J. Taub (New York, NY/US)

Welcome from the Representative for Research of the American Society of
Plastic Surgery (ASPS)
Charles E. Butler (Houston, TX/US)

08³⁰–09¹⁰

Scientific Session I

Ischaemia and angioneis

Chairs

P. di Summa (Lausanne/CH), G. Felmerer (Göttingen/DE)
N. Ghețu (Iasi, Botosani/RO)

08³⁰

LOP01

Induction of therapeutic neoangiogenesis, using in-vitro generated endothelial
colony-forming cells – an autologous transplantation model in rat
L. P. Jiga, J. Jiga, B. Hoinoiu, S. Barac, A. Nistor, M. Ionac (Timisoara/RO)

08⁴⁰

LOP02

Combined hypoxic preconditioning and postconditioning do not confer
additive protection of ex vivo human skeletal muscle from ischemia/
reperfusion injury
A. Naporus (London/GB; Toronto/CA), H. Ashrafpour, N. Huang, S. O. Hofer
T. Zhong, C. R. Forrest (Toronto/CA), C. Y. Pang (Toronto/CA)

08⁵⁰

LOP03

Optimized reconstruction of injured peripheral nerves by adipogene derived
stem cells in combination with fibrin glue
C. Radtke (New Haven/CT/US), B. Schmitz (Hanover/DE)
K. Jeffery (New Haven, CT/US), P. M. Vogt (Hanover/DE)

LOP04

Presentation has been cancelled.

09⁰⁰–09²⁵

Keynote Lecture I

Challenging complications ... and what you can learn from them
Keith E. Brandt (St. Louis, MO/US)

09²⁵–10²⁰

Microsurgical Corner (see page 32)

09³⁵–10²⁰

Company Presentation – BmedS GmbH
Coffee Break

- 10²⁰–11¹⁰ **Scientific Session II**
 Stem cell biology and tissue engineering
- Chairs J. P. Beier (Erlangen/DE), M. L. Bentz (Madison, WI/US)
 C. E. Butler (Houston, TX/US)
- 10²⁰
 LOP05 Sustainable fat grafting – optimizing fat grafting in an in vivo tissue engineering chamber model
H. Debels (Brussels/BE; Melbourne/AU), X.-L. Han
 J. Palmer (Melbourne-Fitzroy/AU), M. Hamdi (Brussels/BE), K. Abberton
 W. Morrison (Melbourne-Fitzroy/AU)
- 10³⁰
 LOP06 Interactions between mesenchymal stem cells (MSCs) isolated from periprosthetic capsule and breast cancer cells – the role of paracrine effect
L. Grasseti, M. Torresetti, E. Bolletta, A. Scalise, M. Orciani, R. Di Primio
 G. Di Benedetto (Ancona/IT)
- 10⁴⁰
 LOP07 New insights into lymphangiogenesis – mesenchymal stem cells promote angiogenic properties of lymphatic endothelial cell
R. Bräutigam, B. Thomas, A. Weigand, R. Horch, J. P. Beier
 A. Boos (Erlangen/DE)
- 10⁵⁰
 LOP08 New perspectives for tissue engineering of skeletal muscle – co-culture of myoblasts and mesenchymal stem cells
R. Witt, A. Boos, A. Weigand, R. Bräutigam, R. Horch, J. P. Beier (Erlangen/DE)
- 11⁰⁰
 LOP09 Fabrication of three-dimensional vascular networks within tissue engineered hydrogel constructs
R. Bleeker, R. Campbell, K. Hernandez, J. Joyce, J. A. Spector (New York, NY/US)
- 11¹⁰–12¹⁰ **Panel I**
 Microsurgical education and training
- Chair J. C. Selber (Houston, TX/US)
- 11¹⁰ Mihai Ionac (Timisoara/RO)
 11²⁵ Ali Ghanem (London/GB)
 11⁴⁰ Ferit Demrikan (Istanbul/TR)
 11⁵⁵ Pierluigi Tos (Turin/IT)
- 12¹⁰–13⁰⁰ **Microsurgical Corner** (see page 32)
- 12¹⁰–13⁰⁰ Company Presentation – S&T AG
 Lunch Break

13⁰⁰–13⁵⁰

Scientific Session III

Tissue regeneration with fat

Chairs

D. P. Baumann (Houston, TX/US), K. E. Brandt (St. Louis, MO/US)
M. W. Neumeister (Springfield, IL/US)

13⁰⁰
LOPI0

Identification of novel, biocompatible, synthetic hydrogels that selectively bind adipose derived perivascular stem cells using high throughput hydrogel microarray technology and fluorescence activated cell sorting
N. Arkoulis, C. C. West, R. Zhang, K. J. Stewart, M. Bradley
B. Péault (Edinburgh/GB)

13¹⁰
LOPI1

Non-woven electrospun caprolactone-based poly(ester-urethane) scaffolds seeded with adipose-derived stem cells under flow conditions in a bioreactor
A. Gugerell, J. Kober, S. Hacker (Vienna/AT), T. Laube, T. Walter (Jena/DE)
C. Kasper, A. Neumann (Vienna/AT), M. Schnabelrauch, R. Wyrwa (Jena/DE)
M. Keck (Vienna/AT)

13²⁰
LOPI2

Adipose-derived stem cells and electrospun modified polyurethane scaffolds as a new approach in adipose tissue engineering
M. Keck, J. Kober, S. Hacker (Vienna/AT), T. Laube, T. Walter (Jena/AT)
C. Kasper, T. Hatlapatka (Vienna/AT), E. Grönninger (Hamburg/DE)
M. Schnabelrauch, R. Wyrwa (Jena/AT), A. Gugerell (Vienna/AT)

13³⁰
LOPI3

Efficacy of adipose-derived adult stem cells in improving the evolution of post traumatic or surgical scars
F. Lembo, D. Parisi, A. Portincasa (Foggia/IT)

13⁴⁰
LOPI4

Differentiated adipose-derived stem cells promote cutaneous nerve regeneration in rat skin flaps
K. Tomita, K. Hosokawa (Suita/JP)

13⁵⁰–14¹⁵

Keynote Lecture II

Update paediatric plastic surgery

Michael L. Bentz (Madison, WI/US)

14¹⁵–14⁵⁵

Scientific Session IV

Head and neck/Craniofacial

Chairs

P. C. Neligan (Seattle, WA/US), L. Santecchia (Rome/IT)
J. C. Selber (Houston, TX/US)

14¹⁵
LOPI5

Repair of oronasal fistulae with amniotic membrane allografts
N. Rohleder (Munich/DE), L. Steinstraesser (Bochum/DE), K.-D. Wolff
M. Kesting (Munich/DE)

14²⁵
LOPI6

Analysis of SPECCIL in zebrafish model of oblique (tessier) facial clefts
L. Gfrerer, V. Shubinetz, C. Morton, R. Maas, E. Liao (Boston, MA/US)

- 14³⁵
LOP17 **Pharyngoesophageal reconstructive outcomes following 350 cases**
J. C. Selber, J. Liu, M. Hanasono, R. Skoracki, P. Yu (Houston, TX/US)
- 14⁴⁵
LOP18 **Free flaps in craniomaxillofacial surgery without perioperative hemodilution**
R.-D. Bader, G. F. Raschke, C. Dietze, S. Schultze-Mosgau (Jena/DE)
- 14⁵⁵-15³⁰ **Microsurgical Corner** (see page 32)
- 14⁵⁵-15³⁰ Company Presentation – Systagenix
Coffee Break
- 15³⁰-16⁰⁰ **Panel II**
Upper limb reconstruction
Chair W. M. Kuzon (Ann Arbor, MI/US)
- 15³⁰
15⁴⁵ Roberto Adani (Verona/IT)
Michael W. Neumeister (Springfield, IL/US)
- 16⁰⁰-16⁴⁰ **Scientific Session V**
Composite tissue transplantation and wound healing
Chairs B. Hendrickx (Brussels/BE), E. Eriksson (Boston, MA/US)
D. H. Lalonde (Saint John/CA)
- 16⁰⁰
LOP19 **Experimental study of new vascularized composite allotransplantation:**
Anorectal transplantation with rats, dogs, and human cadavers
J. Araki (Tokyo/Jp), Y. Nishizawa (Kagawa/Jp), T. Sato (Saitama/Jp)
M. Naito (Tokyo/Jp), T. Nakamura (Kyoto/Jp), K. Akita, I. Koshima (Tokyo/Jp)
- 16¹⁰
LOP20 **bFGF promotes fibroblast migration in wound healing**
S. Kanazawa, T. Kubo, K. Yano, K. Hosokawa (Suita-shi/Jp)
- 16²⁰
LOP21 **Tracheal allotransplantation and prefabrication for long tracheal stenosis with**
withdrawal of immunosuppression – from bed to bench
M. Den Hondt, P. Delaere, J. J. Vranckx (Leuven/BE)
- 16³⁰
LOP23 **Hbd-3 and RNase7 induce human keratinocyte migration**
L. Waschkowski, F. Jacobsen, M. Becerikli, A. Rittig, M. Schulte, M. Lam
M. Lehnhardt, L. Steinstraesser (Bochum/DE)
- 16⁴⁰-17⁰⁵ **Keynote Lecture III**
Microenvironment of wound healing
E. Eriksson (Boston, MA/US)

17⁰⁵–17³⁵
Chair

PSRC Highlight Session

L. P. Jiga (Timisoara/RO), P. J. Taub (New York, NY/US)

17⁰⁵

Hardesty Award

Cutaneous collateral axonal sprouting re-innervates the skin component and restores sensation of denervated swine osteomyocutaneous alloflaps
Z. Ibrahim, J. Christensen, D. S. Cooney, J. M. Sacks, W. P. Andrew Lee
M. Polydefkis, P. Hauer, M. Alrakan, G. Furtmuller, K. Sarhane
G. Brandacher (Baltimore, MD/US)

17¹⁵

Shenaq Award

Tracheal allotransplantation: the learning curve
M. Den Hond, P. Delaere, J. J. Vranckx (Leuven/BE)

17²⁵

Snyder Award

Ex-vivo assembly & transplantation of a stem cell-derived hybrid graft using the LGR6+ epithelial stem cell on common acellular matrices for treatment of full thickness soft tissue wounds
M. W. Neumeister (Springfield, IL/US), D. M. Lough
D. S. Cooney (Baltimore, MD/US), S. D. Mendenhall (Salt Lake City, UT/US)
M. Yang, J. D. Reichensperger (Springfield, IL/US), L. A. Cox
N. M. Cosenza (Springfield, IL/US), N. Wetter, C. E. Harrison

18⁰⁰–19³⁰

Short Lectures I (e-Poster Session I)

SOP01–SOP27 (see page 24)

19³⁰

Social Evening

Luke 3, MS Cap San Diego

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- Attract new participants (attendees)
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- Solicit new members

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- 08⁰⁰–08⁴⁰ **Scientific Session VI**
 Tissue biology and burns
 Chairs A. Ghanem (London/GB), M. Ionac (Timisoara/RO), N. Pallua (Aachen/DE)
- 08⁰⁰
 LOP24 Skin graft taking – a proteomic approach
N. Lindenblatt, A. Heggin (Zurich/CH), M. Glocker (Zurich/CH, Rostock/DE)
 B. Vollmar (Rostock/DE), P. Giovanoli (Zurich/CH)
- 08¹⁰
 LOP25 Electrical burns in adults
L. Y. Goh, K. Mamtara, C. O'Boyle, S. Al-Benna (Nottingham/GB)
- 08²⁰
 LOP26 Transcription of extracellular matrix components and proangiogenic factors is increased in endothelial cells after cocultivation with primary human osteoblasts
D. Steiner, F. Lampert, F. Simunovic, D. Pfeifer, G. B. Stark
 G. Finkenzeller (Freiburg/DE)
- 08³⁰
 LOP27 Association of exosome secretion and drug resistance in aggressive lymphomas model
 T. Aug (Göttingen/DE)
- 08⁴⁰–09⁰⁵ **Keynote Lecture IV**
 How to demystify hand surgery
 Donald H. Lalonde (Saint John/CA)
- 09⁰⁵–09⁵⁰ **Microsurgical Corner** (see page 32)
- 09⁰⁵–09⁵⁰ Coffee Break
- 09⁵⁰–10³⁰ **Scientific Session VII**
 Regeneration and reinnervation
 Chairs L. Larcher (Salzburg/AT), P. Tos (Turin/IT)
- 09⁵⁰
 LOP28 Hyaluronic acid nerve guide for peripheral nerve injury repair up to 2cm
L. Annacontini, L. Cagiano, A. Iannelli, D. Parisi, A. Portincasa (Foggia/IT)
- 10⁰⁰
 LOP29 Novel methodology using diabetic peripheral blood stem cells for effective tissue regeneration
R. Tanaka, K. Arita, S. Jitsukawa, H. Ishihara, R. Hirano, K. Okada
 H. Mizuno (Bunkyo-ku/JP)
- 10¹⁰
 LOP30 The development of a novel, bioactive preadipocyte loaded fibroin biohybride for the augmentation of soft-tissue defects
H. Hanken (Hamburg/DE), M. Wöltje (Aachen/DE), M. Blessmann, M. Heiland
 R. Smeets (Hamburg/DE)

- 10²⁰
LOP31 **Peripheral nerve repair – multimodal comparison of the regenerative potential of adipose tissue derived cells in a biodegradable conduit**
P. E. Engels, E. A. Kappos, M. Meyer zu Schwabedissen, M. Tremp
A. Fischmann, D. J. Schaefer, D. F. Kalbermatten (Basel/CH)
- 10³⁰–11³⁰
Chair **Panel III**
Lymphatic microsurgery
C. E. Butler (Houston, TX/US)
- 10³⁰
10⁴⁵
11⁰⁰
11¹⁵ Corrado Campisi (Genova/IT)
Francesco Boccardo (Genova/IT)
Yener Demirtas (Samsun/TR)
Gunther Felmerer (Göttingen/DE)
- 11³⁰–13⁰⁰ **Microsurgical Corner** (see page 32)
- 11³⁰–13⁰⁰ Company Presentation – BSN medical GmbH
Lunch Break
- 13⁰⁰–14⁰⁰
Chairs **Scientific Session VIII**
Scaffolds for tissue engineering
C. Campisi (Genova/IT), G. C. Dindelegan (Cluj-Napoca/RO)
N. Lindenblatt (Zurich/CH)
- 13⁰⁰
LOP32 **Early kinetics of investigation of collagen-GAG regenerative scaffolds in a diabetic mouse model**
Y. I. Heit (Magdeburg/DE, Boston, MA/US), L. Lancerotto,
R. Cortes (Boston, MA/US), I. Mesteri (Vienna/AT), M. Ackermann (Mainz/DE)
R. Hollander, Q. Li (Boston, MA/US), M. A. Konerding (Mainz/DE)
D. P. Orgill (Boston, MA/US)
- 13¹⁰
LOP33 **Microstructured collagen scaffolds facilitate deterministic guidance of cells during wound repair**
E. Rezaie (New York, NY/US)
- 13²⁰
LOP34 **Neuronal guidance factors – a new approach to reconstructive surgery**
E. Guelke, S. Strauß, V. Bucan, C. Allmeling, C. Radtke, P. M. Vogt
K. Reimers (Hanover/DE)
- 13³⁰
LOP35 **Scarless regeneration of rat skin following ablation by non-thermal irreversible electroporation**
G. F. Brölsch, A. Golberg, S. Bohr, M. Mihm, H. Albadawi, M. T. Watkins
W. G. Austen Jr., M. L. Yarmush (Boston, MA/US)
- 13⁴⁰
LOP36 **Microtransplantation of epidermal cells with fibroblast into Matriderm® and in vivo application in a full thickness wound model**
J. Killat, K. Reimers, S. Jahn, P. M. Vogt, C. Radtke (Hanover/DE)

- 13⁵⁰
LOP22 In vivo skin-targeted electro gene delivery of human host defense peptide LL-37 reveals potential treatment for wound healing
M.C. Lam (Bochum/DE; Brussels/BE), G. Vandermeulen, P. E. Porporato (Brussels/BE)
M. Becerikli, A. Rittig, B. Merwart (Bochum/DE), P. Sonveaux (Brussels/BE)
F. Jacobsen (Bochum/DE), V. Pr at (Brussels/BE), L. Steinstraesser (Bochum/DE)
- 14⁰⁰–14³⁰ **Panel IV**
Perforator flaps
Chair A. Georgescu (Cluj-Napoca/RO)
- 14⁰⁰
14¹⁵ Geoffrey G. Hallock (Allentown, PA/US)
Joon Pio Hong (Seoul/KR)
- 14³⁰–15⁰⁰ **Microsurgical Corner** (see page 32)
- 14³⁰–15⁰⁰ Company Presentation – TapMed Medizintechnik Handels GmbH
Coffee Break
- 15⁰⁰–15²⁵ **Keynote Lecture V**
My worst cases in plastic surgery – What did I learn?
Peter C. Neligan (Seattle, WA/US)
- 15²⁵–16¹⁵ **Scientific Session IX**
Reconstructive microsurgery
Chairs Y. Demirtas (Samsun/TR), P. B. Garvey (Houston, TX/US)
A. Georgescu (Cluj-Napoca/RO)
- 15²⁵
LOP37 Surgical treatment of upper extremity tissue large defects using vascularized fibular flap
M. Muradov, T. Sadykov (Almaty/KZ)
- 15³⁵
LOP38 Plastic reconstructive surgery techniques for treating complex urogenital fistulas
F. J. Paprottka (Rotenburg (W umme)/DE), J. A. Lohmeyer (Munich/DE)
R. Muschter, D. Hebebrand (Rotenburg (W umme)/DE)
- 15⁴⁵
LOP39 Designing a breast reconstruction as a MS FTRAM rather than a DIEP is not protective against radiation damage
P. Garvey, M. Clemens, A. Hoy, S. Kronowitz, C. Butler (Houston, TX/US)
- 15⁵⁵
LOP40 Enhanced recovery after microsurgery
C. Bonde, H. Khorasani, K. Eriksen, M. Wolthers, H. Kehlet, J. Elberg (Klampenborg/DK)
- 16⁰⁵
LOP41 The pig as an ideal training model for perforator flap dissection in living tissue
A. Nistor, L. P. Jiga, D. Georgescu, G. Miclaus, S. Barac, B. Hoinoiu, C. Dumbuleu
M. Ionac (Timisoara/RO)
- 17⁰⁰–18³⁰ **Short Lectures II (e-Poster Session II)**
SOP28–SOP54 (see page 28)
- 19³⁰ Social Evening
Pool deck, MS Cap San Diego

- SOP01 Presentation has been cancelled.
- SOP02 Lessons from revision cosmetic breast implant surgery – indications, techniques and recommendations
A. Mohan, T. Tomouk, L. Fopp, C. M. Malata (Cambridge/GB)
- SOP03 Accurately diagnosed basal cell carcinoma had better excision clearance
A. Farroha, M. Syed, O. Shelley, P. Dziejulski (Chelmsford/GB)
- SOP04 The theories of perfusion zones of Deep Inferior Epigastric Perforator (DIEP) free Flap – a clinical assessment using tissue oximetry method
R. Arya (Chelmsford/GB), R. Parker (Cambridge/GB)
M. Griffiths (Chelmsford/GB), M. Shafiqhi (Bern/CH)
V. Ramakrishnan (Chelmsford/GB)
- SOP05 will be presented on Saturday, August 24, 2013
- SOP06 will be presented on Saturday, August 24, 2013
- SOP07 MEDIAL crural steal and tongue-in-groove procedures in rhinoplasty
A. Vidrascu, S. Simon, P. Polihovici (Cluj-Napoca/RO)
- SOP08 Establishment of an anticoagulation protocol for the generation of axially vascularized tissue using a nanostructured bone grafting material in the sheep arteriovenous loop model
A. Weigand, A. M. Boos, J. Ringwald, A. Hess, R. E. Horch
J. P. Beier (Erlangen/DE)
- SOP09 Multiplanar convergent mammoplasty planned by the divine proportion
O. Pereira, J. Bins-Ely, E. Machado, K. Lee (Florianópolis/BR)
- SOP10 Treatment of Merkel cell carcinoma – Which way?
F. Lembo, D. Parisi, A. Portincasa (Foggia/IT)
- SOP11 Microsurgical primary and secondary prevention of lower extremity lymphedema secondary to melanoma treatment
C. Campisi, F. Boccardo, C. Campisi (Genova/IT)
- SOP12 Presentation has been cancelled.
- SOP13 Virtual planning of complex head and neck reconstructions – satisfactory match between real outcomes and virtual models
H. Hanken, C. Schablowsky, I. Nourwali, A. Al-Dam, M. Blessmann, A. Gröbe
B. Riecke, R. Smeets (Hamburg/DE)

- SOP14 Autologous lipofilling as treatment option for late seromas and double capsules in breast augmentation
T. Shafiei Tabar, S. Allert (Hamelnd/DE)
- SOP15 Morphological quantitative criteria and aesthetic evaluation of eight female han face types
Q. Zhao, R. Zhou, L. Zheng (Hangzhou/CN)
- SOP16 Establishment of murine embryonic fibroblast cell lines as alternative models to analyse the process of cell differentiation
K. Dastagir, K. Reimers, V. Bucan, N. Dastagir, C. Radtke
P. M. Vogt (Hanover/DE)
- SOP17 Defining the transition from device to tissue in acellular dermal matrix
D. Adelman (Houston, TX/US)
- SOP18 Outcomes for oncologic thoracic reconstruction with synthetic versus bioprosthetic mesh
P. Garvey, M. Clemens, J. Doolittle, H. Zhang, D. Baumann, S. Swisher
C. Butler (Houston, TX/US)
- SOP19 A prospective study of Transit Time Flow Volume (TTFV) measurement for intra-operative evaluation and optimization of free flaps
J. C. Selber, P. Garvey, M. Clemens, E. Chang, H. Zhang
M. Hanasono (Houston, TX/US)
- SOP20 Microsurgical mandibular reconstruction in the Oculo-Auriculo-Vertebral syndrome (Goldenhar syndrome)
R.-D. Bader, G. F. Raschke, C. Dietze, S. Schultze-Mosgau (Jena/DE)
- SOP21 Clinical outcome following symmetrisation procedures in the irradiated breast
I. Khattak, J. Murphy, M. Chandrashekar (Liverpool/GB)
- SOP22 Capsular contracture in implant based breast reconstruction – the effect of porcine acellular dermal matrix
M. Lardi, M. Ho-Asjoe, R. Rolph, J. Farhadi (London/GB)
- SOP23 Age-related effect of monobloc fronto-facial distraction on orbital volume, morphology, and clinical outcome in 29 Crouzon-Pfeiffer cases – a controlled study
B. Way, R. Khonsari, T. Karunakaran, S. Ashraff (London/GB), J. Nysjö
I. Nyström (Uppsala/SE), D. Dunaway, R. Evans, J. Britto (London/GB)
- SOP24 Dynamic muscle transfer in facial nerve palsy – the use of orbicularis oculi muscle
A. Dharmasena, S. Sadiq, W.-H. Chan (Manchester/GB)

- SOP25 A branching pattern of the facial nerve trunk with six initial branches – Possible implications for parotid surgery?
O. Smith, G. L. Ross (Manchester/GB)
- SOP26 In-vivo quantification of fibroblast proliferation seeded on a acellular human dermis in a multimodal therapy setting using the dorsal skinfold chamber model
M. Vitacolonna (Mannheim/DE), M. Smith (Berlin/DE), P. Hohenberger
E. Roessner (Mannheim/DE)
- SOP27 Traction assisted dermatogenesis by serial intermittent skin tape application
M. Daya, V. Nair (Mayville, Durban/ZA)

