

### Short Review

## Alzheimer

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Dementia is a progressive and fatal disease. It is characterized by memory impairment, progressive decline in daily living activities, various psychiatric symptoms and behavioral disorders. Alzheimer's disease is the most common cause of dementia. It is a common problem in the elderly. It is seen in 5% over the age of sixty-five and in 50% over the age of ninety. Since the disease may initially begin with insidious forgetfulness, forgetfulness observed in old age should not be considered normal. 'Alzheimer's disease is the most common degenerative disease among all dementias. The first complaint expressed by the patient's relatives on behalf of the patients is usually forgetfulness. Losing one's way and losing one's calculations are among other common complaints. Memory impairment is insidious at first and family members or friends may not realize there is a problem until the disease progresses and symptoms become apparent. According to research, the disease is rarely seen before the age of 50. It is seen in 3% of those aged 65-74, 19% of those aged 75-84 and 47% of those over 85 years of age.

In Alzheimer's disease, memory records cannot be transferred from the cache memory to the main memory, or the information transferred to the main memory cannot be recorded. Thus, the memory operation takes place as far as the cache can store. Memory records are stacked in the main memory regions, with the first learned information at the bottom and the next ones on the top. Thus, the first memories are at the bottom and the last records are at the top. In all dementia syndromes, including Alzheimer's, memory records begin to be erased from the very last. However, the interesting point here is that as the last records are deleted, the ones below are remembered

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more clearly. This misleads the relatives of the patient because the fact that the past is remembered better than anyone else causes it to be perceived as if there is no forgetfulness. Inability to keep recent memories in memory, on the other hand, good recall of the past is a distinguishing indicator for Alzheimer's. The disease usually begins with the loss of memory and continues to deepen over time. In the following process, other cognitive and motor abilities are also affected and behavioral disorders can occur. However, it should not be forgotten that some dementias may start with motor and cognitive disorders, not memory losses. Transcranial magnetic stimulation (TMS) [1,2] is a noninvasive form of brain stimulation in which a changing magnetic field is used to induce an electric current at a specific area of the brain through electromagnetic induction. An electric pulse generator, or stimulator, is connected to a magnetic coil connected to the scalp. The stimulator generates a changing electric current within the coil which creates a varying magnetic field, inducing a current within a region in the brain itself.

The Standardized Mini Mental test is a neuropsychiatric evaluation tool. Priority is given to elderly patients with dementia. It enables the evaluation of mental skills of elderly people with delirium and dementia. There are two versions created for trained people and untrained people. We conducted our research by applying the Standardized Mini Mental Test to 17 female and 13 male Alzheimer's patients between the ages of 55-80, who came to our clinics between 2011 and 2013, before and after TMS sessions. We analyzed the data we obtained by applying dependent sample test with IBM SPSS 21.0 in computer environment. [3,4] According to the SMMT we applied to our patients, there is a significant ( $p<0.05$ ) difference between the state of the disease before the TMS application and after the TMS sessions are over. We have determined that electromagnetic signals sent from outside to certain parts of the brain with TMS have a stimulating shock effect on the cells related to the movement system in the cortex and on the cognitive cells related to thoughts and behaviors in the limbic centers, correcting cell metabolism and degeneration, thus providing significant benefits in preventing the symptoms or progression of the disease.[5].

Note: In the IBM Spss 21.0 analysis, it was seen that there was an average improvement of 10.7% in 30 people between the initial state and the final state of the disease.

### Discussion

Regardless of the type of dementia, it is a progressive disease. Drugs used to increase the functionality of neuromuscular junctions or to stop the degenerative process do not stop the disease. However, it slows down partially and sometimes it does not affect it at all. Moreover, billions of dollars of research that have been completed or are still ongoing around the world have not yet reached a satisfactory result. Studies using PET and SPECT in Alzheimer's disease detect low metabolism in the main memory centers, especially in the temporal regions. And it is thought that this hypometabolism causes the degenerative process. On the other hand, it is known from PET and SPECT studies that Transcranial Magnetic Stimulation (TMS) increases the

metabolism of whichever brain region it is applied to. Based on this, as a first in the world, we applied TMS in sessions to all types of dementia, especially Alzheimer's, in our three branches (REEM Neuropsychiatry Clinics) in Istanbul. We carried out our treatments in two stages. In the first stage, we performed a 15-session loading cure. We completed the loading period in 45 days at most, with more frequency in the first sessions. We also had patients who we completed in 15 days by doing sessions every day. In the second stage, maintenance treatments were carried out once a month. We also performed 2 sessions every 2 months or 3 sessions every 3 months for patients coming from outside the province or abroad. And we repeated the memory tests every 2 or 3 sessions. We determined each treatment session as 20 minutes at 5 Hz. Our application areas were the left prefrontal lobe and the right and left parietotemporal lobe.

## Conclusion

We tested the effects of TMS on patients with various memory tests before starting the treatment and after ending the sessions. The results were extremely surprising and encouraging. As a result of our research on 30 patients for approximately 3 years, we found that TMS treatment showed statistically significant improvements in memory functions. Most importantly, not only was there no regression in the clinical manifestations over the years of treatment, but there was an average improvement of around 10%. We conducted our research by applying the Standardized Mini Mental Test (SMMT) to 17 female and 13 male Alzheimer's patients between the ages of 55-80, who came to our clinics between 2011 and 2013, before and after TMS sessions. We analyzed the data we obtained in a computer environment by applying a dependent sample t test with IBM Spss 21.0. According to the SMMT we applied to our patients, there is a significant difference ( $p < 0.05$ ) between the state of the disease before the TMS application and the state after the TMS sessions are completed. As a result, we applied the Standardized Mini Mental test before and after

treatment. In the IBM Spss 21.0 analysis of the test results, it was determined that there was an average improvement of 10.7% in 30 people between the initial state and the final state of the disease. And no regression was observed in the condition of patients who received maintenance treatment at regular intervals for three years. No side effects were observed in one or two cases during or after the treatment, except for mild headaches that were relieved with simple painkillers. Later, in another study of 47 patients between 2021 and 2023, we obtained similar results to our first study. At this point, it shows that TMS treatment is a new and successful treatment model for dementia syndromes and that the disease can be stopped with this treatment.

Note: IBM Spss 21.0 license belongs to Istanbul Bilim University. Thanks for their contributions.

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