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An Evidence-Based Occupational Therapy Intervention Protocol for Individuals with Post-Stroke Unilateral Neglect

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AN EVIDENCE-BASED OCCUPATIONAL THERAPY INTERVENTION PROTOCOL FOR INDIVIDUALS WITH POST-STROKE UNILATERAL NEGLECT

by

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A Scholarly Project
Submitted to the Occupational Therapy Department
of the
University of North Dakota
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for the degree of
Master’s of Occupational Therapy

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This Scholarly Project Paper, submitted by Sarah Fischer in partial fulfillment of the requirement for the Degree of Master’s of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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Title An Evidence-based Occupational Therapy Intervention Protocol for Individuals with Post-Stroke Unilateral Neglect

Department Occupational Therapy

Degree Master’s of Occupational Therapy

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CHAPTER I
INTRODUCTION

A stroke, or cerebrovascular accident (CVA), is caused by a vascular injury to the brain, which may cause a variety of neurological deficits. Depending on the mechanism, location, and extent of a stroke, the symptoms and prognosis for the individual are determined. Results of a stroke may include hemiparesis or hemiplegia (weakness and/or paralysis of the body opposite the site of the CVA), aphasia or other communication deficits, apraxia (impaired motor planning), and unilateral neglect syndrome (UNS) (decreased ability to react to stimuli on one side of the body). For the purposes of this project, UNS will be the primary focus.

According to Law (2002), UNS is a failure to notice, orient, or respond to stimuli in the space contralateral to the lesion. UNS may even cause an inability to recognize aspects of one’s body as their own. UNS is commonly associated with right hemisphere damage and parietal lobe lesions, such as with a right CVA. Neglect may occur without the presence of other impairments or may be increased as a result.

UNS is a common occurrence post-stroke and greatly affects one’s ability to successfully complete daily tasks, especially the tasks of self-cares (i.e. grooming and dressing). Although there are large amounts of information on the topic of stroke and UNS, exact daily activities that are affected and to what extent are rarely identified. Because of the various occupational therapy (OT) interventions found to be effective with
individuals who have experienced UNS due to stroke, it would be beneficial to have a product with specific interventions as they relate to certain impairments. For the profession of OT, documented information regarding these issues and specific intervention methods would be a useful addition to the practice as well as a valuable contribution to the clients being treated.

As a result of numerous terms used to signify that of “unilateral neglect”, which causes confusion, only one term will be utilized in this project: “Unilateral Neglect Syndrome (UNS)”. Other common terms to describe this concept include visual inattention, personal and extrapersonal neglect, hemi-inattention, hemispatial visual neglect, sensory and motor neglect (both subtypes of UNS), and the list goes on. Therefore, due to so many terms currently being used, only one term will be used to refer to the overall concept of neglect involving the inability to appropriately interact with stimuli presented on the affected side.

Most of the literature currently available pertains to how UNS hinders one’s ability to perform in the natural environment and how a variety of therapeutic interventions may improve that functional capacity. The theories that support these specific interventions are often from the viewpoint of an “outsider”. One aspect that is rarely documented is the viewpoint of the affected individual. As an occupational therapist, it is essential to gain first-hand information from that individual in order to more effectively identify their needs and views on how therapy should proceed. This can be a difficult process due to the fast-paced environment of the current healthcare system in the United States. This project addresses these needs with a focus on client-centered intervention.
The following chapters address: current literature and findings in order to determine functional areas most commonly affected by UNS and effective OT interventions, methods to combine current information in order to develop a useful product that will be beneficial to the OT profession, the overall product, and a summary of the entire project. The primary outcome of this scholarly project is the product, which consists of a manual for occupational therapists to refer to in order to provide interventions proven effective for use with individuals who experience UNS. The product also includes a list of outcome measures commonly used to assess functional change over time. Through use of this manual, OT interventions will be more client-centered, meaningful, and effective.
CHAPTER II
LITERATURE REVIEW

Introduction

This literature review will examine multiple articles that discuss how unilateral neglect syndrome (UNS) affects one’s ability to successfully complete daily activities. The selected articles will identify various daily activities most often affected as a result of UNS, specifically self-care activities (i.e., dressing, grooming, bathing). This literature review will also describe how occupational therapy (OT) intervention may be implemented to assist with the improvement of one’s functional ability as a result of the information presented by the various articles.

The following is a comprehensive summary of the articles involved in this literature review that will include each study’s purpose, design, sample and characteristics, procedures/interventions, results, and conclusions. Next, a synthesis of the frequent methods used to assess change will be presented along with the activities of daily living (ADL) most commonly affected by UNS. Lastly, a review of effective OT intervention techniques will be described as a result of the findings of the articles used for this literature review.

Summary of Articles

Chen-Sea (2000) reported the validity and reliability of the Draw-A-Man Test when used with individuals who had experienced a right-sided cerebrovascular accident (RCVA). This author described personal neglect as a disorder of body schema and
indicated that individuals affected by this may be unaware of the left side of their body, may deny left side disabilities, or may be unable to recognize that their paralyzed left extremities belong to them. Extrapersonal neglect is therefore referred to as the inability to recognize various stimuli in one's environment. Fifty-one individuals who had experienced a RCVA within 2-6 months post-onset were included in this study. Characteristics of these individuals included: participated in a rehabilitation program, previously independent in self-cares, and right-hand dominant. Approximately 100 individuals made up the control group.

The results of this study indicated that the Draw-A-Man Test has reliability and validity in regards to ability for determining whether or not personal neglect is present with individuals who have experienced a RCVA. This was determined by requiring that the individuals draw a figure they perceived as themselves. If the entire body was intact, no personal neglect was present. However, if the individual skewed the left side of the drawing, that individual was classified as having personal neglect. Through this study, the conclusion can be made that use of the Draw-A-Man Test may be used to assess whether or not an individual post-RCVA is experiencing personal neglect and, therefore, improve the client-centeredness of occupational therapy (OT) intervention (Chen-Sea, 2000).

