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Use of Prism Adaptation in Patients with Unilateral Neglect in Stroke: A Literature Review

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Abstract
Background: Neglect results in a failure to report or react to contralesional stimuli, is a common problem following a stroke. Given the detrimental effects on motor recovery, independence in self-care, transfers, and locomotion, neglect rehabilitation is crucial. A phase of prism adaptation therapy involves aiming at targets while wearing prismatic or Fresnel lenses on your glasses. Prism adaptation training is particularly successful in addressing unilateral neglect, according to recent studies.

Objective: The study's aim was to examine how well prism adaptation treats unilateral neglect in stroke patients.

Method: This was done by conducting a literature review of sources available on search engines like Google Scholar, PubMed, and Research Gate. The search strategy focused on studies published between 2006-2022

Results: According to the literature that is currently available, prism adaptation was effective in 9 articles and produced favourable improvement in patients. 1 article was neutral which concludes it cannot be used for long term improvement.

Conclusion: The findings show that prism adaptation can be used in the treatment of unilateral neglect and thus helps in activities of daily living.

Keywords: Prism adaptation, Unilateral Neglect, Stroke, ADL.

1. Introduction

A stroke is an unanticipated loss of neurological function brought on by an obstruction of blood flow to the brain (cerebrovascular accident [CVA]). The most common type of stroke is an ischemic stroke, which can be driven on by thrombosis, embolism, or hypoperfusion. Blood leaks into or around the brain during a hemorrhagic stroke as a result of blood vessels rupturing[1].

Unilateral neglect, also known as hemi-inattention, hemineglect, and unilateral visual inattention, is the failure to detect and integrate inputs and sensations from one side. Nearly half of all stroke patients experience unilateral neglect, a clinically diverse illness. Patients with neglect lack the ability to distinguish between objects on the other side and focus on them, as well as to plan activities with the neglected hemisphere in mind. Neglect has been linked to a higher chance of falling, depression, and much worse rehabilitation outcomes[2].

USN is far more common in right-sided brain lesions than in left-sided lesions; it has been recorded in 13 % to 100 % of right-sided stroke victims. Because interference with rehabilitation processes is the most common clinical concern in USN patients, resulting in poor functional outcome[3]. Neglect in 40% of patients does not improve after a year and becomes chronic[4].Stroke patients who have been neglected have a lower functional result than stroke patients who have not been neglected. Patterns of recovery are slower and less pronounced[5]. By acting on the patient's awareness of the impairment, there are two methods for eliminating perceptual and behavioral biases. One is a physiological strategy that uses

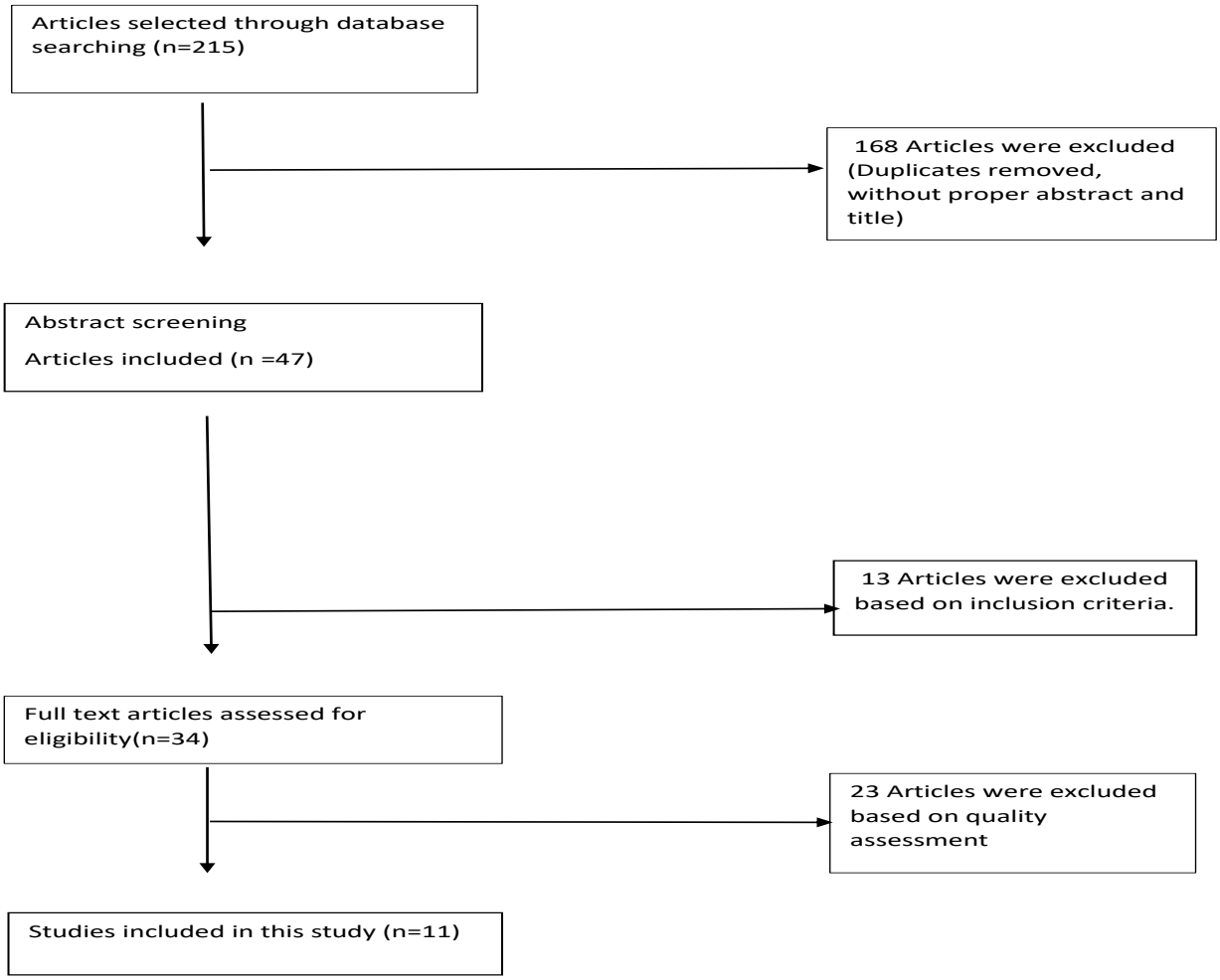
vision deprivation and passive sensory manipulation to alter the sensory-motor level. The other directly affects by avoiding the central awareness deficiency.

