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Implementation of Fine Motor Exercise Programming for Persons with Parkinson's Disease:
Occupational Therapy's Role

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Implementation of Fine Motor Exercise Programming for Persons with Parkinson's Disease:
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Abstract

This study examined occupational therapy's role in implementation of fine motor activities and fine motor exercises within the Rock Steady Boxing (RSB) exercise program to improve overall fine motor skills and coordination in boxers. The purposes of this study were: 1) To determine the impact of incorporating fine motor activities throughout RSB classes on improving fine motor coordination in persons with PD and, 2) To assess participants' perceptions of improvement in fine motor skills and, 3) To educate coaches, boxers, and family members on the use of adaptive equipment throughout boxing classes, the community, and within the home to increase overall independence and quality of life. An educational seminar was held on March 10th, 2019 at Rock Steady Boxing Flagship gym to educate and promote adaptive equipment in order to meet the the third objective of the Doctoral Capstone Experience (DCE). In attempt to expand the literature, an occupational therapy student conducted a pretest-posttest design to compare fine motor coordination before and after 8 weeks of participation in group-based fine motor activities, using the Nine Hole Peg Test (Oxford Grice et al., 2003). A convenience sample was recruited from current RSB participants via email. Participants' previous PDQ-39 was used to identify perceived fine motor deficits. Data collection for each participant occurred in a 15 to 30-minute session where the researcher reviewed and obtained informed consent, demographics such as age and gender, and administered the NHPT pre and post the 8-week fine motor activity intervention. Although the difference in means from pre to post NHPT ($p=.150$) of the right upper extremity did not show statistical significance, the findings of this study suggest that left upper extremity results tended toward significance in difference of means from pre to post NHPT ($p=.058$). Although both upper extremities did not show statistical significance the study may not have been adequately powered to achieve significance secondary to type II error.

Literature Review and Background

Parkinson's disease (PD) is a gradual neurological disorder characterized by a large number of motor and non-motor features that can impact an individual's ability to function as they normally would, prior to the diagnosis (Jankovic, 2008). Persons with PD exhibit progressively worsening neurological symptoms, including speed, flexibility, and coordination of gross and fine motor function, including the extremities, trunk, face, and voice (Suchowersky et al., 2006). More than one million people in the United States are diagnosed with this neurodegenerative disease, typically between 40 to 70 years of age (Baatile, Langbein, Weaver, Maloney, & Jost, 2000). Lack of dopamine causes a chemical imbalance resulting in the symptoms of PD, which ultimately leaves the individual unable to accomplish simple tasks of daily living (Baatile et al., 2000). Research suggests that an exercise routine can raise dopamine levels and metabolism, which consequently increases functional independence in those diagnosed with PD (Sasco, Paffenbarger, Gendre, & Wing, 1992). Boxing training, a nontraditional form of exercise recently implemented for patients with PD, encompasses whole-body movements, with punching motions and footwork in many directions (Combs et al., 2011).

Rock Steady Boxing (RSB) is a "501 (c)(3) nonprofit organization that gives people with Parkinson's disease hope by improving their quality of life through a non-contact boxing based fitness curriculum" (RSB, 2018). RSB was founded in 2006 by Scott C. Newman, former Marion County (Indiana) Prosecutor, who is living with PD (RSB, 2018). Newman began intense, one-on-one, boxing training a few years after he was diagnosed with PD and noted his quality of life improved tremendously in a short time due to his fighting back against Parkinson's disease (RSB, 2018). The Rock Steady Boxing logo is the Statue of Liberty embellished with a boxing glove. According to Newman, "the words inscribed on the Statue of Liberty and the hope

symbolized by her presence at Ellis Island illustrated his dream that RSB would be a beacon of light and hope for those suffering with Parkinson's Disease" (RSB, 2018). What started as one man's dream to fight back against Parkinson's has grown to currently consist of 741 RSB programs around the world and continues to grow by adding new members. To date, 37,050 individuals with Parkinson's disease are training with the Rock Steady Boxing program (RSB, 2018). RSB holds group exercise programs every day of the week that focus on whole-body movements, with upper-extremity punching motions and lower-extremity footwork in all directions, balance, agility drills, and strength training. At RSB, the boxers train for optimal agility, muscular endurance, hand-eye coordination, speed, footwork, and total body strength to fight back against their opponent, Parkinson's (RSB, 2018).