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Magazin für Ästhetische Chirurgie

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Neues topisches Lokalanästhetikum
kombiniert Lidocain mit Tetracain

Postoperative Patientenbegleitung nach dem plastischen Eingriff
Mit 1470nm von Varizen bis Hyperhidrose

- SOP05 Wrap or Un Wrap the P.o.P? – a comparative study to determine the most effective method of application
D. Hunt, A. El Gawad, D. Gurusinghe, M. Maher (Chester/GB)
- SOP06 Atypical fibroxanthoma – Do we need guidelines?
A. Sadri, D. Hunt, L. Touil, A. El Gawad, M. Maher, A. Yousif
A. Juma (Chester/GB)
- SOP28 End-to-end vs. End-to-side microvascular anastomosis – a meta-analysis of free flap outcomes
P. Herle, I. Ahmadi, W. Rozen (Melbourne/AU)
- SOP29 Application of sequential flow-through free arterialized venous flaps in one-stage reconstruction of separate defects in the hand and foot
T.-J. Cheng (New Taipei City/TW)
- SOP30 Outcomes following the use of a novel enzymatic alginate dressing in the management of cement burns
L. Ng, K. Rahman, S. Pape, S. Varma (Newcastle upon Tyne/GB)
- SOP31 Extra-abdominal (desmoid) fibromatosis: a review of current practice, long-term recurrence rates and survival
N. Eastley (Leicester/GB), R. Silk (Nottingham/GB), R. Aujla (Leicester/GB)
T. McCulloch, A. G. Perks, A. Raurell (Nottingham/GB)
R. Ashford (Leicester/GB)
- SOP32 Are plastic surgeons receiving adequate remuneration in reconstructive multi-speciality surgery?
S. Craxford, S. Cairns, P. Lim, C. O'Boyle, S. Al-Benna (Nottingham/GB)
- SOP33 Composite tissue reconstruction of extensive sacral chordoma excision defects
H. Mohajer-Bastami, S. Cairns, P. Lim, C. O'Boyle, N. Quraishi
S. Al-Benna (Nottingham/GB)
- SOP34 Teaching aesthetic surgical skills on the basis of free flaps
E. Sarantopoulos, H. Menke (Offenbach/DE)
- SOP35 Improved diagnostic outcomes in craniofacial surgery by use of next generation DNA sequencing
V. Sharma, A. Fenwick (Oxford/GB), M. Brockop (Los Angeles, CA/US)
S. McGowan (Oxford/GB), J. Goos, J. Hoogboom (Rotterdam/NL), A. Brady
O. Jeelani (London/GB), S. Lynch (Dublin/IE), J. Mulliken (Boston, MA/US)
D. Murray (Dublin/IE), J. Phipps (Oxford/GB)
- SOP36 Segmental anatomy of vastus lateralis muscle – guidelines for selective flap harvesting
F. Toia, S. D'Arpa, C. Melloni (Palermo/IT), E. Brenner (Innsbruck/AT)
A. Cordova, F. Moschella (Palermo/IT)

- SOP37 Distally based fasciocutaneous flaps in the management of soft tissue war injuries of the lower half of the leg
E. Sabri (Paris/FR), H. Alani, T. Abdul Qadir (Baghdad/IQ)
- SOP38 The Transverse Musculocutaneous Gracilis (TMG) flap for secondary breast reconstruction after simple mastectomy – a single center experience
L. Larcher, F. Ensaf, H. M. Schubert (Salzburg/AT)
T. Schoeller (Stuttgart/DE), G. Wechselberger (Salzburg/AT)
- SOP39 Minimal blood loss palatoplasty using saline hydrodissection
B. Lotha Shitiri (Sana'a/YE)
- SOP40 Use of pre-operative MRI to predict tissue thickness of mastectomy skin flaps
A. Nasser, B. Huston, A. Kanth, M. Fourman, R. Palermo, P. Fisher, C. Rizk
B. Phillips, D. Bui, T. Huston (Stony Brook, NY/US)
- SOP41 Role of retinoic acid for endochondral bone formation
Y. Minegishi, K. Hosokawa (Suita, Osaka/JP), N. Tsumaki (Kyoto/JP)
- SOP42 A new training model in pigs allows mastering the approach of internal mammary vessels
A. Nistor, G. Miclaus, M. Ionac (Timisoara/RO), A. Spano (Milano/IT)
A. Georgescu (Cluj-Napoca/RO), Z. Crainiceanu (Timisoara/RO)
A. Avram (Cluj-Napoca/RO), B. Hoinoiu, L. P. Jiga (Timisoara/RO)
- SOP43 Development of perfusate for composite tissue allograft – new maneuvers extending the ischemic golden period
J. Araki (Tokyo/JP), H. Sakai (Singapore/SG), Y. Kagaya, M. Narushima
M. Mihara, I. Koshima (Tokyo/JP)
- SOP44 Spare parts concept in emergency limb reconstruction
P. Tos (Torino/IT)
- SOP45 Functional impairment due to surplus skin in successful post-bariatric surgery patients – a comparative analysis
S. Giordano, M. Victorzon, E. Suominen (Turku/FI)
- SOP46 Early treatment of extravasation injuries using liposuction
H. Arnold (Unterkrnach/DE), H. Pühler (Villingen- Schwenningen/DE)
- SOP47 Hernia repair with Coriumflap? – Vascularized!
B. I. Gruber, B. Todoroff (Vienna/AT)
- SOP48 Quality of life following breast reduction mammoplasty – a meta-analysis of published studies
E. Evgeniou (Wexham/GB), P. Mylothridis (Alexandroupolis/GR)
P. Dimitriadis (Wexham/GB)

- SOP49 Heterotopic replantation of the fingers in reconstructive surgery of the hand
M. Muradov (Almaty/KZ)
- SOP50 Compliance of randomised controlled trials in trauma surgery with the CONSORT statement – a systematic review
S.-Y. Lee, P. Teoh (Southampton/GB), C. Camm (Oxford/GB)
R. Agha (Aylesbury/GB)
- SOP51 Systematic review – surgical treatment of craniosynostosis with distraction osteogenesis
C. Wallner, A. Tong, O. Johnson III, A. Dorafshar (Baltimore, MD/US)
- SOP52 Setting the standard for outcome reporting reconstructive breast surgery: initial results of the BRAVO (Breast Reconstruction and Valid Outcomes) Study: a multi-centre consensus process to generate a core outcome set for research and audit in breast reconstruction
S. Potter, J. Ward, S. Cawthorn (Bristol/GB), C. Holcombe (Liverpool/GB)
R. Warr, S. Wilson (Bristol/GB), E. Weiler-Mithoff (Glasgow/GB), D. Harcourt
Z. Winters (Bristol/GB), J. Blazeby (Bristol/GB)
- SOP53 Improving the tensile strength of tendon transfer fixation – the double ended tendon weave
A. Harper, D. Machin, N. Geary (Bristol/GB)
- SOP54 Use of bone-anchored devices for intuitive muscular prosthetic control
Y. Al-Ajam, H. Lancashire, C. Pendegrass, N. Kang, R. Dowling, S. Taylor
G. Blunn (London/GB)

The missions of the EPSRC Lighthouse Endowment Fund are the delivery of high-quality patient care through the contribution to innovations in medicine through basic and translational research and clinical outcome studies, and the education of medical students, postgraduate trainees, residents and consultants to insure an adequate supply of academic plastic surgeons for the future. This Society is a non-profit organization managed by and for the benefit of the young plastic, reconstructive and aesthetic surgery research community. The annual EPSRC meeting will offer an exciting opportunity for young plastic surgery researchers to discuss their latest work and future challenges in a uniquely informal, interactive format for basic science and clinical outcome research. The EPSRC meeting will provide a valuable means of disseminating information and ideas in a way that cannot be achieved through the usual channels of communication – publications and presentations at large scientific meetings.



This year we are starting off with securing the financial stability of the European Plastic Surgery Research Council with the help of the EPSRC Lighthouse Endowment Fund. EPSRC Lighthouse Fund Donors have committed themselves to the ongoing support of your new generation of Plastic Surgeon Scientists in Europe.

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The microsurgical corner contains five fully-equipped workstations, bringing the fascinating world of microsurgery up, close and personal for all EPSRC attendees. Young colleagues, willing to experience microsurgery „live“, will have the chance to perform microvascular anastomosis using ex-vivo models (chicken legs), throughout the meeting. Working with top-quality magnification (Carl Zeiss GmbH), microsurgical instruments and sutures (S&T AG) everyone interested to attain microsurgical techniques will find here besides expert advice from our faculty, all the informations needed regarding microscopes, instrumentation, microsurgical sutures and so on.

Through the kind support of our sponsor, Synovis Micro Companies Alliance Inc, the microsurgical work-stations will be provided with the GEM Microvascular Anastomotic Coupler (TM) and the proper instrumentation to exercise mechanical microvascular anastomosis, an ever-evolving technique which has become a standard technique in reconstructive microsurgery.

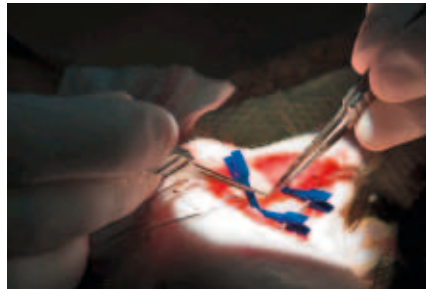


IMPORTANT:

1. This is not a practical course but only a booth offering a unique hands-on experience in performing microvascular anastomosis. No diplomas of any kind will be issued.

2. Places will be distributed on the “first come, first served” basis for all EPSRC attendees interested to experience microvascular anastomosis.

3. The microsurgical corner will be only available during the official congress breaks. The maximum time allowed under microscope is 30 minutes/person.



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For registration, please sign in at the registration desk.

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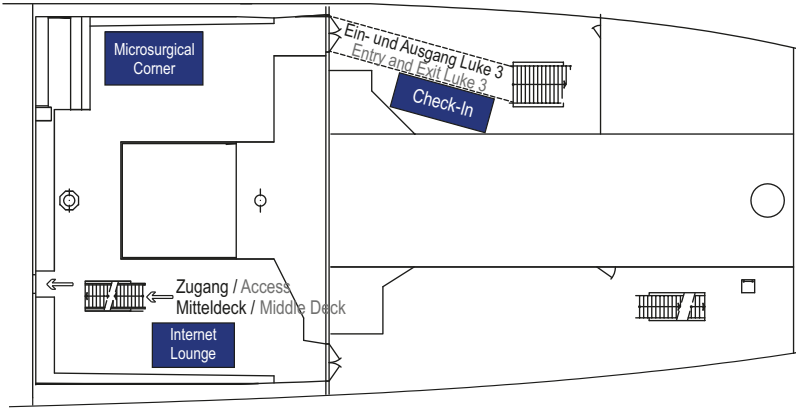
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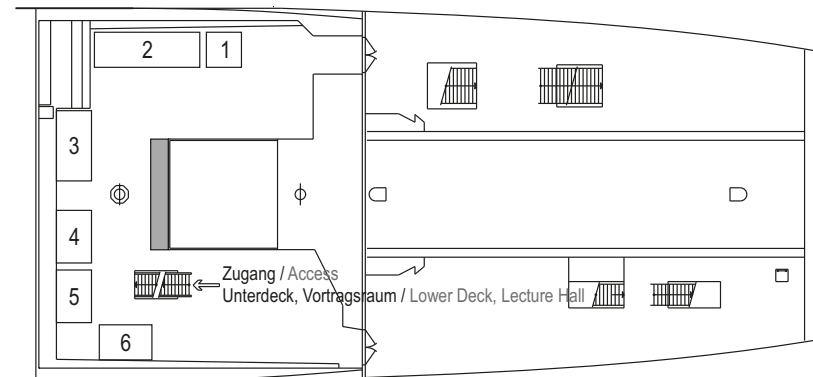
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MS Cap San Diego • Oberdeck / Upper Deck



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■ Catering



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Welcome Reception

EPSRC invites you to kick off the Annual Meeting on Thursday, August 22 with the Welcome Reception in the "Captain's Salon" on board the MS Cap San Diego. Join us for a casual Meet and Greet within the maritime setting.

Date	Thursday, August 22, 2013
Time	19 ⁰⁰ –22 ⁰⁰
Venue	Captain's Salon, MS Cap San Diego • Überseebrücke, 20459 Hamburg
Costs	included for Participants, 35 EUR for Accompanying persons

Social Dinner

You are invited to round off the scientific program in casual atmosphere. Take some time to refresh contacts or even to make new contacts! Food and beverages are provided.

Date	Friday, August 23, 2013
	Saturday, August 24, 2013
Time	20 ⁰⁰ –24 ⁰⁰
Venue	Luke 3, MS Cap San Diego • Überseebrücke, 20459 Hamburg Pooldeck, MS Cap San Diego • Überseebrücke, 20459 Hamburg
Costs	included for Participants, 35 EUR for Accompanying persons

Farewell Brunch

Finally, we will start our day with a farewell brunch before we say "Goodbye & See you again!".

Date	Sunday, August 25, 2013
Time	9 ⁰⁰ –12 ⁰⁰
Venue	Captain's Salon, MS Cap San Diego • Überseebrücke, 20459 Hamburg
Costs	included for Participants, 10 EUR for Accompanying persons

Insider Tip

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 25, 2013
Time	05 ³⁰ –09 ⁰⁰
Venue	St. Pauli Fish Market/Große Elbstrasse

Please note this is not an official program event. Those interested should ask at the check-in desk.

LOP01: Induction of therapeutic neoangiogenesis, using *in-vitro* generated endothelial colony-forming cells – an autologous transplantation model in rat

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Introduction: Major limb amputation due to ischemic tissue loss is an endemic phenomenon. With no other alternative to overcome this dreadful disease, “regenerative” cell-based interventions for induction of postnatal neoangiogenesis are coming of age. Using murine modeling, in this study we investigate the use of bone marrow-derived endothelial colony-forming cells (bmECFCs) as promising tools for vascular repair.

Materials and methods: Either *in-vitro* generated and characterized autologous bmECFCs or placebo was injected into ischemic hind-limbs of Sprague-Dawley rats. Tissue perfusion was quantified by laser Doppler, in perfusion units (PU) at day 0, 15, 30.

Results: Rat bmECFCs, acquire typical phenotype D34+VEGFR2+CD133+CXCR4+CD45-, culture and functional behaviour (Dilac-LDL+) *in-vitro*. Injection of autologous bmECFCs improves tissue perfusion in ischemic hind-limbs (183.5+3.29 PU/bmECF Cs/day 30 vs 131+3.9 PUcontrols/day 30, $p < 0.001$).

Conclusion: We conclude that rat bmECFCs promote ischemic tissue reperfusion and their proangiogenic properties are a potential mechanism for this effect.

LOP02: Combined hypoxic preconditioning and post conditioning do not confer additive protection of *ex vivo* human skeletal muscle from ischemia/reperfusion injury

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Introduction: In reconstructive surgery, prolonged ischemia can cause irreversible ischemia/reperfusion (I/R) injury, even when successful revascularisation is achieved. We previously reported that hypoxic pre- (HPreC) and postconditioning (HPost-C), effectively protected *ex vivo* human skeletal muscle from I/R injury. At present, animal studies are inconclusive which is better or whether there is an additive effect when combined. Moreover, no human tissue studies have been reported.

Methods: Human rectus abdominis muscle strips were cultured in Krebs buffer bubbled with 95%N₂/5%CO₂ (hypoxia) or 95%O₂/5%CO₂ (normoxia). Controls underwent 5h normoxia. Other groups underwent 3h hypoxia/2h reoxygenation (H/R) and were treated with HPreC, HPostC, HPreC+HPostC or no treatment. In addition, atractyloside, a mitochondrial permeability transition pore (mPTP) opener was added to other treatment groups. Muscle injury, viability, and ATP synthesis were assessed by LDH release, MTT reduction and ATP content.

Results: LDH release increased and MTT reduction and ATP content decreased after H/R (p).

Conclusions: HPreC and HPostC are equally effective in protection of *ex vivo* human skeletal muscle against I/R injury. There is no additive effect in combination because they both

act by closing the mPTP. The potent effect of HPostC alone suggests a clinical application of ischemic postconditioning for salvage of human tissue from reperfusion injury in transplantation and replantation surgery, obviating the need for prophylaxis and dramatically reducing numbers needed to treat.

LOP03: Optimized reconstruction of injured peripheral nerves by adipogene derived stem cells in combination with fibrin glue

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Question: In this present study we investigated the interaction of fibrin glue, neuro-gen differentiated adipogene derived stem cells (adMSC's) and the influence of these components on peripheral nerve regeneration. We compared the effects of sutured peripheral nerve combined with adMSCs to nerves repaired with Fibrin glue followed by nerve transplantation.

Methods: AdMSC's were isolated from fat tissue of adult rats and grown as monolayers on plastic dishes. These cells were phenotypically and immunocytochemically characterized before cultured and grown up with epidermal growth factor (EGF) and basic fibroblast growth factor (bFGF) to induce the glial differentiation. Furthermore the glial differentiated adMSC were transplanted into a sciatic nerve after complete lesion.

Results: We could show that the nerve regeneration was more enhanced by using glial differentiated adMSC's in combination with fibrin glue. Up to now there are no comparative studies for sutured and glued nerves in combination with ad MSC cell transplantation.

Conclusion: In continuation of our prior work adipogene derived stem cells are a very attractive cell type to induce and support peripheral nerve regeneration after glial differentiation in combination with fibrin glue.

LOP05: Sustainable fat grafting – optimizing fat grafting in an *in vivo* tissue engineering chamber model

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Purpose: Autologous fat grafts are used in various body contour procedures, such as breast reconstruction. One of the main concerns is tissue resorption over time, raising questions of sustainability. The aim of this study is to gain insights in fat grafting and to improve long term outcome by adding a novel adipose derived matrix to the fat graft.

Methodology: A known rat tissue engineering model is used. An arteriovenous loop, microsurgically created from the femoral vessels, is positioned inside a 2ml hemispheric perforated chamber in the groin. 1 mL minced autologous fat, a novel adipose derived acellular matrix (ADM) or a combination of both is inserted within the chamber. The constructs are morphologically and histologically examined at 6 (n=3) and 12 weeks (n=6).

Results: In groups where fat was used, the volume of grafted tissue remained stable at 6 weeks, but most of the inserted fat cells appeared having died. In all groups, the amount of viable adipocytes rose between and 12 weeks, indicating neoadipogenesis. At 12 weeks, the ADM group showed similar results to fat whereas combining both resulted in significantly better results (2.5 times more viable fat). In this group the inserted disrupted fat, was almost entirely regenerated.

Conclusion: The mechanisms behind fat grafting seem to be based on regeneration of fat, likely from adipose stem cells. However clinical results are variable and optimization is

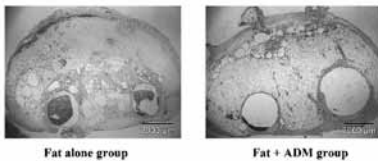
needed. At 12 weeks, excellent adipogenesis was seen when a novel matrix called ADM was added to the fat graft. We believe that the use of the ADM-matrix has a great potential in fat grafting. Moreover, we showed that a pedicled adipose fat flap can be generated in vivo, offering perspectives for larger reconstructive flap surgery as well.

Figure 1



Figure 2

Histological cross section(H&E) of tissue within the chamber at 12weeks



LPO06: Interactions between mesenchymal stem cells (MSCs) isolated from periprosthetic capsule and breast cancer cells, the role of paracrine effect

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Question: MSCs are multipotent cells with potential applications in regenerative medi-

cine. They exert an important paracrine effect on tumor cells by influencing the progression of the tumor with conflicting results, depending on their source of isolation and their degree of differentiation. MSCs produce soluble factors with regulatory functions. Fibrous periprosthetic capsule is a chronic inflammation that develops after breast reconstruction, rich in MSCs and essential for the tumor growth.

Methods: We evaluated interactions between MSCs isolated from periprosthetic capsules of women affected by invasive ductal carcinoma and subjected to breast reconstruction post-mastectomy, and a cell-line of breast cancer (MCF-7). MCF-7 were grown in presence of MSCs or with the medium previously conditioned by them. We analyzed the proliferative capacity and the expression of genes involved in oncogenic pathways.

Results: MSCs had a double effect on MCF-7:

- increase the proliferative potential.

- decrease the aggressiveness of cancer cells.

This effect was exercised either directly by the presence in culture of MSCs or by the conditioned medium without MSCs.

Conclusion: This study yields more information about MSCs paracrine effect and provides a preliminary assessment of whether breast reconstruction with implants could influence interactions of MSCs with Tumor Cells. Breast implants cause inflammation that requires a constant presence of MSCs, but they do not seem to promote any recurrence of tumor, that instead appears to be less aggressive. However, the presence of a persistent inflammation suggests to consider peri-prosthetic capsule as a critical site for the excessive production of soluble factors by Stem Cells. Further studies need to better understand these mechanisms and to correlate the laboratory observations with the clinical outcomes.

Figure 1

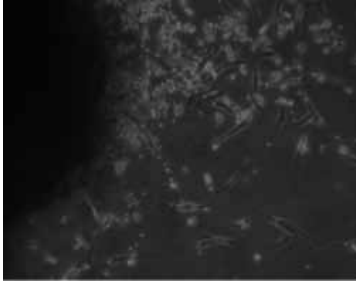
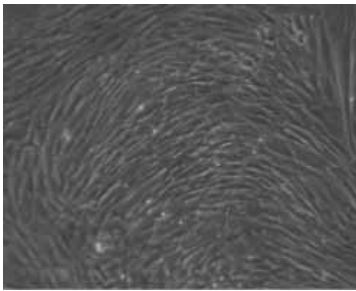


Figure 2



LOP07: New insights into lymphangiogenesis – mesenchymal stem cells promote angiogenic properties of lymphatic endothelial cell

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Introduction: Lymphatic metastasis is one of the main prognostic factors concerning long term survival of cancer patients so that millions will benefit from antilymphangiogenic therapies. Reliable experimental models are critical to further decipher the lymphangiogenic cascade. The arteriovenous loop model provides a perfectly isolated environment to investigate such vascular phenomena. The present study addresses the interaction between mesenchymal stem cells (MSC) and lymphatic endothelial cells (LEC) and aims at identifying novel paracrine factors.

Material and Methods: Human LEC were stimulated with either VEGF-C+bFGF, MSC conditioned medium (CM) or by co-cultivation with human MSC. LEC proliferation was assessed using an MTT assay. Migration capability was tested by a horizontal and a transmigration assay. To evaluate tube formation capacity LEC were plated on Matrigel™. Cell sprouting was investigated in a 3D-assay.

Results: LEC proliferation and migration could be elevated by MSC CM due to secretion of LEC stimulating factors in a higher extent than by stimulation with control medium or growth factors like VEGF-C and bFGF. MSC secreted factors furthermore enhanced LEC tube formation and sprouting directly. Ongoing experiments are focusing on loss-of-function and gain-of-function studies and aiming at identifying the unknown MSC-derived lymphangiogenic activity.

Conclusions: The MSC-derived pro-lymphangiogenic activity could be demonstrated and provide the basis for current *in vivo* experiments to establish a lymphatic endothelial cell network in the nude rat AV-loop model. This model will allow deeper insights into lymphangiogenesis and subsequently be used for anti-lymphangiogenesis and metastasis research.