In another study by Chen-Sea (2001), the purpose was to experimentally compare the effects of unilateral neglect syndrome (UNS) on activities of daily living (ADL). Included in the study were 46 individuals with RCVA, 110 “normal” (no history of neurological impairment) subjects for the control group who provided data for the Draw-A-Man Test, and 120 “normal” subjects who provided data for the Random Chinese
Word Cancellation Test (RCWCT). Individuals who had experienced a stroke were administered the Klein-Bell ADL Scale test during the first session. All other assessments were completed during the following session(s). Data were obtained for the control group from the results of the Draw-A-Man Test and RCWCT.

Results indicated that individuals who experienced personal neglect along with extrapersonal neglect performed most poorly with ADL as compared to individuals with only extrapersonal neglect or those with no neglect at all. Use of the Draw-A-Man Test and RCWCT allowed for identification of personal and extrapersonal neglect in individuals who experienced a RCVA. A conclusion was drawn that individuals with both personal and extrapersonal neglect will require more intense intervention as compared to individuals with only extrapersonal neglect or no neglect at all to improve ability to perform ADL (Chen-Sea, 2001).

York and Cermak (1995) examined the performance of individuals with RCVA and LCVA in regards to praxis and visual perception and how each type of stroke affected these areas. There were 45 subjects [15 RCVA, 15 left-sided cerebrovascular accident (LCVA), and 15 with no history of cerebrovascular accident (CVA)] included in this experimental group comparison study. All subjects were right-handed, between the ages of 45 to 75, and had experienced a stroke at least two weeks, but no more than six months, prior to this study. All subjects received various assessments in a specific order once they had been determined to be within functional limits in regards to the auditory comprehension subtest of the Western Aphasia Battery. This occurred in two to three 30-minute sessions and was completed within the first week of initial contact with the subject.
It was found that, in regards to visual perception, individuals with RCVA performed the poorest while individuals with LCVA performed the poorest in regards to gesture comprehension and praxic production. Individuals with RCVA performed the poorest on the gesture discrimination test. All individuals with CVA performed more poorly as compared to the control group. Although individuals with RCVA and LCVA are commonly labeled as having impaired visual perception and praxis respectively, it often occurs that all individuals have difficulty with these aspects. Professionals must then determine the underlying cause of their patients’ impaired performance and provide effective intervention as deemed appropriate (York & Cermak, 1995).

The article by Hanna-Pladdy, Heilman, and Foundas (2003) examined whether or not ideomotor apraxia (IMA) negatively impacts one’s independent functioning post-stroke. Ten subjects, who had experienced a left hemisphere stroke, were involved in this study. All subjects received a cognitive screening, depression screening, test of auditory comprehension, aphasia screening, and an assessment to evaluate use of dominant hand. If a subject was not right hand dominant, they were excluded. Subjects were also evaluated in regards to praxis, independence in physical self-maintenance skills, and motor functioning.

There was a relationship identified between the severity of apraxia and the level of independence with physical ADL performance. Results also indicated that individuals with apraxia experienced less independence in bathing, toileting, and grooming. This study also concluded that, because there was no indication of a relationship between apraxia with dressing or ambulation, the inability to complete activities of this nature is
related to perceptual impairments instead of deficits with skilled movements (Hanna-Pladdy et al., 2003).

The purpose of the article by Walker, Sunderland, Sharma, and Walker (2004) was to assess cognitive deficits affecting the ability to relearn to dress oneself with individuals who had experienced a stroke. Thirty participants obtained through consecutive admissions to a community hospital stroke unit were involved in this pretest-posttest study. One requirement for the participants was that they had to be within six weeks of admission. Rehabilitation intervention occurred approximately twice per week consisting of physical and/or verbal cues to assist with completion of upper body dressing tasks. The same occupational therapist provided intervention while the specific treatment was documented in each patient’s care plan for nursing to complete when the therapist was unavailable. Individuals with upper extremity function were able to use both arms to don their shirt, despite apraxia and visuospatial impairment, when allowed adequate time.

For patients with upper extremity paresis, most were dependent to don their shirt. Of the patients who were independent with this task, less cognitive impairment was noted on tests for apraxia and visuospatial perception as they scored within the “normal” range. Three of the participants who failed to complete upper body dressing experienced neglect or apraxia and arm paresis at follow-up. Results indicated that cognitive impairment (including perceptual impairment) hindered the ability of those who were required to dress themselves using one upper extremity while those who dressed themselves using both were unaffected. The three participants who were unable to dress themselves at follow-up were unable to learn compensatory strategies to assist with completion.
Therefore, the type of rehabilitation intervention provided will be affected by one’s cognitive abilities (Walker et al., 2004).

The purpose of the article by Rubio and Van Deusen (1995) was to synthesize current literature pertaining to two specific areas of impairment: performance components of perceptual processing and self-concept. These are two areas of major concern for OT in terms of effective intervention to improve ADL performance. Literature used for this study indicated that perceptual dysfunction, which is the inability to complete specific activities due to impaired processing and use of stimuli, might occur with individuals who experience a stroke. It does not matter in which hemisphere (i.e., left or right) it occurred. Articles for this review also found that body image dysfunction, which is a disturbance of one’s body scheme, is common following a stroke and often has a correlation with ADL difficulties. Another finding was that impaired ability to dress oneself, complete grooming tasks, and perform mobility activities strongly relates to perceptual limitations if UNS is present.

