

Summary

Die Veränderung des visuellen Systems aufgrund von Läsionen:

rTMS-Studie zum Einfluss von prächiasmatisch bedingter Langzeitdeprivation auf den visuellen Kortex
Was Blinde sehen – eine deskriptive Befragung zum Charles-Bonnet-Syndrom

Untersuchung der Kontrastempfindlichkeit im gesunden Gesichtsfeld bei Patienten mit Hemianopsie

Within the scope of this thesis two different methods were used to investigate the visual system: transcranial magnetic stimulation (TMS) was used to investigate the excitability of the healthy and deprived visual system (part 1) and pattern recognition and -detection was used as a perimetric method in healthy subjects and hemianopic patients (part 3). In an additional short study resulting from reports of participants of the TMS-study, a questionnaire concerning the symptoms of the Charles-Bonnet-Syndrom was given to the blind subjects (part 2).

In the first part of the study, functional changes of the healthy and deafferented visual system was investigated by applying rTMS over the occiput of healthy, visually deprived and blind subjects. The results show that 1) partial visual deafferentation leads to changes in the quality of visual cortex function, 2) complete deafferentation of the visual system induces reorganization of the unused cortex area, which leads to a significant reduction in the number of effective stimulation sites, 3) phosphene thresholds were normal for all groups, even after long term deafferentation.

Therefore, TMS of the visual cortex might be a useful tool for testing preoperatively for residual functions of the visual cortex in blind people who subject themselves to cortex stimulation with so-called visual prosthesis which uses phosphenes to generate mental pictures (Hambrecht et al. 1995, Schmidt et al. 1996).

In the second part, the often reported perception of hallucinations in blind subjects (Charles-Bonnet-Syndrom, CBS) was investigated with a questionnaire. It could be shown that CBS can not be defined exclusively by complex hallucinations. Many subjects reported simple photopsies. This experience can often be very disturbing for these patients, however support and sufficient help is rare. The need for better education about this condition for the medical staff was highlighted.

In the third part of the study, changes in contrast sensitivity within the visual field of hemianopic patients were investigated. To summarise, besides the discrepancy of pattern recognition and –detection, a significant decrease of contrast sensitivity within the “healthy” visual field of hemianopic patients could be shown. This aspect is often neglected in daily life and could explain the problems of orientation experienced by such patients.