LOP08: New perspectives for tissue engineering of skeletal muscle – co-culture of myoblasts and mesenchymal stem cells

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Introduction: Tissue engineering (TE) of skeletal muscle is a promising method for the treatment of soft tissue defects in reconstructive surgery. Mesenchymal stem cells (MSC) could be a promising cell source for muscle TE due to their ability to be largely expanded without losing their differentiation capacity. Dexamethason and growth factors such as IGF-1, bFGF, and HGF, play a key role in myo-

genic differentiation and proliferation. The present study aims at engineering skeletal muscle from co-culturing bone-marrow and adipose-derived mesenchymal stem cells and primary myoblasts on electrospun scaffolds with different growth factors.

Material and Methods: The myogenic potential of GFP-transduced MSC and adipose-derived stem cells co-cultured with myoblasts in combination with different concentrations of bFGF, dexametha-son, HGF and IGF-1 was analysed by immunocytochemistry, fluorescenceactivated cell sorting (FACS) and quantitative PCR after 1, 2, 4 and 8 weeks.

Results: MSC-myoblast co-culture showed the formation of hybrid myotubes. FACS and PCR analyses revealed myogenic differentiation of MSC with expression of MEF2 (myogenic enhancer factor 2) and alphasarco-mericactin in co-cultures with primary myoblasts. Significantly higher numbers of MSC nuclei were involved in myotube formations when bFGF (basic fi-broblast growth factor) and dexamethason were added to co-cultures.

Conclusion: This study has determined optimal co-culture conditions for MSC myogenic differentiation up to myotube formations as a promising step towards applicability of MSC as a cell source for skeletal muscle TE as well as other muscle cell-based therapies.

LOP09: Fabrication of three-dimensional vascular networks within tissue engineered hydrogel constructs

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Question: The fabrication of a micro-vascular network approximating the diameter of human capillaries remains one of the foremost challenges facing tissue engineers. We have demonstrated successful synthesis and *in vivo* microsurgical anastomosis of collagen constructs containing a 1.5 mm diameter central

channel. Here we aimed to synthesize constructs containing a preformed 3D network recapitulating microvasculature diameters found *in vivo*.

Methods: Pluronic F127 microfibers ranging in diameter from 100-500 μm were laid over a PAM-coated glass plate (cooled to -20°) in a continuous rapid fashion with fibers placed in the vertical and horizontal planes. One cm squares of the above microfibers were prepared from the networks and laid on two unconnected longitudinal or one loop (1.5 mm diameter) macrofiber which served as the inlet and outlet. 3D networks were embedded and sacrificed.

Results: 3D networks of interconnected microfibers were successfully embedded and sacrificed within 4% alginate, 1% collagen and PDMS. Networks resembled human microvascular networks, coalescing into an "arteriole" inlet and "venule" outlet. In constructs containing separate longitudinal macrochannels, patency of the internal microchannels was confirmed via perfusion through the inlet and exit through the outlet.

Conclusion: We have developed a novel technique for the fabrication of complex 3D networks utilizing sacrificial microfibers within biodegradable, biocompatible hydrogels. This complex network of channels resembles a capillary bed with feeding arteriole and draining venule as found *in vivo*. These findings represent a significant advancement towards the creation of surgically relevant engineered tissue constructs.

Figure 1

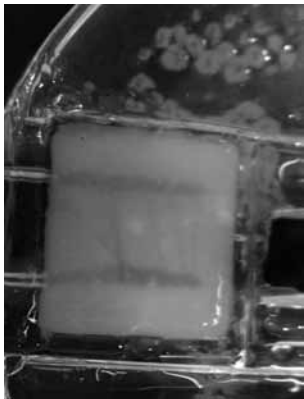


Figure 2



LOPIO: Identification of novel, biocompatible, synthetic hydrogels that selectively bind adipose derived perivascular stem cells using high throughput hydrogel microarray technology and fluorescence activated cell sorting

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Introduction: Adipose stem cells (ASCs) show great potential in enhancing fat grafts, but they represent heterogeneous cell populations of

unclear origin. Recent evidence has shown that ASC progenitors reside in the perivascular niche (perivascular stem cells-PSCs) and can be prospectively isolated from fat in large numbers and purified to homogeneity, offering a better option for fat graft support than ASCs. However, before their full potential can be utilised, methods for their isolation and expansion need to be established. Here, we demonstrate that by using Fluorescence Activated Cell Sorting (FACS) and high-throughput microarray technology, we identified hydrogel combinations that selectively bind PSCs in vitro.

Material and Methods: PSCs (pericytes/ adventitial cells) were isolated from lipo-aspirate using FACS (pericytes: CD31-CD34-CD45-CD146+, adventitial cells: CD31-CD34+CD45-CD146-). An ultra-low volume dispensing system was used to print hydrogel microarrays onto microscope slides; these were subsequently cultured with PSCs for 24h, at which point they were stained with DAPI and screened with specialized software to reveal the best candidates.

Results: Analysis revealed specific hydrogel combinations that selectively bound PSCs.

Furthermore, combinations with strong preference to either pericytes or adventitial cells were identified.

Conclusions: This study identifies unique, synthetic hydrogel combinations that selectively bind PSCs in vitro, as well as hydrogels with affinity to specific subpopulations of PSCs. The most promising of these hydrogels could be scaled up to create stem-cell carrying "fillers" with the ability to support, enhance or substitute autologous fat grafts.

LOPI1: Non-woven electrospun capro-lactone-based poly(ester-urethane) scaffolds seeded with adipose-derived stem cells under seeded conditions in a bioreactor

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Question: Electrospinning is an established technique to fabricate nano- or micro-structured three-dimensional scaffolds for tissue engineering purposes. In the present study electrospun scaffolds of a caprolactone-based poly(esterurethane) (CPEU) were seeded with human adipose-derived stem cells (ASCs) and assessed under dynamic culture conditions in a specialized bioreactor.

Methods: ASCs were isolated and cultivated under standard conditions. CPEU-scaffolds were stacked and seeded with ASCs. Cell-seeded PCL scaffolds were put into the bioreactor for 4 days with a medium flow of 0.3 ml/min. After four days, bioreactors were disassembled and the CPEU-sheets were fixed separately in 4% formalin for one day. Cells were stained with TRITC-phalloidin and DAPI for evaluation of cell morphology.

Result: Up to four fleeces were seeded with ASCs and stacked. ASCs showed physiological appearance and adhered and migrated throughout the scaffolds.

Conclusions: ASCs were successfully seeded on 3D CPEU-scaffolds and cultivated in perfusion bioreactors under controlled conditions. In this setting it is possible to generate a three dimensional tissue substitute.

LOPI2: Adipose-derived stem cells and electrospun modified polyurethane scaffolds as a new approach in adipose tissue engineering

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E. Grönninger¹, M. Schnabelrauch², R. Wyrwa²

A. Gugerell¹

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Question: Electrospinning is an established technique to fabricate nano- or micro-structured three-dimensional scaffolds for tissue engineering purposes. In the present study we generated two novel electrospun polymeric scaffolds and evaluated ASCs viability, proliferation and differentiation when seeded on these matrices.

Methods: Poly (caprolactone-co-urethane) PCL-UR and Poly(L-lactide-co-urethane) PLLA-UR dissolved in suitable solvent and concentration were fed at a constant rate of 1.5 mL h⁻¹ through the syringe to the needle tip resulting in the formation of fibres with diameters of about 0.5 to 2 µm. Degradation and tensile properties were evaluated. Scaffolds were fixed and ASCs were seeded on these fleeces. Cell morphology was analyzed microscopically.

FDA staining and MTT assay were performed to evaluate cell viability and proliferation. To investigate adipocyte differentiation potential, cells were differentiated for 21 days and lipid accumulation was quantified by AdipoRed staining.

Results: ASCs adhered and proliferated throughout both scaffolds. Morphology of the cells was slightly better on the PLLA-UR fleece

than on the PCL-UR fleece, showing a more spreaded, physiological appearance. MTT assays confirmed high proliferative activity of ASCs on both scaffolds. Adipo-genic differentiation of ASCs was achieved on both materials with cells forming lipid droplets to the same amount.

Discussion: Poly(caprolactone-co-urethane) and Poly(L-lactide-co-urethane) meshes can serve as a useful scaffold for adipose tissue engineering. ASCs were able to proliferate and differentiate on both scaffolds. PCL-UR electrospun scaffolds showed higher elasticity, which in our opinion is favorable in terms of soft tissue engineering, revealing potential for the use under dynamic culture conditions in specialized bioreactors.

LOP13: Efficacy of adipose-derived adult stem cells in improving the evolution of post traumatic or surgical scars

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Question: Autologous adipose tissue grafting (lipofilling) is currently used for clinical applications such as volume correction due to malformations, pathological scars and after oncologic and/or aesthetical procedures. Many protocols have been tried for treatment of pathological scars but there are not yet precise guidelines. Purpose of this study was to investigate if autologous fat grafting is a good strategy for the management of these scars.

Methods: Thirty five patients, from January 2006 to January 2012 underwent lipofilling according to Coleman's technique (16F,19M, range 13-58, mean age 36 yrs) for pathological scars of face (6 cases), breast (9), thorax (5), abdomen (6), upper and inferior limbs (9). Always short-term profilaxis. Mean hospital stay: 3.8 (3-5 days). Follow up performed at 3, 6 and 12 months.

Results: Using the Vancouver scale we observed a significant improvement of four variables: vascularity, thickness, pliability and

pigmentation. Patients also reported a remarkable reduction of unpleasant sensations. No complications excepted the necessity to repeat the lipofilling (a mean of 40-50% of injected adipose tissue was resorbed after 6-12 months).

Conclusions: 'Lipostructuring' appears to be a reliable, safe, easy, repeatable technique able to improve tissue healing, cells regeneration, bothersome symptoms. Identification of ADSC in the grafted adipose tissue, clarify why skin trophism and healing processes improve dramatically after lipostructuring.

LOP14: Differentiated adipose-derived stem cells promote cutaneous nerve regeneration in rat skin flaps

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Introduction: Sensory recovery of skin flaps is generally poor unless they are elevated as an innervated flap. We recently reported that adipose-derived stem cells (ASCs) could transdifferentiate into SC-like cells (dASCs) under specific conditions. We therefore hypothesized that dASC transplantation could be a therapeutic intervention to improve the sensory recovery of skin flaps.

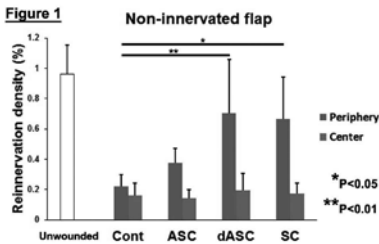
Material and Methods: ASCs and SCs were cultured from GFP rats. ASCs were differentiated to dASCs with a cocktail of growth factors. Island groin flaps were elevated bilaterally in 32 Lewis rats. On the right flap, the epigastric nerve was resected and ligated (non-innervated flap), and on the left flap, the nerve was crushed (innervated flap). ASCs, dASCs, SCs, or vehicle were simultaneously injected to the dermal and hypodermal layers of flap. After 20 weeks, the reinnervation pattern of flap was assessed immunohistochemically using a neuronal marker, PGP9.5.

Results: dASCs and SCs significantly increased reinnervation density in the periphery of both types of flaps (Fig. 1 and 2, P < 0.05), and this effect was more pronounced in non-innervated

flaps. On the other hand, ASC transplantation showed no statistically significant effect on the peripheral reinnervation ($P > 0.05$). In the center of flap, there was no statistically significant increase in reinnervation density in all groups irrespective of flap innervation ($P > 0.05$).

Conclusion: dASCs could improve flap reinnervation by the two mechanisms: First, neurotrophic factors produced by dASCs facilitated regrowth of cutaneous axons from the surroundings of flap. Second, NGF released by dASCs induced the collateral sprouting of undamaged axons in adjacent tissues. Although these effects are likely limited in the early stage after transplantation, dASC transplantation therapy could be a new approach to improve the sensory recovery of skin flaps.

Figure 1



LOP15: Repair of oronasal fistulae with amniotic membrane allografts

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²Ruhr University Bochum, Department of Plastic Surgery and Burns, Bochum, Germany

Introduction: Oronasal fistulae are a frequent complication after surgery of cleft palate. Numerous repair methods have been described, but wound healing problems occur often. The authors investigated, for the first time, the suitability of multi-layered amniotic membrane (AM) allograft for fistula repair in a swine model (animal experiment, AE), and an initial series of patients (clinical trial, CT). Pro-

TECTIVE plates were produced and used in both study arms in order to prevent membrane ruptures.

Material and Methods: AE: Iatrogenic oronasal fistulae in 18 piglets were repaired with AM allograft, autofetal AM, or small intestinal submucosa (SIS); n=6 each. Healing was evaluated by probing and visual inflammation control (no/moderate/ strong) on postoperative days 3, 7, 10, and 76. Histological analysis with hematoxylin/eosin stain was performed to visualize tissue architecture. CT: Four patients (2 female, 2 male; ages 21-51 years) were treated with multi-layered AM allograft.

Results: AE: Fistula closure succeeded in all animals treated with AM with less inflammation than in the SIS group. One fistula remained persistent in the SIS group. CT: All fistulae healed completely without inflammation.

Conclusion: AM can successfully be used for oronasal fistula repair. The multi-layer technique and protective plates should be utilized to prevent membrane ruptures.

LOP16: Analysis of *SPECC11* in Zebrafish model of oblique (tessier) facial clefts

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²Brigham and Women's Hospital, Boston, United States

Background: The genetic basis of oblique facial clefts was unknown until the identification of *SPECC11*.

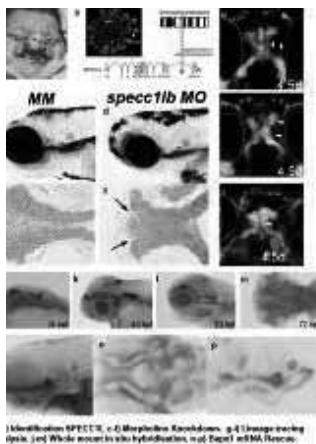
Material and Methods: Expression analysis was carried out by whole mount RNA in situ hybridization. Antisense morpholino knock-down and mRNA rescue was performed for functional analysis. Lineage tracing, proliferation and TUNEL assays, and molecular analysis were performed in the *specc11b* morphant.

Results: Expression analysis of *SPECC11* homologs in zebrafish (*specc11a*, *specc11b*) re-

vealed that all homologs were expressed in the craniofacial region. Knockdown of *specc11b* showed a distinct craniofacial phenotype resulting in bilateral clefts between the median and lateral parts of the palate. Lineage tracing analysis showed that cranial neural crest cells fail to “fuse” with cells that form the lateral part of the palate. Expression analysis of *frzb* and *bapx1* genes revealed downregulation in *specc11b* morphants, implicating *specc11b* to coordinate *wnt* and *endothelin* pathways. Over-expression of *bapx1* in the *specc11b* morphant can partially rescue the lower jaw, revealing the necessary function of *bapx1* in jaw formation, acting downstream of *specc11b*.

Conclusions: We report expression and functional analysis of *SPECC11*, the first gene implicated in oblique facial clefts. Knockdown of *specc11b* results in failure of fusion of the median and lateral zebrafish palatal cells, which is equivalent to failure of fusion of frontonasal and maxillary prominences in mammals. Therefore, *specc11b* knockdown phenotype faithfully models oblique facial cleft in humans and thus represents the first animal model of this malformation. Ongoing work is aimed to elucidate the biochemical relationship between *specc11b* and its interacting proteins.

Figure 1



LOP17: Pharyngoesophageal reconstructive outcomes following 350 cases

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¹MD Anderson Cancer Center, Plastic Surgery, Houston, United States

Question: Pharyngoesophageal reconstruction (PE) is complex, with a diverse set of reconstructive considerations. This is the largest series in the literature, and examines a range of outcomes.

Methods: A retrospective review identified 349 cases from 2000-2011. Patients were grouped according to defect extent and location. Groups were compared by co-morbidities, flap type, donor and recipient site complications, post-operative diet and TEP speech.

Results: Of 349 patients, 263(75%) were male. Average age was 60.7, BMI was 24.4 kg/m² and follow-up was 15.2 months. One-hundred and ninety-three (55%) were circumferential defects and 156 (44.7%) were partial. The majority of defects were laryngo-pharyngectomies (72.5%), most reconstructed with the anterolateral thigh flap (ALT). There were 15.5% total esophagectomies, all of which received supercharged jejunums (SCJ). Eighty-one patients (23.2%) had recipient-site and 51 patients (14.6%) had donor-site complications. Fistula rate trended higher in circumferential defects (11% vs. 6%, $p=0.144$), and the stricture rate was significantly higher (9.3% vs. 3.8%, $p=0.044$). Three hundred and two patients (86.5%) had an oral diet after reconstruction, and 18% required supplemental tube feeds. Among 147(42%) patients who received TEPs, 19(12.9%) eventually failed. Approximate 87% of patients with TEPs achieved fluent speech. Five year survival was low for all groups, ranging from 0 to 30%.

Conclusions: Pharyngoesophageal reconstruction can be performed safely, and most patients will achieve functional speech and swallowing. Swallowing function is worse when the larynx is removed, and stricture rate is higher with circumferential defects. A full repertoire of techniques is required.

LOP18: Free flaps in craniomaxillofacial surgery without perioperative hemodilution

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Aim: There is a great deal of discussion regarding the application of hemodilution in free flap surgery. Since the early days of microsurgery different drugs like heparin, dextran or HES are in use. All of these drugs have adverse effects. Aim of our study was the evaluation of CMF microsurgery without hemodilution.

Material and Method: Between April 05 and April 13 554 patients underwent free flap surgery (w=183, m=371, median age 58.0 years, 2-89). Till January 11 we applied 500 ml HES (10%) within the first 24 hours in 400 patients (72.2%). Afterwards we performed the flaps without hemodilution in 154 patients (27.8%). We analysed age and gender distribution, flap type, disease, complication and flap loss rate.

Results: There were no significant differences (p>0,05) in age distribution (57.0 years median age (2-89) with HES vs. 59.0 years (16-89) without HES), gender distribution (67.3% men/32.8% women with HES vs. 66.2% men /33.8% women without HES), flap type (42.3% vs. 36.4% scapula, 44.3% vs. 52.6% forearm, 3.5% vs. 1.3% lateral arm, 5.3 vs. 3.9% latissimus, 4.5% vs. 4.5% fibula, 0.3% vs. 1.3% others), disease (82.5% vs. 88.3% tumors, 0.5% vs. 0.6% cysts, 5.0% vs. 5.8% bone necrosis, 2.0% vs. 1.3% dysmorphism, 1.0% vs. 1.3% trauma, 9.0% vs. 2.6% others.), complication rate (13.8% vs. 14.9% minor complications, 9.3% vs. 9.7% major complications) and flap loss rate (4.5% with HES vs. 4.5% without HES).

Conclusion: It seems in craniomaxillofacial microsurgery hemodilution isn't necessary. In cases without hemodilution there are a few more complications but no significantly higher flap loss rate.

LOP19: Experimental study of new vascularized composite allotransplantation: Anorectal transplantation with rats, dogs, and human cadavers

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Introduction: Ostomy is an effective surgery for anorectal dysfunctions. However, patients often suffer from stress caused by their stomas. Many alternative therapies have been developed, but none have resolved this critical issue. Allotransplantation of the anorectal segment (all organs of defecation function including perineal skin, anus, rectum, and sphincter muscle) has major potential to be an innovative therapy for anal dysfunctions.

Materials and Methods: We have experimented on anorectal transplantation with rats, dogs, and human cadavers. In the rat model, we succeeded in autotransplantation of the anal segment using super-microsurgery, a technique enabling anastomosis of small vessels 0.3 mm in diameter. As the next step, we examined anorectal transplantation in a canine model, as anal function is similar to that of humans. Indocyanine green angiography showed the pudendal arteries to provide more blood flow than the inferior mesenteric artery (IMA) to the anal segment. Anal function was suggested to be reconstructed 1 year after surgery using pudendal nerve cutting and reanastomosis. In addition, mock anorectal transplantation was performed on a human cadaver. The donor anorectal graft was trans-

planted into the recipient's defect with micro-anastomoses of the IMA, IMV, and pudendal nerves.

Results and Conclusion: Human anorectal transplantation was revealed to be technically possible. Recent progress in operative maneuvers and transplant medicine has allowed other novel transplants, such as limbs, face, larynx, and uterus. The ethics of non-life-saving organ transplants involve assessment of possible gains in the quality of life (QOL) to be achieved for the recipient relative to the risks of the procedure and the follow-up interventions necessary for maintaining organ function.

LOP20: bFGF promotes fibroblast migration in wound healing

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Purpose: Fibroblast proliferation and migration play important roles in wound healing. bFGF is known to promote both fibroblast proliferation and migration during the process of wound healing. However, the mechanism of bFGF-induced fibroblast migration is still unclear. Herein, we investigated the effect of bFGF on fibroblast migration and its signal transduction regardless of its effect on fibroblast proliferation.

Methods: Primary skin fibroblasts were derived from rats aged 3 days. We performed all of the experiments in the presence of mitomycin-C to block fibroblast proliferation. To investigate the effect of bFGF on fibroblast migration, a scratch-wound healing assay was performed. The small GTPases of the Rho family are the key regulators of cytoskeletal dynamics and cell migration. To investigate the involvement of the Rho family, PI3-kinase and JNK in bFGF-induced fibroblast migration, we measured the activities of these proteins using western blotting.

Results: A scratch-wound migration assay showed that bFGF promoted fibroblast migration in a dose-dependent manner (Fig.1). bFGF activated RhoA, Rac1, PI3-kinase, and JNK in cultured fibroblasts. Inhibition of RhoA did not block bFGF-induced fibroblast migration, whereas inhibition of Rac1, PI3-kinase, or JNK blocked fibroblast migration significantly. PI3-kinase-inhibited cells down-regulated the activities of Rac1 and JNK, and Rac1-inhibited cells down-regulated JNK activity, suggesting that PI3-kinase is upstream of Rac1 and that JNK is downstream of Rac1.

Discussion/Conclusion: We concluded that PI3-kinase, Rac1, and JNK were essential for bFGF-induced fibroblast migration, which is a novel pathway of bFGF-induced cell migration (Fig.2).

Figure 1

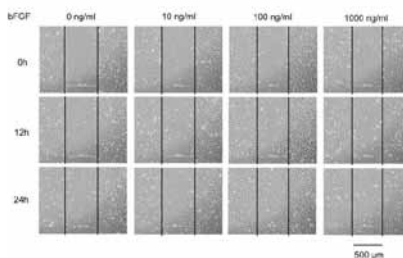
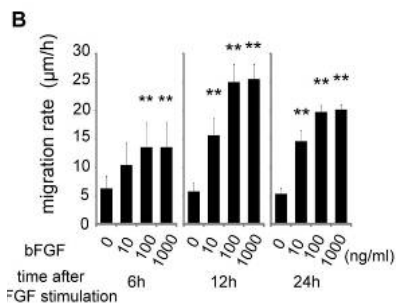


Figure 2



LOP21: Tracheal allotransplantation and prefabrication for long tracheal stenosis with withdrawal of immunosuppression: from bed to bench

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Introduction: Few therapeutic options exist for repairing tracheal defects longer than 5 cm since no autologous fibrocartilagenous framework is available for reconstruction and trachea lacks an identifiable vascular pedicle that would enable direct anastomosis to recipient vessels.

Materials and Methods: Based on our previous research, we reconstructed 6 long-segment tracheal defects using an allograft revascularized by heterotopic wrapping in radial forearm fascia. Patients received immunosuppressive therapy. After revascularization, the mucosal lining was replaced progressively using recipient buccal mucosa, creating a chimera of donor respiratory epithelium and recipient buccal mucosa. The chimera allowed for gradual withdrawal of immunosuppression. Four to ten months after implantation, the tracheal allograft was dissected with its new vascular pedicle and brought into its orthotopic location by microvascular techniques.

