Cyprus University of Technology
Faculty of Health Sciences

Master's Thesis

The Aftereffects of Gamma Frequency Stimulation in Motor Cortex: A Case Study

Georgia Georgiou

Limassol, May 2021

CYPRUS UNIVERSITY OF TECHNOLOGY

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF REHABILITATION SCIENCE

Master's Thesis

The aftereffects of a gamma frequency stimulation in Motor cortex: A Case Study

Georgia Georgiou

Limassol, May, 2021

Approval Form

Master's Thesis

The aftereffects of a gamma frequency stimulation in motor cortex: A Case

Presented by

Georgia Georgiou

Supervisor: Faculty Name Surname and position

Signature _____

Member of the committee: Name Surname and position

Signature _____

Member of the committee: Name Surname and position

Signature _____

Cyprus University of Technology

Limassol, May 2021

Copyrights

Copyright© 2021 Georgia Georgiou

All rights reserved.

The approval of the thesis by the Department of Rehabilitation Science does not imply necessarily the approval by the Department of the views of the writer.

Acknowledgements

I would like to express my deepest thanks to my supervisor, Dr. Nikos Konstantinou, for his continuous encouragement of my MSc thesis, as well as his patience, inspiration, and extensive knowledge. I am also thankful to my abroad supervisors, PhD (s) Artemis Traikapi and Phivos Phylaktou, for sharing their experience, as well as their honest and important assistance and support. Their advice was invaluable during the research and writing of this thesis. I'd also want to express my appreciation to everyone who has participated in this venture, whether directly or indirectly.

ABSTRACT

Transcranial magnetic stimulation (TMS) is a noninvasive technique that is used to modulating brain activity. TMS can be used not only for patients but also for healthy individuals. Gamma oscillations at 40 Hz have been shown to cause an overall neuroprotective response that recruits both neurons and microglia on a mouse model. 40 Hz frequency has been confirmed to be able to drastically improve mental function as they have also drastically reduced AD symptoms. Objective: To assess the safety and aftereffects of 40 Hz TMS stimulation on motor cortex in a healthy subject. Methods: A case study, one subject received one session of 40 Hz TMS over the motor cortex. The applied protocol involved 25 trains of 40 Hz TMS with 29sec interval rest at 80% of subject's resting motor threshold (RMT). The experiment lasted almost 12 min. Motor threshold re-tested after 5, 10 and 15 minutes. Results: There were no side effects of 40 Hz rTMS apart from transient headache. There was no significant change in the RMT after rTMS. Conclusions: This study could be a first step in exploring the impact of therapeutic potential.

Keywords: gamma frequency, TMS, MT, 40 Hz, aftereffects