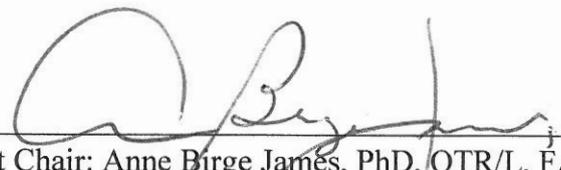
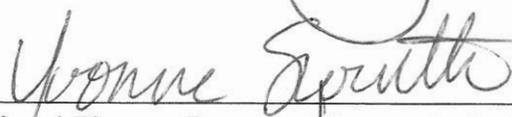


An Activities-Based Home Program Manual
for Student Occupational Therapists in a Campus-Based Teaching Clinic

May, 2015

This project, submitted by Casey Brumbach and Kathryn Louthain, has been approved and
accepted
in partial fulfillment of the requirements for the degree of
Master of Occupational Therapy from the University of Puget Sound.


Project Chair: Anne Birge James, PhD, OTR/L, FAOTA


Director, Occupational Therapy Program: Yvonne Swinth, PhD, OTR/L, FAOTA


Dean of Graduate Studies: Sunil Kukreja, PhD

Abstract

Home programs are one component of occupational therapy service delivery that improves outcomes for clients and furthers the gains made in therapy. Home programs are individually designed activities and exercises that are intended to be incorporated into the client's daily routine. Adherence to home programs, however, can be challenging and adherence rates range from 40-70%. Occupational therapy focuses on the use of meaningful, functional activities that have inherent therapeutic power. Home programs utilizing functional activity have been shown to increase effectiveness and follow-through for clients. Despite this evidence, very few activity-based home program resources exist for occupational therapists. Thus, a manual containing 37 ideas for activity-based home programs was created for use at the University of Puget Sound On-site Occupational Therapy Clinic. A pilot study was completed to determine the effectiveness and organization of the manual. The final, completed manual is available in the resource room and online on the student Moodle course website for OT661.

Key Words: meaningful activities, task-oriented approach, home programs, upper-extremity rehabilitation

An Activities-Based Home Program Manual
for Student Occupational Therapists in a Campus-Based Teaching Clinic

At the University of Puget Sound (UPS) On-site Occupational Therapy (OT) Clinic, clients are afforded a unique opportunity to receive OT and physical therapy (PT) services by student therapists at no or minimal cost under the supervision of experienced and licensed clinical instructors. This not only allows community members access to care they otherwise would not have, but also provides hands-on learning for therapy students. Most of the clients treated at the UPS On-site OT Clinic do not have adequate healthcare coverage or have reached their limit for therapy services (S. Doyle, personal communication, February 10, 2014). Granting these individuals access to OT services can contribute to an overall improvement in their quality of life, renew their sense of self-efficacy, and increase their occupational engagement.

Home programs are an essential component of the therapy process and OT students develop one for their clients at the UPS On-site OT Clinic. Services provided at the UPS On-site OT Clinic are limited to an 11-week period each spring semester. Due to the limited amount of time for the clients to reach their goals, providing the clients with home programs to progress or maintain therapy gains is crucial. These programs may be implemented between treatment sessions and after discharge (S. Doyle, personal communication, February 10, 2014).

Home programs often include exercises for clients with neuromuscular rehabilitative goals (S. Doyle, personal communication, February 10, 2014). However, home programs that consist primarily of rote exercises are often not followed as prescribed (Combs, Kelly, Barton, Ivaska, & Nowak, 2010). Rote exercise consists of strengthening, stretching, and endurance training with traditional exercise equipment such as weights or therapy bands (Combs et al., 2010). Often times, clients get caught up in their lives and do not complete their home programs.

Occupation and the therapeutic power of engagement in meaningful activities is the core of OT (American Occupational Therapy Association [AOTA], 2014a). Increasing participation in specific everyday activities is a strategy that OT practitioners often use to help clients work toward neuromuscular rehabilitative goals. Studies have shown that activities (e.g. folding laundry and washing the car), as opposed to rote exercise (e.g. therapy bands and weight lifting), yield an increase in the amount of time that an individual is engaged in movement (Combs et al., 2010).

Historically, student occupational therapists at UPS have primarily prescribed rote exercise programs for their clients and follow through has been poor (White, 2013). The faculty of the UPS OT program theorized that underutilization of activity-based home program, was a strong contributor to low adherence rates (A. James, personal communication, February 14, 2014). More specifically, the faculty recognized that activity-based programs would be ideal for the large number of clients with chronic conditions seen at the UPS On-site OT Clinic. The faculty's reasoning was based off findings that activities to promote neuromuscular goals can be easily integrated into a client's daily routine (Combs et al., 2010; Orellano, Colon, & Arbesman, 2012).

It is our vision that by providing a readily accessible manual with activities that facilitate neuromuscular rehabilitation for student therapists at the UPS On-site OT Clinic, we can increase the use of activity-based home programs for the UPS OT clients. We believe that an activity-based home program manual will help to advocate for clients' use of everyday activities to reach their therapeutic goals. An activity-based home program manual will serve to motivate clients to participate in daily tasks and remain engaged in their lives, while making progress towards their goals.

Background

Healthcare Changes: Implications for Occupational Therapy

Healthcare in the United States is changing more now than it has in recent years (U.S. Department of Health and Human Services [HHS], 2014). The Affordable Care Act (ACA) is the largest change to the U.S. healthcare system since Medicare was introduced in 1965 (AOTA, 2014a). This legislation change will affect OT services for both providers and consumers (AOTA, 2014a). One significant change made under the ACA prohibits insurance companies from denying an individual coverage based on preexisting conditions (U.S. HHS, 2014). In addition, rehabilitation and habilitation services are now considered essential benefits. Both of these changes are projected to have positive effects on access to rehabilitation services (AOTA, 2014a). Despite these positive changes, there are still current policies within the healthcare system that can make it challenging for individuals to receive adequate OT services.

