Department of Otorhinolaryngology – Head and Neck Surgery

Chair of Otorhinolaryngology

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Research Focus
- Ultrasound, endoscopy, and salivary glands
- Computer assisted surgery/robotics
- Cochlear implant outcome in the elderly
- Neurootology/vestibular laboratory
- Neurophysiology
- Allergology/clinical immunology and rhinology
- Experimental otorhinolaryngology
- Nanomedicine
- Laboratory for sleep disorders/somnology (SEON)

Structure of the Department

In the Department of Otorhinolaryngology, altogether an average of 339 people are employed in part- and full-time. Out of this staff, 43 people are engaged as physicians, 25 in the scientific-medical-technical, 76 in the medical-technical area, 24 in the administration, 157 in the nursing, and 14 in house staff.

Research

Ultrasound, endoscopy, and salivary glands

In modern ultrasound systems and endoscopy units, studies about sono graphic imaging of head and neck malignancies and salivary gland tumors remain an important role of scientific efforts. Identification and classification of tissues using tissue harmonic imaging and compound imaging were evaluated in the neck area. The gland preserving surgery for benign salivary gland tumors is the main focus. The main topics are currently the long-term outcomes after limited, extracapsular resection in particular of pleomorphic adenoma and zystadenolymphoma of the parotid gland.

Results of treatment of ranula during the last ten years have been published and showed that gland preserving procedure was possible in nearly 90% of the cases. Combined endoscopic and open surgical procedures offer a new option for the treatment of obstructive, but also of further salivary gland diseases, such as traumatic duct injuries. The long-term results and subjective patient outcome of such a treatment were evaluated and published. In vitro experiments on the effectiveness of a new device for endoscopically controlled, pneumatic, intracorporeal lithotripsy in salivary stones were performed in 2014. The device that is already in use for the therapy of kidney stones will now be first tested and also used for the treatment of salivary stones.

Results on the short-, medium-, as well as long-term outcomes after treatment of stenosis of the parotid gland and submandibular gland were published which showed that a gland removal after treatment of duct stenosis with endoscopically-dominated process no longer seems necessary in almost all cases.

Computer assisted surgery/robotics

In this research sector, studies to assess the accuracy of intraoperative electromagnetic (EM) navigation are performed. Therefore, we compared three different EM navigation systems with the established optoelectric system. On the basis of the EM technique, it was possible to test potential applications and apply them successfully to the patient. One main focus was the navigation controlled balloon sinoplasty of the frontal sinus. Possibilities, but also limits of the entire technique could be explored. In the research area “Robotics”, laboratory trials for the development of an automated endoscope holder for the skull base have been performed.

Cochlear implant outcome in the elderly

Today cochlear implants (CI) provide an efficient treatment of profound hearing loss and inner ear deafness. Due to the ageing of people in developed countries, more and more seniors are to be implanted. The aim of this project was to investigate speech perception and electrophysiology of elderly CI listeners. Founding was provided by industry and the Johannes-and-Frieda-Marohn-Foundation.

Neurootology/vestibular laboratory

The emphasis of the neurootology/vestibular laboratory was in particular on the pre- and postoperative diagnostics concerning cochlear implants and octavusneurinomas.

Neurophysiology

The neurophysiology and electromyography (EMG) laboratory focuses on diagnosis and therapy of cranial nerves involved in ear, nose, and throat procedures.

Allergology/clinical immunology and rhinology

Endonasal endoscopic sinus surgery and ASS desensitization come into question as a treatment for ASS-intolerant patients. A functional blood test to determine Eicosanoid-imbalance (FET-AIT®) is under investigation. There is an evaluation regarding the success of aspirin desensitization in patients with recurrent polyposis and aspirin intolerance. The efficiency of oral corticosteroids as a postoperative treatment for chronic rhinosinusitis is investigated in a multicenter, double-blind, placebo controlled trial.

Experimental otorhinolaryngology

Damage to the auditory system, e.g. due to noise trauma, do not only lead to hearing impairments, but may also cause subjective tinnitus. We could demonstrate in our (gap-noise) animal model that prophylactic as well as therapeutic treatment with Egb 761®, a Ginkgo extract, counteract both, noise induced hearing loss (NIHL) and behavioral signs of tinnitus. Furthermore, we compare maladaptive neuropsychiatric processes that underlie the development of tinnitus with those of neuropathic pain. In addition to the electrophysiological characterization and modelling of this neuroplasticity, we investigate possible effects of NIHL on the cortical perineuronal net and characterize trauma induced subcellular changes within the cochlea.

Nanomedicine

Project manager: Prof. Dr. C. Alexiou
Main focus of the Section of Experimental Oncology and Nanomedicine (SEON) is targeted local cancer therapy by using magnetic nanoparticles as drug carriers (Magnetic Drug Targeting; MDT). This interdisciplinary research project was funded amongst others by the Else Kröner-Fresenius-Stiftung and the BMBF Excellence Cluster “Medical Engineering”. In the frame of this work, the largest preclinical animal study for local cancer therapy with magnetic nanoparticles was published by SEON in 2013. Furthermore the broadening of the research fields was continued and a project funded by the Bavarian State Ministry of the Environment and Consumer Protection that investigates the toxicity of nanoparticles dedicated to medical use was started. In cooperation with the Institute and Outpatient Clinic of Occupational, Social,
and Environmental Medicine and within the DFG Excellence-Cluster “Engineering of Advanced Materials” (EAM), SEON has taken over the task of toxicological testing of new synthesized – mostly technical – nanoparticles in 2013. In the same year, the subgroup “Cardiovascular Nanomedicine” was launched. This group is funded by the FP7-EU-Project “Nanothero”. Here, a consortium of 16 research laboratories and companies from ten European countries is aiming at improving the diagnosis and therapy of cardiovascular diseases. In the field of regenerative nanomedicine, the intramural funding by the Emerging Field Initiative project “TopBio” was complemented in 2013 by a funding aiming at improving the diagnosis and therapy of cardiovascular diseases. In the field of regenerative nanomedicine, the intramural funding by the Emerging Field Initiative project “TopBio” was complemented in 2013 by a funding.

Teaching
Traditional instruction forms (main lecture with case-demonstration and live transmission of operations, block practical courses) are supplemented by interdisciplinary meetings. Furthermore the possibility for hospitalization in the outpatient clinic and operating theater exists all through the year.

Selected Publications
Cicha I, Garlicks CD, Alexiou C. Cardiovascular therapy through nanotechnology – how far are we still from bedside? European J Nanomedicine 2013, 6: 63-87

International Cooperations
Prof. C. Bachert, Ghent University, Ghent: Belgium
Prof. M. Mc GuriK, Guy’s, King’s and St. Thomas’ Dental Institute: UK
Prof. D. A. Sherris, University of Buffalo, Buffalo: USA
Dr. L. Vekas, Center for Fundamental and Advanced Technical Research, Timisoara: Romania
Prof. Dr. E. Tomáž, University of Szeged: Hungary
Prof. Dr. H. Mange, Medizinische Universität Graz: Austria

Meetings and International Training Courses
16. – 19.04.2013: International Course In Facial Plastic Surgery
19. – 21.06.2013: International Course on Diagnostics and Surgery of Salivary Gland Diseases in Consideration of New Minimal Invasive Techniques
31.01.2014 Nano World Cancer Day 2014
22. – 24.10.2014: International Course on Diagnostics and Surgery of Salivary Gland Diseases in Consideration of Minimal Invasive Techniques
14.05./16.07./17.09./12.11./10.12.2014: Expertenforum HNO