This study went on to discuss various interventions that may improve ADL ability with individuals affected by UNS due to stroke. Results indicated that a restorative/transfer-of-training approach (i.e., use of perceptual tasks such as three-dimensional-copying and sequencing tasks) was not effective when the goal was to improve ADL performance. A cognitive-perceptual skill remediation program (i.e., visual scanning, time judgment, and visual-spatial orientation tasks) proved highly useful, especially with ADL including grooming, bathing, and toileting. Use of a functional/adaptive training approach (i.e., use of occupation-based activities with appropriate modifications) has shown most effective when attempting to improve self-
care abilities and perceptual dysfunction. This study also indicated that a combined restorative-functional approach might be the most effective intervention for improvement of wheelchair mobility or driving ability. Client-centered interventions were also identified as having a positive effect on functional outcome (Rubio & Van Deusen, 1995).

The article by Wiart, Bon Saint Come, Debelleix, Petit, Joseph, and Mazaux et al. (1997) discussed the identification of the reliability of the Bon Saint Come’s device when combined with intervention consisting of trunk rotation and exploration of the individual’s environment with individuals experiencing UNS. This device consists of a vest that attaches to the subject’s trunk and has a metal bar which projects horizontally from above the subject’s head. The second part of this device consists of a series of targets located on a board and activated when touched by the metal bar.

Two studies were completed in this article using a methodological design. The first study included 22 subjects who had experienced a stroke less than three months prior to the study and were experiencing severe UNS. Subjects received one hour of the experimental treatment (to include use of the Bon Saint Come’s device combined with trunk rotation and exploration of the subject’s environment) followed by 2-3 hours of traditional rehabilitation for 20 days. The control group received 3-4 hours of traditional rehabilitation each day. The second study included five subjects who had been experiencing UNS for 6-7 months. These subjects participated in the experimental program for one month. Results indicated that there was improvement in all test groups for both studies; although significant improvements were observed in the experimental group of the first study (improvements in equilibrium and vision were observed in almost
all subjects of this group following the first training session). It was also found that stabilization of functional performance of all study groups was observed during the follow-up assessment. In conclusion, use of the Bon Saint Come’s device along with intervention to include trunk rotation and exploration of the individual’s environment will most likely result in significant functional performance improvements with individuals who experience UNS (Wiart et al., 1997).

A second article (de Seze, Wiart, Bon-Saint-Come, Debelleix, de Seze, & Joseph, 2001) assessed the efficacy of the Bon Saint Come’s device using a 3-month randomized controlled trial. Twenty consecutive patients, who experienced a stroke resulting in hemiplegia and axial postural disturbance, were involved in this study. All patients were separated into two groups of ten: one being the control and the other being the experimental group. For one month, subjects participated in an experimental program for one hour daily and neurorehabilitation for one hour daily. The control group received neurorehabilitation for two hours daily. For the next two months, both groups received neurorehabilitation two hours daily. Patients were evaluated on days 0, 30, and 90.

Postural and neglect tests showed improvement when assessed on day 30. This result was significantly more evident with the experimental group. This improvement remained the same when assessed on day 90. Results also indicated gait performance improving more quickly in the experimental group. For both groups, Functional Independence Measure (FIM) scores improved. The Bon Saint Come’s device appears to assist with the improvement of postural disturbances of individuals with hemiplegia. Combining voluntary trunk control retraining with spatial exploration is a technique that
may be used as a type of intervention to improve postural control for individuals with hemiplegia (de Seze et al., 2001).

Feys, De Weerdt, Verbeke, Cox Steck, Capiau, and Kiekens et al. (2004) examined the effect of repetitive sensorimotor training of the affected upper extremity at five years post-stroke onset. One hundred patients initially post-stroke and experiencing UNS were randomly assigned to an experimental or control group for this single-blind, stratified, randomized, controlled study. Patients were assessed before, midway, and after intervention. Intervention of sensorimotor stimulation to the affected arm occurred daily over a period of six weeks.

Following the reevaluation, significant differences in scores were found for the experimental group in both the Brunnstrom-Fugl-Meyer (BFM) and Action Research Arm (ARA) tests. No change was found with the Barthel Index (BI) scores. The sensorimotor intervention was found to be most effective in patients who experienced severe initial motor impairments and UNS. Utilizing a specific sensorimotor intervention for the involved arm during the acute phase following a stroke has high indications to result in improved motor function that is long-term (Feys et al., 2004).

In the article by Eskes, Butler, McDonald, Harrison, and Phillips (2003), the purpose was to assess the effectiveness of active and passive limb movement to the affected limb to improve the scanning ability of individuals experiencing UNS. Nine patients who experienced RCVA and left-sided UNS were involved in this before and after trial using a case series study. Active left limb movement and passive left limb movement using functional electrical stimulation (FES) administered while completing visual scanning testing was the intervention.
Results indicated that target detection was significantly improved during scanning tasks on the left side with both active and passive limb activation. Two out of three active movement patients and six out of eight passive movement patients experienced improved scanning ability. As a result of this study, active and passive limb activation using FES are techniques that may be used to improve the scanning abilities of patients with neglect (Eskes et al., 2003).

Harvey, Hood, North, and Robertson (2002) identified the effects of visual and perceptual feedback in regards to intervention techniques, which included lifting rods of various lengths, with individuals experiencing UNS. Fourteen individuals, who had experienced a stroke within the past 5-25 months and were experiencing UNS, were the subjects of this pre-test and post-test with follow-up study. All subjects were right-hand dominant. Subjects participated in therapy sessions that included lifting rods of various lengths with their hands. Subjects were then required to readjust their hand placement so that it was in the center of the rod while visual and perceptual feedback; they were also required to lift the rods on only their right sides.

Significant improvements in subjects' neglect were observed. Visuomotor feedback and repetition may be used as an aspect of the intervention technique with individuals post-stroke experiencing UNS. Through this type of intervention, there is high potential for improved functioning as a long-term effect (Harvey et al., 2002).

Freeman (2001) reviewed theories pertaining to UNS and the use of two possible treatment approaches [i.e. constraint-induced therapy (CIT) and partial visual occlusion (PVO)] and their application to OT intervention. Various studies completed with use of CIT or PVO for individuals experiencing UNS following a stroke were the basis of this
systematic review. Individuals experiencing UNS were provided therapeutic intervention using CIT or PVO. There were also other studies discussed in this article that incorporated intervention techniques consisting of decreased input to the unaffected side.