RSB does not have a fine motor exercise program in place at its flagship location to address fine motor deficits. RSB previously found, through collection of the PDQ-39 for program evaluation (Jenkinson et al., 1997) that the majority of boxers indicate they have experienced fine motor deficits, but RSB was not addressing those deficits consistently throughout workouts. According to Foster, Bedekar, & Tickle-Degnen (2014), "To date, the demonstrated effects of physical performance skill interventions for people with PD have been primarily task specific in that improvements in trained skills do not translate to improvements in untrained skills" (p. 43). These authors indicate a wider variety of task-specific training was needed in order to improve overall coordination in persons with PD (Foster, Bedekar, & Tickle-Degen, 2014). A case series conducted by Combs et al. (2011) concluded that "the patients in the case series showed short-term and long-term improvements in balance, gait, activities of daily living, and quality of life" after attending 24-36 boxing training sessions for a period of 12 weeks (p.141). Activities of daily living (ADL's) are considered to be anything an individual may need

to do, wants to do, or is required to do. Often times ADL's require fine motor skills to be intact in order for independent performance of the task. According to Broderick, Van Gemmert, Shill, & Stelmach (2009), compromised upper extremity function in PD has been connected with deficits in activities of daily living and decreases in quality of life. In a study conducted by Park, Gong, & Yim, stroke patients participated in a sitting boxing program 3x a week for 6 weeks while a control group attended traditional physical therapy for the same period of time (p. 79, 2017). The sitting boxing group showed increases in upper extremity function, balance, walking ability, and quality of life (Park, Gong, & Yim, 2017). A study comparing fine motor coordination abilities of task specific activities before and after training would help fulfill this need. Therefore, the purpose of this Doctoral Capstone Experience (DCE) and research study was to determine the impact of incorporating fine motor activities throughout RSB classes on improving fine motor coordination in persons with PD. A secondary objective was to assess participants' perceptions of improvement in fine motor skills. A third objective was to educate coaches, boxers, and family members on the use of adaptive equipment throughout boxing classes, the community, and within the home to increase overall independence and quality of life.

The American Occupational Therapy Association (AOTA) (2014) declares occupational performance as the ability to carry out activities of daily life. Furthermore, an area of occupation can be defined as: any activity one performs to fulfill their time and provide one with identity, purpose, meaning, and volition (AOTA, 2014). Individuals with PD often experience decreased occupational performance and difficulty with completion of ADL's as the disease progresses.

The Motor Learning frame of reference (FOR) was used throughout the DCE at RSB. This frame is focused on providing guidelines for interventions in regards to restoring functional movement with clients that have a broad range of health conditions (Cole & Tufano, 2008). The

NHPT was used to measure increase in functional movement (Oxford Grice et al., 2003) and a rating scale for perceived fine motor abilities was used to measure boxers' perceptions of fine motor capabilities. Change within this FOR consists of learning motor strategies by trial and error at first, and later by practice and refinement of skilled movements resulting in permanent changes (Jarus, 1994).

The Person-Environment-Occupation-Performance (PEOP) model served as the theoretical basis for the Doctoral Capstone Experience (DCE) (Christiansen, Baum, & Bass, 2011). The focus throughout this DCE was to facilitate improvement in an area considered to be "dysfunctioning" according to the PEOP model, and turn it into "functioning". Dysfunction within this model is considered to be a deficit in occupational performance, resulting in a lack of competence (Cole & Tufano, 2008). It was the occupational therapy student's (OTS) goal to assess the boxers (*person*) by using the PDQ-39 (Jenkins et al., 1997), previously used for program evaluation at RSB, and the 9 Hole Peg test (NHPT) (Oxford Grice et al., 2003) to identify the areas of dysfunction. The OTS also used a rating scale pre and post intervention to assess perception of fine motor abilities and fine motor coordination activities that the boxers find troublesome. Then, the OTS collaborated with the coaches and RSB staff regarding a change in the exercise program to increase fine motor exercises/activities offered (*environment*). By the end of the DCE the OTS's planned to increase the boxer's ability to participate in meaningful occupations (*occupational performance*) through increasing task specific fine motor skills. Using the PEOP as a theoretical basis throughout the DCE, the OTS kept interventions and the educational seminar occupation based. The OTS kept exercises and activities focused on what was most important to the boxer and what activities addressed the "dysfunctional" tasks identified by the boxer by way of the rating scale and NHPT. Function within this model is

considered to be involvement in meaningful occupations while juggling environmental demands (Cole & Tufano, 2008). After a diagnosis of PD, a boxer tends to experience a lack in their occupational performance and difficulty adapting to their environment due to physical setbacks (tremors, stiffness, etc.) (Combs et al., 2011). Using the PEOP was a good fit for this DCE because it allowed the OTS to remain occupation-based and effectively facilitate growth in fine motor dexterity abilities within RSB boxers.

