

# Preoperative Evaluation of the Risk of Functional Decline

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## Products

Elements Fibertracking

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## Clinical Background

The treatment of patients with eloquent brain lesions presents a special challenge to surgeons. During surgery, as much tumor as possible should be resected without inducing an unintended decline in motor or speech function. The role of preoperative functional mapping (nTNS based) combined with DTI tractography (Elements Fibertracking) is emerging for risk stratification by enabling the delineation of white matter pathways and thus revealing lesion-to-tract distances (LTDs).

## Study Objective

The aim of study was to evaluate the utility of nTMS based functional mapping combined with Fibertracking for risk assessment of surgery-related decline of motor or language function.

N = 250 lesions, single center prospective cohort study

## Results

- Patients with permanent, transient as well as no surgery-related deficits showed significant differences of LTDs in relation to the corticospinal tract (CST), arcuate fascicle (AF) and other adjacent language-related tracts
- For surgery-related paresis or aphasia cut-off values were:
  - 12 mm (LTD—CST)
  - 16 mm (LTD—AF)
  - 25 mm (LTD—the other closest language-related tract)
- Surgery-related deficits are significantly correlated to LTDs for the CST or AF. The smaller the distance the worse the outcome

## Summary

- Elements Fibertracking enables avoidance of surgery-related deficits by assessing the critical lesion-to-tract difference (LTD) in relevant motor and language related tracts
- Results prove that LTD qualifies as a viable marker that can be seamlessly assessed in a clinical setup. No patient with an LTD above the cut-off values showed severe and/or permanent surgery-related deficits
- Through access to highly individual functional representations, such as fiber tracts, preoperative evaluation of the risk of functional decline can be deemed as indispensable