The 2015 Medicare therapy cap for OT services is set at \$1940, which limits reimbursement of OT costs to that amount each calendar year (Centers for Medicare and Medicaid Services, 2015). The current system in place to appeal for extended therapy services is lengthy and many providers are slow to help clients obtain the therapy cap exception of up to \$3,700 for each calendar year (Center for Medicare Advocacy, 2014). As a result, individuals with chronic conditions that would benefit from ongoing services are often discharged before they have reached their full rehab potential (Center for Medicare Advocacy, 2014). Limitations in outpatient therapy services and shorter hospital stays are making home programs more important than ever for clients with chronic or progressive conditions (Center for Medicare Advocacy, 2014).

According to the World Health Organization (WHO; 2004), chronic conditions are the leading cause of disability and death in the U.S. Chronic neurological conditions, such as Parkinson's disease, cerebrovascular accident, traumatic brain injuries, and multiple sclerosis are expected to increase in number of cases. Chronic conditions with neurological components can be especially debilitating due to the nervous system's extensive influence on overall function. Chronic conditions currently affect 133 million Americans and have been shown to decrease quality of life, require expensive medical treatment, and put a burden on families (WHO, 2004).

Occupational Therapy and Chronic Conditions

Chronic neurological illness or injury often causes impairments in sensation, motor skills, cardiovascular function, communication, and cognition; any of which can impact an individual's ability to perform his or her daily occupations (Woodson, 2014). These occupations refer to activities of daily living (ADL), instrumental activities of daily living (IADL), work, and leisure activities (Robison et al., 2009). ADLs are the tasks necessary for personal self-care such as feeding and toileting, whereas IADL are tasks that support daily living but go beyond basic everyday needs such as food preparation, household cleaning, and shopping (AOTA, 2014b). It has been shown that resuming previously valued activities and independence in function following an illness or injury is important to an individual's sense of self-efficacy, identity, and overall quality of life (Robison et al., 2009).

OT is a health profession that facilitates an individuals' ability to participate in meaningful occupations. To achieve this a therapist may utilize the direct practice of occupations (e.g., learning one-handed dressing techniques), use of selected activities (e.g., playing a game to achieve fine motor movements needed for ADL or IADL), and preparatory treatments (e.g., prolonged stretch to a muscle group to decrease spasticity and improve available movement)

(AOTA, 2014b). Activities that are components of specific occupation-based goals may be practiced as an “end” or outcome of treatment (e.g. practicing fasteners to support dressing skills) (AOTA, 2014b). On the other hand, activities can be used to develop underlying skills that will support their participation in meaningful occupations (Latham, 2014). For example, playing chess at a tabletop to provide the necessary repetitions, sensory input, and task demands to challenge and enhance motor function for a client to achieve an increased forward reach for participation in IADL, is using occupation as “means” to treatment. This project will focus on the use of activities as means to promote change in client factors or performance skills that will enhance participation in a range of occupations.

Neuromusculoskeletal function and motor skills are commonly impaired in persons with chronic neurological disorders. These impairments are often addressed in OT and are the focus of this project. Upper extremity impairments are often the focus of OT neuromuscular rehabilitation, because of the high level of involvement of the upper extremities in occupations. Therefore, the manual is designed to include activities to facilitate upper extremity neuromuscular rehabilitation. Neuromuscular impairments can limit an individual's ability to coordinate movement, grasp and manipulate objects, maintain balance, initiate movement, and actively contract muscle groups with sufficient force (Woodson, 2014). Additionally, motor deficits often affect individuals' ability to care for themselves (Woodson, 2014). Due to the complex nature of the nervous system, the motor changes seen in different conditions vary greatly and are treated in different ways (Woodson, 2014).

The motor deficits seen in many chronic conditions are due to disturbances of the neurons within the central nervous system, the peripheral nervous system, or both (Sabari, Capasso, & Feld-Glazman, 2014). Evidence supporting the brain's ability to reorganize itself to compensate

for damage to neurons has increased in recent years (Sabari et al., 2014). This reorganization, called neuroplasticity, has informed rehabilitation practices with improved outcomes for those with neurological conditions (Sabari et al., 2014). Neuroplasticity has been shown to occur even years after the initial injury to the neurons, which gives further promise for motor rehabilitation of chronic conditions (Sabari et al., 2014; Sullivan et al., 2007). More specifically, for occupational therapists who frequently work on motor rehabilitation with these chronic conditions. There are many approaches to motor rehabilitation within therapy such as biomechanical, neurodevelopmental, and acquisitioned (Rao, 2011). For the premise of our project, we have selected the task-oriented approach, which is based on motor learning theory.

Motor Learning and the Task Oriented Approach

Motor learning is the process of learning or re-learning a motor skill through repetitive interactions between a person's body systems with the surrounding environment and tasks within the environment (Mathiowetz, 2011; Schmidt & Lee, 2011). Over the past 30 years, research has focused on how to best facilitate this process, leading to the development of motor learning theory. The evidence-based principles of motor learning theory have been applied to the field of rehabilitation for establishing and restoring motor skills (Mathiowetz, 2011). The application of motor learning principles within functional activities to promote the acquisition of motor skills is referred to as the task-oriented approach (Mathiowetz, 2011).

