EVALUATION OF IMAGE QUALITY OF MRI DATA FOR BRAIN TUMOR SURGERY

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INTRODUCTION
In brain tumor surgery, high-quality MR images are required for accurate therapy planning, and intra-operative navigation. Particularly systems for automatic image analysis are known to need high quality images in order to provide accurate results [1]. We have analyzed the influence of image quality on the suitability of the images as well as the agreement between the neurosurgeon and the neuroradiologist.

MATERIAL & METHODS
We analyzed a total number of 202 MRI datasets from 24 patients in a retrospective study. An experienced neurosurgeon and an experienced neuroradiologist annotated each image. The annotations have been statistically analyzed. Spearman’s rank correlation coefficient has been used to measure correlation. We also evaluated the agreement between the surgeon and the radiologist. Wilcoxon’s signed-rank test has been used to measure the significance of the agreement.

RESULTS
For a surprisingly high number of images the overall suitability has been rated as bad or unusable, particularly by the surgeon, who also seems to be more critical (Fig. 1). The coverage as well as the general quality characteristics correlate well with the suitability from the surgeon’s point of view. For the radiologist, the only parameter that shows a good correlation to the suitability is the presence of motion artifacts.

DISCUSSION & CONCLUSION
Our results show that MRI data acquired for brain tumor surgery does not always meet the required quality standards. We also found significant differences between radiologists and surgeons, the latter being more critical. Whereas noise, resolution, and the coverage of anatomical structures were the main criteria for the surgeon, the radiologist was mainly bothered by motion artifacts.

REFERENCES