Through intervention consisting of CIT or PVO, UNS decreased and improved the individual’s functional performance. By decreasing input to the unaffected side, functional performance was also increased as a result of improved UNS. It is recommended that CIT and PVO be provided in addition to regular therapy sessions. It is also suggested that initiation of these forms of intervention occur as soon as possible during the recovery period following a stroke. Another recommendation is that these intervention methods occur throughout the rest of the day to improve functional performance and, therefore, possibly decrease the amount of time required for recovery in the hospital/rehabilitation setting. Decreasing stimuli to the unaffected side is another effective treatment that may improve one’s functional performance (Freeman, 2001).

The purpose of the article by Katz, Hartman-Maeir, Ring, and Soroker (1999) was to evaluate individuals with RCV A experiencing UNS and its effect on the rehabilitation outcome and long-term functioning in ADL and instrumental activities of daily living (IADL) using a pre-test and post-test design with follow-up. This sample included 40 consecutive adults who were right-handed and experiencing a first, single, RCV A. Subjects participated in the standard rehabilitation program of a facility (Loewenstein Rehabilitation Hospital) and were assessed three times per day with the Functional Independence Measure (FIM) and ADL Checklists administered all three times. Administration of the Behavioral Inattention Test (BIT) and Loewenstein Occupational Therapy Cognitive Assessment (LOTCA) occurred at admission and discharge. The
Rabideau Kitchen Evaluation Revised (RKE-R) was administered at discharge and follow-up.

Patients with UNS experienced more prominent sensorimotor and cognitive impairments along with increased functional disability. Both individuals with and without UNS experienced a significant recovery during the hospitalization period, which was evidenced through improved results of the FIM; a significant improvement was also noted for the UNS group in the ADL Checklist for neglect. Another finding was that the length of stay for the UNS group was longer as compared to those without UNS; most (79%) UNS patients required caregiver support following discharge while some (19%) of the patients required support with only ADL functions. Individuals who experience UNS will more than likely require a longer duration of time to improve function as compared to individuals without UNS. Through rehabilitation services provided for individuals post-stroke onset, ability to complete functional daily tasks was improved (Katz et al., 1999).

The article by Tham, Ginsburg, Fisher, and Tegner (2001) studied the effectiveness of an intervention program focused on improving the awareness of limitations (i.e., UNS). Four consecutive individuals (all women) admitted to a hospital due to experiencing a stroke with duration of no longer than ten weeks were the participants of this single-case study. UNS was a result of the stroke for the participants, who were all right-handed. An intervention program incorporated client-centered, occupation-based activities to improve awareness of the participants’ limitations.

Results indicated that all participants improved the awareness of their limited abilities. Decreased UNS and increased sustained attention were the results for two of
the four participants. Use of an intervention program utilizing methods to improve individual awareness of disability may facilitate enhanced abilities to complete ADL and decrease UNS (Tham et al., 2001).

Tham and Kielhofner (2003) completed a qualitative study to assess the impact of the social environment in regards to rehabilitation performance of individuals who were experiencing UNS as the result of a stroke. Four individuals, who had experienced a RCVA of less than ten weeks duration, consecutively admitted to an in-patient rehabilitation program were the participants of this study. All individuals were female and experienced left hemiparesis and UNS. All participants were interviewed 5-7 times each over four months. Participants received OT, along with other rehabilitation services (i.e., physical therapy), over this time period. From the third to seventh week, participants received specialized OT treatment (1-2 hours, 5 days per week), which was focused on improving the UNS. Observations of the functional performance of all participants occurred daily.

It was found that individuals interacted with their social environments in different manners as the time from onset of their stroke increased. At first, individuals were completely unaware of their “left-world” (this being the environment on the left side of their body) and felt overwhelmed due to the chaos involved with learning about this “new” environment. At first, they preferred that items be placed on their right side to enhance their ability to find the object and decrease confusion, which occurred due to the UNS. As time progressed, these individuals indicated feeling more comfortable with interacting with their “left-world” through trial-and-error. During the end stages of their rehabilitation, participants were more accepting of the neglect and better able to discuss
this occurrence with others in order to improve their functional performance (Tham & Kielhofner, 2003).

**Frequent Methods Used to Assess Change**

Throughout all of the journal articles used for this literature review, various methods were used to identify changes in relation to an individual’s ability to function effectively. Methods used more than once will be described here. Originally, it was found that more than 50 different methods were used. Only 16 methods will be discussed, as these were the assessments most commonly implemented (i.e., included in more than one article).

The most commonly used method to assess change was the Schenkenberg Line Bisection Test (LBT). This assessment is used to determine the presence of visual spatial inattention. Articles that included this assessment were Harvey et al. (2002), Wiart et al. (1997), and York et al. (1995).

Another method frequently used was the Functional Independence Measure (FIM) instrument. According to Law (2002), the FIM is used to measure disability and predict one’s functional status at discharge and length of stay. The FIM instrument was included in the articles by Katz et al. (1999), de Seze et al. (2001), and Wiart et al. (1997).

The Letter Cancellation Task (LCT) was also present in various articles used in this literature review. This assessment consists of a form that includes numerous letters and requires the subject to identify every letter “A” they encounter. Unilateral neglect syndrome (UNS) assessed via the LCT consists of three levels: mild, moderate, and severe. Tham et al. (2001) and Walker et al. (2004) included the LCT in their studies.
Other commonly used assessments included the Mini-Mental Status Examination (MMSE), Barthel Index (BI), Albert Line Cancellation Test (ALCT), and Klein-Bell Activities of Daily Living (ADL) Scale. According to the article by Wiart et al. (1997), the MMSE is used to assess global cognitive status. The article by Feys et al. (2004) indicates that the BI is an overall index of functional recovery. Yelnik et al. (2002) describes the ALCT as being used to determine visuospatial neglect. Used in the article by Chen-Sea (2001), the Klein-Bell ADL Scale measured the degree of independence for six areas of basic self-care.