Screening and Evaluation

To analyze and assess the needs of RSB, it was determined through reviewing literature and comparing screening options that the PEOP situational analysis should be used as the evaluation framework. The PEOP model provides practitioners with a natural and structured way to comprehend the best way to support people's abilities in order to perform or do the activities, tasks, and roles necessary for everyday life (Christiansen, Baum, & Bass, 2011). Regardless of the setting, types of clients served, age, life stage, or diagnoses the PEOP is a relevant model to be used (Christiansen, Baum, & Bass, 2011).

The PEOP situational analysis model was completed by the OTS and two primary stakeholders at RSB to determine the general areas of concern and related occupational issues. The OTS and the stakeholders collaboratively decided upon specific occupational therapy (OT) related questions to look at on the PDQ-39 assessments filled out by each boxer to determine the need for fine motor interventions. After completion of the PEOP situational analysis it was determined that RSB would benefit from implementing fine motor activities throughout all classes to further meet the needs of the boxers that attend RSB (refer to Appendix A for completed PEOP situational analysis). There was a need to implement fine motor activities throughout the classes to improve overall independence and dexterity due to boxers identifying

fine motor activities that they find troublesome. To determine the needs of all boxers, additional evaluations were needed. Further determination of needs was completed through attending RSB meetings, engaging with the boxers and caretakers, presenting boxers with a rating scale regarding fine motor abilities, and additional discussions with the head coaches at RSB.

When discussing with RSB stakeholders, the main concerns for the organization were lack of fine motor coordination activities, lack of knowledge regarding adaptive equipment for the boxers, sustainability of fine motor program, and communication between affiliates regarding the fine motor program. After the concerns were identified the OTS determined that there was a match between RSB and what the OT approach could do for their program. The next step in the situational analysis, after a match was identified, was to determine RSB's capabilities and enablers, while identifying barriers and constraints that need to be overcome (refer to Appendix A) (Christiansen, Baum, & Bass, 2011).

Paired with a review of the literature and completion of the situational analysis the occupational therapy student and primary stakeholders were able to come to a conclusion regarding what needs to be done at RSB to fill the fine motor coordination gap throughout the boxing classes. Therefore, the purpose of this DCE and research study was to determine the impact of incorporating fine motor activities throughout RSB classes on improving fine motor coordination in persons with PD. An additional objective was to assess participants' perceptions of improvement in the fine motor skills. A third objective was to educate coaches, boxers, and family members on the use of adaptive equipment throughout boxing classes, the community, and within the home to increase overall independence and quality of life.

The occupational therapy student and stakeholders agreed to complete a pretest-posttest study design to compare fine motor coordination before and after participation in group-based

fine motor activities, using the Nine Hole Peg Test. The primary stakeholders mentioned their main concern was the PD 3 and PD 4 classes secondary to them having the most difficulty with fine motor skills and being in stages 3 through 4 on the Hoehn & Yahr Scale (Modified Hoehn and Yahr Scale, 2012), that groups the progression of the disease. A convenience sample was recruited from current RSB participants via e-mail recruitment from the Indianapolis Headquarters Rock Steady Boxing program. Inclusion criteria for this study comprised: 1) diagnosed with PD or Parkinsonism; 2) rated in the stages 3 through 4 on the Hoehn & Yahr Scale (Modified Hoehn and Yahr Scale, 2012); 3) currently participating in the RSB program; and 4) participants must be between the ages of 21 and 90 years of age. The participants were excluded from the study if they do not return for the posttest. The Nine Hole Peg Test was used to measure fine motor coordination for adults with PD (Earhart et al., 2011).

Data were collected during regular class sessions at RSB on February 6, 7, and 8, 2019. The pretest session entailed the participants to first read and sign the Informed Consent Document (ICD) if they wish to participate. Second, the occupational therapy student created a master list to assign participants a number to be used on the pretest/posttest documents to de-identify the documents. Third, participants filled out a brief demographic questionnaire. Fourth, the occupational therapy student tested each participant using the Nine Hole Peg Test according to protocol as outlined by Earhart et al. (2011). Finally, the occupational therapy student used the master list and participants' numbers to photocopy and de-identify participants' responses on PDQ-39 forms that were previously collected by RSB to identify fine motor difficulties. Throughout the course of 8 weeks, between pretest and posttest, the occupational therapy student incorporated fine motor activities throughout the boxing classes. Fine motor activities incorporated throughout the boxing classes were occupation based and supported by research.

Throughout the posttest session, participants completed the demographic questionnaire with likert scale rating of perceived fine motor abilities. Then the occupational therapy student tested participants again using the Nine Hole Peg Test.

