

## Evaluation of the effectiveness and safety of an innovative, non-pharmacological method using transcranial direct current stimulation in combination with cognitive training and nasal near infrared stimulation to improve cognitive functions and quality of life in elderly people with mild cognitive impairment (MCI) and Alzheimer's disease (AD).

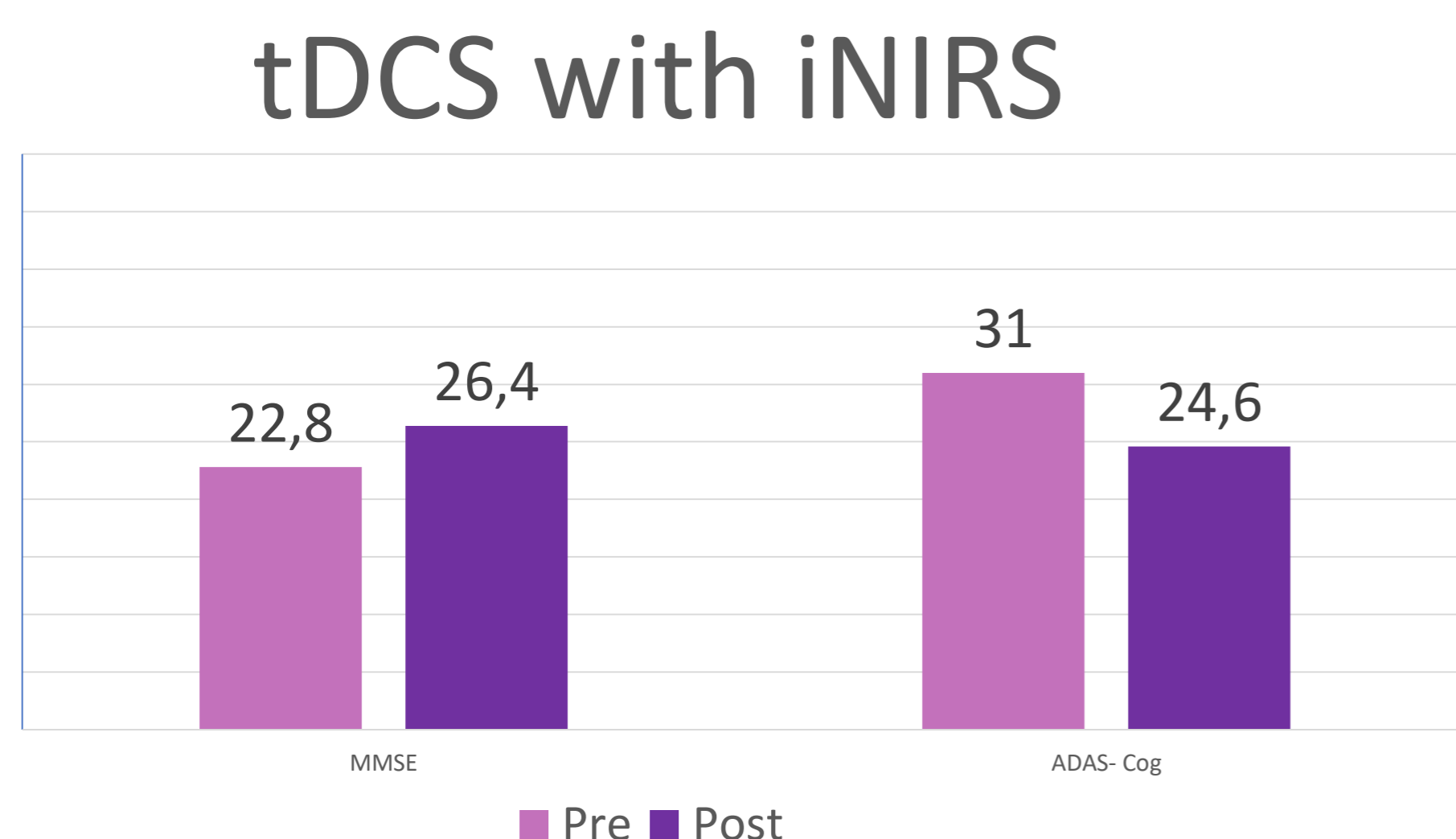
### INTRODUCTION

Alzheimer's disease (AD) belongs to progressive neurodegenerative disorders and is the most common cause of dementia in the elderly population. Currently about 47.5 million people worldwide suffer from AD, only in Poland there are 300 000 patients.