Results: In all patients immunosuppressive therapy was withdrawn. In one patient vascularization problems of the mucosal lining occurred. Shortening the time span for the orthotopic transplantation limits quality of outcome. There is a fragile balance between the immunologic parameters and the vascularization of the internal lining.

Conclusion: Vascularization of the mucosal lining of the trachea determines the quality of outcome and timing of treatment. We currently analyze from bed to bench the impact of pro-angiogenic stem cell-based strategies in a rabbit model. We analyze the reduction of immunogenicity of the allogenic trachea by means of surgical and enzymatic decellularization techniques, and we investigate the

replacement of inner lining by functional respiratory epithelium.

LOP22: *In vivo* skin-targeted electro gene delivery of human host defense peptide LL-37 reveals potential treatment for wound healing

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Introduction: Gene therapy approaches delivering host defense peptides have shown promise in promoting wound healing and inhibiting bacterial growth. However, effective non-viral *in vivo* techniques to deliver DNA encoding proteins of therapeutic interest remain limited.

Material and Methods: Two full-thickness skin wounds were created on the back of non-diabetic C57B6 (n=5) and diabetic db/db mice (n=6) using 4mm biopsy-punches. 50  g DNA were intradermally injected to the wounds followed by electroporation (EP) and followed over 12 days. In another experiment, hindlimb ischemia was achieved by femoral artery and vein dissection in C57B6 (n=6 per group), and 100  g DNA were intradermally injected above the ligation area followed by EP. Blood perfusion was evaluated over 12 days and the gastrocnemius muscle weight was compared. Wounds were treated with plasmid pQE-hCAP-18/LL-37 or pQE-eGFP as negative control. Electroporation was performed by one high- (700V/cm, 100   s) and low-voltage (200V/cm, 400 ms) electric pulses, delivered by a Cliniporator system (IGEA, Carpi, Italy) using spaced plate-electrodes.

Results: EP of LL-37 accelerated reepithelialization of non-diabetic wounds significantly by 14% ($p < 0.01$), and diabetic wounds by 19% ($p < 0.001$) in mean compared to eGFP after 12 days. Cutaneous EP of LL-37 increased blood perfusion significantly by the factor two, $85\% \pm 7$ compared to $42\% \pm 11$ ($p < 0.001$). Finally, treatment reduced muscular atrophy, showing in average 8,4% higher muscle weight ($p < 0.05$) at day 12.

Conclusion: We introduced a non-viral gene therapeutic technique to successfully treat acute, diabetic and ischemic wounds with LL-37 leading to faster wound closure and neovascularization. In addition, our treatment reduces ischemia-reperfusion injury and could be considered for surgical flaps.

LOP23: Hbd-3 and RNase7 induce human keratinocyte migration

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Introduction: Antimicrobial peptides as part of the innate immune defense system acquire an increasing importance in the age of resistant microorganisms. Further known as host defense peptides (HDP) earlier experiments proved that HDPs are not only antimicrobial active but also their signal molecule attribute gain the same attention in wound healing. The aim of the study was to investigate the effect of three different HDPs on the migration of keratinocytes which is an imperative process in wound healing. We focussed on human cathelicidin LL37, beta defensin 3 (hBD3) and RNase7.

Materials and Methods: For testing the migration and producing autologous supernatants ($n=3$) we used a HaCaT cell line. Primary human fibroblasts were derived from surgically resected skin specimens ($n=3$); both cell lines were transduced with adenoviral vectors (Ad-

5) containing the transgenes of GFP, hCAP18 (LL-37), hBD3 and RNase7. The cells were incubated for 5 days in DMEM medium (2% FCS; 1% P/S) and the supernatants were collected for the migration assay. We used ibidi®-inlays with 2×10^5 HaCaT cells per well. After adding the supernatants the HaCaT migration was controlled at $t = 0, 4, 8, 12, 24, 28, 48$ [h].

Results: We found that only the supernatants of RNase7 and hBD3 transduced fibroblasts significantly enhance migration of HaCaT cells ($t = 28h$: GFP control $64,04 \pm 5,69$ [%]; hBD3 $32,95 \pm 5,62$ [%] $p \leq 0,01$; RNase7 $37,46 \pm 7,52$ [%] $p \leq 0,05$) whereas the other approaches don't. As well as all instant proteins secreted by transduced HaCaT cells have no ameliorative effect on cell migration.

Conclusion: RNase7 and hBD3 might be proteins that could be useful for wound therapy in future. Further studies should focus on the transfer to in vivo conditions.

LOP24: Skin graft taking – a proteomic approach

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Introduction: The goal of this study was to identify protein expression and transcription during skin graft taking in order to apply this knowledge to skin tissue engineering.

Materials and Methods: The modified dorsal skinfold chamber was performed in B6 mice ($n=30$). Autologous full-thickness skin grafts were transplanted and harvested for proteome analysis after 0, 1, 3, 5 and 10 days. Each mouse underwent intravital microscopy to characterise the stadium of graft take and vascularisation (0d=normal skin, 1d=no perfusion, minor phenotypic angiogenic capillary changes, 3d=graft reperfusion, 5d= graft

angiogenic response with bud formation, 10d= reestablishment of normal skin capillary pattern, no more angiogenic changes). Subsequently the protein fraction was separated in a 2D approach (3gels/time-point), followed by MS and MS-MS protein identification.

Results: 52 differentially expressed proteins and their expression pattern were identified. A number of proteins could be assigned to the NO pathway. Arginase-1 was found to be decreased leading to an increase of active eNOS. Complementary to this, Ca²⁺ binding proteins (Sorcin, Parvalbumin, Troponin T) showed a decreased expression, leading to increased level of Ca²⁺ ions required for eNOS activation. Other identified candidates (HSPB1, HSP6) belong to the group of heat-shock proteins, which are known to be involved in cell migration.

Conclusion: The proteomic approach proved its suitability to deliver new insights into the process of skin graft taking on the protein level. Further analyses are on-going revealing the involvement of novel proteins in engraftment. This knowledge may be beneficial for tissue engineering of skin in the future.

Figure 1

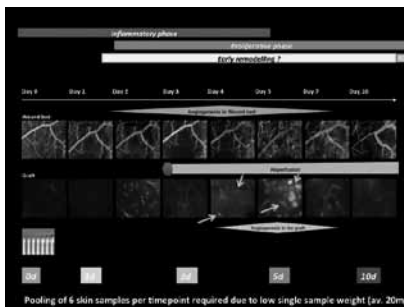
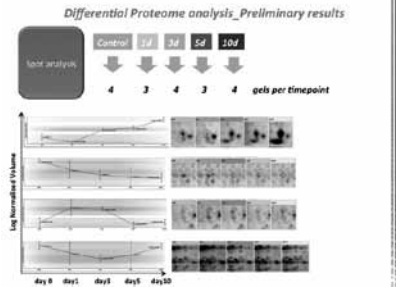


Figure 2



LOP25: Electrical burns in adults

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Introduction: Electrical burns account for up to 10% of burns admissions worldwide. Although a potentially serious mechanism of injury, there exists limited British data. The aim of this study was to describe the epidemiology, presentation, management and complications of electrical burn injuries in adults referred to a UK Regional Burns Unit.

Methods: A retrospective case note review of all adults with electrical burns admitted to Nottingham University Hospitals NHS Trust Burns Unit from 2006-2012. Data were collected using the International Burn Injury Database software (IBD v1.1). Data were presented as means ± SEMs.

Results: Forty-one cases were identified. The mean age was 40.4±2.1 years. 92.7% were male. The most common activities causing the injuries were work (39.0%) and DIY (31.9%). A low voltage

Discussion: Electrical injury is an infrequent but potentially serious cause of injury in adults. Minor injuries may be successfully managed non-operatively.

LOP26: Transcription of extracellular matrix components and proangiogenic factors is increased in endothelial cells after cocultivation with primary human osteoblasts

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Introduction: Providing an adequate vascularization is one of the major challenges in bone tissue engineering applications. A promising approach is the cocultivation of the primary cells namely osteoblasts (OBs) and endothelial cells (ECs). Manifold studies reveal that the coimplantation of OBs and ECs in tissue engineering constructs results in the formation of well perfused blood vessels and enhanced osteogenesis. In order to understand the molecular interplay between OBs and ECs we performed microarray gene expression profiling on ECs after cocultivation with OBs.

Materials and Methods: For microarray analysis OBs and ECs were cocultured in a ratio of 1:1. After 48 h cells were separated and RNA was isolated. Total RNA was processed and the resulting cDNAs were fragmented, labeled and hybridized to the microarrays. After scanning the arrays the data was further processed with Genedata Expressionist[®] and MetaCore[™]. In order to validate our findings we performed quantitative real-time PCR.

Results: Pathway analysis using the MetaCore[™] platform and literature research suggested a striking upregulation of transcripts related to extracellular matrix (ECM) and cell-matrix interactions. Most of these upregulated transcripts are able to influence OB's cell physiology e.g. proliferation, apoptosis and osteogenic differentiation. In addition to that a number of major angio-genetic factors were upregulated.

Conclusion: Enlightening the molecular changes on RNA level our data confirm that

ECs enter into a proangiogenic state after cocultivation with OBs. Furthermore this study underlines the significance of ECM components produced by ECs concerning OB's cell physiology and the possibility of ECM as a therapeutic target.

LOP27: Association of exosome secretion and drug resistance in aggressive lymphomas model

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Introduction: Although significant proportions of patients with aggressive B-cell lymphoma are cured by R-CHOP immunotherapy, tumor cell susceptibility to chemotherapy varies, with mostly fatal outcome in cases of resistant disease. Here, we analyzed there the clearance of chemotherapy associated with exosome release and ABCA3 expression.

Material & Methods: Diffuse large B-cell lymphoma (DLBCL) cell lines SuDHL4, Balm3 and OCI Ly1 were pulsed with doxorubicin, vincristine and vinblastine in vitro, washed twice and incubated in exosome-free medium for 24h. Lymphoma derived exosomes were analyzed by HPLC measurement, and expression of the ABC transporter A3 (ABCA3) expression. The combination treatment of chemotherapy and pharmacological blockade of exosome formation (indomethacine, rapamycin and U18666A) and the silencing of ABCA3 by using short hairpin-RNA (shRNA) viability were measured by MTT.

Results: Using HPLC measurement we were able to detect different amounts of doxorubicin, vincristine, and vinblastine in exosomes and cell culture, patients supernatants. We confirmed significant inhibitions of exosome release occurring at nontoxic concentrations of the drugs. Diminished exosome release was

associated with increased efficacy of immunotherapy. Also, silencing of ABCA3 by lentiviral shRNA constructs reduced exosome release from the cell line models Balm-3, Su-DHL-4, and OCI-Ly1. Concordantly, silencing ABCA3 also increased the susceptibility of the lymphoma cells to immunochemotherapy.

Conclusion: We here found that exosomes participates in resistance to chemotherapy. Both pharmacological blockade and silencing of ABCA3 enhanced the susceptibility of target cells to cytotoxic agents.

LOP28: Hyaluronic acid nerve guide for peripheral nerve injury repair up to 2cm

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Introduction: Peripheral nerve lesions are common due to car accident, working and domestic injuries. They may cause a loss of function (sensitive and motor) characterized by distal wallerian degeneration associated to the proximal nerve regeneration. Authors present a new nerve guide device made of hyaluronic acid for the repairing of this trauma in presence of a defect up to 2cm.

Materials and Methods: November 2011-January 2012: 15 Wistar studied, mean weight 180gr. On each rat an inverted autologous sciatic nerve graft (control) on one leg and a hyaluronic acid tubular conduit on the other leg (study) were used to repair a jatrogenic defect up to 2 cm. Prolene 9/0 was for the epineural suture. At 7, 30 e 60 days motor function was evaluated and objectified throught a grading scale (poor-moderate-good-complete), elaborated by us. Morpho histological (E/E) and immunohistochemical (s-100) studies were carried.

Results: Techniques used for nerve repair up to 2cm were: autologous nerve grafting and tubulization by means of new jaluronic acid tubes. Hyaluronic acid nerve guide allows an appreciable nerve regeneration throught a

"simple to use" technique also by novices, with a "ready to use" device, eliminating donor site morbidity in presence of small nerve defect, using a totally bio-compatible material which is gradually decomposed and completely absorbed by the body, avoiding any nerve compression.

Conclusions: This new device is a valid option for nerve lesions up to 2cm in length. This easy to use technique can be mastered in a short time by novices, with satisfactory results if compared with more widely used tubes, lowering costs (hospital stay, cost of the device, elimination of autologous nerve harvesting) for each patient.

LOP29: Novel methodology using diabetic peripheral blood stem cells for effective tissue regeneration

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Introduction: The quality and quantity of endothelial progenitor cells (EPC), i.e., CD34+ cells is known to be impaired in diabetic patients, thereby raising declined tissue repair in autologous EPC therapy. Recently, we have disclosed the newly developed quantity and quality control culture (QQc) system to potentiate the vasculogenic property of EPCs for tissue repair and regeneration. Herein, we investigate the efficacy of diabetic post QQc-CD34+ cell transplantation for wound healing.

Materials and Methods: CD34 + cells were isolated from 25 ml of peripheral blood in diabetic patients by auto MACS system, then underwent QQc for 7 days. The vascular regeneration capability of CD34 + cells pre- or post QQc was evaluated with EPC colony forming assay (EPC-CFA), tube formation assay, and FACS. In vivo wound healing and vasculogenesis was evaluated by pre or post QQc CD34 + cells cell therapy in Balb/c nude mice.

Results: QQc increased the CD34+ cell num-

ber by 5 folds and significantly increased *in vitro* vasculogenic potential and tubular formation activity ($p < 0.05$). Transplantation (Tx) of post-QQc CD34+ cells consecutively unveiled the greater closure, as compared with that of pre-QQc CD34+ cell Tx or PBS. Further, Tx of post-QQc CD34+ cells promoted wound granulation, or wound maturation as well as vascularity vs that of pre-QQc CD34+ cells or PBS group at day 14.

Conclusion: Our results indicate that QQc not only enhances vasculogenic potential of EPC but enhances skin tissue regeneration. QQc system maybe novel alternative cell based therapy for tissue regeneration.

LOP30: The development of a novel, bio-active preadipocyte loaded fibroin biohy-bridge for the augmentation of soft-tissue defects

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Question: Defects of subcutaneous adipose tissue in the facial area with a loss of the isolating layer to the deeper laying structures cannot be reconstructed adequately without the use of suitable soft tissue transplants. Nowadays, autologous adipose tissue obtained by liposuction is commonly used, even though it has known shortcomings. The transplants shrink and harden or are even lost completely over time. Neovascularisation and nutritive supply are crucial factors for the survival of the transplanted adipose cells. This project aims to develop an alternative to these conventional techniques by utilizing a novel scaffold material consisting of fibroin that presents the growth factors *vascular endothelial growth factor* (VEGF) and *fibroblast growth factor -2* (FGF-2) and was evaluated *in vitro* as a potential adipose tissue transplant after being cultured with preadipocytes.

Methods: Transgenic silk worms integrate VEGF and FGF-2 into the silk thread, which is the basis for fibroin, by which the scaffold becomes bioactive. The applicability and biocompatibility of these novel bioactive scaffolds as a carrier material for preadipocytes was examined. After seeding the scaffolds with preadipocytes, standard biocompatibility tests, ELISA tests and rt-PCR as well as immunohistochemical examinations were performed.

Results: The scaffolds showed a good penetration by the preadipocytes and a full differentiation to adipocytes was possible. The biocompatibility tests showed at all times a long lasting survival of the cells without a reduction of the pH-value

Conclusions: This novel technique has the potential to provide large volume adipose tissue transplants, which could be specifically cultured. The *in vitro* data shows a good biocompatibility. A further evaluation of these promising scaffolds is will be performed *in vivo*.

LOP31: Peripheral nerve repair – Multimodal comparison of the regenerative potential of adipose tissue derived cells in a biodegradable conduit

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Introduction: Tissue engineering is a popular topic in peripheral nerve repair. Combining a nerve conduit with supporting cells could offer an opportunity to improve clinical outcome. Aim of this study was to provide a broad overview over promising transplantable cells under equal experimental conditions over a long term period.

Methods: 1 Mio. of the following cells were introduced into biodegradable fibrin conduits: rat adipose-derived stem cells (rASCs), Schwann cell (SC)-like differentiated rASC (drASC), rat SCs (rSCs), human (h-)ASCs from the superficial and deep abdominal layer as well as human stromal vascular fraction (SVF). A 10mm gap in the sciatic nerve of female Sprague Dawley rats (7 groups of 7 animals, 8 weeks old) was bridged through the conduit. As a control we re-sutured a nerve segment as an autograft. Longterm evaluation was carried out after 16 weeks comprising walking track, morphometric and MRI analysis. The Sciatic Function Index was calculated. Cross sections of the nerve proximal, distal and in between the two sutures were analysed. Gastrocnemius muscle weights were compared and MRI analyses performed.

Results: MRI proved biodegradation of the conduit. Correlating trends throughout the different evaluation techniques could be shown: Superficial hASC supported regeneration better than deep, in line with published in vitro data. SC-like drASC had the best regeneration potential compared to other adipose tissue derived cells.

Conclusion: Comparison of the most promising cells in a multimodal manner comprising functional and morphometric analysis revealed that particularly differentiated ASCs could be a clinically translatable route towards new methods to enhance peripheral nerve repair.

LOP32: Early kinetics of investigation of collagen-GAG regenerative scaffolds in a diabetic mouse model

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Background: Collagen-glycosaminoglycan (c-GAG) scaffolds, originally designed to treat severe burns are now commonly used in patients with complex wounds associated with diabetes mellitus. Here we investigate how the thickness of the scaffold would affect cellular integration with the diabetic host and if this can be accelerated using subatmospheric wound therapy devices.

Methods: C-GAG scaffolds, 500 µm to 2000 µm thick, were applied to dorsal wounds in genetically diabetic mice. In addition, 1000 µm c-GAG scaffolds with and without silicone were treated with a subatmospheric pressure device (-125 mmHg). On days 5 and 10, cellular and vascular integration of tissues was studied by histology, immunohistochemistry, corrosion casting and PCR.

Results: Cells and vessels from the wound surface populated the scaffold to form layers with varying cellular density. Areas of high cell density and proliferation were noted at the bottom of the scaffold. Increasing the thickness of the scaffold did not affect the extent of cellular ingrowth, so that thicker scaffolds had a thicker residual acellular layer on surface. The thickness of cellular ingrowth was stable between days 5 and 10, while vessels seen in

the scaffolds on day 10 were not yet present on day 5. Subatmospheric pressure devices applied to silicone covered c-GAG scaffolds minimized the granulation tissue formation beneath the scaffold, which enhanced vessel ingrowth.

Discussion: The early kinetics of cellular integration into c-GAG scaffolds is independent of scaffold thickness in a diabetic wound model. Scaffold adherence to the wound and integration can be improved using a sub-atmospheric pressure device.

LOP33: Microstructured collagen scaffolds facilitate deterministic guidance of cells during wound repair

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Introduction: Wound healing is a complex process. Acellular dermal matrices (ADMs) are used to reconstruct tissue loss in burn and trauma patients. Currently available ADMs are avascular, precluding their use over poorly vascularized areas. We have previously shown that well-defined pores guide cellular adhesion and vertical invasion. Here we fabricate collagen scaffolds, containing vertical pores and lateral networks that guide both vertical and lateral cellular invasion

Methods: Polydimethylsiloxane stamps containing 100 µm pores, were transferred from SU-8 masters via soft lithography. Neutralized type I collagen was used with or without Pluronic F127 fibers to create 8 mm scaffolds with vertical pores alone, longitudinal channels alone, interconnected pores and channels and blank controls. Scaffolds were subcutaneously implanted into the dorsa of mice. After 7 and 14 days scaffolds were harvested. Immunohistochemical staining was performed and scaffolds imaged.

Results: Scaffolds containing pores, interconnected pores and channels showed an increased rate of cellular adhesion and invasion compared to blank controls. Lateral and vertical invasion was demonstrated by cellular invasion of longitudinal channels within scaffolds containing interconnected pores and channels.

Conclusions: We have demonstrated that biodegradable, biocompatible collagen scaffolds have the capacity to drive cellular adhesion and deeper invasion within a matrix. Scaffolds with contiguous vertical pores and perpendicular axial channels have the potential to revolutionize reconstructive surgery by facilitating lateral cell invasion and neovascularization, permitting its use over suboptimal, avascular wounds.

LOP34: Neuronal guidance factors – a new approach to reconstructive surgery

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Question: The regenerating limb of the axolotl (*Ambystoma mexicanum*) offers the opportunity to elucidate the crosstalk between vessels and nerves through neuronal guidance factors (NeGFs). These molecules both steer or repulse trunk vessels and thereby help fashion the architecture of the vasculature. It is our concern to dissect the prominent role NeGFs might play within the context of neovascularization and reinnervation after limb amputation.

Methods: NeGFs were cloned by rapid amplification of cDNA from axolotl limb regeneration tissue. Sequence identity was confirmed by sequencing and bioinformatics analysis. Temporal expression patterns were determined by quantitative PCR. A further examination of the function of Netrin/UNC5B was fulfilled in a newly established cell culture model and histological analysis performed. MRI was

used to visualize the regeneration of the vascular system in the regeneration limb.

Results: All nine NeGFs were abundantly found in regeneration blastema while characteristic expression patterns indicate functionally fine-tuned intercourses between pairs of ligands and receptors during limb regeneration. Orthologous sequences for the concerned mediators were detected. Analysis of HE stainings allows initial conclusion for the role of UNC5B in the regenerating limb: Stimulation with supplemented netrin resulted in enhanced growth of regeneration tissue in an in vitro model.

Conclusions: Not only were we able to identify these so far undescribed proteins in the axolotl, but also could we sequence them and illustrate their expression patterns. The role of Netrin/UNC5B has been addressed and the regeneration of vessels in MRI images revealed. The key for sufficient healing is the best blood supply obtainable. By investigating the navigating role of these factors we invest in future therapeutic answers to vessels' defects.

LOP35: Scarless regeneration of rat skin following ablation by non-thermal irreversible electroporation

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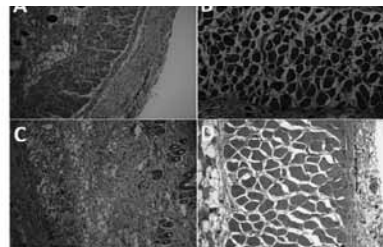
Introduction: Scar formation is a common clinical condition with no effective therapy and poorly understood pathophysiology. Irreversible electroporation (IRE) causes permanent damage to the cells in the targeted area by affecting the cell membrane, however, sparing tissue scaffolding and vasculature. Complete parenchymal tissue regeneration following IRE has been reported. In this study, we investigated the dynamics and outcome of tissue regeneration following IRE ablation of skin in a rat model.

Methods: 1cm² areas on the dorsum of *Sprague Dawley female rats* (200 g; n=5) were subjected to IRE using contact electrodes (4 x 45 pulses, 250Vmm⁻¹ field, 70µs duration, 1Hz, pause of 30s between treatments). Laser Doppler imaging was used to investigate the impact of IRE on skin perfusion. Histologic evaluation was performed at multiple time-points for up to 3 weeks.