According to the task-oriented approach, the degree to which an individual is able to recall and generalize a motor skill is indicative of the level of mastery of the skill. Generalization of a motor skill refers to the ability of an individual to apply a motor skill to a variety of tasks and contexts (Preissner, 2010). For example, a person who learns how to flex his elbow and shoulder simultaneously to hit a tennis ball with a racket and then later demonstrates a similar

action with a ping-pong ball and paddle has generalized the motor skill. Generalization is best supported when the individual has the chance to randomly utilize a specific movement throughout their day, usually in the context of functional activity (Schmidt & Lee, 2011).

Orrell, Eves, Masters, and MacMahon (2007) conducted motor research with stroke survivors using a keyboard to elicit finger extension of an affected upper extremity. Their findings support the original research of Schmidt in 1991 who found that random practice of a motor skill led to increased accuracy and speed compared to repetitive blocked practice (Schmidt & Lee, 2011). This finding is the premise for the promotion of random practice of a motor skill throughout one's daily routine to support efficient movement and generalization within the task-oriented approach (Preissner, 2010).

Within the principles of the task-oriented approach, not only does random practice of a motor skill encourage generalization, but also practice within multiple environments and contexts (Mathiowetz, 2011). Furthermore, circumstances that naturally elicit the targeted movement are most optimal for appropriately organizing a motor skill (Preissner, 2010). Mathiowetz and Wade (1995) conducted a study of motor learning patterns in 40 adults with and without multiple sclerosis. They connected infrared-emitting diodes to the subjects' arms to compare the movement patterns when subjects pretended to be doing a specific task (i.e. gesturing as if one was eating applesauce) and when the subjects participated in the task itself (i.e. actually eating applesauce). They found that the participants that actually performed the activity used more precise, smooth movement patterns than the group that performed the action in a context that was not intuitive or functional (Mathiowetz & Wade, 1995). Within the task-oriented approach, therapists are encouraged to provide opportunities for clients to practice movements in a functional context to encourage the development of optimal motor performance

(Mathiowetz, 2011). In addition, the therapist facilitates re-learning of motor tasks by providing visual demonstration and verbal feedback at the beginning of the therapy process (Sabari et al., 2014).

When clients with neurological impairment are re-learning how to perform their daily activities, the therapist has a vital role in ensuring that the client understands the desired movement pattern and in facilitating the ability of the client to critically analyze the movement (Sabari et al., 2014). Visual demonstration of the motor skill with carefully selected verbal narration is integral in facilitating motor learning. Sabari et al. (2014) reported that hand over hand assist, pictures, and videos can aid the client in developing a thorough understanding of the desired movement. Individuals with damage to their central nervous system may have diminished sensory systems affecting their ability to use intrinsic feedback during movement, to accurately feel and interpret executed movement. Sabari et al. (2014) studied the importance of the therapist in helping re-establish the intrinsic feedback system in clients experiencing diminished ability to integrate and interpret their sensory feedback. They reported that early in the development of a motor skill, extrinsic feedback, such as prompts or gestures, could be beneficial in promoting the development of intrinsic feedback. However, their review found that too much extrinsic feedback or continuous extrinsic feedback hindered clients' ability to re-establish their own intrinsic feedback system. As a result, the task-oriented approach embraces the use of the minimal amount of feedback necessary for the client to complete the task and the gradual decrease of external feedback as the client progresses. This principle provides support for facilitating practice outside of therapy where clients have opportunities to develop their own intrinsic feedback systems (Mathiowetz, 2011).

Not only does practice outside of a therapy session promote the development of intrinsic feedback, it also allows for repetitive random practice of a motor skill (Fabrizio & Rafols, 2014). Although a therapist can structure a treatment session so that practice is intermittent, additional practice outside therapy will provide more opportunities for repetitions as well as practice in multiple contexts and environments (Fabrizio & Rafols, 2014). Given that the purpose of our manual is to create activity-based home programs for physical rehabilitative goals, the task-oriented approach is an ideal frame of reference to guide our project.

There is a growing body of research comparing the outcomes of activity-based programs versus rote-exercise for motor skill interventions (Combs et al., 2010; Orellano et al., 2012). Orellano et al. (2012) conducted a systematic review of 38 studies that looked at the effect of activity-based programs on physical function measures compared to that of rote-exercise programs for older adults. Their findings suggested that although both programs lead to improvements in physical function, activity-based programs had longer sustained results and better functional outcomes in performance of IADL. Furthermore, several studies have found that engagement in activity-based programs increased the tolerance of an activity and decreased the experience of pain (Combs et al., 2010; Melchert-McKearn, Deitz, Engel, & White, 2000). Not only have activity-based programs been proven to produce optimal outcomes within treatment sessions but also within therapy home programs (Randomski, 2011).

Adherence to Home Programs

Opportunities for practice outside of regular therapy sessions are imperative to further or maintain the gains of motor rehabilitation, (Randomski, 2011). Occupational therapists often design home programs to provide such practice opportunities (Combs et al., 2010). Despite the

necessity of home programs to achieve therapy goals, however, adherence to home programs for patients with chronic conditions is around 40-70% (Mitchell & Kemp, 2000).

There is some evidence that activity-based home programs may improve adherence in people with chronic conditions. Combs et al. (2010) designed an intensive two-week program for 12 individuals with chronic stroke that included an activity-based home program component. All participants received intensive therapy in an outpatient clinic for two-weeks with instruction to complete 30 minutes of prescribed home activities per day. Even though the home program required only 30 minutes of participation per day, the group averaged an hour of engagement in the functional activities each day. The average scores of the group improved from the pre-test to the post-test on all motor and balance measures, including the Wolf Motor Function Test, Berg Balance Scale, and Timed Up and Go, after the two-week intensive intervention that was supplemented with the home activities program. Combs et al. (2010) reasoned that the activity-based programs strengthened the participants' incentive to follow through with the program because they were meaningful in nature. Furthermore, activity-based home programs are completed within the purposeful context of functional activities, thus increasing the odds that the motor skill will be generalized (Orellano et al., 2012).