Due to Rock Steady Boxing being a community based program and not having a licensed occupational therapist on staff, it was not appropriate throughout this DCE to complete individualized or group occupational therapy evaluations for the boxers. Screening and evaluating RSB as a whole through the lens of OT was appropriate in order to facilitate program planning and implementation of OT based activities to further meet the needs within RSB. Within a traditional OT setting where direct OT services are provided for fine motor deficits/delays, occupational therapists are able to evaluate an individual's ability to perform fine motor activities and their ability to function independently in everyday meaningful occupations. The use of screening and evaluation tools is commonly found in settings where direct care is provided by an OT (Scaffa & Reitz, 2014). OT's are educated on many different assessment tools available in order to determine the most appropriate fit for the population being served and how to best meet their needs (Duggan, Gaston, Barr, Lizcano, & Lannigan, 2016). Within the community based settings, including RSB, the evaluation process differs compared to direct care services. Therefore, the occupational therapy student completed a needs assessment with RSB and its stakeholders rather than a formal evaluation. Completion of a needs assessment "provides the opportunity to gain new data to help clarify a problem or help generate evidence about gaps in practices that currently exist" (Bonnel & Smith, 2018, p. 142).

Implementation

There are three defined service provision models used by occupational therapists: direct, monitoring, and consultation (Dunn, 1988). The monitoring service model was the primary

model used to guide this DCE project in order to focus on the identified needs. The needs assessment at RSB indicated the need for fine motor implementation, assistive device education, and incorporation of occupational therapy in the screening process. The head coaches and the OTS collaborated to determine programs and projects that best fit the needs of the facility.

Fine Motor Implementation

A main concern voiced by the head coaches was the lack of fine motor/ manual dexterity exercises implemented throughout the program determined by the review of PDQ-39 scores for project evaluation. According to Foster, Bedekar, & Tickle-Degnen (2014), findings suggested physical activity could result in improvement or maintenance in physical performance skills in individuals with PD and are likely to develop new performance skills through task specific training (p. 43). Appendix B includes all the task specific fine motor activities completed throughout the 8-week study. This 8-week study required participants to attend at least 2 RSB classes a week and participate in a fine motor activity for an average of 5-10 minutes each class. The OTS requested verbal feedback from boxers during week 3 of the implementation phase and received positive feedback from boxers that they felt the fine motor activities were important and helping them gain strength as well as confidence in their fine motor abilities. In addition to the 8-week fine motor activities, the OTS created a fine motor resource binder. The binder included a list of materials needed to complete all activities, the purpose of the activities, and possible ways to adapt the activity if needed. A culmination of videos that includes all fine motor activities and instructions was created and posted on RSB Forum page in order for all other RSB affiliates to view.

Educational Seminar

Increasing education regarding adaptive and assistive devices was of great priority to the boxers and coaches at Rock Steady Boxing. In order to address this need, the OTS reached out to several assistive device manufacturing companies asking if they would be willing to send a sales representative to RSB to give a presentation on equipment they offer. The OTS also requested the company educate the boxers on assistive devices that may be beneficial to them in their journey of maintaining independence while living with PD. North Coast Medical (NORCO) agreed to donate around fifteen assistive devices to RSB for the educational seminar hosted by the occupational therapy student on March 10th, 2019 at Rock Steady Boxing Flagship Gym. NORCO was unable to send a sales representative therefore the OTS presented the assistive devices to the attending boxers while educating them on the devices. NORCO agreed to facilitate a webinar during the educational seminar in order for boxers to ask a sales representative questions regarding equipment and pricing of NORCO equipment. The OTS wrote a paragraph explaining the purpose of the educational seminar and posted the information as recruitment at the front desk for all boxers to read and sign up. The seminar was structured in a way that allowed the OTS to educate the boxers and their caretakers on the adaptive equipment, time for the boxers to share what ADL's they struggle with and receive feedback from other boxers, allowed time for boxers and caretakers to ask the OTS any questions regarding OT and/or any adaptive equipment questions, and allowed time for the boxers to get a hands on experience with the assistive devices. The OTS created educational handouts for each assistive device discussed at the seminar as another avenue to educate boxers on the devices presented. The educational handouts included information regarding what the device is, how it will assist the boxer, where it can be purchased, and the cost of the device. For purposes of sustainability of the educational seminar's the OTS gave the head coach at RSB NORCO's contact information to facilitate a

relationship between the two for future needs of RSB regarding adaptive equipment. RSB plans to host at least one assistive device seminar every other month as well as sharing NORCO's information with other RSB affiliates on the RSB Facebook Forum to further educate coaches and boxers on assistive devices. NORCO also agreed to give RSB 25% of all sales made at the seminar, if RSB were interested. To assure the educational seminar met the needs of those who attended the OTS created a feedback survey for those who attended to fill out (refer to Appendix C). Hosting the educational seminar allowed the OTS to advocate for OT's role in this community based setting. It was also a time for the OTS to increase awareness and education on adaptive equipment available.