According to Rubio and Van Deusen (1995), deficits with dressing, grooming, and mobility activities are related to impaired perceptual skills. The study by Hanna-Pladdy et al. (2003) concurred with this finding and proceeded to discuss how bathing, toileting, and grooming are commonly impaired as a result of apraxia. As a result of this evidence, grooming is significant in that this is an ADL commonly affected by both perceptual impairments and apraxia.

Effective Occupational Therapy Intervention Techniques

As a result of the findings from the studies previously discussed, many interventions may be used as a means to provide effective treatment for those who are affected by unilateral neglect syndrome (UNS) as a result of a stroke. Due to the study by Walker et al. (2004), cueing techniques (verbal and/or physical) were found effective. Use of a functional/adaptive approach is valuable when the goal is to improve self-care deficits and perceptual limitations while a combined restorative-functional approach is useful for the goal of improving mobility (Rubio & Van Deusen, 1995). Trunk rotation with use of the Bon Saint Come’s device and exploration of the subject’s environment
may be used to improve the functional performance of individuals experiencing UNS (Wiart et al., 1997; de Seze et al., 2001). For those who experience severe initial motor impairments, repetitive sensorimotor intervention, to include functional electrical stimulation (FES), used in the acute stages post-stroke has been shown to be valuable (Feys et al., 2004). Another study (Eskes et al., 2003) found stimulation of the affected arm to be useful for improved scanning abilities when paired with active and passive movement. Harvey et al. (2002) discovered that visuomotor feedback and repetition is effective for a long-term effect. Two other forms of intervention, constraint-induced therapy and partial visual occlusion, may be used outside of the therapy sessions in order to decrease input to the unaffected limb and, therefore, require the affected limb to be more functional in completing activities (Freeman, 2001). Tham et al. (2001) concluded that improving one’s awareness of their impairment (i.e., UNS) would improve their functional capacities.

Summary

Current literature primarily identifies use of specific rehabilitation intervention methods that have been studied mainly from an “outsider’s” point of view. By being more client-centered and demonstrating more patience for how the individual feels most comfortable, professionals, as well as others involved in the rehabilitation process (i.e., family), may provide an optimal environment in which the individual will feel more at ease and able to perform and explore their areas for further improvement. The recovery period post-stroke may be lengthy but, by adapting the ways in which we interact with
the individual affected by UNS, their ability to effectively function will be enhanced. As individuals progress through stages of rehabilitation, their functional abilities most often improve.
CHAPTER III

METHOD

A client-centered approach was chosen for the completion of this study. The profession of occupational therapy (OT) takes great pride in client-centered, occupation-based interventions. Through implementation of this type of approach, it has been indicated that therapeutic intervention is more meaningful and effective for the individual being treated.

The procedure of this study included a comprehensive literature review of current information addressing the occurrence of unilateral neglect syndrome (UNS) as a result of a stroke. All of the articles included in the literature review were specifically chosen for their content. In order to be chosen for this particular study, it was required that articles pertained to individuals who had experienced UNS as a result of a stroke along with daily activities affected and/or interventions proven effective for use with this population. After conducting the extensive literature review, effective methods of intervention and outcome measures were identified.

The final product, the Unilateral Neglect Protocol: An Evidence-based Occupational Therapy Intervention Protocol for Individuals with Post-Stroke Unilateral Neglect, was produced to include effective OT interventions for individuals experiencing UNS, along with useful methods to measure change in one’s ability to complete functional tasks. This product will allow for increased client-centered intervention as it
provides a description of a variety of effective interventions. Therefore, through use of this protocol, occupational therapists will be able to choose interventions that most appropriately correlate with the needs of the individuals being treated to provide more meaningful and effective treatment.
CHAPTER IV

PRODUCT

The product of this scholarly project is the Unilateral Neglect Protocol: An Evidence-based Occupational Therapy (OT) Intervention Protocol for Individuals with Post-Stroke Unilateral Neglect. It consists of a compilation of OT intervention methods found to be effective for treatment when used with individuals affected by unilateral neglect syndrome (UNS) as a result of a stroke. This protocol is a manual that consists of intervention descriptions, purposes, methods for implementation in order to utilize each intervention safely and effectively, and examples. The Unilateral Neglect Protocol also contains commonly used methods to measure outcomes and assess the functional capacities of individuals. All information was obtained through a review of the current literature pertaining to UNS, daily activities commonly affected, and/or effective intervention procedures used with this population.
CHAPTER V

SUMMARY

For this scholarly project, various steps were completed. One of those steps included finding relevant and competent literature to complete the literature review. Another step was to analyze all information to combine and include in the product. It was then decided to include effective intervention methods and outcome measures in the final product. The final product was an occupational therapy (OT) protocol to guide the selection of intervention to assist persons with unilateral neglect syndrome (UNS) in their post-stroke recovery.

As a result of the literature review, information pertaining to UNS was gathered. The purpose of finding evidence-based material of this nature was to assist with increasing the overall knowledge of occupational therapists in regards to using effective interventions with those who experience UNS as a result of a stroke. A method to achieve this goal may be through the use of the product, the Unilateral Neglect Protocol: An Evidence-based Occupational Therapy Intervention Protocol for Individuals with Post-Stroke Unilateral Neglect, which resulted from this scholarly project process.

The Unilateral Neglect Protocol is a manual that consists of two sections. The first section includes various effective interventions which may be used by occupational therapists. The second section is a list of useful outcome measures to guide the reporting of intervention results and lead to possible comparative research. All information in this
manual may be implemented by occupational therapists for treatment of individuals experiencing UNS.