Fuller (2012) conducted a study at the UPS On-site OT Clinic on client adherence to home programs 10 months following their treatment in the spring of 2011. Of the 18 participants in the study, follow through was found to be between 10 and 30%. An analysis of qualitative data collected from participants provided noteworthy feedback on the barriers to completion of home programs. Specifically, the most common barrier cited was perceived inappropriateness of the program by the clients because the programs didn't match their goals, were too difficult, or

lacked meaning. Other common barriers included lack of accessible resources to complete the program (money or transportation) and difficulty scheduling the program into a daily routine.

White (2013) conducted a follow-up study to Fuller (2012) that analyzed adherence to home recommendations in 18 adults with chronic conditions treated with OT at the UPS On-site OT Clinic in the spring of 2012. White's (2013) results on adherence between the participants who received rote exercise compared to activity-based recommendations were not statistically significant ($p = .055$). However, the participants who received activity-based recommendations had a greater compliance average (2.21 recommendations) compared to those who only received rote exercise recommendations (1.75 recommendations). In addition, the participants reported the activity-based recommendations to be “easy” or “somewhat easy” to fit into their routine, and many of them reported a decreased feeling of pain and an increased perception of independence (White, 2013). Within White's (2013) study, 16 of the clients received rote exercises programs and only 11 clients received activity-based home programs.

The wide availability of instructions and pictures of rote exercise that can easily be developed into a home program is one likely contributor to the lack of activity-based programming. Even though upper extremities are heavily involved in everyday activities, there are more resources for traditional exercise approaches for upper extremity rehabilitation. A simple search in Google for home programs for the upper extremity leads to 960,000 results, in which the first four pages include only rote exercises. These findings stress the need for a readily available resource of activity-based home programs for student therapists to access at the UPS On-site OT Clinic. This resource will be based on the principles of motor learning theory and utilize the task oriented approach to optimize clients' motor performance and increase adherence to their prescribed program.

Purpose Statement

The purpose of this project is to provide OT students and OT clinical instructors at the UPS On-site OT Clinic with a manual containing activity-based home programs. Furthermore, this project is designed to provide activity-based home programs for adult clients with upper extremity motor and sensory deficits that can be easily integrated into their daily lives to improve physical functioning and occupational performance.

Description of Final Product

The UPS On-site OT Clinic, located in Tacoma, WA, offers pro bono OT services to the community. Clients are enrolled upon referral from a health care provider, self-referral, or direct access (UPS, 2014). Clients receive OT services from student therapists who are directly supervised by experienced licensed occupational therapists (UPS, 2014). The UPS On-site OT Clinic provides a unique opportunity for hands-on learning for students, while offering quality services to those who might otherwise not have access to care.

In 2013, it came to the attention of the UPS OT faculty that many clients who have chronic conditions would benefit from activity-based home programs, however, students primarily prescribe rote exercise programs (A. James, personal communication, February 10, 2014). The idea of a readily available activity-based home program manual was created in response to this need (A. James, personal communication, February 10, 2014).

The manual has been designed for student therapists to use when prescribing home programs for their clients. The manual is available to students electronically and includes 40 activities that specifically pertain to rehabilitation of the upper extremity. A spiral bound hard copy of the therapist pages is also available in UPS resource room for student therapist to access.

The beginning of the manual has a simple title page followed by a table of contents and disclaimer. The introduction includes the purpose of the manual and the rationale behind activity-based exercises for UE rehabilitation. The premise of motor learning and the task-oriented approach is included to establish the frame of reference and rationale that was used in designing the manual. Special considerations are outlined to assist student therapists in using the manual properly to ensure safety and encourage motor learning.

Each activity has an associated therapist page and client page (see Appendices A and B for sample pages). The therapist page includes information on the potential goals, primary muscles involved, typical functional grasp patterns used, suggested instructions, ideas for grading up, ideas for grading down, and special considerations/precautions. An asterisk was added to the primary muscle groups and functional grasp patterns that are most involved in the activity (see Appendix A for sample page). The client page includes the headings of therapeutic goals of the activity, materials, instructions, frequency, precautions, and special considerations (see Appendix B for sample page). The client page also includes a list of suggested materials and a picture of an adult performing the activity. Within both pages were reminders to modify each section to the individual client.

The activities are organized by areas of occupation in accordance with the Occupational Therapy Practice Framework (OTPF). The sections and related activities included are:

- ADL: Braiding hair, brushing, hair, brushing teeth, eating with chopsticks, putting on lotion, washing your body.
- IADL: Chopping vegetables, cutting coupons, dusting furniture, emptying the dishwasher, folding towels, ironing clothes, making a peanut butter and jelly sandwich, matching socks, opening containers, painting toenails, putting groceries

away, sweeping, washing the car, washing dishes, washing mirrors/windows, watering plants.

- Leisure: Beading, coins in a can, cribbage, making lemonade, mancala, needle point, origami, painting, playing cards, playing checkers, playing fetch with your dog, reading the newspaper, screwing nuts and bolts, tying a bowline knot, typing on the computer, wrapping presents.

The manual includes a reference list of the sources used within the manual and those used to create the manual. For detailed information on the process used to develop the project, see Appendix C.

