Generation of axially vascularized bone tissue in the large animal
The transplantation of engineered bone will be evaluated in combination with angiogenic and osteogenic cells in clinically relevant dimension in the sheep tibia defect model.
3) Tissue engineering of axially vascularized bone in a small animal model
The aim of this study is to generate axially vascularized bioartificial bone tissue using bioactive matrices in combination with endothelial cells (EC) and adipose derived stem cells (ADSC).
4) Investigation of the specific cell-cell interactions between ADSC and EC concerning osteogenic differentiation
5) Biofabrication of cellularized and AV loop vascularized tissue containers for the transplantation of drug-producing cells
6) Intravital microscopy in the AV loop model To understand the mechanisms of de novo tissue formation in the AV loop model, we developed a suitable chamber model which allows intravital microscopic evaluation.
7) Ischemic tolerance of different tissues
By using the model of rat hindlimb amputation, extracorporeal perfusion, and replantation, we analyze and try to prolong the critical ischemia time of different tissues.
8) Perfusion-based de- and recellularization of a whole skeletal muscle
A skeletal muscle will be decellularized, thereafter recellularized and the construct implanted in vivo by vascular and nerve anastomosis to engineer a skeletal muscle.
9) Differences in functional cell properties of ADSC compared to stem cells from healthy adipose tissue and stem cells from tumor-associated adipose tissue.
10) Skin tissue engineering by the use of ADSC
Current treatment options for chronic wounds will be optimized using growth factors and ADSC.
Interaction of regenerative strategies and tumor progression
PI: Prof. Dr. R.E. Horch1,6, Prof. Dr. J. Beier1, Prof. Dr. A. Arkudas4,8, PD Dr. Boos4, Dr. I. Ludwig1,4,7, Dr. A. Cai1, F. Fried1
1) Intraoperative fluorescence imaging of tissue perfusion in free flap transplantation using the SPY Elite® system
To improve the knowledge of tissue perfusion in free tissue transfer and free flap autonomaization in the long term follow-up, intraoperative fluorescence imaging of tissue perfusion using a laser camera was performed.
2) Prospective analysis of grip force in common hand conditions
Hand conditions may be accompanied by a loss of hand function or grip force. This prospective study evaluates the effect of a surgical procedure on hand grip force.
3) Evaluation of carpal instability regarding scapholunate ligament injuries
The aim of this study is to evaluate wrist mobility between carpal bones using CT analysis in
order to invent new strategies to treat ligament injuries.

4) Influence of different silicone surface textures to prevent capsular fibrosis of the breast
Capsular fibrosis represents a significant complication following implantation of silicone breast implants, necessitating further surgical intervention. Experimental in vitro studies are conducted to investigate diverse silicone surface textures and their influence on capsular fibrosis.

5) Evaluation of an innovative negative pressure dressing in postobariatric patients
To improve postoperative wound healing and achieve better scar quality, this study compares an innovative negative pressure dressing to a standard wound dressing.

6) Comparison of thermography and ICG-angiography in the perfusion analysis of free flaps for autologous breast reconstruction
Intraoperative perfusion of free flaps from the abdomen for autologous breast reconstruction is assessed by using thermography and ICG-angiography.

7) Analysis of skin elasticity before and after body contouring procedures
In a prospective trial different skin elasticity parameters are assessed in patients after massive weight loss. Data are collected before and after body contouring procedures to gain more insight in the characteristics of the skin.

8) Comparison of shoulder function of patients after muscle-sparing and complete latissimus dorsi harvest
The aim of this study is the evaluation of the relevance of muscle-sparing latissimus dorsi flap harvesting regarding shoulder functionality and strength.

Clinical retrospective studies
PIs: Prof. Dr. R.E. Horch1,8, Dr. M. Schmitz2, Dr. I. Ludolph3, Dr. A. Cai4, Dr. W. Müller-Seubert5, Dr. T. Hauck1

1) Retrospective analysis of surgical therapy in cubital tunnel syndrome
In this study, outcomes and complications after partial median epicondylectomy in cubital tunnel syndrome are analyzed.

2) Retrospective analysis of body contouring procedures after massive weight loss in patients with body mass index greater than 35
In this retrospective study, complications after body contouring procedures in patients with a BMI greater than 35 are analyzed.

3) Negative pressure wound therapy with instillation in chronic-infected wounds
The aim of this retrospective study is to investigate an effect of negative pressure wound therapy with instillation with regard to a reduction of the bacterial load as well as the bacterial count in chronically infected wounds.

4) Analysis of quality of life and physical activity of postobariatric patients
The impact of body contouring procedures on quality of life and physical activity of patients that have undergone massive weight loss is retrospectively analyzed.

5) Negative pressure wound therapy in the treatment of chronic ulcers of the lower leg
In this study patients with problem wounds of the lower leg are investigated with regard to the use of negative pressure wound therapy and the defect reconstruction.

6) ICG-angiography for analysis of the zonal perfusion of free flaps from the abdomen in autologous breast reconstruction
By using ICG-angiography intraoperatively, the zonal perfusion of DIEP/msTRAM flaps is analyzed to gain further insight in the vascular anatomy and the perforasome theory and to optimize the outcome of such procedures.

7) The role of the pedicled gastrocnemius flap in covering defects in the knee and proximal lower leg area
This retrospective study evaluates the outcome of pedicled gastrocnemius flaps. The results are evaluated using a self-created and a validated questionnaire (Knee Outcome Survey).

8) Dupuytren’s disease
Retrospective analysis of severe, advanced and relapsing Dupuytren’s disease with actual evaluation by DASH-Score. Evaluation of the Erlangen distraction device.

Teaching
With compulsory and elective subjects, the Department of Plastic and Hand Surgery is involved in the curriculum-based teaching in medicine. In this context, besides a preclinical conjoint course together with the Institute of Anatomy, a microsurgical suture course is offered besides theoretical courses. Furthermore, MD and PhD theses are supervised.

Selected publications


International cooperation
Prof. S. Jiaming, Tongji Medical College, Huazhong University of Science and Technology, Wuhan: China