With this manual, occupational therapists are able to consider a variety of treatments shown to be effective when used with this population. By selecting interventions that are most appropriate for each individual, therapy sessions may be conducted in a more client-centered manner because they are directed towards improving that specific individual’s functional abilities. Through use of individualized interventions included in this manual, the motivation of the individuals participating in the therapy may also be enhanced. Evidence supports the fact that if activities are directly related to an individual’s wants and needs, that person will demonstrate increased motivation to complete an activity and will thereby improve their ability to participate. By providing therapy that is more client-centered, individuals’ functional capacities and independence are improved.

The Unilateral Neglect Protocol also provides a list of outcome measures. These may be used to assess functional changes that may occur following the use of effective intervention methods. All outcome measures included in the protocol were common methods to determine change within the evidence included in the literature review.

Through the production of the Unilateral Neglect Protocol, more effective and client-centered treatment may occur. It is the intent that the protocol will be used by occupational therapists to identify specific interventions determined most appropriate for each individual. Therefore, treatment sessions will be more focused to address the needs of each person.
As a result of this scholarly project, OT will become even more beneficial for persons recovering from UNS post-stroke. Improved functional performance of the individual receiving rehabilitation services may also be enhanced as a result. Therefore, one will be more able to perform their daily activities more effectively. Because of the Unilateral Neglect Protocol, the overall goal of OT will become more achievable. The intent of this scholarly project was to improve each person’s ability to function post-stroke as independently as possible in his or her natural context.
Unilateral Neglect Protocol: An Evidence-based Occupational Therapy Intervention Protocol for Individuals with Post-Stroke Unilateral Neglect

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Effective Interventions

1. Active and Functional Electrical Stimulation (FES)-Stimulated Passive Movements

2. Bon Saint Come’s Device Used with Trunk Rotation and Voluntary Exploration

3. Client-Centered Intervention

4. Cognitive-Perceptual Skill Remediation

5. Constraint-Induced Therapy (CIT)

6. Cueing

7. Functional/Adaptive Training Approach

8. Partial Visual Occlusion

9. Repetitive Sensorimotor Training

10. Restorative-Functional Approach

11. Training Awareness of Disability

12. Visuomotor Feedback Training with Repetition
Limb Activation through Active and Functional Electrical Stimulation (FES)-Stimulated Passive Movements during Scanning Activities

Description:
- Combination of:
  - **Active movements** – movements in which the individual is able to complete independently
  - **FES-stimulated passive movements** – movements activated through FES
    - FES facilitates, enhances, or acts as a substitute for muscle contraction after a central nervous system lesion and is easily adaptable.

Purpose:
- Improve visual scanning on affected side and ability to complete daily activities

Method for Implementation:
- Individual completes visual scanning activity and detects specific targets by demonstrating active or passive movements with affected limb placed in its same hemispace (i.e., left limb affected and performs activity in left hemispace).
- **Active movement** – individual detects target independently
- **FES-stimulated passive movements** – therapist manipulates individual’s affected limb (i.e., fingers or arm) to provide passive movement to detect target during visual scanning activity while FES is being administered

Example(s):
- Individual completes visual scanning activity and is required to verbally indicate each item (i.e., use piece of paper with words, numbers, and pictures).
- Individual triggers a buzzer with the affected limb (located in same hemispace) each time correct word (i.e., “house”) is indicated.
- This is completed using both FES-stimulated passive and active movement with FES-stimulated passive movement initiated prior to active movement.
  - **FES-stimulated passive movement**
    - Implementation of FES and passive movement to complete
  - **Active movement**
    - Individual completes independently

Reference(s):
Eskes et al. (2003)
Bon Saint Come’s Device Used with Trunk Rotation and Voluntary Exploration

Description:
- Bon Saint Come’s device consists of 4 parts that are interconnected by electrical wiring: trunk orthosis, 2 hemipanels, and keyboard
  - A custom-molded trunk orthosis supports a posterior vertical post holding a horizontal pole that projects over the subject’s head; the anterior tip of the pole has a metal tip designated as the pointer.
  - Two mobile hemipanels (left and right) are connected in the middle and located to the front of the subject; targets of various forms are distributed over both panels and have 1 or more metal notches located on each target.
  - Keyboard is connected to the trunk supports and hemipanels to allow the therapist to activate light and sound signals of the target and emit positive feedback upon appropriate response of individual.

Purpose:
- Improve postural disorders affected by unilateral neglect syndrome

Method for Implementation:
- Subject dons the Bon Saint Come’s device and is required to contact the metal tip of the rod located on the Bon Saint Come’s device with the intended target to elicit a positive response.
- Once each target is located by the Bon Saint Come device through trunk rotation and visual scanning of the subject, visual and auditory feedback is provided to indicate successful location of the target.
- If subject is standing, he/she is required to not move their feet while subjects who are sitting are required to avoid shifting their body laterally – therapist provides cues to assist subject in maintaining these requirements.
  - Subject completes activity in sitting position first; once therapist determines subject has adequate trunk control in sitting, subject completes while standing.
- If subject experiences left hemiplegia and neglect, tasks are performed from right to left, then left to right, and then randomly – subjects with right hemiplegia and neglect perform tasks starting with left to right, then right to left, and then randomly.

Example(s):
- The Bon Saint Come’s device is used in manner described above.

Reference(s):
de Seze et al. (2001)
Walker et al. (1997)
Client-Centered Intervention

Description:
- Use of interventions that are motivating for the individual in which to participate
- Use of context similar to individual’s natural environment

Purpose:
- Improve overall functional ability through meaningful interventions
- Enhance individual’s motivation to complete activity
- Increase individual’s ability to generalize to own environment

Method for Implementation:
- Utilize methods of intervention which include the use of activities the individual is motivated and willing to perform
- Setup environment as close as possible to that of individual’s natural context
- Use situations that individual is familiar with performing

Example(s):
- Individual completes kitchen tasks while preparing items he/she regularly performs in natural environment with kitchen setup in similar layout.
- Provide choices to improve motivation and willingness to perform (i.e., “Would you rather complete your grooming tasks in the bathroom first or get dressed?”)