Outcomes of Project

Below are the anticipated long term goals and objectives of the implementation of the activity-based home program manual at the UPS On-site Clinic. Goals one and two are targeted at the student therapists. Goal three was designed for the clients with UE impairments receiving OT at the UPS On-site OT Clinic. Some of the goals were designed to be more long term and therefore could not be met within the three-week piloting period.

Goal 1: After reviewing the manual, student therapists will use it to prescribe activity-based home programs that will help adult clients at the UPS On-site OT Clinic work toward established OT goals.

Objective 1: After reading the introduction to the manual, students will be able to describe at least three conditions that could potentially benefit from activity-based home programs.

Objective 2: After reading the manual, student therapists who have an upper extremity rehabilitative goal for an adult client with a chronic condition, will refer to the manual a minimum of one time to review it for relevant activities.

Objective 3: After reviewing the manual, student therapists who have an upper extremity rehabilitative goal for an adult client with a chronic condition, will assign at least one of the activities from the manual to their adult client during the 11 weeks of treatment.

Progress toward goal: Goal in Progress. Two out of the five students that participated in the pilot had clients that were either not interested in the available activities or whose impairment severity precluded performance of the activities. With the future cohorts, this goal should be again reviewed to determine the outcome.

Goal 2: After selecting and administering an activity from the manual for their client, students will report that it was easily accessible, comprehensible, and versatile enough to match their individual client's goals and routines.

Objective 1: Of the students who used the manual, >90% will report that they easily accessed the manual via the resource room or the online course management system (Moodle).

Objective 2: After selecting and administering an activity from the manual for their client, >80% of student therapists will report that that each step within the instructions was clear and comprehensible.

Objective 3: After selecting and administering an activity from the manual for their client, >80% of student therapists will report that it was moderately easy to very easy to find an activity that matched or could be easily modified to fit their client's goals and routines.

Progress toward goal: Goal in Progress. During the piloting period, the short-term objectives of this goal were met. Feedback was received from all five students on the organization and usefulness of the manual was, overall, very positive. Students stated that it was easy to use, organized, and a useful resource in their home program planning. To meet the long-term goal, a larger population of students will need to utilize the manual and successfully recommend the activities to their clients.

Goal 3: After receiving a home program with one or more activities from the manual, clients at the UPS On-site OT Clinic will report that the activity instructions were easy to follow.

Objective 1: After receiving an activity from the manual, > 80% of the clients will report that each step within the instructions was clear and understandable following adequate instruction from the student therapist.

Objective 2: After receiving a home activity from the manual, >90% of the clients will report that they referred to the activity sheet for duration, special considerations, and number of repetitions suggested by therapist.

Objective 3: After receiving a home activity from the manual, >90% of the clients will report that they found the picture on the activity sheet “somewhat helpful” to “very helpful” in understanding the activity.

Progress toward goal: Goal in Progress. Due to the limited sample size and lack of fit between the activities and two clients, three of the five client received home programs with activities from the manual. All three clients reported that the handout and/or student therapist demonstration and education was helpful in remembering the suggested activities. The clients reported that the handout was organized and user-friendly. Two of the clients reported full adherence with the prescribed recommendations and the other client reported that he did not perform the prescribed

activities at home. The student assigned to the client who did not do the activities reported that she has not had success with adherence to any home activity, exercise, or recommendation. The additional 20 activities added to the 20 piloted, were created to allow for a wider variety of interests and therefore promote better adherence with future clients.

Summary: At this point in time, the piloting period provided valuable feedback and began to progress the project in meeting its goals. However, the sample size and limited number of weeks of piloting was not sufficient to meet all the above goals. As future cohorts of occupational therapy students use the manual, it is recommended that faculty evaluate these outcomes so the manual can be modified or expanded to meet the needs of the OT students and their clients. The projected outcome of the project is to have an easily accessed manual available on the student course website, which students can use throughout spring clinic to make home recommendations for their clients. This manual will provide students with a review of motor learning principles and encourage the use of functional activities in clinic and in clients' homes.

Implications for OT

According to the OTPF, it is the responsibility of OT practitioners to implement treatment that improves a client's occupational engagement (AOTA, 2014b). Since the beginning of OT, occupational engagement has been the end goal of therapy, and activity has been a powerful means to rehabilitation (Mathiowetz, 2011). Activity as a means refers to using tasks or activities to work on developing or re-establishing specific client factors and performance skills (Latham, 2014). Client factors are an individual's abilities, characteristics (including body functions and structures), and beliefs (AOTA, 2014b). For example, a person's emotional regulation, muscle strength and their value of freedom of speech are all considered client factors under the OTPF (AOTA, 2014b). Performance skills are the actions required to complete a

specific task (typically using a combination of body functions and structures) and are dependent upon the context in which they take place (AOTA, 2014b). For example, the ability to sequence motor movements to perform a specific task or respond to questions in an understandable manner are considered performance skills according to the OTPF (AOTA, 2014b).

Activity as means for treatment facilitates client centered and meaningful therapy (Orellano et al., 2012). The use of activities to establish or regain motor skills is an example of using activity as means of treatment. Not only do activities allow for more meaningful treatment, they are more easily incorporated into a client's daily routine (Combs et al., 2010; Orellano, et al., 2012). Having a firm understanding of the benefits of activity in rehabilitation, the UPS OT faculty recognized the need to increase the use of activity based home programs within the UPS On-site OT Clinic (A. James, personal communication, February 10, 2014). More specifically, Professors Anne James and Sue Doyle envisioned that an increased use of activities within home programs would better facilitate the movement repetitions necessary for the motor learning process for clients with chronic conditions.

Emphasizing activity-based treatment with an easily accessed manual at the UPS On-site OT Clinic will encourage the development of well-rounded, resourceful, creative practitioners, and help clients with chronic conditions reach their goals in an intrinsically motivating and optimal way.