Inclusion of Occupational Therapist in Quarterly Physical Therapy Screening Process

RSB holds physical therapy (PT) screenings every quarter for boxers. PT screenings are held at RSB Flagship Gym in order to give boxers the opportunity to seek medical advice from volunteers who are licensed physical therapists regarding change in status, newly identified deficits, and aches/pains. The RSB coaches expressed that they have been wanting to include occupational therapy to the PT screenings for awhile but were unsure of what role OT would hold in the process. The OTS observed PT screenings and noted the need for OT's holistic approach to be incorporated throughout the PT screening process. The OTS contacted a former University of Indianapolis OT alumni that works with the current PT volunteers at Community Health Neuro Specialty Clinic, and asked if she would be willing to volunteer her time and expertise to the boxers here at RSB. The OTS received Kristin's contact information from Stephanie Combs-Miller, a neuroscience physical therapist, who volunteers her time and knowledge of research to RSB. Kristin agreed to see boxers for the scheduled April 6th PT screening. The OTS and OT collaborated on screening and implementation ideas that would fit

best with RSB screening process. The OTS educated RSB staff on the importance and benefit of maintaining inclusion of OT services in the PT screening process in order to facilitate holistic treatment.

Discontinuation and Outcomes

The main focus of this DCE and project was program evaluation and providing education with hopes to improve fine motor skills, educational resources, and inclusion of occupational therapy in the established screening process at RSB. After the needs were defined and a literature review was completed it was determined that creation of a fine motor protocol for the gym, continuous educational seminars, and indefinite inclusion of occupational therapy services throughout the screening process could fulfill the goals of the DCE project and needs of RSB. For purposes of sustainability and quality improvement (QI) following the completion of the DCE, the OTS and site mentor planned accordingly to ensure the identified needs at RSB would continuously be met. According to Bonnel and Smith (2018), “QI is an ongoing effort to address and document outcomes to improve the health of the community” (p.46). QI is an ongoing process that involves multiple components such as evaluating and reflecting, teamwork, responding to changing needs, and receiving feedback (Bonnel and Smith, 2018).

Outcome measures are an intricate part of quality improvement for they allow one to assess the effectiveness and benefits of the programs as well as help identify challenges and means for improvement. To address QI and ensure improved practice, creating and completing an outcome analysis for the different implemented projects was necessary. To provide the best fit for the needs of the population being served completion of outcome measures was necessary to allow identification of appropriate modifications.

Fine Motor Implementation

“Implementing fine motor exercise programming for persons with PD: Occupational Therapy’s Role” consisted of 8 weeks of fine motor activities in the RSB classes in order to educate and practice the importance of fine motor activities. The goal of the fine motor implementation study was to increase fine motor coordination, overall fine motor skills, and confidence in fine motor abilities. The first and final week of the study included completion of a pre/post-demographic questionnaire that also assessed the participants’ confidence in performing fine motor activities, such as tying shoes, fastening buttons, opening containers, and picking up small objects (Appendix D). The participants could respond to the survey question with 1: “very poor/cannot do” or 5: “excellent” on a likert rating scale. There was an additional open-ended question asking, “Please comment on your current fine motor coordination abilities, including any activities you find troublesome”. Each week the fine motor activities targeted task specific training in order to increase fine motor skills. Although the difference in means from pre to post NHPT ($p=.150$) of the right upper extremity did not show statistical significance, the findings of this study suggest that left upper extremity results tended toward significance in difference of means from pre to post NHPT ($p=.058$). Although both upper extremities did not show statistical significance the study may not have been adequately powered to achieve significance secondary to type II error. Post Hoc Power analysis indicated that with a total sample size of twenty-five participants and effect size set at .05 (large) and alpha error probability set at .05 the power was 0.67. Ottenbacher & Barrett, 1990 (as cited in Stein, Rice, & Cutler, 2013) state that an adequate power level is considered to be 0.8 (p. 361). Based on G*Power estimates for t-tests results of this study were not adequately powered to find smaller effect size.

In addition to the 8-week fine motor activities, the OTS created a fine motor resource binder which included a list of materials needed to complete all activities, the purpose of the

activities, and possible ways to adapt the activity if needed. To ensure sustainability of fine motor activity incorporation, the fine motor resource binder is available in the gym at all times to all coaches to encourage incorporation of fine motor exercises in each boxing workout.