Reference(s):
Rubio and Van Deusen (1995)
Cognitive-Perceptual Skill Remediation

Description:
- Use of problem-solving abilities and senses incorporated into performance of an activity

Purpose:
- Improve grooming, dressing, toileting, and/or driving skills

Method for Implementation:
- Interventions consisting of activities requiring:
  - Scanning
  - Figure-ground differentiation
  - Spatial perception
  - Attention
  - Visual imagery

Example(s):
- **Restorative/transfer-of-training approach**: use of perceptual tasks such as three-dimensional-copying and sequencing tasks
  - **Purpose**: Improvement of wheelchair mobility or driving ability
- **Cognitive-perceptual skill remediation**: visual scanning, time judgment, and visual-spatial orientation tasks
  - **Purpose**: Improve abilities to complete activities of daily living (ADLs) to include grooming, bathing, and toileting
- **Functional/adaptive training approach**: use of occupation-based activities with appropriate modifications such as having individual complete simple meal preparation (preparing items they choose and are common to them) in kitchen that is setup in similar layout as their own
  - **Purpose**: Useful to improve self-care abilities and perceptual dysfunction

Reference(s):
Rubio and Van Deusen (1995)
Constraint-Induced Therapy (CIT)

Description:
- CIT, also known as “forced use”, involves restraint of the unaffected limb to counteract the effects of learned nonuse.
  - Learned nonuse occurs when the individual experiencing hemiparesis is unsuccessful with using the affected limb and, therefore, experiences positive effects when using compensatory strategies with the unaffected limb.
- Use to minimize sensory input to the unaffected limb and assist with improvement of spatial neglect symptoms on the affected side

Purpose:
- Improve use and functional ability of affected limb
  - Especially useful with individuals who experience somatosensory neglect and, therefore, learned nonuse of the affected extremity
  - Recommend use with individuals who demonstrate insight regarding their limitations
- Reduce the manifestations of unilateral neglect syndrome

Method for Implementation:
- Use device (either sling or glove – if using glove, subjects more often require frequent cues to limit use of unaffected limb) which will restrain affected limb while maintaining individual’s safety
- Require individual to perform various tasks with affected limb while restraint is donned on unaffected limb

Example(s):
- While restraint is donned on unaffected limb, individual completes:
  - Grooming
  - Simple meal preparation
  - Dressing
  - Feeding
  - Toileting

Reference(s):
Freeman (2001)
Cueing

Description:
- Visual and/or verbal prompts provided to assist with participation in various activities

Purpose:
- Improve functional ability
- Enforce technique to be used in order to enhance ability to successfully complete task

Method for Implementation:
- Visual and/or verbal cues provided as necessary to enforce performance of specific techniques

Example(s):
- Demonstration (visual cueing) is provided to educate subject on dressing technique in which affected limb is dressed first
  - Verbal cues provided as needed when subject performs technique (i.e., “Which step is next?”)

Reference(s):
Walker et al. (2004)
Functional/Adaptive Training Approach

Description:
- Use of functional or occupational tasks as treatment modalities to enhance the individual’s independence

Purpose:
- Improve perceptual impairments
- Decrease impairments of body image dysfunction
- Increase ability to complete self-care activities

Method for Implementation:
- Environmental/task modification
- Practice of specific functional activities

Example(s):
- Adapt environment during dressing tasks by utilizing regular-height chair instead of wheelchair
  - This will improve functional mobility and individual’s ability to dress their lower-body.
- Place objects in all visual fields
  - This requires the individual to scan environment and generalize those skills to daily functioning.

Reference(s):
Rubio and Van Deusen (1995)
Partial Visual Occlusion

Description:
- Used to restrain the less affected side
- Requires the individual to use compensatory strategies (i.e., turning the head and eye movements) to improve functional performance

Purpose:
- Improve scanning abilities of affected side

Method for Implementation:
- Consists of either of the following (use the one most effective for the individual):
  - Individual’s glasses are patched on the half field that is not neglected.
  - Individual is provided with hemispatial sunglasses.

Example(s):
- Subject uses partial visual occlusion while completing morning grooming tasks.
- Meal preparation is completed in simulated natural kitchen environment with use of partial visual occlusion and cues provided as needed.

Reference(s):
Freeman (2001)
Repetitive Sensorimotor Training

Description:
- Consists of sensorimotor stimulation (e.g., providing sensory input that requires a motor response) of the affected arm

Purpose:
- Improve mobility and stability
- Decrease effects of unilateral neglect syndrome
- Acquire basic movements that may be used for completing various aspects of entire activities

Method for Implementation:
- Use during acute phase of injury for 30-minute treatment sessions on a daily basis
- Treatment sessions using this approach are suggested to be intensive, repetitive, and targeted.

Example(s):
- While seated in rocking chair, chair is tilted slightly forward to elicit a motor response in which the subject uses affected arm to push against object (e.g., board, therapist’s hand, etc.) in order to readjust body to upright position.
  - This activity should be completed repetitiously.
  - Recommend use of this example only if subject has appropriate trunk control for safe completion of activity; suggest use of more than one appropriate professional if needed to ensure safety of all individuals involved.