Special Considerations

This project is designed to be a supplemental tool for addressing the upper extremity goals of clients at the UPS On-site OT Clinic. These activities are to augment OT services, not to be the sole source of intervention. The design of the activities is targeted to enhance motor control and/or strength of the client's upper extremity.

It is important to consider the compensatory movements commonly found in individuals with neuromuscular deficits when designing these activities, such as lateral trunk flexion to raise the opposite upper extremity (Fabrizio & Rafols, 2014). These compensatory movements tend to increase during tasks that are challenging (Fabrizio & Rafols, 2014). Some therapists find these compensatory movements beneficial for clients who otherwise would not be able to voluntarily elicit the normal movement pattern to complete the task (Fabrizio & Rafols, 2014), while for other clients, the goal may be to reduce compensatory movements in order to enhance movement and motor skills of the upper extremity. Observation of the client performing the activity should be performed to ensure that the client is completing the activity in a way that supports their goals.

Since the activities are designed to take place in the home it is also important to consider the versatility within different home environments. An activity might be a perfect match for a client in that it addresses all of his or her upper extremity goals, but the setup of the home environment could make the task too challenging, not challenging enough, or might alter the desired movement. Student therapists should also consider access to resources. Clients may want to perform a selected activity, but may not have the required materials at home or the resources to procure them.

Limitations of Project

The first limitation of the project was the small piloting sample. Five students volunteered to pilot the manual, two of them had clients for whom the activities were not an appropriate fit. As a result, client feedback on the manual was limited to only three individuals. In addition, selecting activities for the manual that are of interest to a wide variety of clients proved to be a challenge. Additionally, one of the student therapists in the pilot reported that her

client did not follow through with home recommendations consistently; therefore, his adherence during the piloting period was not likely. In order to reach those clients who are not typically motivated to perform their home program recommendations, a more comprehensive manual with additional activities would need to be designed. Similarly, since the UPS On-site OT Clinic treats clients with a variety of impairments, finding activities that can be utilized across a range of motor relearning needs was a challenge. The UPS On-site OT Clinic requirement that prescription of the home program occur at discharge is another limitation. Although students are encouraged to make home recommendations throughout treatment, the true determination of the success of the manual in prescribing activity-based home programs will be in future cohorts after the manual has been made accessible during the discharge process. Finally, due to the functional nature of our manual, many of the activities selected are not usually performed repetitively throughout the day (e.g. washing the car). This limitation makes it difficult to perform the activities with the repetitions necessary for motor learning. Student therapists are encouraged to pair activities together to increase repetitions, but beyond these considerations and recommendations, it is up to the student to facilitate adequate repetitions and participation for their clients.

Future Steps and Sustainability

The manual will be available for future OT students via the online course management system (Moodle) for the course Applied Clinical Treatment and Management (OT 661). Additionally, a hard copy of the introduction and therapist page for each activity will be available to future students in the clinic resource room. Students should notify the faculty clinic administrator if they have any difficulty accessing either resource. To determine whether long term goals and objectives are met in the future, it is recommended that the outcomes of the

project be reassessed after the manual has been fully accessible to OT students during the Spring On-site Clinic. Additional activities and updates are recommended to promote expanded use of activity-based home programs and implementation of current research. Finally, development of a kit that includes the materials used within the activities (i.e. juice squeezer, loofa) is recommended to provide student therapists to set up practice opportunities in the clinic.

Conclusion

Everyday activities can be structured to support neuromuscular rehabilitation. Activity-based interventions support the OT philosophy of client-centered purposeful engagement. Based off the need for increased activity-based resources for the UPS On-site OT clinic, a manual was created consisting of 40 activities. Each activity was designed to target upper extremity neuromuscular rehabilitation. The activities were structured to be customizable by the student therapist and included recommendations for various intervention goals.

A pilot of the manual revealed that the activities were useful for the student therapists in planning activity-based home programs. However, not all of the students found that the activities matched their client's interests or level of function. Of the clients who were given activity-based home programs, all reported that their handout on the activity was organized and user-friendly. Based off feedback from the pilot, additional activities and ways to grade the activities were included. Further evaluation of the manual's success in future cohorts at the UPS On-site OT clinic is suggested to ensure sustainability of the project.

References

- American Occupational Therapy Association. (2014a) *Essential health benefits*. Retrieved from <http://www.aota.org/Advocacy-Policy/Health-Care-Reform/Essential-Health-Benefits.aspx>
- American Occupational Therapy Association. (2014b). Occupational therapy practice framework: Domain and process (3rd ed.). *American Journal of Occupational Therapy*, 68(Suppl. 1).S1-S48. doi:10.5014/ajot.2014.682006
- Center for Medicare Advocacy. (2014) *Medicare therapy caps: A call for repeal*. Retrieved from <http://www.medicareadvocacy.org/medicare-therapy-caps-a-call-for-repeal/>
- Centers for Medicare and Medicaid Services. (2015). *Therapy Services*. Retrieved from <https://www.cms.gov/Medicare/Billing/TherapyServices/index.html?redirect=/TherapyServices>
- Combs, S., Kelly, S., Barton, R., Ivaska, M., & Nowak, K. (2010). Effects of an intensive, task-specific rehabilitation program for individuals with chronic stroke: A case series. *Disability and Rehabilitation*, 32(8), 669–678. doi:10.3109/09638280903242716
- Fabrizio, A. & Rafols, J. (2014). Optimizing abilities and capabilities: Range of motion, strength, and endurance. In M. V. Radomski, & C. A. T. Latham (Eds.). *Occupational therapy for physical dysfunction* (7th ed., pp. 589-613). Philadelphia, PA: Lippincott Williams & Williams.
- Fuller, N. (2012). *Client adherence to discharge recommendation from a campus occupational therapy study clinic*. (Unpublished Master's thesis). University of Puget Sound, Tacoma, WA. Retrieved from http://soundideas.pugetsound.edu/ms_occ_therapy/45/

Latham, C. A. T., 2014. Conceptual foundations for practice. In M. V. Radomski, & C. A. T. Latham (Eds.). *Occupational therapy for physical dysfunction* (7th ed., pp. 2-23).