Results: At the treated sites, IRE caused a temporary hypoperfusion for up to 6h followed by a period of hyperemia up to 3 weeks. Histology at 24h post-IRE showed: (1) severe damage to muscle fibers; (2) degranulation of mast cells; (3) swelling of nerve fibers; (4) undamaged vasculature; (5) cell fusion and apoptosis in sebaceous glands; (6) damage to hair follicles. At one week post IRE, minor inflammatory infiltrates were still apparent; muscle tissue, however, showed high proliferative activity. By three weeks post-IRE, complete restoration of skin architecture without any visible signs of inflammation or scar formation was observed.

Conclusions: Our results in a rat model show that IRE transiently altered skin perfusion and resulted in acute cellular death and inflammation that resolved with complete skin tissue regeneration and without signs of fibrosis.

Figure 1



Rat skin IRE. Damage and regeneration. A) Initiation of inflammation in the panniculus carnosus six hours after initial IRE (10X) B) Strong inflammation in the treated area (10X) 2 hours after IRE C) Initiation of muscle regeneration (20X) after 1 week d) 3 weeks after treatment. Diastolic and centralized nuclei indicated on active muscle regeneration (20X).

LOP36: Microtransplantation of epidermal cells with fibroblast into Matriderm® and *in vivo* application in a full thickness wound model

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Question: New skin substitutes for the treatment of burn patients or in reconstructive surgery pose an important issue in plastic surgery. The study's aim was to establish a sufficient method of injecting fibroblasts and keratinocytes into Matriderm®. Another goal was the establishment of a functional skin substitute.

Methods: Fibroblasts and keratinocytes were cultured, passaged and subsequently injected in Matriderm®. The cells' presence and viability was shown via LIVE/DEAD assay. The skin substitute was sutured into mice and the survival of the cells was assessed. Their proliferation was monitored with the proliferation marker cdc6, their integration evaluated in histology.

Results: The viability of fibroblasts and keratinocytes in Matriderm® could be shown for several weeks. Cells could be found throughout the whole thickness of the matrix. Their proliferation was proven. Finally the integration of the dermal substitute was seen in histology. The successful use of Matriderm® treated with epidermal cells provides us with a good alternative in skin substitutes. Cells can be kept vital. The introduced substitute resembles the function and integrity of healthy skin.

Conclusion: Based on this study further investigations can be done examining the characteristics of epidermal stem cells injected into a collagen-elastin matrix using it as a carrier.

LOP37: Surgical treatment of upper extremity tissue large defects using vascularized fibular flap

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Methods: From August 2007 to January 2013 we treated 25 patients with large segmental defects of one of the forearm bones, using the vascularized fibular flap. The majority of patients were young men of working age – 18 to 45 years (74%). Causes of bone tissue defects were: severe trauma - 6, osteonecrosis - 11, osteomyelitis - 2, false joints - 3, tumor - 3. Average duration of disease was 6–24 months.

The operation is performed simultaneously by two teams. The first one performed necrectomy, sequestrectomy of forearm tissues, osteotomy of the radius and ulna bones, blood vessels, that is, made preparations of “bed” for autotransplant. Second team performed harvesting of polycomplex tissues (skin, fascia, muscle, and a fragment of the fibula) by standard methods.

Results: Long-term results were followed in all patients. 24 patients had complete flap retention with consolidation of bone fragments, and full or partial restoration of the operated extremity function. In one case flap lysis was occurred. For an objective evaluation of the effectiveness of treatment of patients with segmental bone defect we used standard objective criteria: the amount of movement in three planes in adjacent joints, compared with the normal, hand dynamometry, radiological signs of retention. Functional insufficiency of the upper extremity according to the questionnaire DASH (The Disabilities of the Arm, Shoulder and Hand) in patients before surgery was 64,25±2,64 points, compared to patients who underwent surgery – 12,27±2,64 points. The use of vascularized bone grafts led to the retention of the recipient bone and autotransplant (type of primary bone callus), and restore

extremity function up to $85\% \pm 3,77\%$ points. Perfused flaps, improving the biomechanics by accelerating the process of restructuring of the transplant, can significantly reduce the time of treatment.

LOP38: Plastic reconstructive surgery techniques for treating complex urogenital fistulas

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Introduction: Urogenital fistulas represent not be underestimated complications after mutilating tumors or trauma. Surgical treatment is fairly challenging because incomplete resection often results in a disease's reoccurrence. These difficult circumstances lead to remission of life quality, rising patient's frustration & face the attending physician with enormous challenges.

Materials and Methods: 12/30 pat. with urogenital fistulas, which were surgically treated in our clinic from 2004-2012, fulfilled the given criterias for further retrospective statistical analysis (n=12). In those cases, VRAM- (5x) or Gracilis-flaps (8x) were used for plastic surgical reconstruction in order to cover up given tissue defects & to perform a functional continence-preserving reconstruction. Mean follow-up period was 5 1/12y (± 3 1/3y). Urogenital fistulas were e.g. caused by prostate carcinoma, rectal cancer, malignant melanoma, abscess or Crohn's disease.

Results: In all cases, a final surgical treatment of the long-lasting fistula sickness by VRAM- or Gracilis-flaps could be obtained (mean operating time: 5:31h ($\pm 1:17$ h) for VRAM- &

3:11h ($\pm 1:31$ h) for Gracilis-flap) . Primary outcome measures are quality of life & survival. 2/12 pat. passed away during given follow-up period. 10/12 pat. could be operated on in a continence-preserving way. In addition, post-operative complications are demonstrated. Furthermore, exact surgical steps of VRAM- & Gracilis-flap re-construction are presented exemplarily in 2 case reports.

Conclusion: Plastic surgical defect coverages of chronic urogenital fistulas provide an efficient & effective treatment option. With preformed flaps complex urogenital fistulas could be successfully eradicated & in most times continence was preserved. Main focus should be recovery of life quality. The continence success rate has to be defined on basis of each case individually.

Figure 1

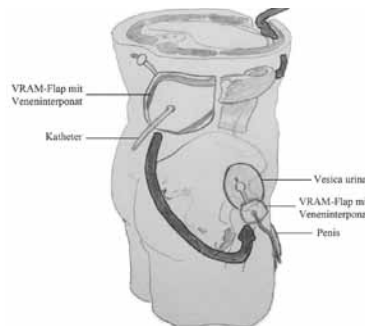
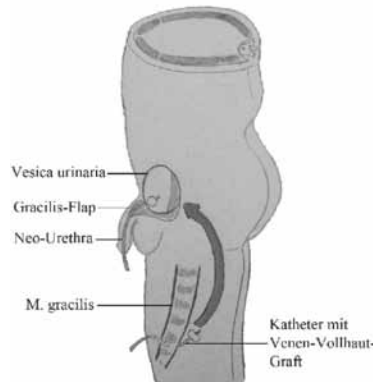


Figure 2



LOP39: Designing a breast reconstruction as a MS FTRAM rather than a DIEP is not protective against radiation damage

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Question: Radiation compromises free flaps following immediate breast reconstruction. Some believe designing the breast reconstruction as a muscle-sparing free transverse rectus abdominis musculo-cutaneous (MS FTRAM) flap rather than as a deep inferior epigastric perforator (DIEP) flap can offset the deleterious effects of radiation. We hypothesized that radiated MS FTRAM flaps would experience less fat necrosis than radiated DIEP flaps.

Methods: We retrospectively compared all consecutive immediate MS FTRAM and DIEP flap breast reconstructions that received direct radiation therapy after immediate breast reconstruction to non-radiated flaps over ten-years at a single institution. Logistic regression analysis identified potential associations between patient and reconstructive characteristics and the development of fat necrosis.

Results: 625 flaps were reviewed: 40(6.4%) radiated vs. 585(93.6%) non-radiated. Radiated flaps (i.e. both DIEP and MS FTRAM flaps) developed significantly more fat necrosis (22.5%) than the non-radiated flaps (9.2%; $p=0.009$). Direct comparison of the radiated and non-radiated DIEP vs. MS FTRAM fat necrosis rates showed no differences.

Conclusions: Designing a flap as a MS FTRAM rather than a DIEP flap did not protect flaps from the deleterious consequences of direct post-mastectomy radiation therapy following immediate breast reconstruction. Furthermore, both types of reconstructions experienced unacceptably high rates of fat necrosis when exposed to radiation therapy

in comparison to non-radiated flaps. We recommend surgeons not underestimate the consequences of radiation therapy to free flap breast reconstruction and pursue strategies that avoid direct radiation to the flap.

LOP40: Enhanced recovery after microsurgery

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Introduction: The concept of fast-track surgery or *enhanced recovery after surgery* (ERAS) is a peri- and post-operative care concept developed to reduce length of hospital stay (LOS) and morbidity after surgery. ERAS programs, have been reported from other surgical specialities but this is the first report of ERAS in microsurgery.

Material and Methods: We have performed autologous breast reconstructions since 1994. In 2006 we introduced an ERAS program. Important changes in procedure were: early mobilization, fewer and faster removal of drains and urinary catheters, discontinuation of epidural analgesia, planned early discharge and multinodal opiate-sparing analgesia with paracetamol, specific COX-2 inhibitor in 2006 and later an NSAID, and gabapentin.

The results, from all unilateral autologous breast reconstructions, with free abdominal flaps in the first 5 years after the implementation of the ERAS ($n=177$), was compared to our results prior to the ERAS ($n=292$). Flap type, operating time, blood loss, and ischaemic time, LOS, early flap related and systemic complications (< 30 days) were analyzed.

Results: The implementation of the ERAS reduced mean LOS from 7.4 days to 6.2 days. When compared to our pre-ERSA results, we found similar flap types, operating time, blood loss and ischaemic time. LOS > 7 days were due to complications, the most common being recipient area hematoma. No significant change in complication rates (6.5% vs 7.9%) or flap loss (2% vs 2%) were found but hemato-

mas were more frequent with the use of NSAID than COX-2 inhibitors (9% vs 4%)

Conclusion: Using a simple, peri- and post-operative care concept it is possible to reduce LOS after microsurgery by at least one day without increasing complication rates or flap loss. More work is needed to reduce LOS further and in the optimisation of the multi-nodal analgesia. Our considerations on how to achieve this is presented.

L0P41: The pig as an ideal training model for perforator flap dissection in living tissue

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Introduction: Successful perforator flap harvesting demands precise microsurgical skills attainable only through extensive training in experimental setting. Here, we describe five new types of perforator flaps in pigs, delineate their harvesting technique and provide evidence of their role as live training models.

Materials and methods: Ten common-breed pigs, with an average weight of 25 kg were submitted to CT angiography (CT-angio) using a 64-detector scanner (Siemens Somatom Sensation 64). Through maximum intensity projection (MIP), three-dimensional volume rendering (VRT) and multiplanar reformatting (MPR) imaging, detailed examination of the vascular anatomy of integument was performed. Using microsurgical techniques and CT-angio perforator mapping, true perforator flap models were standardized.

Results: Five perforasomes with consistent anatomy, around four anatomically distinct body areas (e.g. dorsal cervical, lateral thoracic, anterior abdominal, gluteal) were defined. On these, five different flaps were harvested based perforator vessels of either dorsal cer-

vical artery (DCApf), deep superior epigastric artery (DSEpf), thoracodorsal artery (TDAPf), intercostal artery (ICApf) or superior gluteal artery (SGApf).

Conclusion: The five new perforator flaps described, provide evidence that pigs can be efficiently used as live training models for perforator flap dissection.

SOP02: Lessons from revision cosmetic breast implant surgery – Indications, techniques and recommendations

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Introduction: Primary bilateral breast augmentation is the commonest aesthetic procedure in the UK and USA. Occasionally revision breast implant surgery is warranted. Multiple indications and complexity of surgery make it difficult to generalise the approach and patients present with a gamut of implant generations. We present a review of the literature, topical issues and our experience highlighting trends and treatment options for surgery.

Methods: A single surgeon's 12-year retrospective review of revision cosmetic breast implant patients referred to the senior surgeon. The indications, original implant surgery details, surgery adopted for revision surgery (including adjuvant procedures) and outcomes were noted.

Results: 100 consecutive patients were referred from various sources. Main indications were capsule contracture, suboptimal cosmesis, implant related (malrotation, malposition, rupture) and desire for larger implants. Complications: no implant infections, 4% developed haematomas, 2% had delayed healing requiring surgical intervention; 7% wanted further revision surgery, including larger implants. Specific implant and capsule procedures performed will be presented and a practical management strategy proposed.

Conclusion: Revision cosmetic breast implant

surgery is an increasing part of many surgeons' practice in private and public sectors. This topical subject requires on-going prospective review. The last decade has seen an evolution of breast implants available, the recent PIP implant scandal and FDA approval of silicone gel implants. Despite complexities in decision-making, surgical approaches and myriad of available implant types, a practical strategy can lead to more predictable outcomes.

SOP03: Accurately diagnosed basal cell carcinoma had better excision clearance

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Introduction: Basal Cell Carcinoma BCC is the commonest skin cancer. The purpose of this study is to determine the accuracy of the clinical diagnosis of BCC and the adequacy of surgical excision in a plastic surgery department.

Method: All patients who had an operative procedure in a plastic surgery outpatients department between December 2010 and November 2011 were identified. Pathology reports of all patients were reviewed to identify those with either a clinically suspected or histological diagnosis of BCC. The positive predictive value (PPV) and sensitivity were calculated for the clinical diagnosis of BCC. And the adequacy of the surgical excision was analysed.

Results: All the identified 1038 pathology reports of BCCs were included. The PPV and sensitivity for the clinical diagnosis of BCC were 71.5% and 88.7% respectively. 90.6% of the BCCs were adequately excised. The BCCs were near the deep &/or radial margins in 7.0% and extended to the deep &/or radial margins in 2.4%. Accurately diagnosed BCCs had better excision clearance.

Conclusion: This study established a benchmark for future audit. There is scope for improvement of the PPV and techniques such as Dermoscopy which have been proven to be helpful in diagnosis.

SOP04: The theories of perfusion zones of Deep Inferior Epigastric Perforator (DIEP) free flap: a clinical assessment using tissue oximetry method

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Introduction: The perfusion of various zones of DIEP flap has been the subject of extensive debate. The classic Hartrampf zones II and III were shown by Holm to be reversed. Other cadaveric or cross-sectional clinical studies proposed distinct "perfora-somes" for medial and lateral row perforator flaps conforming to Hartrampf and Holm's models, respectively. There is a paucity of clinical studies on continuous perfusion of these zones in the post-operative period. We assessed the perfusion of the zones and their post-operative changes using tissue oximetry method.

Patients and methods: 15 consecutive DIEP flaps were assessed for perfusion of the three zones of Holm using three oximeter probes continuously measuring the partial pressure of tissue oxygen (PtiO₂) for each zone over the first 48 hours after the operation. 9 flaps were raised on medial and 6 on lateral row perforator(s). For statistical analysis a linear mixed effects model was applied to the perfusion data with time and zone as fixed and location of the perforator as random effect.

Results: Zone 3 had lower PtiO₂ than zones 1 and 2 in lateral perforator group however zone 1 PtiO₂ was not significantly different to zone 2. In medial perforator group, zone 1 had greater PtiO₂ than zones 2 and 3. There was no difference in PtiO₂ values between zones 2 and 3. Perfusion rates and their differences

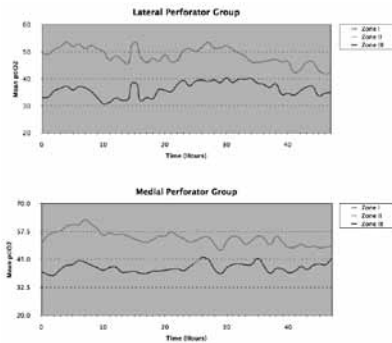
do not appear to change significantly over 48 hours across the zones.

Conclusion: In-vivo perfusion of the three zones of DIEP flap do not follow the previously proposed models strictly. Authors believe that the zonal perfusion is mainly affected by the calibre of the perforator vessel and the distance from the vessel as determined by Poiseuille's law rather than mere location of the perforator.

Figure 1

	Medial perforator (n = 5)	Lateral perforator (n = 5)	All (n=15)
Age	51.7 (44-55)	54.8 (40-69)	52.9 yrs (40-69)
BMI	27.4 (20.6-38.2)	26.2 (22.9-28.9)	26.9 (20.6-38.2)
Radiotherapy	1	1	2
Diabetes	1	0	1
Hypertension	1	1	2
Type of reconstruction:			
* Immediate	6	5	11
* Delayed	3	1	4
Flap used weight	536 gr (257-741)	545 gr (366-738)	540 gr (257-741)
Number of perforators:			
* 1	5	3	8
* 2	4	2	6
* 3	0	1	1
Ischaemia time	101 (62-127)	90 min (62-120)	96.5 min (62-127)
Recipient vessels			
* TD	7	4	11
* Imp	2	2	4

Figure 2



SOP05: Wrap or Un Wrap the P.o.P?? – a comparative study to determine the most effective method of application

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A great deal of surgical interventions in the hand often warrants the use of plaster of Paris (P.o.P) splints. Nine different geometries of the Volar POP splint has been investigated. The average maximum strenght (Load at failure) was measured for wrapping the splints with different materiales compared to a control unwrapped group.

Objective: To compare the strenght of the POP splints with or without wrapping.

Materials & Methods: Uniform rectangular shaped splints were made and divided into three groups according to the number of layers and subdivided according to the type of wrapping material. The strenght of the POP splints were then assessed by measuring the force needed to produce a fracture point especially at the wrist level.

Results: It has been shown that the average maximum strength (load at failure) the impact of wrapping the POP splints with different materials and can improve the strength and stiffness of plaster casts without adversely influencing weight, or cost.

SOP06: Atypical fibroxanthoma – Do we need guidelines?

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Introduction: Atypical fibroxanthoma (AFX) is a malignant derma tumour. A lack of appreciation for this tumour can lead to loss to follow-up and lack of treatment. No guidelines exist for the management of AFX. We present our 10 year experience with these malignant tumours of the skin.

Methods: A retrospective review of all cases of AFX was performed between 2002 to 2012. The

following outcomes; location of lesion, method of biopsy, excision margin, total follow-up period, metastases, recurrence and time to recurrence and finally deaths were recorded.

Results: Thirty-three cases of AFX were treated between 2002–12. The scalp (67%) was the commonest site and predominated in elderly male individuals (90.9%). Biopsy was performed in 30% of cases. Three percent of biopsy proven AFX did not go on to have formal excision. Four lesions (12%) were incompletely excised. The recurrence in incompletely excised cases was 50% and 6.1% overall. 18% of patients were discussed at an MDT. No deaths were recorded.

Conclusion: This is the largest UK series of AFX. It shows similar management issues that other series have described such as lack of follow-up, incomplete excision without re-excision and lack of MDT discussion.

SOP07: MEDIAL Crural Steal and Tongue-in-Groove procedures in Rhinoplasty"

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Question: How can we decrease the tip projection without changing the tip rotation and columella wide? MEDIAL Crural Steal procedure was never described before. On the contrary, for nose shortening there is described the Medial Crural Division but this procedure leads to columella widening.

Objective: MEDIAL Crural Steal technique is used by the authors in order to decrease the nasal tip projection, without making changes in tip rotation. This is ideal for male patients, for whom the rotated tip is not an option. On female – avoidind piggy nose.

Methods: More distal on medial crura intradomal sutures.

Patients: The records of 137 patients, who underwent open rhinoplasty.

Outcome measurements: tip rotation, projection

Instruments: digital application;

Results: out of 137 (100%) patients, 120 (85, 5%) had satisfactory results and had no complaints about the tip rotation and position. 17 patients (14,5%) had minor complaints.

Conclusions: MEDIAL Crural Steal and Tongue-in-Groove techniques offer an effective solution for a predictable tip rotation and projection.

Keywords: nose tip, medial crural steal, tongue-in-groove, lateral crural overlay, nose projection, tip rotation; References Guyuron B, Hossam. M.T. Foda,

Figure 1

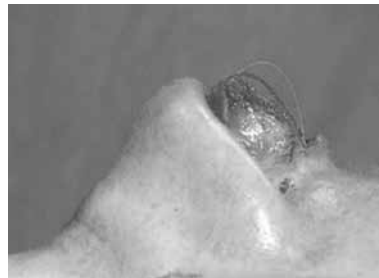


Figure 2



SOP08: Establishment of an anticoagulation protocol for the generation of axially vascularized tissue using a nanostructured bone grafting material in the sheep arteriovenous loop model

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Introduction: In an effort to overcome the inherent limitations of current treatment options for large-scale bone defects, a microsurgically created arteriovenous (AV) loop in an unharmed area of the body can be used for intrinsic vascularization of bone substitutes. Sufficient anticoagulation is essential to prevent thromboembolic events in microvascular animal studies, however in sheep no standardized scheme has been developed so far.

Material and Methods: The effect of antiplatelet (ASA, clopidogrel, ticagrelor) and anticoagulant (enoxaparin, dabigatran) drugs was evaluated in sheep in different doses by several in vitro analyses. Applying optimal anticoagulation regime, the nanostructured synthetic bone substitute NanoBone® block soaked with blood was implanted in the sheep AV-loop in an isolation chamber for 18 weeks. Constructs were evaluated by histological and imaging methods (μ -CT, MRI).

Results: For the first time an effective anticoagulation regime (high dose clopidogrel/age-dependent doses of enoxaparin) was established in sheep and resulted in AV-loop patency >93%. NanoBone® was vascularized almost completely with bone formation in some parts. Maturation of vessels could be determined by coverage with smooth muscle cells and imaging of the vascular tree.

Conclusion: The anticoagulation regime validated in this study can help to prevent early drop-outs due to thromboembolic events more efficiently in future translational experiments. NanoBone® proved to be a promising bone substitute for de novo formation of axially vascularized tissue in clinically relevant size, thus paving the way towards clinical application. Further studies aim at optimization of the bone formation and acceleration of vascularization.

SOP09: Multiplanar convergent mammoplasty planned by the divine proportion

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Background: The purpose of this study is to plan the mammoplasty according principles of the divine proportion, phi, associated to convergent multiplanar assembling with progressive sutures. The strategy is based on the constancy of the submammary fold line. It is orientated over a figure of 60° “V”-shape triangle which the vertex is situated at the umbilicus, point u, with each branch parallel to the mammary line.

Method: The approach has prospectively being investigated in 165 patients, n=330 breasts with follow-up ranging from 6 month to 3 years. The mean age was 36 years.

Technique: **P1**, the key point, is situated at the union of each branch of V triangle with the sub-mammary fold line. A straight line connecting **P1** crossing the mediosternal line origin the point **m**. The distance P1-m is transposed cranially from m over the medio-sternal line demarcating the point **m'**. **P2**, the apex of the new breast, is situated over each branch of the “V”-shape triangle at the distance =(P1 until m) cm x phi. It is equal the distance **P2-m'**. The assembling of the new breast is performed in multiplanar layers in a convergent fashion rotating the breast tissue from lateral, anterior axillary line, to P1 and medial, internal quadrant also in direction to P1. The main layer is

the sutures between the mammary tegument and the submammary fold fascia. Usually 10 to 15 stitches are performed.

Results: The data scored good in the majority of the patients according the Strassner grading. The complications were: scar ulceration in 15 patients, 9%, discrete asymmetry in 12, 7,5%, and partial nipple necrosis in 2, 1,2%.

Conclusion: Mammoplasty planned according the mathematical principle of divine proportion associated with multiplanar convergent assembling of the breast proportionates balanced breast with few complications.

SOP10: Treatment of Merkel cell carcinoma: Which way?