Educational Seminar

The Educational Seminar on assistive devices/adaptive equipment was held on March 10th. The OTS spent two hours educating those who attended on different assistive devices available to them, the purpose of the devices, where they can purchase them, and how to use them. The OTS verbally educated the boxers and their caregivers at the educational seminar as well as gave them a tangible handout that they could take home with information regarding the device. Not only did the OTS verbally educate the boxers, but also physically demonstrated how to use the adaptive equipment. Each item discussed at the seminar had a handout that went along with it. To assess the outcome of the event, a feedback survey (Appendix C) was developed and attendees were encouraged to complete it anonymously. The OTS created an assistive/adaptive device resource binder including the items discussed at the seminar and items not discussed at the seminar that is kept in the Counterman's lounge resource library for boxers and their caregivers to have access to at all times. To ensure sustainability of educational seminars, the OTS and site mentor collaboratively identified three other medical professionals to present information at the upcoming educational seminars. The topics that will be discussed at future educational seminars include; Depression and PD, Swallowing and PD, and Pharmaceuticals and PD.

Inclusion of Occupational Therapist in Quarterly Physical Therapy Screening Process

The OTS reached out to an occupational therapist, Kristin, and asked if she would commit to volunteering her time to the RSB physical therapy screening process. Upon her

agreeing, the OTS collaborated with Kristin on screening and implementation ideas for the RSB screening process. Due to occupational therapy services being included in the screening process for the first time, the OTS created a concise paragraph stating what occupational therapy is and what occupational therapists do. Educating boxers on the difference between physical therapy and occupational therapy (Appendix E) allowed the boxers to make a decision on what therapy they felt would best address their specific need. In order to ensure continuous quality improvement, the OTS created a feedback survey (Appendix F) asking those who signed up for the occupational therapy screening with Kristin if they felt as though their needs were met. RSB plans to continue including an occupational therapist throughout their screening process if positive feedback is received.

Providing education, resources, and physical demonstrations of fine motor activities provided a way to promote accurate carryover following the discontinuation of the DCE. These aspects also encouraged implementation of OT foundations, principles, and evidenced-based implications to improve overall quality of services provided to the Parkinson's community. At Rock Steady Boxing (RSB), the OTS incorporated task specific fine motor activities such as buttoning, unbuttoning, tying, and zipping into workouts. The OTS incorporated games and activities that target the use of specific digits that are used in everyday life of the boxers for completion of activities of daily living (ADL's). This is impacting not only the boxers at this RSB Flagship location, but the other RSB facilities as well. The site mentor video recorded each of the fine motor tasks/activities and posted some of the videos on the RSB Facebook Forum that was shared with all RSB coaches across the world. This is impacting the RSB community based program and the Parkinson's community by increased awareness of fine motor activities that can be implemented throughout usual boxing workouts. Completing the DCE project as an OTS with

the PEOP as the primary guide allowed for the needs of the boxers, staff, Parkinson's community, and coaches to be continuously identified and addressed.

Overall Learning

Being able to communicate effectively and professionally throughout all aspects of the DCE was of primary importance. In order to complete all projects throughout the DCE, it was required to communicate with various individuals in a variety of different ways. During the educational seminar it was important to be able to demonstrate verbal and written communication to provide beneficial resources and demonstrations to the boxers and their family members regarding adaptive equipment. It was necessary to provide efficient and professional written communication via emails to other disciplines, manufacturing companies, colleagues, and staff in order to promote awareness and education in a professional and acceptable manner. Written communication was also used through advertisement of the educational seminar to boxers, through educational handouts, and differentiating effectively the difference between physical and occupational therapy. Oral communication was demonstrated through speaking at the educational seminar, speaking to groups of boxers explaining the fine motor activity for the day, phone calls, and speaking with RSB staff. I learned to speak loudly and with confidence when educating groups of boxers on the fine motor activity of the day and throughout the educational seminar.

Through my time spent at RSB, I was able to further develop effective communication, management skills, leadership skills, research skills, and client-centered skills. Working directly with individuals fighting the fight against Parkinson's disease provided me the chance to improve my client-centered skills, non verbal communication skills, and flexibility. Many times I had to adjust the fine motor activity for the day to accommodate different boxers' needs.

Adapting activities in the moment was something I struggled with upon arriving at RSB; however, now I feel confident in my ability to adapt tasks on the spot to provide client-centered, occupation-based, and evidence-based activities for each boxer individually. Prior to the DCE, I lacked confidence in my knowledge, education, and on the spot skills but through leading the educational seminar and being the only individual at the facility with a therapeutic background I had to learn to trust my abilities and know that I am competent.

Throughout my DCE I have had many opportunities to advocate for the profession/role of OT. Having the skill to successfully explain the profession to a variety of individuals from all different backgrounds is a skill that I will be able to use throughout the entirety of my career as an occupational therapist. I feel as though this DCE experience has taught me many life lessons regarding change, professional practice, and carryover. The goals and objectives set out for this DCE were met by completion of an 8-week fine motor activity intervention, an educational seminar to educate boxers on available adaptive equipment, and perceived fine motor abilities were assessed pre and post the 8 week fine motor intervention. Being able to demonstrate therapeutic use of self, confidence, humility, leadership, and empathy are skills that have improved throughout my Doctoral Capstone Experience at Rock Steady Boxing Flagship Gym.

