

COMPUTER AIDED SURGERY AROUND THE HEAD

Project leader: PD Dr. Marco Caversaccio

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The Head & Neck surgery Department of the Inselspital in Bern in collaboration with the M.E.Müller Institute for Surgical Technologies and Biomechanics (Dr. F. Langlotz, deputy of the project, www.memcenter.unibe.ch) plays for more than eight years a leading role in the development and clinical application of computer aided surgery (CAS) technologies.

In particular, thanks to the active involvement in the CO-ME network, it was possible to make significant advances in the area of image-guided microscopy in otorhinolaryngology, computer-aided planning and navigation in dental and cranio-maxillofacial surgery and navigated brachytherapy for skull base tumors. In particular, with the parallel development of a coherent software platform for these modules, the necessary condition is from now on given for these tools to be used in day-to-day clinical applications and further research in our ENT and Cranio-maxillofacial clinics and other clinical CO-ME partners (Univ. Basel, Univ. Freiburg i. Br.).

The aim of the Head and Neck group is twofold:

A) **Clinical applied research:** The new technologies developed in the preliminary works, as well as the new developments of this research project must be validated in the clinical practice. This includes module and work-flow optimization, clinical applied studies, standardization of registration and referencing, instrumentation, validation of clinical benefit. The collected feedback will lead to further technological improvements. Having on board strong opinion leaders of the ENT and CMF field, we believe in a unique opportunity to optimize the use of computer-aided tools and to push forward their integration in the clinical routine.

B) **Technological focus:** Develop new technologies for challenging surgical procedures in the head and neck area, ex:

- **Enhanced image-guided microscope with integrated mini-tracker:**

The surgical microscope is used routinely in delicate surgeries in the head and neck area. In collaboration with Leica-microsystems Inc. on the basis of a M500 microscope equipped with an image injection module, an image-guided microscope was developed with an integrated mini-tracker (EPFL).