Sensory Stimulation has been proven to ameliorate a variety of signs of neglect. The fact that some neglect symptoms can be reversed indicates that damage to the right hemisphere is connected to a particular functional element. This may be because multimodal regions engaged in spatial behaviour orientation suffer neglect following injury as opposed to motor or sensory areas such as sensory and motor cortices.

Prism adaption training appears to be beneficial to patients with neglect, according to recent research 18to 22. Therapy with prism adaptation entails a time when you aim for goals while sporting. Fresnel lenses or prismatic lenses on your glasses. When wearing right deviating glasses, both control participants and patients with neglect miss visual targets by reaching too far to the right., but after a brief period, they "adapt" to the perceptual-motor mismatch and they move their reaching arm towards the left side. After they take out glasses these individuals experience a prism adaptation "after effect," in which they miss objects by pointing it far towards the left side. After a brief time of correction, the control participants improved their performance. The prism adaptation after effect, on the other hand, produces a therapeutic leftward shift in left-neglecting patient groups, resulting in more successful reaching in daily tasks. In patients with neglect, the effects of prism adaptation have been noticed to last from one to three days[2]. Because PA has been found to change several important neglect symptoms, including target detection in the ignored hemifield, many writers have come to the conclusion that spatial attention processes in neglect may be advantageously adjusted by PA. clinical manifestations and visual neglect like writing, reading and wheelchair driving shows effects that lasts minimum for two hours after a few minutes of visuo-motor exercises using prisms. The results were shown to be more durable after many adaption sessions, which is more significant for rehabilitation. [6].

2. Methodology

A literature review type study was conducted in Srinivas College of Physiotherapy, Mangalore. Stroke patients (both men and women) with unilateral neglect are the study's participants. The study's intervention consists of prism adaptation. Prism adaptation mainly focused to improve activities of daily living in UN patients. A detailed review was carried out using the search engines Google Scholar, PubMed and Research Gate. Key literature databases were rigorously searched using exact keywords as part of the study selection process to locate and identify relevant material for this review. The term "Prism adaptation and unilateral neglect" were the main search terms, followed by terms like "activities of daily living, stroke." Three components, namely title review, abstract review, and full text review, were used to examine the documents and establish the selection criteria. The inclusion and exclusion criteria for the review were then applied to all articles to determine whether they qualified for inclusion. Participants included publications on studies from 2006 to 2022 that looked at the effectiveness of prism adaptation in unilateral neglect. Studies conducted in years before to 2006 and articles that need payment are excluded from this research.



3. Discussion

The aim of the study was to evaluate studies of various designs that involve the interventions of prism adaptation in decreasing the unilateral neglect in stroke patients in an attempt to assist in the development of solutions to reduce unilateral or spatial neglect. The cognitive consequences of prism adaptation in patients having neglect were investigated in five studies[2,3,4,5,11]. During prism adaptation therapy, you will spend some time aiming for objects while wearing prismatic or Fresnel lenses on your glasses. People with prism adaptation "after effects" overlook objects by pointing too far to the left after taking their glasses off. On the other hand, the prism adaptation after effect causes a left side shift in left side neglecting patient groups, which leads to more successful reaching in daily tasks[2]. After some minutes of prism-based visuo-motor exercises, impacts on visual neglect and clinical manifestations including writing, reading, and wheelchair driving have been found to endure for at least two hours. More significantly for rehabilitation, it was shown that results following repeated adaption sessions were more durable. [2].

4. Analysis and Interpretation

The literature studied consisted of a mixture of literature reviews, systematic reviews, case reports and an observational study. Previously studied research showed positive, negative as well as neutral outcomes on the consequences of prism adaptation in unilateral neglect. Positive studies showed that prism adaptation can be used to improve activities of daily living. It improved the consciousness on affected side, gaze orientation, exploration of personal belongings, and upper limb function improvements. Eye movements while watching video clips, line bisection and star cancellation tests, FIM scores, Catherine bergego scales, Barthel index scores showed improvement. Some of the patients were able to return to work after the treatment

5. Conclusion

Based on the information gathered, it has been determined that prism adaptation therapy improves stroke patients with unilateral neglect's functional mobility and activities of daily living (ADL). As a result, long-term prism adaptation can have good consequences on ADL performance.

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