



Spatial Navigation as an Overlooked Cognitive Marker for Multiple Sclerosis? – a Meta-Analysis



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01. Abstract

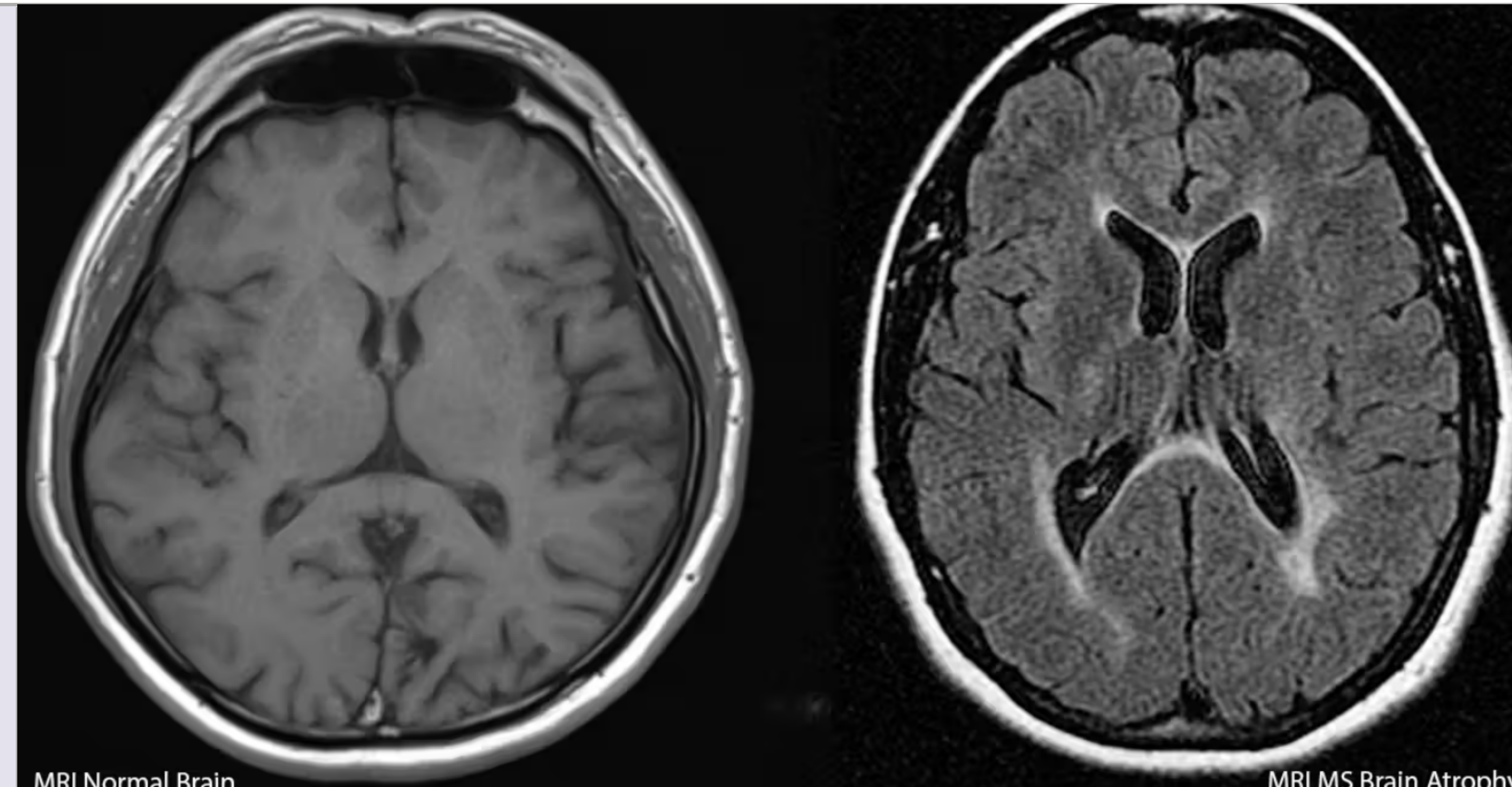
Background: Multiple Sclerosis (MS) is a disease affecting the central nervous system, particularly the brain and spinal cord (O'Brien, 2008). This condition can significantly impact vision, mobility, and balance. Spatial navigation, defined as the process of using landmarks and cues to determine a route to an objective destination, is proposed as an early cognitive indicator of MS in the literature (Nema, 2021). Understanding the interplay between MS pathology and spatial cognition is crucial for enhancing our comprehension of the diverse manifestations of MS and may have implications for the development of targeted interventions to improve the quality of life for individuals with MS.

Methods: This project aims to investigate the relationship between MS and spatial navigation skills by synthesizing findings from previous studies on MS and spatial navigation through a meta-analysis.

Results: Out of 4271 articles in title and abstract screening phase, 81 were identified for full text review. This is an ongoing study.

02. Introduction

- “Multiple sclerosis (MS), a progressive disease of the central nervous system, is characterized by the production of widespread lesions, or plaques, in the brain and spinal cord” (O'Brien, 2008).
- Spatial navigation is the process by which one uses landmarks and other cue sources to determine the route to an objective destination and then take that route (Nema 2021).
- The examination between impaired spatial navigation and MS will researchers and physicians to use spatial navigation as an early cognitive marker of MS which in turn will allow individuals to take steps to slow the symptoms of MS.
- Hypothesis: There will be a positive correlation between MS and poor spatial navigation
- This meta-analysis will synthesize existing research on MS and spatial navigation.
- Understanding the interplay between MS pathology and spatial cognition is crucial for enhancing our comprehension of the diverse manifestations of MS and may have implications for the development of targeted interventions to improve the quality of life for individuals with MS.



03. Methods

- We began by searching across databases such as Eric, ProQuest, Dissertation and Thesis, using specific keywords tailored to MS and spatial navigation to narrow down to research papers
- Those articles were then downloaded and inputted from the data bases to a systematic review database called Covidence.
- The sources were further narrowed by screening each article in Covidence, two reviewers independently screened titles and abstracts to identify studies meeting our inclusion criteria. When necessary, a third reviewer resolved any uncertainties. The duplicate removal feature built into the database ensured data integrity by eliminating duplicate articles.
- Those articles were then downloaded so that the reviewers could read the full texts of potentially eligible studies. A rigorous evaluation against established criteria was used to further ensure relevance to multiple sclerosis and its effect on spatial navigation in the adult population.
- Data extraction was conducted using a standardized form within Covidence, capturing key variables including study characteristics, participant demographics, intervention details, outcomes, and methodological quality. Two reviewers independently extracted data, resolving discrepancies through consensus or consultation with a third reviewer.

04. Expected Results

This study is still ongoing, however, we are in the extraction phase and the articles we have coded so far show that spatial navigation is linked to Multiple Sclerosis. Coded studies show adults with Multiple Sclerosis and healthy matched adults participating in tasks like a maze or hidden goal task. Those with Multiple Sclerosis performed worse on these spatial navigation tasks

05. Conclusion

This study is still ongoing. We are still in the stage of extraction, where we are taking articles that fit our criteria and code for data relevant to our research on spatial navigation and Multiple Sclerosis. We later will take the data extracted to form a conclusion on if spatial navigation can be used as a cognitive marker for Multiple Sclerosis.

06. References

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