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APPENDIX A

The Person-Environment-Occupational Performance (PEOP) Model Situational Analysis

Collection of client(s) information	
<p>1. General description of population/community</p> <ul style="list-style-type: none"> - All boxers, male and female, have a diagnosis of Parkinson's Disease and are between the age of 21-80 years old. All boxers participate in non contact boxing classes at least 2-3 times a week. 	<p>4. Population/community centered goals</p> <ul style="list-style-type: none"> - Increase fine motor activities throughout RSB program - Increase overall independence with ADL's - Increase awareness of adaptive equipment available - RSB wants to be a leader as the headquarter location and have other affiliates follow and implement activities they are implementing

<p>2. General areas of concern</p> <ul style="list-style-type: none"> - Primary stakeholders are concerned about fine motor deficits indicated on PDQ-39 that are not being addressed secondary to not knowing how to address fine motor coordination/dexterity. Funding for fine motor activities and an area where these activities can be performed was an influencing factor. 	<p>5. Match between community or population goals and occupational therapy</p> <ul style="list-style-type: none"> - ADL's - Work/job performance - Social participation - Education
<p>3. Related occupational issues</p> <ul style="list-style-type: none"> - Boxer's have difficulty with ADL's secondary to fine motor deficits - Boxer's lack education regarding adaptive equipment - Boxer's often experience social isolation secondary to embarrassment of presentation of disease 	

<p>Evidence</p>	<p>8. Develop client centered plan to address occupational and related general goals for the population or community</p> <ul style="list-style-type: none"> - Penny game, puff ball game, resistive clothes pin game, hand exercises, handwriting, wet towel game, sorting small objects, tic tac toe with marbles on golf tee
<p>Practitioner evaluation/assessment</p>	<p>9. Implement population/community centered intervention plan</p> <ul style="list-style-type: none"> - Incorporate fine motor activities into each RSB class every day of the week

<p>6. Capabilities/enablers: Person level performance issues: - All coaches hold CPT ACSM credentials - All boxers indicate deficit that could be improved upon Environmental support/policy/condition: - Big gym space - Group workouts - Volunteers at every class Activity/task/role: - Occupation- based activities - Headquarter gym</p>	<p>10. Evaluate outcome of plan - Posttest results indicated effectiveness of intervention - Feedback from boxers regarding perceived fine motor abilities</p>
<p>7. Constraints/barriers Person level performance issues: - Health status - Perform tasks with and without boxing gloves - Require increased time Environmental support/policy/condition: - Limited fine motor supplies - Limited funding Activity/task/role: - Current dilemma between gym headquarters and business headquarters</p>	<p>11. Occupational performance and participation - Fine motor abilities increase - Occupational Therapy on a consult basis</p>

APPENDIX B

Fine Motor Interventions Completed

Week 1:

2/11/19 – Puff balls with resistive clothespins, newspaper bag exercise, threading beads on pipe cleaner

2/12/19 – Fine motor relay, 10 puff balls with black clothespins, and 5 penny flips for each hand.

Whoever was last has to do 10 jumping jacks

2/13/19 – Coin pick up & weight, ball squeezes, 1-3 minute stations

2/14/19 – Golf tees and marbles, threading heart with yarn

2/15/19 - Play dough and beads, rubber bands and pop cans

Week 2:

2/18/19: Golf tees and marbles, tendon glides, play dough and beads

2/19/19: Did not have dexterity station.

2/20/19: Cards and clothespins. Hearts= bridges, Diamonds = weights, Spades = jumping jacks, Clubs = sit to stand

2/21/19: Push and pull workout. Rubber band, extension, for 1:45 minutes. Soft dodge ball, flexion, for 1:45 minutes

2/22/19: Forearm roll ups with 2# or 5# weights

Week 3: Asked for Feedback from Boxers this week

2/25/19: Threading beads on pipe cleaner, puff balls with resistive clothespins

2/26/19: Did not have dexterity station.

2/27/19: Finger walk ups on dowel rod

2/28/19: Carrying marble on spoon for “40-meter dash” with dominant hand one way and non dominant hand other way. If you drop marble, you do 2 squats.