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Question: Merkel-cell carcinoma (MCC), first described by Toker in 1972, is a rare primary neuroendocrine cancer and the most aggressive cutaneous malignant tumour. Nowadays pathogenesis remains largely unknown and management guidelines are not well defined. We report our experience in treatment of MCC, focusing on the appropriate surgical approach and the effectiveness of adjuvant radiation and chemo therapy.

Methods: From January 2000 to October 2011, we treated 7 patients (4F, 3M; mean age 69 years) with MCC. Six tumours localized in the head and neck and one in leg. Mean dimension was 4,8 x 2,3 cm. In all cases performed a wide incision from 1.5 to 2 cm. In 6 cases a delayed sentinel lymph node biopsy (SLNB) was performed: 5 were classified as stage I and treated with adjunctive radiotherapy; 1 patient classified as stage III was treated with adjunctive chemotherapy. One patient refused SLNB and we decided, anyway, to perform adjunctive radiotherapy.

Results: To date (minimum follow-up 12 months) all patients treated by surgery plus adjunctive radiotherapy are alive and free from local or distance disease. The only patient clas-

sified as stage III, died 8 months later because of metastatic neoplasm diffusion.

Conclusions: In our series, the early diagnosis and the multidisciplinary approach seem to lead to a better prognosis. Authors believe that adjuvant radiation therapy would allow to perform a less aggressive surgical approach and a better control of local recurrence; so loco-regional integrated approach seems a good option to function-conservative treatment of this rare kind of cancer.

SOP11: Microsurgical primary and secondary prevention of lower extremity lymphedema secondary to melanoma treatment

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Introduction: Aim of the study is to evaluate the efficacy of microsurgical procedures for the prevention and management of lymphatic complications secondary to melanoma treatment.

Material and Methods: A retrospective review of patients undergoing groin dissection for melanoma treatment from February 2006 to April 2009 was performed. This study enrolled 18 patients (T-group) with melanoma in the trunk and 41 patients (E-group) with melanoma localized at the extremities. T-group had primary prevention of lymphedema with microsurgical derivative lymphatic-venous anastomoses (LVA, Fig.1) performed simultaneously with groin dissection (*Lymphatic Microsurgical Preventive Healing Approach*). On the other hand, E-group underwent LVA to treat already clinically evident secondary lymphedema of lower extremity following groin dissection, after an accurate oncological assessment (18 stage IIB/IIIA; 12 stage IIA; 11 stage IB). Pre-operative and post-operative limb evaluation was performed with venous duplex scan, lymphoscinti-graphy and water volumetry. Median follow-up time was 46 months (range 6-67).

Results: No lymphedema occurred after microsurgical primary preventive approach (T-group). Significant reduction (average 80% of pre-operative excess volume, Fig.2) of lymphedema appeared after microsurgery performed for secondary leg lymphedema (E-group). Adequate follow-up demonstrated the long-lasting patency of LVA. Lymphoscintigraphy was performed post-operatively and allowed to demonstrate the patency of microsurgical anastomoses in all the cases.

Conclusion: Proper preventive microsurgical procedures (LVA) demonstrated to be able to avoid the occurrence of lymphedema after trunk melanoma treatment. On the other hand, it is possible to correctly manage with lymphatic microsurgery already stabilized lymphedema secondary to melanoma of the extremities.

Figure 1

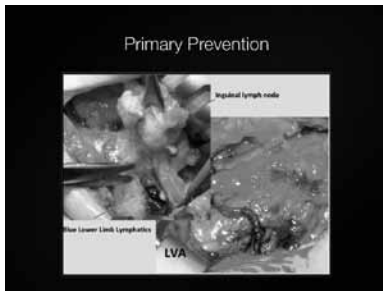


Figure 2



SOP13: Virtual planning of complex head and neck reconstructions – satisfactory match between real outcomes and virtual models

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Question: The reconstruction of large facial bony defects using microvascular transplants requires extensive surgery to achieve full rehabilitation of form and function. This retrospective study evaluates the virtual planning tool ProPlan CMF[®] to enhance precision and efficiency of the reconstructions.

Methods: Thirty patients with virtual planned immediate or secondary microvascular reconstructions of bony and soft tissue defects of the mandible and maxilla were acquired for this study. The virtual planning was done using ProPlan CMF[®] (Materialise NV, Leuven, Belgium). Based on a preoperative CBCT or CT scan of the defect and donor site, the resection and osteotomies were virtually planned. Patient specific plates were bended according to planned outcome models. Postoperatively, a CBCT scan was used to assess the accuracy and precision of the acquired results in comparison to the virtual planned outcome.

Results: 63 bone segments were transplanted. In average, the deviations between the virtual planning and the postoperative situation were for the defect sizes **+1.17mm**, for the resection planes **+/- 1.69mm** and **10.16°** and for the planes of the donor segments **10.81°**. The orientation of the segments differed by **6.68°** from the virtual plan, the length of the segments differed by **-0.12mm** and **+0.17%**, respectively, while the volume differed by **-31.02%**. The distance between the transplanted segments and the stumps were **+/- 1.49mm** and between the segments **+/- 1.49mm**.

Conclusions: ProPlan CMF® is a reliable and precise tool for virtual planning of microvascular bony reconstructions in the head and neck.

SOP14: Autologous lipofilling as treatment option for late seromas and double capsules in breast augmentation

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Question: The late complications of breast implants, either for cosmetic or reconstructive reasons, have attracted increasing interest. Many case reports and publications have created awareness regarding the phenomena of late seromas and double capsules. Currently, only the replacement of implants has been considered to maintain breast volume. Even in case of recurrent late seromas and double capsules, implant replacements have been conducted.

Case report: A patient underwent a bilateral breast augmentation because of hypoplasia. After one year she consulted our department with a swollen but painless right breast. Intraoperatively, a late seroma and double capsule were assessed. A partial capsulectomy with implant replacement followed. Two months later, she developed the same clinical symptoms in the left breast. Again she was treated with partial capsulectomy and implant replacement. Two years postoperatively the same patient presented with a recrudescence at the right breast. To diminish the risk of recrudescence this time, both implants and capsules were removed, but not replaced by new implants. The breast volume was maintained by a bilateral autologous fat lipotransfer.

Conclusion: The prevailing opinion in literature is that the treatment of late postoperative complications after breast implants should be accompanied by implant replacements. Even in case of recrudescence, no other alternatives than applying the same method have currently been provided. As a therapy proposal with good outcome we wanted to demonstrate

with this case the possibility of implant volume replacement by autologous fat lipotransfer to avoid recrudescence of implant complications.

SOP15: Morphological quantitative criteria and aesthetic evaluation of eight female han face types

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Methods: A photographic database of young Chinese Han women's faces was created. Photographed faces (450) were classified based on eight established types and scored for attractiveness. Measurements taken at seven standard facial landmarks and their relative proportions were analyzed for correlations to attractiveness scores. Attractive faces of each type were averaged via an image-morphing algorithm to generate synthetic facial types. Results were compared with the neoclassical ideal and data for Caucasians.

Results: Morphological proportions corresponding to the highest attractiveness scores for Chinese Han women differed from the neoclassical ideal. In our population of young, normal, healthy Han women, high attractiveness ratings were given to those with greater temporal width and pogonion-gonion distance, and smaller bizygomatic and bigonial widths. As attractiveness scores increased, the ratio of the temporal to bizygomatic widths increased, and the ratio of the distance between the pogonion and gonion to the bizygomatic width also increased slightly. Among the facial types, the oval and inverted triangular were the most attractive.

Conclusion: The neoclassical ideal of attractiveness does not apply to Han faces. However, the proportion of faces considered attractive in this population was similar to that of Caucasian populations.

SOP16: Establishment of murine embryonic fibroblast cell lines as alternative models to analyse the process of cell differentiation

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The investigation of processes of cell differentiation provides an ideal advancement of research and medical care in regenerative medicine. However despite of many applications of cell differentiation in modern research, numerous unresolved questions remain to be clarified and need detailed investigations. The aim of this study was to find standardized cell lines for using them as models to analyse the process of cell differentiation. We analysed the differentiation ability of three murine embryonic fibroblast cell lines into adipogenic, chondrogenic and osteogenic lineages using histological stainings, Western blot and real-time PCR. NIH-3T3s and MEFs were able to differentiate into adipogenic, chondrogenic and osteogenic lineages. Both cell lines expressed typical marker genes and proteins. Interestingly the Flp-In-3T3s did not differentiate into any of the three mesenchymal lineages, although the Flp-In-3T3s are genetically very similar to NIH-3T3s. The results were confirmed by histological stainings. Mesenchymal stem cells (MSCs) and mesenchymal progenitor cells (MPCs) have been extensively characterized according to their multipotent properties and are accepted for their potential of differentiation. Flp-In-3T3, NIH-3T3 and MEF are standardized murine embryonic fibroblast cell lines. They are usually used for DNA transfections, recombinant protein expression, and as "feeder cells". Unlike the MSCs and MPCs they are easy to obtain, to expand and they also do not change their structure and morphology even on higher passages. Our results suggest that Flp-In-3T3, MEF and NIH-3T3 are highly suitable to be used as a new alternative model system to analyse the process of cell differentiation.

Figure 1

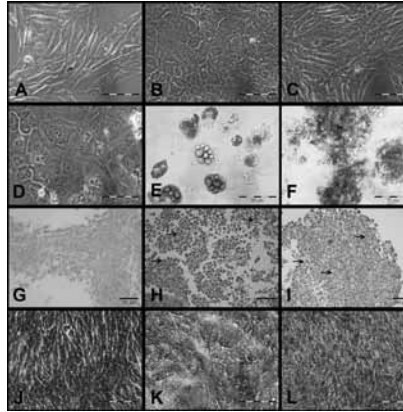
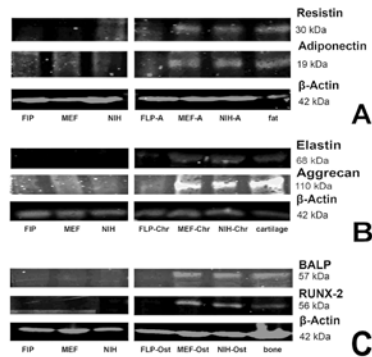


Figure 2



SOP17: Defining the transition from de-vivo to tissue in acellular dermal matrix

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The use of acellular dermal matrices (ADM) is becoming increasingly common in reconstructive surgery. How well an ADM has "incorporated" with a host tissue is an ill-defined concept, and may mean different things to different surgeons. In this study, we try to identify and delineate the individual steps required for matrix transition from devivo to tissue.

Studies are performed in a rat model system, primarily using bovine fetal collagen matrix (SurgiMend). Initial experiments suggest three important phases: adherence, vascularization, and replacement/renewal. We hope this and future studies will provide further insight into the biology of these matrices to increase their utility in reconstructive biology.

Figure 1



SOP18: Outcomes for oncologic thoracic reconstruction with synthetic versus bioprosthetic mesh

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Question: Bioprosthetic mesh (i.e. porcine, bovine, or human acellular dermal matrix) has demonstrated advantages over synthetic mesh in abdominal wall reconstruction. We hypothesized that patients' outcomes would also be superior with bioprosthetic compared to synthetic mesh for chest wall reconstruction.

Methods: We retrospectively compared surgical outcomes for consecutive patients who underwent reconstruction of thoracic defects following oncologic tumor resection with either

bioprosthetic or synthetic mesh combined with locoregional flaps at a single institution over ten years. Multiple logistic regression analyzed associations between patient, defect, and reconstructive characteristics and surgical outcomes.

Results: 120 patients were included: 40 (33%) bioprosthetic vs. 80 (67%) synthetic. Mean follow up was 33.2 months. Multivariate regression analysis demonstrated a trend towards synthetic mesh experiencing higher overall complications (OR=2.9 [1.0-8.6]; $p=0.055$). Three factors more strongly predictive of overall complications than mesh choice included ≥ 4 ribs resected (OR=3.9 [1.4-10.7]; $p=0.009$), chronic obstructive pulmonary disease (COPD) (OR=16.4 [1.5-184.2]; $p=0.02$), and preoperative radiation (OR=2.7 [1.1-7.0]; $p=0.04$). Each of these three factors was also predictive of infection and mesh removal on multivariate regression analysis, whereas mesh choice was not.

Conclusions: Although surgeons should not routinely employ costlier bioprosthetic mesh for chest wall reconstructions that include flap coverage, bioprosthetic may be advantageous for patients with characteristics found to be independent predictors of infection (preoperative radiation, COPD, or ≥ 4 ribs resected).

SOP19: A prospective study of Transit Time Flow Volume (TTFV) measurement for intra-operative evaluation and optimization of free flaps

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Question: Transit time flow volume (TTFV) measurement, a non-Doppler-based ultrasound technology, has been shown to accurately evaluate the quality of coronary artery bypass grafts and improve outcomes of cardiac surgery. We hypothesized that TTFV measurements would also improve decision-making in microvascular free tissue transfer procedures.

Methods: We measured TTFV in 52 consecutive free flaps. Measurements were recorded at three times: In Situ, after flap elevation and isolation on its pedicle; Time 1, immediately following anastomosis and reperfusion; and Time 2, 30 minutes following anastomosis and reperfusion. Intra-operative decisions based on TTFV were documented.

Results: Arterial inflow was on average 1.5 times greater than venous outflow, and arterial resistance was 3.59 times greater than venous resistance. Free transverse rectus abdominis musculocutaneous flaps had the highest venous and arterial flows, and free radial forearm flaps had the lowest. Compared to the baseline (In Situ) measurement, all flaps had higher flows immediately after transfer (Time 1) ($p < 0.0001$), but no significant differences were seen 30 minutes later (Time 2) ($p = 0.68$). Arterial resistance, however, increased during that interval ($p = 0.006$). Operative decisions, including selection of the higher-flow vena comitans (sometimes the smaller of the two), and when to revise an anastomosis, were modified on the basis of TTFV findings in 19 (36.5%) of 52 cases.

Conclusion: TTFV provides novel physiologic flap data and identifies flawed anastomoses and higher-flow venae comitantes. These data have clinical value in microsurgery and hold the potential to reduce microvascular complications and improve outcomes.

SOP20: Microsurgical mandibular reconstruction in the Oculo-Auriculo-Vertebral syndrome (Goldenhar syndrome)

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Aim: Despite an incidence of 1:5600, the Goldenhar syndrome is often not recognized due to a high symptom variance. The pathogenesis is poorly understood. Eyes, ears, lower jaw, musculoskeletal system and internal organs may be affected. Due to the rare occur-

rence of severe forms there are usually only case reports. We report 4 patients in the age between 2–27 years which underwent a microsurgical mandible reconstruction.

Material and Method: Two 5-year-old female patients had a permanent tracheotomy in consequence of their micrognathia and the resulting upper airway constriction. A 2-year-old female patient had a micro-gnathia without tracheotomy. In this three cases, there was a gap in the lower jaw. A 27-year-old female patient with a micro-gnathia and soft tissue defect had complications after an alloplastic reconstruction with Bioverit. In all four cases a free flap bone transfer (2 fibulae, 2 scapulae) was performed. The anastomoses were examined by Doppler sonography. The resulting changes of the bone were controlled radiologically. The aesthetic result was judged by the preoperative and postoperative photographic documentation.

Results: All anastomoses showed a good flow rate. In all cases the mandible reconstruction was possible, no flap was lost. Mastication and respiration were normalized as far as possible. A soft tissues harmonization was achieved in all cases.

Conclusion: The described surgical approach allows a volume-stable reconstruction of the mandible and the soft tissue. It provides an opportunity for maxillofacial reconstruction in Goldenhar syndrome cases with vascularized tissue.

SOP21: Clinical outcome following symmetrisation procedures in the irradiated breast

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Background: Following breast conserving surgery (BCS) and whole breast radiotherapy, some patients may develop gross asymmetry. Symmetrisation surgery is usually limited to the contralateral breast, as procedures involving the index side are still considered an ab-

solute contraindication in many centres due to the effects of radio-therapy. Here, we present a series of patients who have undergone breast symmetrisation procedures following BCS and whole breast radiotherapy.

Methods: A retrospective analysis was performed on all patients undergoing BCS and radiotherapy by a single surgeon at our institution between 2003-10. Patients who underwent symmetrisation surgery involving the BCS breast were identified and clinicopathological data was extracted from the case notes. Primary clinical outcome measures were post-operative complications whilst cosmesis was a secondary measure.

Results: 16 patients were identified (8 reduction mammoplasty, 5 mastopexy, 1 Mastopexy augmentation and 2 augmentation procedures). The time interval between whole breast radiotherapy and symmetrisation ranged from 13 months to over 15 years.

No major complications (tissue loss/return to theatre) were noted. Minor complications occurred in 31% of cases; (2 fat necrosis, 3 minor degree of wound dehiscence with delayed wound healing). Despite prolonging their recovery all healed with satisfactory cosmetic results.

Conclusions: The risk of wound infection and delayed healing is increased in these patients but safety of the procedure is not compromised. Reduction mammoplasty and mastopexy/augmentation procedures can be completed safely in patients previously treated with radiotherapy, after careful patient selection and with close follow up.

SOP22: Capsular contracture in implant based breast reconstruction – the effect of porcine acellular dermal matrix

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Introduction: Irradiation of implant based breast reconstructions (BR) is known to increase capsular contracture (CC) rates from 10-20% to 30-50%. The use of acellular dermal matrix (ADM) has reduced CC rates to 2-3% in non irradiated BR. Experimental and clinical studies suggest that ADM may also reduce CC rates in irradiated breasts. The aim of the study was to evaluate the effect of porcine ADM (PADM) on CC rates in non irradiated and irradiated one and two stage BR.

Methodology: A single centre retrospective cohort study was performed from 12/2008 to 10/2012. 200 immediate implant based BR were performed using PADM for inferior pole coverage. Exclusion criteria was a follow-up less than 6month after last procedure (n=10), less than 1 year post radiation therapy in irradiated BR (n=9) and intra- and preoperative irradiation (n=4). Spear-Baker classification for irradiated BR was used for grading CC. Grade III and IV were determined as clinically significant CC.

Results: 150 BR matched the criteria. In 55 BR no follow up for capsular contracture could be done (loss of implant, change to autologous reconstruction (n=28), no follow up (n=27)). 122 BR were included for CC grading (84 non irradiated, 38 irradiated). 6% showed clinically significant CC in non irradiated BR (1.9% in one stage, 13.3% in two stage) and 13% in irradiated BR (0% in one stage, 18.5% in two stage)

Conclusion: The results support the clinical evidence to date of lowering CC rates when ADM is used in non irradiated BR. The study shows a significant reduction in CC rates in irradiated BR when PADM is used. CC rates were significant higher in two stage procedures. The results suggest a protective effect of PADM

against CC in non- and irradiated BR and expansion might trigger formation of CC.

SOP23: Age-related effect of monobloc fronto-facial distraction on orbital volume, morphology, and clinical outcome in 29 Crouzon-Pfeiffer cases – a controlled study

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Question: Monobloc frontofacial advancement by distraction (MBD) is a valuable strategy in the management of Crouzon-Pfeiffer syndrome (CPS) for functional and aesthetic gain. We ask whether MBD undertaken at infancy to adolescence achieves a stable volume expansion of the orbit in the treatment of symptomatic oculo-orbital disproportion.

Methods: CT radiologic data of 29 CPS patients (58 orbits, R= 3m-17yr), were assessed in Osirix software against that from 30 age-matched neurosurgical controls. Globe volume, orbital volume, orbital morphology and globe position in the orbit were obtained by manual segmentation, verified by a mesh-based semi-automatic technique (Nyström et al). Patient data included pre-operative, six-week post-MBD, and delayed postoperative (8-18 mnth) scans, correlated with ophthalmic examination findings.

Results: Control globe and orbit volumes are symmetrical. Volume increase of the orbit rises from 14-21cc aged 2-10 yrs and plateaus at 22cc aged >10yrs. Control globe protrusion is symmetrical, constant, and independent of age. CPS orbits are more symmetrical of volume than shape. Meanunoperated CPS orbital vol-

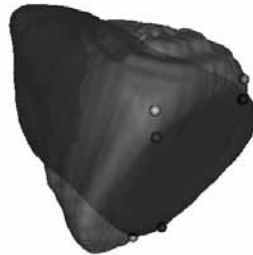
ume is 10.7 mls (10yrs). Crouzon globe volume approximates control, but globe protrusion significantly exceeds control (p10yrs, and is neither clinically nor statistically significant).

Conclusions: Monobloc frontofacial advancement relieves syndromic oculo-orbital disproportion and globe protrusion to ap-proximate normal. Surgical relapse characterises younger patients, nonetheless for whom functional necessity is paramount.

Figure 1



Figure 2



SOP24: Dynamic muscle transfer in facial nerve palsy – the use of Orbicularis Oculi muscle

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Purpose: To describe the results of dynamic muscle transfer with an orbicularis muscle flap in patients with House-Brackman grade 6 facial nerve palsy.

Material and Methods: A case series of 6 patients who underwent dynamic muscle transfer with a flap of healthy orbicularis oculi muscle from the contralateral side into the paralyzed side. All patients had a House-Brackman grade 6 facial nerve palsy. All the subjects had previous multiple surgical procedures to improve the eyelid function. In spite of this they were all symptomatic in terms of corneal exposure before orbicularis muscle transfer. All patients had post-operative follow up in excess of 6 months after the procedure.

Results: All patients improved symptomatically and had reduced lagophthalmos post-operatively. Five patients who had an absent blink reflex showed a significant improvement in their blink reflex post-operatively. There were no complications at the donor site.

Conclusions: All patients showed a significant improvement of their symptoms and also found to have their lagophthalmos reduced post-operatively. Most importantly, the blink occurred involuntarily at the same time as the blink on the normal side. The authors propose that a dynamic muscle transfer using the contralateral orbicularis muscle may be considered to improve lid closure and blink reflex to improve corneal exposure in patients with grade 6 facial palsy who have not benefited from conventional surgical procedures.

SOP25: A branching pattern of the facial nerve trunk with six initial branches: Possible implications for parotid surgery?

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Introduction: Aside from a few reported cases of trifurcation the facial nerve trunk (FNT) usually bifurcates to form the tempo-rofacial and cervicofacial trunks. We report a case of the FNT branching with six initial branches, which may have implications for parotid surgery. A similar case has not been previously reported.

Materials and Methods: The facial nerve of a formaldehyde-fixed cadaver, who came from a wider cadaveric dissection series, with no facial abnormalities was dissected. The lengths of the FNT from the stylomas-toid foramen to the branching points were measured using digital calipers.

Results: Six branches arose from the FNT within the posterior aspect of the parotid gland. Branch I arose 8.3 mm from the styl-omastoid foramen, and passed antero-superiorly into the gland. Branch II arose 13.6 mm from the foramen and passed antero-superiorly into the gland. Branches III-VI arose from the same point of the FNT, 15.5 mm from the foramen, and passed antero-inferiorly into the gland. All branches emerged before the facial nerve passed over the external carotid artery and retro-mandibular vein. The branches had no connections with each other apart from a single anastomosis between branch III and IV. All branches ran in the same plain within the parotid gland and no further anastomoses were observed before the nerves passed into the face.

Conclusion: The branching arrangement may have implications for parotid surgery as the surgeon would need to be aware of the presence of six early branches to minimise risk of facial nerve palsy.

Particular vigilance of Branch I, occurring proximally along the FNT, would be required when the FNT is being traced by anterograde dissection into the gland.

SOP26: *In-vivo* quantification of fibroblast proliferation seeded on a acellular human dermis in a multimodal therapy setting using the dorsal skinfold chamber model

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Introduction: Autologous cells inside a matrix must be supplied as soon as possible with nutrients. However, it is known that the vascularization *in-vivo* requires several days. The aim of this study was to find out, if seeded cells proliferate on an acellular human dermis despite the absence of blood supply in irradiated and unirradiated tissues after transplantation. In addition, we investigated, whether porous matrices affect the cell proliferation and vascularization.