In the last few years, studies on the effectiveness of non-pharmacological forms (tDCS, iNIRS) in the treatment of AD were conducted. tDCS (repetitive transcranial current stimulation) and iNIRS (intranasal near infrared stimulation) are low risk and non-invasive methods which penetrates through skull bones into the cerebral cortex and stimulates neurons with their synapses. Recent studies related to tDCS and iNIRS use in AD have promising results.

### RESULTS

Following the tDCS with iNIRS procedure, two clinical scores changed over time, showing a statistically significant improvement (MMSE score: 22,8 vs 26,4 points, before and after therapy, respectively,  $p=0,024$ ; ADAS-Cog: 31 vs 24,6 points;  $p=0,048$ ).



### OTHER ACHIEVEMENTS

Active participate in Conference **Alliance4Life Early Stage Researchers' Retreat AI in Science & Research Visibility 17-18/01/2024 Zagreb, Croatia**

Active Participate i International Conference **16th World Congress of the International Neuromodulation Society (May 11-16, 2024) Vancouver, Canada – oral presentation during Neuromodulation for Neuropsychiatric Disorders Session**

**„EVALUATION OF THE EFFECTIVENESS AND SAFETY OF RTMS AND TDCS WITH INIRS IN THE TREATMENT OF PATIENTS WITH COGNITIVE IMPAIRMENTS”**

**Preliminary result publication *Neuromodulation: Technology at the Neural Interface* IF 2,8 MNiSW 100 pkt.**

Completion of patient recruitment for the study according to the deadline in the IPB (including follow-up)

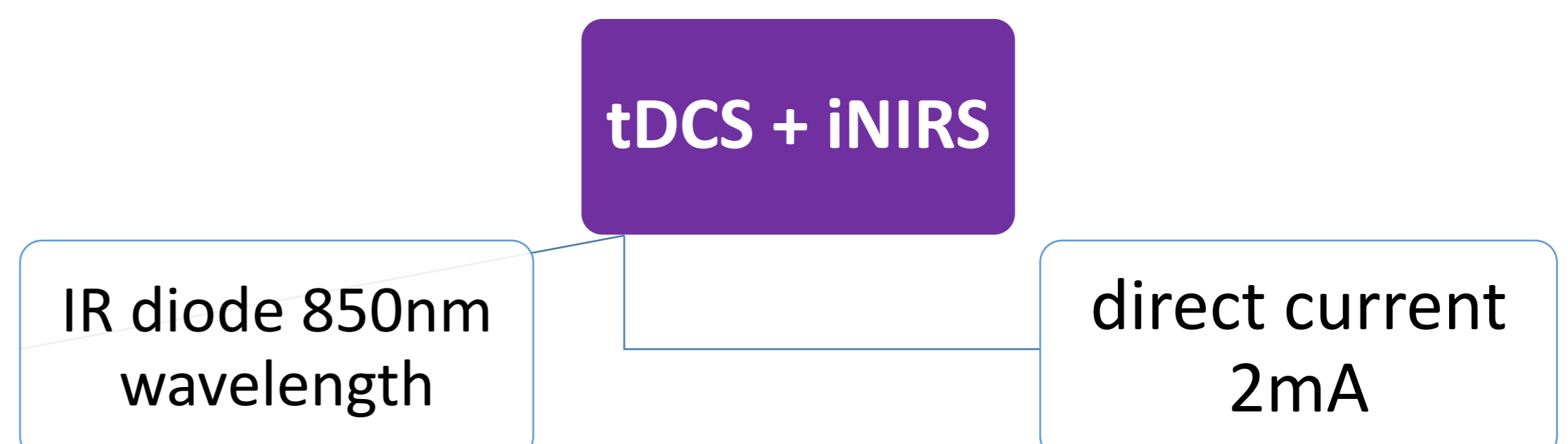
Preparation of scientific articles based on the collected original material (in progress)

### MATERIALS & METHODS

The group of 10 patients with a diagnosis of AD (median age 75 years, 9 women- 90% and 1 men- 10%) were evaluated using ADAS-Cog, MMSE scales before and after the tDCS with iNIRS treatment.

The group of subjects underwent procedure of tDCS with iNIRS including 40 sessions in the period of 10 weeks. Patients were recruited into study on different time points.

Exclusion criteria: Epilepsy or a history of epileptic seizures, pacemaker, metal implants of CNS.



### CONCLUSIONS

According to present findings tDCS with iNIRS therapy has a positive impact on cognitive functions of patients with AD, however, more significant effects are noticed in MMSE scores. Current findings indicate that non-pharmacological methods has potential to be effective and even breakthrough therapy for AD patients. Of note, further studies with more considerable number of participants and the use of sham (placebo) procedure are needed.

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