3/1/19: Finger walk ups on dowel rod

Week 4:

3/4/19: Button It Up, Zip It, Tie One On (ADL station)

3/5/19: Resistive clothespins with Legos to build desired design

3/6/19: Partners playing memory game using tweezers to pick up cards

3/7/19: Rice bucket for hand strengthening and range of motion (ROM) exercises

3/8/19: Dodge ball hand strengthening exercises

Week 5:

3/11/19: 7 Helpful Hand Exercises for PD

3/12/19: Finger walk ups on dowel rod

3/13/19: Dodge ball hand squeezes from seated, lying, and standing position. 2,4,6,8,10,8,6,4,2

3/14/19: Flarp putty for finger strengthening

3/15/19: Rice Bucket for hand strengthening and range of motion (ROM) exercises

Week 6:

3/18/19: Ring out wet wash cloth in bucket for hand strengthening

3/19/19: Button shirt relay (with use of button hook) and resistive clothespins

3/20/19: Thumb war, Hot Hands, and Double Double with partners

3/21/19: Assembly and pulling beads off of sticky tape

3/22/19: Did not have dexterity station

Week 7:

3/25/19: Isometric hand exercises. Squeeze dodge ball and hold for 5 seconds. Extend fingers with resisted rubber band and hold for 5 seconds.

3/26/19: Did not have dexterity station

3/27/19: 7 Helpful Hand Exercises for PD. Exaggerating extension of all exercises.

3/28/19: Writing exercise. First write in cursive “I love Rock Steady Boxing”, then print in all capital letters “I LOVE ROCK STEADY BOXING”.

3/29/19: Writing exercise. First write in cursive “I love Rock Steady Boxing”, then print in all capital letters “I LOVE ROCK STEADY BOXING”.

Week 8:

4/1/19: Squeeze and pop gadget to address hand strengthening. Post NHPT testing.

4/2/19: Did not have dexterity station. Post NHPT testing.

4/3/19: Isometric hand exercises with dodge ball. Holding for 5 seconds each hand.

4/4/19: Post NHPT testing

4/5/19: Post NHPT testing

APPENDIX C

Educational Seminar Feedback

*Thank you for attending the Educational Seminar over adaptive equipment and assistive devices!
I hope the seminar met your reason for attending. Please take a few minutes to complete this
survey to help me better understand what I did right as well as how I could improve.*

How satisfied were you with the overall event? (Circle one)

Completely
Satisfied

Somewhat
Satisfied

Somewhat
Dissatisfied

Completely
Dissatisfied

What was your favorite part of the seminar?

Was there anything about the seminar you think could have been done better?

How did you benefit from attending?

The information presented was meaningful to me: (Circle one)

Strongly
Disagree

Disagree

Neutral

Agree

Strongly
Agree

Additional Comments/Suggestions

APPENDIX D

Demographic Information and Motor Skills Question

Implementing fine motor exercise programming for persons with PD: Occupational Therapy's Role

Participant Number: _____

Age: _____

Gender: _____

RSB Class: _____

On a scale of 1 to 5, how well do you think you are performing fine motor activities, such as tying shoes, fastening buttons, opening containers, and picking up small objects? 1- Very Poor/ Cannot do; 5 = Excellent, No Problems. Circle your answer below.

1 Very Poor/Cannot Do	2	3	4	5 Excellent
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Please comment on your current fine motor coordination abilities, including any activities you find troublesome.

APPENDIX E

Description of the Difference Between Occupational Therapy and Physical Therapy

What is the difference between occupational therapy and physical therapy?

An occupational therapist (OT) is skilled and trained to educate and assist individuals from all walks of life **to be as independent as possible in activities of daily living (ADL's)**. ADL's are, simply put, anything you want to do, need to do, or are required to do. If you find yourself having difficulties with ADL's seek out an occupational therapist. OT's can provide exercises, adaptive equipment, and emotional regulation strategies to assist an individual in their journey towards independence.

A physical therapist (PT) is skilled and trained to educate and assist individuals from all walks of life **to be as independent as possible in performing movement of the human body**. Physical therapists focus on a biomechanical approach to facilitate correct movement, prevent injury, and reduce pain. If you find yourself having a difficult time doing the things you want to due to pain, loss of balance, or neurological deficits seek out a physical therapist. PT's can provide exercises, massages, and other techniques to treat the actual impairment from a biomechanical approach.

APPENDIX F

Occupational Therapy Screening Feedback

Thank you for signing up for an Occupational Therapy (OT) screening at Rock Steady Boxing's quarterly PT screening. I hope that the OT met your reason for signing up. Please take a few minutes to complete this survey to provide RSB feedback on the inclusion of OT in the quarterly PT screenings.

How satisfied were you with the overall 30 minutes with the Occupational Therapist?

(Circle)

Completely
Satisfied

Somewhat
Satisfied

Somewhat
Dissatisfied

Completely
Dissatisfied

How did you benefit from seeing an occupational therapist?

In what way were you educated on your identified need?

Would you recommend other boxers to see an occupational therapist? Explain.

Additional Comments/Suggestions