Materials and Methods: 24 rats received a dorsal skinfold chamber and were divided into 2 main groups, irradiated and unirradiated. Rats were irradiated with 20Gy.

Each of these 2 groups received either matrices with or without pores. Fibroblasts were transduced with a fluorescent protein for cell tracking and seeded statically. Implanted scaffolds were examined every 3 days for a total of 12 days by intravital microscopy. Cells and vessel density were quantified semi-automatically.

Results: In all groups, cell numbers decreased until day 3 and increased again continuously until day 6 with varying extents. In the group without irradiation but with pores significantly more cells and vessels were counted compared to group without pores. In the groups with irradiation we found that the treatment

significantly inhibits cell proliferation and vessel density, wherein the pore group had significantly more visible cells and vessels than the group without pores.

Discussion: We have shown, that autologous cells proliferated within the human dermis, but the irradiation significantly affected the proliferation of the seeded cells and the vessel density. Further, the pores increased significantly the cell proliferation and vessel growth, particularly in irradiated tissues.

SOP27: Traction assisted dermatogenesis by serial intermittent skin tape application

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Introduction: Tissue expansion with use of internal tissue expanders is a reputable and reliable method of creating skin in many forms of reconstruction. Other techniques like presuturing, towel clips and skin stretching devices are useful but are mainly applicable intraoperatively usually a few days running up to the definitive reconstruction. All these procedures are invasive. We describe a technique in which micropore is used to serially expand the skin for resurfacing of healed defects in several areas of the body. Its biggest advantage is the low cost, non invasiveness, and can be very easily performed by the patient.

Methods: Twenty six consecutive patients made up of 8 males and 18 females were prospectively recruited for expanding the skin by our devised technique of intermittent serial traction micropore taping of skin at a weekly interval. Once the skin was expanded the scar revision was performed in 1 or 2 stages by excision and flap advancement. The age range was 8 to 48 years. The anatomical regions scar revision were scalp=6, face=9, upper limb=6, and lower limb=9.

Results: The size of the scars to be resurfaced ranged from 35 mm by 50 mm on the temple to 280 mm by 130 mm on the scalp. The av-

erage follow up following surgical correction was 11 months. The number of taping sessions ranged from 2-15 sessions with an average of 6.9. Fourteen patients had successfully completed the surgical management, 4 patients are in midst of their management. Four patients defaulted treatment and four patients the expansion failed to progress. Illustrative samples of some of the cases are described. .

Conclusion: Traction assisted dermato-genesis is an additional method of tissue expansion that is easy and cost effective in our reconstructive armamentarium.

Figure 1



Figure 2



SOP28: End-to-end vs End-to-side microvascular anastomosis – a meta ana-lysis of free flap outcomes

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Question: Does End-to-End (ETE) anastomosis have better outcomes compared to end-to-side (ETS) anastomosis in microvascular surgery.

Method: Based on the PRISMA statement, a systematic search of the literature was conducting using the Pubmed and Medline databases for data regarding end to end versus end to side venous anastomosis. 3045 articles were initially found over an unrestricted time period. 26 articles eventually were included in the study. Inclusion criteria included i) Explicit statement of anastomotic configuration (ETE and / or ETS) for arterial and / or venous anastomosis and ii) Thrombosis and/or flap failure data stated specifically for each of the anastomotic configurations. Data was combined using Mantel-Hansen Fixed effects and random effects modelling using MetaXL™. Outcomes of the analysis were risk ratios of flap failure and anastomosis thrombosis outcomes between the ETS vs ETE groups and 95% confidence intervals of risk –ratios (RR). Random effects (RE) modelling was utilised if there were unacceptable levels of heterogeneity in the methods of the studies. In cases of unacceptable heterogeneity, a subgroup analysis (Leave out one meta-analysis) would be conducted. Results were verified by analysis with Cochran’s RevMan 5.2 to ensure accuracy.

Results: Risk ratios for thrombosis and flap failure in the ETS vs the ETE venous anastomosis groups were 1.10 and 1.41 respectively. This data demonstrated little heterogeneity. Sub group analysis of the studies comparing arterial outcomes, with better controlled methods yielded RR of throm bosis and flap failure of 1.02 and 0.89 and demonstrated little heterogeneity.

Conclusions: Only marginal differences between rates of thrombosis and failure in between anastomotic methods have been observed. ETE and ETS may be considered valid techniques under certain relevant circumstances.

Figure 1

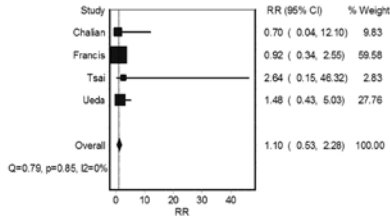
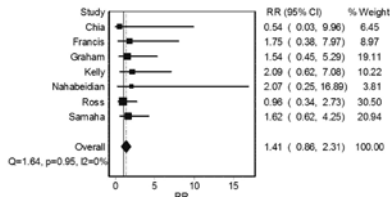


Figure 2



SOP29: Application of sequential flow-through free arterialized venous flaps in one-stage reconstruction of separate defects in the hand and foot

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Question: Venous flap, in free arterialized version, has been proved to be a versatile option in repair of hand defect. Not uncommonly, however, there will be more than one defects need to be repaired following crush injury or after release of severe scar contraction over hand and foot regions. The flow-through perfusion pattern of venous flap makes it feasible to design the flap in a sequential pattern, i.e. carrying more than one cutaneous islands in a single-pedicled flow-through design.

Methods: We evaluate the clinical versatility of such new flap design in one-stage reconstruction of separate defects in the hand and foot. The authors had applied this principle in repairing separate defects over multiple digital amputation stumps or separate traumatic foot defects in one-staged wound closure. Also, separate defects following release of segmental scar in contracted digit can be repaired in one stage with such flap design. The perfusion pattern of our flap is arterialized, antitrade with one inflow and one or more-than-one outflows in performance.

Results: In spite of early postoperative flap congestion, satisfactory survival of all flap components has been achieved in the author's series. Stable wound closure and good functional result are both obtained.

Conclusions: With meticulous flap design, inset and microsurgical execution, multiple nearby defects in the hand and foot can be reconstructed with a single sequential flap in a single stage operation. Using this new pattern of flap design, the application of venous flap in repairing hand defects can be extended to one-flap, one-staged reconstruction of multiple defects in a single operation.

Figure 1

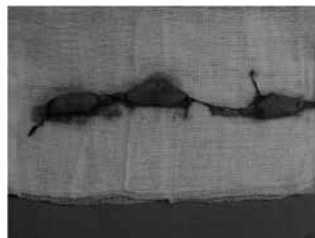


Figure 2



SOP30: Outcomes following the use of a novel enzymatic alginate dressing in the management of cement burns

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Background: Cement burns account for relatively few admissions to burns units but can be challenging to manage due to the insidious onset of injury and late presentation. For optimum wound healing a suitable micro-environment with exudate control and antimicrobial activity is essential. There is limited evidence on the comparative efficacy of wound management products in the specific treatment of cement burns. Here we describe our positive experiences following the use of a novel enzymatic alginate gel (FLAMANIL) in the UK North East and North Cumbria Burns Centre.

Method: A retrospective review of burns unit admissions from 2006 to 2012 yielded 33 cases of patients with lower and upper limb cement burns. This accounted for approximately 2% of all admissions to the unit. Clinical photographs taken of burns during their varying stages of healing were reviewed.

Results: Photographs taken demonstrate excellent wound healing with the use of Flamanil in superficial to mid-dermal burns. Wounds appeared to re-epithelialize well and a satisfactory level of debridement was achieved. There were no significant complications or adverse reactions noted. Whilst the presence of common skin organisms was prevalent within this case series this did not appear to cause any problems with wound healing.

Conclusion: Flamanil is an effective option that minimizes wound exudate, reduces bio-burden and provides an ideal environment for healing. As demonstrated by our unique case series it is clear that this is a safe and effective option worthwhile considering in the management of cement burns.

SOP31: Extra-abdominal (desmoid) fibromatosis – a review of current practice, long-term recurrence rates and survival

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Background: Desmoid fibromatosis is a rare benign soft tissue neoplasm often described as a low-grade fibrosarcoma. Although it does not metastasise, it tends to aggressively infiltrate local tissues complicating surgical excision and leading to high recurrence rates.

Methods: A retrospective analysis of all cases referred to our service over the last 8 years was carried out, with patients identified from local histo-pathological databases. All intra-abdominal, pelvic, and superficial cases were excluded.

Results: 53 patients were identified, with a mean age at diagnosis of 40.6 years, and the majority involving the trunk wall (64%). Only 47% of cases underwent pre-operative MRI, although 41 of the 53 cases were discussed at some point in a sarcoma MDT. Of those cases treated surgically, 22 had histologically incomplete excisions with 8 showing disease recurrence and a further 4 showing disease progression, compared to only 1 case of recurrence in those with histologically complete excisions. One death was seen from an unrelated cause.

Conclusions: The authors feel that these difficult cases are best managed with appropriate pre-operative imaging, biopsy and definitive management after discussion with a specialist sarcoma MDT. Due to potentially high recurrence rates follow-up is best performed by the same specialist team.

SOP32: Are plastic surgeons receiving adequate remuneration in reconstructive multi-speciality surgery?

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Introduction: Reconstructive surgery has long been recognised as a diverse speciality with a particular interest in problem-solving. This has led to plastic surgeons involvement with operations of other specialities, from post-ablative reconstruction to limb trauma salvage. Referrals from other specialities constitute an increasing workload for plastic surgeons but plastic surgeons only get full credit for patients under their direct care. The aim of this study was to determine the percentage of the National Health Service (NHS) tariff that the department of plastic and reconstructive surgery was entitled to, but did not receive, at Queen's Medical Centre (Nottingham, UK), having performed reconstructive surgery for other specialities.

Methods: Referrals were prospectively recorded on a computerised patient database over a one year period. Notes were reviewed and all reconstructive surgical procedures at Queen's Medical Centre coded using the NHS tariffs. The tariffs and attributed speciality were obtained. The fees for the Department of Plastic Surgery were calculated using the NHS tariffs.

Results: Eighty-five patients from other specialities received plastic surgical intervention. The referring specialities received £1,643,035 (\$2,632,684) for their procedures. The calculated fees for the Department of Plastic Surgery totalled £983,061 (\$1,575,188).

Conclusions: It is essential that speciality departments are remunerated accurately for work that is undertaken. There should be adjustments to the tariff to reimburse interventions undertaken by specialised services, such as plastic and reconstructive surgery.

SOP33: Composite tissue reconstruction of extensive sacral chordoma excision defects

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Introduction: Excision of sacral chordomas often creates large and complex defects with deep cavities, exposed viscera and sacral deficiency. The aim of this study is to describe our experience of composite tissue reconstruction following resection of extensive sacral chordoma.

Methods: Over a one year period, consecutive patients underwent reconstruction of complex defects secondary to sacral chordoma excision by a plastic surgery team at a regional spinal centre. The nature, extent and complexity of the surgical defects were examined and functional and aesthetic results of reconstruction were assessed.

Results: Three consecutive cases with extensive posterior peritoneal defects after sacral amputation for sacral chordoma are presented. Bilateral gluteus maximus adipomuscular sliding flaps enabled successful reconstruction of the posterior peritoneal defect in all cases. The cutaneous defects were closed using local perforator-based flaps. Midline plication of bilateral gluteus maximus flaps allowed relative midline fixation of the muscle, representing a reconstruction of gluteus maximus origins. Post-operative clinical examination confirmed that plication of the gluteus maximus muscles allowed these patients to on walk on a flat surface, walk up-stairs and right themselves from a bending position. Magnetic resonance imaging confirmed that the volume of the flaps was well maintained behind the rectum, three months post-operatively.

Discussion: Composite tissue defects following sacral chordoma resection present a reconstructive challenge. Despite this, satisfactory functional and aesthetic outcomes can be achieved by surgical teams possessing a variety of surgical and microsurgical techniques. Specifically, reconstruction of the gluteus maximus origin is a valuable augmentation of this procedure, allowing post-operative ambulation, hip extension and stability.

SOP34: Teaching aesthetic surgical skills on the basis of free flaps

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Introduction: Successful and appropriate teaching of aesthetic surgery is probably one of the best options in order to avoid future complications after performing aesthetic surgical procedures. A number of surgical procedures in every plastic surgical field are essential during the residency. Although plastic surgical trainees do perform numerous procedures, aesthetic operations are usually "out of reach".

Material and Methods: From January 2008 until March 2012 we performed 71 free flaps for the reconstruction of the breast. 48 patients had a breast reconstruction with the DIEP-flap and 23 patients undergone a breast reconstruction using the TMG-flap.

In order to cover the donor site defect of the DIEP-flap an abdominoplasty was performed. This procedure was performed by a plastic surgical trainee in 29 patients (60,4 % of the cases). The same concept applies to the coverage of the TMG-flap's donor site defect. We perform a thigh-lift in order to close the donor site. This "modified thigh-lift" was performed in 34,8 % of the cases (8 patients) by a plastic surgical trainee.

Results: Closure of the donor-site defect in 52,1 % of our performed breast reconstructions was done by a plastic surgical trainee. Performance of such operations has led to

improvement of surgical skills and self-confidence of the residents.

Conclusion: Introduction to aesthetic surgery through microsurgical reconstructive procedures seems like a paradox. Considering that the closure of the donor site defect of the DIEP- and the TMG-flap has the same principles as popular aesthetic operations, it could be considered an appropriate method to teach anatomical details and necessary aesthetic surgical skills. Thus, microsurgical reconstructive procedures can contribute to the quality of aesthetic surgical teaching provided during the plastic surgical residency.

SOP35: Improved diagnostic outcomes in craniofacial surgery by use of next generation DNA Sequencing

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L. Wilson¹⁴, S. Bennett¹⁵, R. Cornall¹⁵
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Introduction: Craniosynostosis has a prevalence of ~1 in 2,200 and in ~22% of cases, a genetic cause is found. This includes mutations of *TWIST1*, encoding a class II basic helix-loop-helix (bHLH) transcription factor, causing Saethre-Chotzen syndrome, typically associated with coronal synostosis.

Material and Methods: We performed whole-exome sequencing of 7 patients with non-syndromic bilateral coronal synostosis in whom all known gene tests were negative.

Results: Loss-of-function mutations in *TCF12* (Transcription Factor 12) were found in 3 cases. *TCF12* is a class I E-protein that heterodimerizes with class II bHLH proteins

such as *TWIST1*. Follow up Sanger sequencing identified 38 heterozygous *TCF12* mutations in 347 unrelated samples; 14 cases arose *de novo*, accounting overall for 32% and 10% of subjects with bilateral or unilateral coronal pathology, respectively. Significant non-penetrance was found in mutation-positive relatives, possibly related to haplotype. *TCF12* and *TWIST1* act synergistically *in vitro* and mice doubly heterozygous for loss-of-function mutations have severe coronal synostosis, showing normal coronal suture development critically depends on heterodimer dosage. Surgical trajectory of *TCF12*-mutation positive patients is more favourable than other genotypes. Together with another disease gene (*ERF*), diagnostic outcomes have improved from 21% to 24%.

Conclusions: Mutation of *TCF12* is a common cause of coronal synostosis. The post-operative course is uneventful. The TCF12-TWIST1 heterodimer is likely to regulate an embryonic tissue boundary in the skull. Molecular genetic testing for *TCF12* mutations is clinically indicated if mutational hotspots in *FGFR2/FGFR3/TWIST1* are negative.



Figure 1: Typical clinical and radiological appearances of bilateral (left) and unilateral coronal synostosis (right), both with *TCF12* mutations

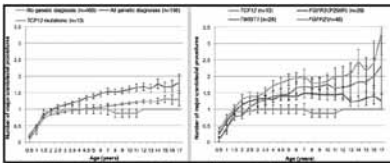


Figure 2: *TCF12* mutation-specific patients. Yellow curve reveals surgical trajectory whether a genetic diagnosis is known or not (left) and in comparison to other monogenic causes of craniosynostosis (right)

SOP36: Segmental anatomy of vastus lateralis muscle – guidelines for selective flap harvesting

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Introduction: Harvesting of the Vastus lateralis (VL) free muscle flap results in an impaired quadriceps function and an aesthetic deformity of the thigh. The whole muscle is often unnecessary for reconstruction, and selective flaps harvest can minimize morbidity. In this paper, the segmental anatomy of the vastus

lateralis muscle and guidelines for selective flap harvesting to preserve function, are described.

Materials and methods: Ten embalmed cadaveric lower limbs were investigated. Muscular partitions were identified according to morphological architecture and vascular and nerve supply. 20 VL or chimeric ALT-VL free flaps, were used in head and neck and lower limb, selectively harvested based on the new anatomical findings.

Results: Three distinct anatomic partitions were clearly identified in all specimens, separated by a superficial and a deep aponeurosis. Each muscular partition constantly received a segmental nerve supply, whose distribution followed the vascular branching pattern. The superficial partition was judged to be the best for flap harvesting, based on its superficial position, adequate size and maximal pedicle length.

The deep aponeurosis and the intermediate and deep partitions were always preserved, and intraoperative electrostimulation confirmed segmental innervation and functional integrity of the flap and of residual muscular partitions. The aesthetic outcome was satisfactory in all patients.

Conclusion: Anatomical basis for minimally invasive VL flaps harvest are provided in this study. Harvesting of flaps from the superficial partition fits most reconstructive needs, and leaves the majority of the muscle anatomically and functionally intact.

SOP37: Distally based fasciocutaneous flaps in the management of soft tissue war injuries of the lower half of the leg

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Background: Soft tissue war injuries affecting the lower half of the leg are a major challenge facing plastic surgeons. Distally based fasciocutaneous flaps have an important role in the management of these defects.

Objective: To demonstrate the role of distally based fasciocutaneous flaps as an alternative to free tissue transfer in the management of lower leg soft tissue defects.

Patients and methods: Thirty seven war injury patients with soft tissue loss in the lower half of the leg were managed by distally based septo-cutaneous flaps (19 cases), and distally based superficial sural artery flap (18 cases), donor areas were closed by partial thickness skin grafts in all of the cases.

Results: All of the 37 flaps survived and healed uneventfully except in 4 cases in whom partial necrosis of the flap occurred at the tip. Two cases of distally based superficial sural artery island flaps developed venous congestion and edema.

Conclusion: Distally based fasciocutaneous flaps are an important alternative to micro-vascular tissue transfer in treating lower leg war injuries. The versatility and arc of rotation of the distally based superficial sural artery flap were better than in distally based septo-cutaneous flaps.

Figure 1



Figure 2



SOP38: The Transverse Musculocutaneous Gracilis (TMG) flap for secondary breast reconstruction after simple mastectomy – a single center experience

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Introduction: Today's standard in secondary autologous breast reconstruction after mastectomy is a free flap derived from the lower abdomen or the back. If these donor-sites are

not available due to lack of tissue, prior operations or the patient's desire to avoid these donor sites, other alternative flaps obtained from the gluteal region or thigh represent feasible options.

Patient and Methods: In the time period of November 2008 till April 2013 23 female patients with the primary diagnosis of unilateral or bilateral breast cancer underwent secondary breast reconstruction using a free musculocutaneous gracilis flap (TMG). The patients were all treated by the Department of Plastic, Aesthetic and Reconstructive Surgery in Salzburg (A) with a single (N=20) or double (N=3) free transverse musculocutaneous gracilis flap following mastectomy (N=14), primary failed implant based reconstruction (n=11) or other flaps (TRAM N=1). The youngest patient was 28 years old, the oldest was 69 years old and the mean age of the patients was 45,34 year. The flaps were harvested either from the left (N=11) as from the right (N=15) side. In 3 cases a simultaneous bilateral breast reconstruction was performed. In 11 cases the left and in 15 cases the right breast was reconstructed following various previous surgical treatments.

Results: Using patients own autologous tissue a high patient satisfaction rate could be reached with 1 reported partial flap losses.

Conclusion: Our results demonstrate that the TMG flap is an excellent option for unilateral and bilateral secondary breast reconstruction in patients with small to medium-sized breasts, less abdominal tissue, excessive inner and posterior thigh fat and substantial skin laxity. Patients with bilateral reconstructions are also ideal candidates for breast reconstruction with the TMG flap, which contributes to excellent breast shape and donor-site symmetry.

SOP39: Minimal blood loss palatoplasty using saline hydrodissection

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Introduction: A minimal incision technique was used for reducing blood loss in palate cleft surgery. The technique of saline hydro dissection using 1:500,000 adrenaline saline solution was used in order to reduce operating time as well as blood loss in older cleft palate patients.

Materials and Methods: Patients: 86 cleft palate patients between the ages of 2- 14 years of age were operated between Jan 2012 and Jan 2013 using the modified saline hydro dissection method. There were 50 males patients and 36 female patients, with a mean age of 6.3 years.

Techniques used: 1:500,000 saline adrenaline hydro dissection was done. The palatoplasty was done using a button hole concept developed here through which the hook of hamulus is fractured and levators repositioned from the medial incision.

Observations: There was no mortality or morbidity with this method. There was minimal bleeding intra operatively and the operating time was short (20-25 minutes for the soft palate). All the others did well at follow up and healed well without significant palatal scarring.

Discussion: Older palates tend to ooze and bleed and this technique helps reduce the problem significantly. The blood loss was minimal and post op recovery excellent in all the cases without any major discomfort since all flaps were fixed and there was hardly any bleeding.

Figure 1

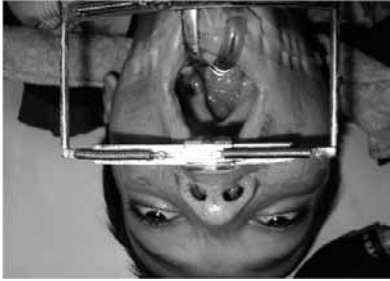


Figure 2



SOP40: Use of pre-operative MRI to predict tissue thickness of mastectomy skin flaps

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Background: Flap necrosis following skin-sparing mastectomy occurs in up to 12% of patients¹. Flap necrosis is thought to result from

compromised blood flow following excision of subcutaneous tissue with underlying breast parenchyma. As such, novel approaches to avoid removing excess subcutaneous tissue may help prevent mastectomy flap necrosis. To determine the extent of breast skin excision during skin-sparing mastectomy, we compared measurements of skin thickness via preoperative MRI versus intra-operative skin flap thickness.

Methods: We designed a retrospective case review of 12 patients who underwent preoperative MRI followed by skin-sparing mastectomy with intra-operative mastectomy flap thickness measurement. An experienced radiologist, blinded to surgical outcome or complications, measured average skin thickness where the superior and inferior skin flaps are developed. These pre-operative measurements were then compared with mastectomy flap thickness measurements obtained in the operating room.

Results: Based on MRI, median thickness of the flaps was 10.0mm (IQ range 6.0-15.0mm) and mean was 11.6mm (95% CI 9.1-14.1mm). Intra-operative skin flap thickness had a median of 7.0mm (IQ range 5.0-9.0mm) and a mean of 6.8mm (95% CI 6.1-7.5mm). Both MRI and OR measurements were normally distributed (Kolmogorov-Smirnov Test $P=0.09, 0.07$) and a paired t-test showed that MRI measurements were significantly higher than OR measurements ($p=0.0006$).

Conclusion: Mastectomy flap measurements are consistently thinner than preoperative skin thickness measurements via MRI. Interestingly, MRI measurements are much closer to published histological reports of normal breast skin thickness. Our results suggest that preoperative MRI may aid the breast surgeon to perform a more limited skin and subcutaneous tissue dissection.

