

The use of Brain-suite® teaching tools improves learning of neuroanatomy

Giuseppe Familiari¹, Michela Relucenti¹, Rosemarie Heyn¹, Luciano Petruzzello¹, Pietro Familiari², Giancarlo D'Andrea², Luciano Mastronardi², Luigi Ferrante²

¹ Department of Human Anatomy, Sapienza University of Rome, Italy

² Department of Neurosurgery, Sapienza University of Rome, Italy

Background Nowadays there is a rich variety of neuroanatomy text books, atlases and multimedial tools. Nevertheless, the students are usually unable to achieve a clear comprehension of spatial relationships existing among the neuroanatomical structures. We tried to by pass this obstacle using neurosurgical images, with the aid of intraoperative Brain Suite®.

Methods Brain Suite® is a magnetic resonance (MR) imaging analysis tool designed for identifying tissue types and surfaces of the human head. It has sophisticated visualization tools, such as MR visualization in 3 orthogonal views (either separately or in 3D view), and overlaid surface visualization of cortex, skull, and scalp. It is an integrated image-guided surgical system allowing to clear delineate white matter major tracts and obtaining colored three-dimensional reconstructions with graphic resolution of relationships between tracts and gray matter. Neurosurgical images, taken with the aid of intraoperative Brain Suite® were used to integrate the traditional neuroanatomy lessons, not only as a clinical trigger but above all for their anatomical three dimensional content. Our aim was thus to implement the view of spatial relationships among neuroanatomical structures. Students' satisfaction and degree of understanding were evaluated by an anonymous questionnaire.

Results and conclusions A total of 105 students filled the questionnaire. Neuroanatomy text books, atlases and multimedial tools are valued as sufficient to achieve a good comprehensive knowledge of neuroanatomy (74%), while they are valued as a sufficient tool to understand the spatial relationships existing among neuroanatomical structures only for 51%. Intraoperative Brain Suite® images are valued as a sufficient tool to achieve a good comprehensive knowledge degree of neuroanatomy for 63%, while they are very useful to learn spatial relationships among nervous system structures for 89%. We asked also if students prefer to view intraoperative Brain Suite® images in each single lesson of the neuroanatomy course or if they prefer to have a series of lesson with only intraoperative Brain Suite® images placed at the end of the neuroanatomy course. The latter choice was preferred (86%). MRI currently represents the most elegant imaging method for intraoperative image guidance, supplying functional images of excellent quality. We think that intraoperative Brain Suite® images help students in learning and comprehension of three dimensional relationships existing among neuroanatomical structures.