Philadelphia, PA: Lippincott Williams & Williams.

Mathiowetz, V. (2011). Task-oriented approach to stroke rehabilitation. In G. Gillen (Ed.), *Stroke rehabilitation: A function-based approach* (3rd ed., pp. 80-99).

New York, NY: Mosby.

Mathiowetz, V., & Wade, M. (1995). Task constraints and functional motor performance of individuals with and without multiple sclerosis. *Ecological Psychology*, 7(2), 99-123.

Melchert-McKearn, K., Dietz, J., Engel, J., & White, O. (2000). Children with burn injuries: Purposeful activities versus rote exercise. *American Journal of Occupational Therapy*, 54, 381-390. doi:10.5014/ajot.54.4.381

Mitchell, J., & Kemp, B. (2000). Compliance with multiple treatment recommendations by older adults with disabilities. *Topics of Geriatric Rehabilitation*, 15(4), 77-88.

Orellano, E., Colon, W., & Arbesman, M. (2012). Effect of occupation- and activity-based interventions on instrumental activities of daily living performance among community-dwelling older adults: Systematic review. *American Journal of Occupational Therapy*, 66(3), 292-300. doi:10.5014/ajot.2012.003053

Orrell, A.J., Eves, F.F., Masters, R. W., & Macmahon, K. (2007). Implicit sequence learning process after unilateral stroke. *Neuropsychological Rehabilitation*, 17(3), 335-354. doi:10.1080/09602010600832788

Preissner, K. (2010). Case report: The use of occupational therapy task-oriented approach to optimize the motor performance of a client with cognitive limitations. *American Journal of Occupational Therapy*, 64, 727-734. doi:10.5014/ajot.2010.08026

- Radomski, M. V. (2011). More than good intentions: Advancing compliance to therapy recommendations. *American Journal of Occupational Therapy*, 65, 471-475.
doi:10.5014/ajot.2011.000885
- Rao, A.K. (2011). Approaches to motor control dysfunction: An evidence-based review, In G. Gillen (Ed.), *Stroke rehabilitation: A function based approach* (3rd ed., pp. 117-155). St. Louis, MO: Elsevier.
- Robison, J., Wiles, R., Ellis-Hill, C., McPherson, K., Hyndman, D., & Ashburn, A. (2009). Resuming previously valued activities post-stroke: Who or what helps? *Disability and Rehabilitation*, 31(19), 1555-1566. doi:10.1080/09638280802639327
- Sabari, J., Capasso, N., & Feld-Glazman, R. (2014). Optimizing motor planning and performance in clients with neurological disorders. In M. V. Radomski, & C. A. T. Latham (Eds.). *Occupational therapy for physical dysfunction* (7th ed., pp. 1000-1041). Philadelphia, PA: Lippincott Williams & Williams.
- Schmidt, R., & Lee, T. (2011). *Motor control and learning: A behavioral emphasis* (5th ed.). Champaign, IL: Human Kinetics.
- Sullivan, K. J., Brown, D., Klassen, T., Mulroy, S., Ge, T., Azen, S., & Winstein, C. (2007). Effects of task-specific locomotor and strength training in adults who were ambulatory after stroke: Results of the STEPS randomized clinical trial. *Physical Therapy*. 87(12), 1580-1602.
- University of Puget Sound. (2014). *On-site occupational therapy clinic*. Retrieved from <http://www.pugetsound.edu/academics/departments-and-programs/graduate/school-of-occupational-therapy/ot-clinic-2/>
- U.S. Department of Health and Human Services [HHS]. (2014) *How the health care law benefits*

you. Retrieved from <http://www.hhs.gov/healthcare/facts/bystate/Making-a-Difference-National.html>

White, J. (2013). *Client adherence to discharge recommendations from an occupational Therapy teaching clinic based on activity type: Occupation-based, purposeful, or preparatory*. (Unpublished Master's thesis). University of Puget Sound, Tacoma, WA. Retrieved from http://soundideas.pugetsound.edu/ms_occ_therapy/87/

Woodson, A. M. (2014). Stoke. In M. V. Radomski, & C. A. T. Latham (Eds.). *Occupational therapy for physical dysfunction* (7th ed., pp. 999-1041). Philadelphia, PA: Lippincott Williams & Williams.

World Health Organization [WHO] (2004). *Country health profile*. Retrieved from <http://www.who.int/countries/usa/en/>

Human Resource

A. James, personal communication, February 14, 2014

Anne James: abjames@pugetsound.edu

S. Doyle, personal communication, February 10, 2014

Sue Doyle: sdoyle@pugetsound.edu

Appendix A

Therapist Page Example

Cribbage

Potential Goals:

- Improve three jaw chuck and lateral grip strength and control

Primary Muscle Groups and Functional Grasp Patterns:

- Pad to pad, three jaw chuck, and lateral grasp*
- Wrist extension* and ulnar and radial deviation
- Elbow flexion and extension*
- Shoulder flexion,* horizontal adduction, and circumduction
- Shoulder and trunk isometric contraction for proximal stabilization

*Most involved

Suggested Instructions:

1. Game play begins with the dealer distributing 6 cards to each player. Hold the deck using ____ (left/right) hand and distribute cards with the opposite hand. Each player gives up two cards to the crib.
2. Cut the deck using ____ (left/right) hand and choose one card.
3. Move the pins around the board to keep track of score using ____ (left/right) hand.