Figure 1

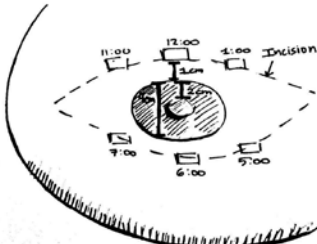


Figure 1. Locations along superior and inferior skin flaps where preoperative MRI measurements of skin thickness were made.

Figure 2

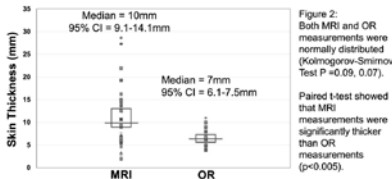


Figure 2: Both MRI and OR measurements were normally distributed (Kolmogorov-Smirnov Test $P > 0.05$, 0.07). Paired t-test showed that MRI measurements were significantly thicker than OR measurements ($p = 0.005$).

SOP41: Role of retinoic acid for endo-chondral bone formation

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Introduction: Retinoic acid (RA) is involved in cell proliferation and differentiation, morphogenesis and limb patterning. Various studies have suggested that RA play important roles in growth plate cartilage.

These roles, however, remain unclear. It was reported that mice constitutively lacking

Cyp26b1, RA-degrading enzyme, exhibit increased RA signaling and multiple malformations including severe patterning abnormalities. Roles of RA in growth plate cartilage cannot be examined in these mice, because patterning abnormalities cause primordial

cartilage defects. To investigate function of Cyp26b1 in endochondral bone formation, we prepared and analyzed conditional KO (cKO) mice lacking Cyp26b1 specifically in proliferating chondrocytes.

Methods: We prepare conditional knockout mice (cKO) by mating Cyp26b1 floxed mice with Col11a2-Cre mice expressing Cre recombinase in proliferating chondrocytes.

Results: Skeletons of Cyp26b1 cKO mice looked normal by appearance and histological examination before and around birth. The cKO mice showed growth retardation 3 weeks after birth. The heights of zones of proliferative chondrocytes were decreased in the central part of the growth plate of proximal tibia at 3-4 weeks old (Fig.1). BrdU labeling indexes of proliferative chondrocytes in the growth plates in the WT mice and cKO mice were $27.6 \pm 3.4\%$ ($n=5$, mean \pm SD) and $5.7 \pm 1.6\%$ respectively at 3 weeks old. Subsequently, the growth plate was abnormally closed only in the central part at 4-5 weeks old.

Discussion & Conclusions: Concentration of RA is considered to be increased in tissues lacking Cyp26b1. Cyp26b1 cKO mice showed abnormal proliferation/ differentiation of proliferative chondrocytes. This suggests that RA plays important roles in chondrocyte maturation and endochondral bone formation.

SOP42: A new training model in pigs allows mastering the approach of internal mammary vessels

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The internal mammary artery (IMA) plays an increasing role for breast reconstructive surgeons as recipient vessel in free flap breast reconstruction. We describe a live tissue-training model in pigs for the approach of internal mammary vessels, with close anatomical resemblance to the human model. Pig IMA anatomy was verified through angioCT-scan analysis in 10 animals in which the diameter of the IMA was 3.4 ± 0.6 mm (mean \pm STDEV) compared to 2.3 ± 0.42 mm (mean \pm STDEV) in humans. The surgical approach consists of a 5 cm incision parallel and lateral to the sternal margin, centered on the 2nd and 3rd intercostal spaces, with resection of the third costochondral cartilage. A real OR setting using live tissue, assures an optimal training experience and a fast learning curve.

SOP43: Development of perfusate for composite tissue allograft – new maneuvers extending the ischemic golden period

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Introduction: In the management of major limb amputation, it is important to consider ischemic time and reperfusion injury by free radicals when the blood supply is reestablished. To maximize the chance for success, replantation operations require minimizing of unnecessary ischemic injury. We report a successful case of hand replantation after prolonged ischemia and the development of a new perfusate using artificial oxygen carrying hemoglobin-vesicles.

Materials and Methods: A 55-year-old man suffered complete amputation of his left hand 0.5 inches distal from the wrist. We performed three simple maneuvers before hand replantation to shorten the warm ischemia time and minimize muscle necrosis.

1. Blood was aspirated from the femoral artery and infused through the radial artery.

2. The dorsalis pedis artery and vein were then anastomosed to the radial artery and vein.

3. One hour prior to replantation, University of Wisconsin solution was used to flush the hand vasculature.

The aim of these maneuvers was to maintain blood pH and electrolyte stability. Microsurgical replantation started 10 hours after the injury. Reperfusion was achieved approximately 12 hours after the injury.

Results and Conclusion: The entire amputated hand survived. There was no evidence of reperfusion injury. We achieved successful microsurgical complete hand replantation despite 12 hours of ischemia. This illustrates that it is possible to extend the ischemic golden

period. After this experience, we developed a "Dynamic Preservation Method" which focuses on the oxygen supply. This is a combination of ET-Kyoto solution (existing organ storage solution made in Japan) and artificial oxygen carrying hemoglobin-vesicles. This perfusion method may overcome the ischemic time limit which is the one of the problems encountered in replantation and allo transplantation.

SOP44: Spare parts concept in emergency limb reconstruction

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Tissues of amputated or unsalvageable limbs may be used for reconstruction of complex defects resulting from severe trauma. This notion is called the "spare parts concept" and is now a well established option for surgeons. A reconstruction strategy to treat complex trauma not only in the upper limb can not ignore this concept which represents the ultimate form of reconstruction allowing the surgeon to exert his creativity, and at the same time drastically decreasing the donor-site morbidity. In emergency, the surgeon should optimize form and function, and not necessarily recreate the pre-injury condition but always think towards future reconstructions in the mangled hand. In other cases the goal should be a quick, simple and fast recovery avoiding stiffness and "useless" fingers in aged patients. Priorities are restoring circulation, repairing divided structures, and achieving stable and adequate coverage, sometimes sacrificing a 'bad' digit to privilege a better one. Spare parts can be used as vascularized or non vascularized grafts, pedicled or free. In this review the different options and indications are schematized and illustrated for upper and lower limbs.

SOP45: Functional impairment due to surplus skin in successful post-bariatric surgery patients: a comparative analysis

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Introduction: Controversy exists between plastic surgeons and bariatric surgeons about candidates for post-bariatric surgery. According to Reynhold's criteria Excess Weight Loss (EWL) >50% is considered successful. However, plastic surgeons prefer to operate on patients with Body Mass Index (BMI) <32 kg/m². We evaluated functional discomfort due to redundant skin in successful post-bariatric surgery patients.

Materials and Methods: 360 patients undergone bariatric surgery procedures >1 year previously completed a questionnaire, which investigated whether they experienced impairment due to redundant skin and any inconvenience was graded using a visual analogue scale (VAS, 0-10). Mean postoperative BMI was 33.6 (6.0) kg/m². Mean Excess Weight Loss Percentage (EWL%) was 60.34%.

Results: The majority of patients (92,8%) reported problems with redundant skin, especially on abdomen, upper arms, and rear/buttocks. Patients with an EWL% >50 showed a significantly surplus skin impairment compared to patients with EWL% <50 (p<0.001) and between patients with postoperative BMI <32 and >32 kg/m² (p=0.011) was detected. No significant difference was found between patients with an EWL% >50 and with postoperative BMI <32 (p=0.71).

Conclusion: BMI ≤ 32 kg/m² might considered as cut-off value for post-bariatric surgery patients, but some successfully treated bariatric surgery patients (EWL% >50) are excluded, although they might also have benefits from plastic surgery.

SOP46: Early treatment of extravasation injuries using liposuction

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Introduction: Extravasation of vesicant drugs (e.g. chemotherapy, hyperosmolar solutions, radiographic contrast agents etc.) into soft tissues can lead to significant tissue necrosis. Depending on the extent of tissue damage, a wide range of reconstructive procedures may be indicated. The objective of this study was to determine if liposuction is a safe and efficient procedure for the early treatment of extravasation injuries with vesicant drugs to minimize damage and prevent necrosis.

Material and Methods: Between 11/2008 and 06/2012 there had been 62 recorded extravasation injuries with vesicant or irritant chemotherapeutic agents and radiographic contrast agents. 10 patients underwent liposuction. Indications for liposuction were: 1) Within 6 to 24 hours of injury; 2) Risk of very significant injury. No intervention was carried out in case of non vesicant drug extravasation (n= 50) and 2 patients were presented after 3–5 days with full thickness skin necrosis. The time lapse from time of injury to time of treatment was 4–17 hours (median 8 hours). Conventional liposuction was performed with Klein's solution (200–500ml, median 280ml).

Results: None the 10 patients who received early treatment with liposuction developed any sign of skin necrosis or even skin sloughing. No complications were encountered in 9 cases, in one case subcutaneous hematoma of the forearm subsided without intervention.

Conclusion: We introduce liposuction as a safe, simple and economic procedure for the early treatment of extravasation injuries of vesicant drugs for the prevention of full thickness skin necrosis. With this approach we were able to return the cancer patients early to their chemotherapeutic regime and prevent expensive and uncomfortable procedures for the patients.

SOP47: Hernia repair with coriumflap?: Vascularized!

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Introduction: Over the last decades the free avascular corium patch was considered a useful solution for hernia repair. It vanished into oblivion for two reasons: Firstly over the last years industry supplies better and better solutions with absorbable and non-absorbable meshes, up to recently disposable avascular xenogeneic dermal matrix. Secondly the donor site (often situated on the thigh) causes mechanical and cosmetic problems. Thus we had the idea to use a vascularised corium flap in selected cases in order to get a solid abdominal wall reconstruction for abdominal defects. This method can be used successfully if it came up to loss of fascia and muscle and yet sufficient flabby skin surplus near the defect.

Methods: We successfully applied this method on four of our patients and submitted them to postoperative monitoring.

Results: We annually operate from 150 to 200 patients with recurrent abdominal wall hernias in our hospital. Between March 2011 and September 2012 we got four possibilities to apply the before mentioned vascularised corium flap. All patients had previously undergone multiple laparotomies and mesh implants followed by mesh infections inducing the necessity of mesh explantation. Patients were aged from 35 to 82 years (mean 58 years), one female and three male. All of them resulted recurrence-free within a postoperative monitoring period of more than six months.

Conclusions: We consider the corium flap an economic solution practicable with basic surgical instruments. Anyway this method should be applied only in selected cases.

SOP48: Quality of life following breast reduction mammoplasty – a meta-analysis of published studies

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Introduction: Female breast hypertrophy represents a significant health issue worldwide, causing significant physical, cosmetic and psychological morbidity. Breast reduction mammoplasty has become one of the most common operations performed on the female breast today. The objective of this study was to evaluate the effect of breast reduction mammoplasty on health-related quality of life.

Materials-Methods: A systematic review of the international literature was performed in order to identify studies assessing the quality of life following breast reduction mammoplasty. Only randomized controlled studies (RCTs) using the validated and widely recognized Short Form (SF) 36 questionnaire were included in the systematic review. 3 studies were identified and a meta-analysis of the data on primary and secondary outcomes was performed.

Results: The effectiveness of breast reduction mammoplasty in women with breast hypertrophy was proven in all 10 outcomes. Specifically, in physical summary measure (MD 8,25 95% C.I.: 5,26-10,64), in mental summary score (MD=9,54 95% C.I.: 6,17-12,90), in physical function (MD=12,42), in role-physical (MD=13,03), in bodily pain

(MD=26,37), in general health (MD=7,81), in vitality (MD=12,94), in social function (MD=14,46) in role-emotional (MD=24,90) and in mental health (MD=9,83) the results were statistically significant.

Conclusions: Breast reduction mammoplasty in women with breast hypertrophy is an intervention that improves both their image and health-related quality of life. Given the fact

that many insurance agents don't cover the operation expenses, because of its aesthetic character, this meta-analysis is a significant proof of the improvement this procedure can offer on the health-related quality of life of many women.

SOP49: Heterotopic replantation of the fingers in reconstructive surgery of the hand

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Methods: From January 2009 to January 2013 we treated 21 patients with multiple traumatic amputation (MTA) of fingers. Total number of amputated fingers was 67. 31 (46%) of them were replanted, among them 22 (71%) were heterotopic replantations and 9 (29%) – orthotopic ones. Most patients (64.7%) had “poor” mechanism of injury – crushing or avulsion. All patients were divided into 2 groups. Group I included 13 patients with MTA of the fingers, combined with amputation of finger I. 11 of them underwent heterotopic transplantation of fingers into the position of finger I, and 2 patients – orthotopic replantation of finger I. Group 2 included 8 patients with MTA only of long fingers. In 7 of them heterotopic replantation of fingers was performed in order to restore finger II. Replantation level of fingers I and II was proximal to proximal interphalangeal joint. In 8 patients finger IV was replanted into the position of finger I.

Results: In the long term period (6 months to 4 years) we specifically examined 19 patients. 14 – after heterotopic, and five – after orthotopic fingers replantation. Good results were obtained in 16 patients after heterotopic replantation of 14 fingers and orthotopic replantation of 3 fingers. All patients had recovery of cylindrical, spherical, pincer and fist grip, complete true opponency of I finger. The ability to bend replanted finger I up to 3 cm and recovery of sensitivity to *normesthesia* were

also restored. In the immediate postoperative period acute circulatory disorder-related necrosis occurred in 5 fingers, (4 replanted orthotopically and 1 - heterotopically). Finally restored fingers vitality was achieved in 26 (83.8%) of all fingers.

SOP50: Compliance of randomised controlled trials in trauma surgery with the CONSORT statement: A systematic review

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Introduction: Randomized controlled trials (RCTs) are the criterion standard for assessing new interventions. However bias can result from poor reporting which also makes critical appraisal and systematic review challenging. The CONSORT criteria for non-pharmacological trials (CONSORT NPT) published in 2008 provided a set of 23 mandatory items that should be reported in an RCT. This is the first study to assess the compliance of RCTs in Trauma with CONSORT NPT criteria.

Method: The Medline database was searched using the MeSH term "wounds and injuries" for English language papers published between January 2009 and December 2011. Relevant papers were scored by two reviewers and compared against surrogate markers of paper quality (such as journal impact factor).

Results: 83 papers were deemed suitable for inclusion. The mean CONSORT score was 11.2/23 items (48.5%, range 3.38-18.17). Compliance was poorest for items relating to the adherence of care providers (0%), abstract (4.8%) and implementation of randomisation (6.0%). There was a significant correlation between the CONSORT Score and the Impact Factor of the publishing journal ($\rho=0.37$, $p=0.0006$) but not for the number of patients or authors or single vs multi-centre trials.

Conclusion: The reporting quality of RCTs in Trauma surgery needs improvement. We suggest ways this could be improved including; better education, awareness and a cohesive strategy amongst all stakeholders and the hard-wiring of compliance through electronic journal submission systems.

SOP51: Systematic review – surgical treatment of craniosynostosis with distraction osteogenesis

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Introduction: Craniosynostosis is a pediatric craniofacial condition that results from premature fusion of cranial sutures. This negatively affects skull growth and can cause neurological sequelae. Distraction osteogenesis has been advocated for its management as it holds selective advantages over conventional osteotomy techniques. Consensus on its efficacy and protocol is not well established. We sought to systematically review the current literature to determine the indications, protocols, benefits, and complications associated with distraction osteogenesis in craniosynostosis.

Materials and methods: Articles were selected in a 3-reviewer independent screening process (Figure 1). Included articles reported findings on (1) types of cranio-synostosis (syndromic/sutural), (2) protocols for distractor application, and (3) patient data on surgical outcomes.

Results: 23 articles met our inclusion criteria. Based on the Oxford Centre for Evidence-based medicine (OCEBM) definition, the majority of reviewed articles represented level 4 evidence. Exploratory pooling of data was obtained for patient demographics, operative data, protocols, and complications associated with distractor device. No relapse has been reported with the distraction technique.

For indications of raised intracranial pressure (ICP), ICP resolution was reportedly achieved in all distracted patients. (Figure 2)

Conclusion: Distraction osteogenesis represents an effective and feasible intervention compared to traditional methods of reconstruction in this clinical entity. Consistency in reporting of distraction protocols is warranted. Based on the limited strength of evidence from current studies, prospective clinical trials are recommended to evaluate the standards of distraction osteogenesis in craniosynostosis.

Figure 1

FIGURE 2: Characteristics of reviewed articles

Characteristics of studies				
Year of publication	2001-2012			
Location of studies				
-North America	6			
-Europe	3			
-Asia	13			
-Oceania	1			
Study design				
: Randomised controlled trial	0			
: Non-randomised controlled trials or series	0			
: Uncontrolled case series	23			
Demographics				
Total number of patients				
: Range of cohorts	3 to 70			
Age at operation (months)				
: Mean	17.65			
: Standard deviation	12.53			
: Range	2.5 to 84			
◆ Syndromic				
Apert				
: Crouzon	21			
: Pfeiffer	7			
: Saetho-Chotzen	6			
: Muenke	4			
◆ Suture type				
Scaphocephaly				
: Plagiocephaly	48			
: Brachycephaly	31			
: Trigonocephaly	28			
: Oxycephaly/Turricephaly	13			
: Pan craniosynostosis	3			
: Multi-sutural	11			
: Multi-sutural	8			
◆ Main indications				
Reconstructive				
: Raised intracranial pressure (ICP)	19			
Operative data				
	Mean	SD	Range	Unreported (n)
Previous surgeries for craniosynostosis (% of cohort)	-	-	10 to 75	0
Amount of blood loss (ml.)	338.8	310.76	50 to 2000	12
Amount of blood transfused (ml.)	217.3	141.85	-	14
Total operative time (mins)	224.81	51.54	170 to 375	0
Number of surgeries to complete distraction	-	-	2 to 3	0
Phases of distraction protocol				
	Mean	SD	Range	Unreported (n)
Latency period (days)	3.35	7.23	3 to 31	5
Distraction rate (mm/day)	1	0	0.5 to 1	8
Distraction period (days)	20.43	6.07	7 to 30	16
Consolidation period (days)	59.59	22.79	0 to 155	6
Outcomes & Follow-up / Postoperative complications				
	Mean	SD	Range	Unreported (n)
Distraction length (mm)	22.93	9.74	10 to 56	15
Follow-up duration (months)	23.56	21.63	6 to 130.8	10
% of cohort				
Resolved intracranial pressure (ICP)				
: Range	0			
Postoperative complications				
: Distractor breakage/loosening/breach/dislodation	2.9 to 83			
: Cerebrospinal fluid (CSF) leak	10 to 33			
: Dural tears	25 to 30			
: Distraction site infections / wound dehiscence/discharges/ hematomas/ edema / scalp erosions	5.7 to 29.2			
: Systemic illnesses	3.5			
: Death	1.8			

* Pooled estimates of mean and standard deviation (SD) are calculated based on size of study cohort
 n = Results indicates number of studies
 -/-/- indicates not available
 ◆ Results indicate the number of cases/patients

SOP52: Setting the standard for outcome reporting reconstructive breast surgery: Initial results of the BRAVO (Breast Reconstruction and Valid Outcomes) Study, a multi-centre consensus process to generate a core outcome set for research and audit in breast reconstruction

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Introduction: Careful selection of outcomes is important if research and audit are to inform clinical practice and direct policy-makers. Systematic reviews, however, have demonstrated marked heterogeneity of outcome reporting in breast reconstruction such that results from individual studies cannot be compared or combined. One solution is to develop and use core outcome sets (COS) – a scientifically agreed-upon minimum set of outcomes that should be measured and reported in all studies. We report the initial results of the BRAVO (Breast Reconstruction and Valid Outcomes) Study which aimed to develop a COS for reconstructive breast surgery.

Methods: A questionnaire was developed from a long-list of outcomes identified from

systematic reviews and qualitative work with key stakeholders and sent to a purposive sample of patients and professionals involved in the provision of specialist care. Participants were asked to prioritise outcomes on a scale of 1 (unimportant) to 9 (extremely important) and the proportion of respondents rating each outcome ‘very important’ (score of 7-9) was compared and contrasted between participant groups.

Results: The response rate was 55.6% (151/274 patients;88/156 professionals). There was agreement between seven out of 10 most-highly ranked outcomes including patient-reported cosmesis, cosmetic satisfaction, early complications and quality of life. Patients, but not professionals rated generic complications including bleeding as important, whilst professionals rated psychosocial issues including self-esteem and body image more highly than patients.

Conclusions: Patients and professionals prioritise similar outcomes, but areas of discrepancy exist. A further Delphi round in which outcomes are re-prioritised and stakeholder meetings to ratify the final decisions will be necessary to determine the final COS.

SOP53: Improving the tensile strength of tendon transfer fixation – the double ended tendon weave

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The rupture of tendon transfer is an uncommon but problematic concern amongst both orthopaedic and plastic surgeons. There are currently no examples in the literature of double ended tendon weaves, however it has been demonstrated that the more weaves performed in the transfer and the suturing technique used dramatically increases the tensile strength of the repair. We present a novel technique for a long-standing surgical procedure showing an increased strength of the double ended tendon weave as compared

with single ended "Pulvertaft type" weaves. We performed a prospective in-vitro direct comparison study using porcine cadaveric tendons to emulate its use in the clinical setting. Following the tendon weave procedure, the tendons were clamped into place in an Anstrom Materials Testing Machine. The tendons were then subjected to consistent deforming force at 20mm/min until complete rupture. The maximum tensile strength before rupture and the mode by which the tendon failed was recorded. The mean load at breakage point for the double ended weave was 375.94 Newtons, the standard Pulvertaft achieved a mean load at breaking point of only 315.78 Newtons. The difference between the mean load at breaking point in Newtons for the double ended weave and the standard Pulvertaft weave was 60.15 Newtons with a 95% confidence interval from 30.63 to 89.64 Newtons. The t test statistic for unpaired data was 3.99 with an associated P value of 0.0036. The new weave is significantly stronger. Clinically this extrapolates to a technique which increases the tensile strength of a tendon transfer, preventing ruptures and therefore altering surgical practice for the better.

SOP54: Use of bone-anchored devices for intuitive muscular prosthetic control

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Introduction: Upper-limb myoelectric prostheses rely on 2 control signals from surface electrodes, placed over muscles in the amputation stump, for limb control. To reduce factors such as lift-off & impedance variation, electrodes can be implanted directly on muscles of interest. Bone anchored devices can be used to overcome problems with prosthetic attachment and additionally used to transfer control signals from these implantable electrodes [1]. To improve control and enable more signal generation, nerves previously controlling the amputated limb can be redirected

to surrogate muscles, a technique known as targeted muscle reinnervation (TMR) [2]. We describe an *in vivo* model using implantable electrodes to record myoelectric signals (MES) from a muscle following TMR, utilizing a bone-anchor as a conduit to carry signals across the skin barrier.

Materials and Methods: An *in vivo* ovine model was used. A bone-anchor was placed trans-tibial and bipolar electrode sutured to *M. Peroneus Tertius* (PT). Motor nerve to PT was divided and coapted with a branch from peroneal nerve. Functional recovery was assessed over 12 weeks during treadmill walking.

Results: Functional recovery (MES & force-plate analysis) was observed after 6 weeks. Histological examination showed restoration of neuromuscular junctions. Recorded MES compare favourably with MES from healthy muscle.

Conclusion: The combination of implanted electrodes & direct skeletal fixation offers clear advantages over current systems for prosthetic attachment & control. This system forms the basis of a complete solution for prosthetic rehabilitation, which can also be used in the context of TMR.

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