(This example is directly from reference, Feys et al., 2004, p. 925)

Reference(s):
Feys et al. (2004)
Restorative-Functional Approach

Description:
- Use of specific skill retraining accompanied by participation in activities of daily living that are modified to enhance the individual’s functional performance

Purpose:
- Decrease perceptual impairments and/or body image dysfunction
- Improve wheelchair mobility and/or driving skill

Method for Implementation:
- Combine specific skill retraining (e.g., pen-and-paper, card, and computer activities) with daily activities in which the individual regularly participates

Example(s):
- Subject writes out schedule for the day by using affected limb to stabilize paper; subject then completes grooming task of brushing teeth and also uses affected limb to stabilize objects
  - This sequence is used to enhance subject’s functional use of affected limb and improve ability to generalize to various situations

Reference(s):
Rubio and Van Deusen (1995)
Training Awareness of Disability

Description:
- Daily occupations that are purposeful and meaningful to the individual are used as therapeutic methods to improve awareness of disabilities.

Purpose:
- Improve awareness of disabilities and overall functional performance

Method for Implementation (all items listed used in combination with others):
- Individual chooses occupations that are purposeful and meaningful with support of the therapist.
  - Individual engages in discussion with therapist.
    - Prior to performing occupation, therapist involves individual in discussion to address anticipated strengths/areas of improvement (therapist may recommend that the individual identify past experiences of similar nature to compare).
  - Following participation in occupation, therapist involves individual in discussion to address:
    - Areas completed successfully and areas requiring improvement in order to successfully complete
- Use of video feedback during beginning of intervention (with consent of individual)
  - Therapist involves activities in which individual’s neglect is more clearly observed.
  - Therapist involves individual in discussion of their performance and compensatory techniques that may be used.
  - Individual completes activity following discussion while using compensatory techniques.
- Use of home environment
  - Between 2-4 home visits are performed to consist of individual completing purposeful and meaningful activities in home environment and compares current performance to that prior to the stroke.
- Use of “therapeutic narratives”
  - Throughout intervention, individuals reflect on their performance in order to enhance the awareness of their abilities.

Example(s):
- Subject completes daily occupations of brushing teeth and combing hair while being recorded with permission from subject.
  - Video feedback is provided followed by discussion with therapist regarding performance and methods to improve ability to complete.

Reference(s):
Tham et al. (2001)
Visuomotor Feedback Training with Repetition

Description:
- Use of repetitious activities that implement visuomotor feedback (e.g., lifting rod with affected limb and positioning hand in center)

Purpose:
- Decrease effects of unilateral neglect syndrome
- Improve functional performance

Method for Implementation:
- Individual is directed to reach, lift, and balance a rod at the center using right hand.
- Individual readjusts grip on the rod until satisfied he/she is holding it in the center.
- Rods may vary in length and may include:
  - Rolling pin
  - Towel rail
  - Roll of wrapping paper
- Individual completes sequence of reaching, lifting, and balancing rod for 9 sets of 8 repetitions.

Example(s):
- Individual reaches, lifts, and balances rod of shortest length (i.e. rolling pin) for 8 repetitions.
  - Next, this same technique is used with rod that is slightly longer (i.e. towel rail).
  - Lastly, same technique is used with rod of longest length (i.e. roll of wrapping paper).
    - This entire sequence of lifting 3 rods of varying lengths is completed 3 times each.

Reference(s):
Harvey et al. (2003)
Methods to Measure Outcomes

1. Schenkenberg Line Bisection Test
2. Functional Independence Measure
3. Letter Cancellation Task
4. Mini-Mental Status Examination
5. Barthel Index
6. Albert Line Cancellation Test
7. Klein-Bell Activities of Daily Living Scale
Schenkenberg Line Bisection Test

- Used to determine the presence of visual spatial inattention
- Consists of:
  - Six horizontal black lines are presented 4 centimeters apart on a piece of paper.
  - Subject is asked to indicate the center of each line by marking each line while other lines are visually occluded.
  - Each line is analyzed to determine deviation from midline of line bisections.

Reference(s):
Freeman (2001)
Harvey et al. (2002)
Rubio and Van Deusen (1995)
Wiart et al. (1997)
York and Cermak (1997)

Functional Independence Measure

- Used to measure the degree of independence and assistance needed in activities of daily living (ADL)
- Provides:
  - Total score
  - 2 factor scores – motor and cognitive
    - Higher scores indicate more independence in ADL functioning.

Reference(s):
de Seze et al. (2001)
Katz et al. (1999)
Wiart et al. (1997)
Letter Cancellation Task

- Used to assess unilateral neglect syndrome and measure severity according to three levels: mild (60-90%), moderate (30-60%), and severe (less than 60%)
  - Determined by using the marked letter “A”s as a percentage of the possible total
- Consists of:
  - Form that includes 120 capital letters
    - 30 letter “A”s and 90 distractors
  - Subject is required to mark (i.e., circle) every letter “A” they encounter.

Reference(s):
Freeman (2001)
Rubio and Van Deusen (1995)
Tham et al. (2001)
Walker et al. (2004)

Mini-Mental Status Examination

- Used to assess global cognitive status

Reference(s):
de Seze et al. (2001)
Hanna-Pladdy et al. (2003)
Wiart et al. (1997)

Barthel Index

- Overall index of self-care and functional recovery

Reference(s):
Feys et al. (2004)
Walker et al. (2004)
Albert Line Cancellation Test

- Used to determine visuospatial neglect
- Subject is required to cross out 41 randomly oriented lines arranged in approximately 6 rows.
- This test is scored according to the number of lines missed.

Reference(s):
Freeman (2001)

Klein-Bell Activities of Daily Living Scale

- Measures the degree of independence for six areas of basic self-care
- 6 activities of daily living (ADL) areas are represented:
  - Dressing
  - Elimination
  - Mobility
  - Bathing and hygiene
  - Eating
  - Emergency telephone communication
- Test is scored for each ADL area and results in an overall total score (sum of all 6 ADL area scores).
- Scores range from:
  - 0-103 (dressing)
  - 0-46 (elimination)
  - 0-68 (mobility)
  - 0-56 (bathing)
  - 0-30 (eating)
  - 0-10 (emergency telephone communication)

Reference(s):
Chen-Sea (2000)
Chen-Sea (2001)
REFERENCES