- For further instructions see: <http://www.instructables.com/id/How-to-Play-Cribbage/>

*Modify for each individual client

Ideas for Grading Down:

- For clients with unilateral upper extremity impairment:
 - Have the client hold his/her hand of cards with his/her affected hand and discard cards with unaffected hand
- Use a card holder to hold hand of cards
- To reduce against gravity movements, play game standing up at table top
- Put discard pile closer to client
- Build up the pins to make them easier to grasp

Ideas for Grading Up:

- For clients with unilateral upper extremity impairment:
 - Have the client use his/her affected UE for grasping the pins and manipulating the cards
- Put the discard pile farther away and across midline from the client
- To increase against gravity movements have board on raised surface (i.e. stacked books)
- Have the client be the dealer for every game played

Precautions and Considerations:

- This game requires a certain level of cognitive function to understand the game, strategize, and add numbers. Consider the clients' cognitive ability when choosing this activity to ensure that he/she will be successful.
- The pins used in cribbage are very small and can be difficult to manipulate, so make sure that the client has adequate motor control to move the pins, while still challenging them
- Suggested activities to pair with to increase motor learning: beading, playing cards, typing knots, and nuts and bolts

Appendix B

Client Page Example

Cribbage

Therapeutic Goal of Activity:

-

Materials:

- 2 pins for each player
- Deck of cards
- Cribbage board

*Modify for each individual client

**Instructions:**

*Paste modified instructions here

Frequency, Precautions, and Considerations:

Appendix C

Procedure

Our project began with a needs assessment in which interviews were conducted with faculty and UPS OT alumni to understand the current resources available to student therapists and determine how the project could be the most beneficial to students and clinical instructors. After the need was determined, a review of the literature was performed to provide evidence in support of our project. Research was centered on motor learning theory, the task oriented approach, barriers for those with chronic conditions, home programs, and activity-based interventions. To begin the implementation portion of our project we compiled a list of activities that would be included in the manual. Each activity was carefully selected using activity analysis. The selection criteria for activities included: 1) commonly performed in the home and 2) lent themselves to repetitive motor performance and incorporation of the upper extremities. The list of activities was then categorized by areas of occupation, specifically ADLs, IADLs, or leisure. We analyzed each activity to identify potential therapeutic goals, appropriate methods to grade the activity up or down, and precautions or considerations. Next, general instructions for completing each activity were created. The analyzed activities and instructions were then reviewed and modified by each author.

A template was designed in Microsoft Word to allow for easy access and modification for student therapists. Each activity included a page for the therapist and an instruction page for clients. After 20 activities had been analyzed and formatted, additional sections of the manual were created. These sections included a disclaimer to state the limited purpose of the manual, an introduction to outline the purpose of the manual and the rationale behind occupation-based activities for UE rehabilitation, a brief overview of the premise of motor learning and the task-

oriented approach to establish the frame of reference and rationale used in designing the manual and a special considerations section to assist student therapists in using the manual properly to ensure safety and encourage motor learning.

Once the introduction and instructions were completed, a pilot was implemented to determine the effectiveness of the manual. An email stating the purpose of the manual and a list of inclusion criteria for piloting was sent to a cohort of second year OT students. Students could participate in the pilot if they were treating an adult client who: 1) had an UE impairment being treated with an establish/restore approach; 2) could independently (or with caregiver assist) complete ADL, IADL, and/or leisure activities at home after simulation or practice in clinic and use of handout; and 3) be willing to complete a survey on the usefulness of the home program forms. Additionally, the students were notified that if they volunteered they would be required to review the introduction to the manual, implement at least one activity over a three week period, complete a survey, and administer a survey to their client on the usefulness and effectiveness of the manual.

Five students who volunteered met the inclusion criteria and agreed to piloting of the manual over three weeks of in-clinic treatment. Following the three weeks of piloting, the surveys were returned and reviewed for feedback. A committee meeting then took place with the project chair for additional feedback on the manual. The 20 existing activities were then revised based on feedback. Format changes were incorporated to make the activities more user friendly for the student therapist. Two additional changes were made to better facilitate repetition for motor learning, including, 1) adding suggested activities to pair with each activity were added to help the user build in repetition of like movements (minimum of three), and 2) recommendations

for how to support repetition within activities. Following the pilot, an additional 20 activities were developed, totaling 40 activities for the manual.

From the five piloting students, three reported that they were able to select activities that were of interest to their clients. One of the students reported that the activities were too advanced for her client, and that the caregiver already had enough to focus on with the client at home. Another student reported that she did not find the household activities appropriate for her client and that he was interested in more rote exercise. Based on the failure to find an appropriate fit for all the clients, we added activities to the leisure section that were not purposeful household tasks but allowed purposeful movements with everyday objects (e.g. screwing nuts and bolts, putting coins in a can).

The following skills and knowledge are required for effective recreation of an activity based home program manual:

- Knowledge of motor relearning theory, the task oriented approach, typical and atypical movement patterns for persons with upper motor neuron damage, and knowledge of chronic conditions.
- OTPF areas of occupation, activity analysis, grading of activities, precautions based on client factors and chosen activity.
- Computer skills (i.e. working knowledge of formatting program used for manual, uploading pictures, editing pictures, drop box to send to designer, PDF).
- Familiarity with APA citation.
- Teamwork skills.