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ENVIRONMENTAL INFLUENCES ON OCCUPATIONAL THERAPY PRACTICE

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ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Rehabilitation Sciences
in the College of Health Sciences
at the University of Kentucky

By
Camille Skubik-Peplaski

Lexington, Kentucky

Director: Dr. Carl Mattacola, Professor of Athletic Training

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Rehabilitation hospitals serve to foster a client's independence in preparation to return home after an injury or insult**.** Having space in rehabilitation environments that is home-like and supportive for each client can facilitate participation in occupations and assist in learning and practicing the skills needed to transition to home. Yet, typically occupational therapists provide interventions to clients in therapy gyms with exercise and impairment based equipment. Currently the stroke population is changing and identifying the optimal rehabilitation environment is imperative to guide occupational therapy practice.

This dissertation contains three studies relating to the rehabilitation environment and occupational therapy interventions. The first study focused on the perceptions of occupational therapists regarding their optimal rehabilitation environment, identifying that they would prefer to offer their clients a variety of rehabilitation environments and that there is a relationship between the environment and the type of intervention provided. A second study examined the effects of occupation-based interventions provided in a home-like environment to an individual recovering from chronic stroke with the results indicating enhanced occupational performance, resumed competence in desired roles, improvement in affected upper extremity function, and notable neuroplastic change. The final study investigated how the rehabilitation environment influenced the interventions used by the occupational therapists. The findings supported the relationship between the therapy environment and a specific intervention; working in the therapy gym with preparatory methods and being in a home-like space using occupation-based interventions.

The environment influenced occupational therapy interventions and it is recommended that the occupational therapist match the client's goals to the ideal environment for optimal intervention.

KEYWORDS: Occupation-based, Environment, Rehabilitation, Therapy, Home-like

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DEDICATION

This dissertation is dedicated to the occupational therapists who want to rise above mediocrity to be leaders in occupation-based practice.

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Chapter 1

The Therapist, the Environment and the Occupation

The goal of rehabilitation is to restore an individual's functional abilities, which is closely aligned with the aim of occupational therapy, to promote health and well-being through engagement in occupations (AOTA, 2008). After a stroke, when clients enter an inpatient rehabilitation hospital, they can be unsure of their current abilities or their future potential. Occupational therapists can offer opportunities to "reduce the risk of disablement" (Law, Baum & Baptiste, 2002, p. 4).

Statement of Purpose

There appears to be a mismatch between the environments that are available in rehabilitation and the interventions used to help clients learn to take care of themselves again. The focus of this dissertation study was to investigate how the therapy environment influenced the interventions that the occupational therapists chose to support the health and well-being of individuals admitted to an inpatient rehabilitation program following a stroke.

Significance of the Study

This study is significant as it is the first to explore how the rehabilitation environment relates to occupational therapy interventions. Information about the environment and its influence on practice will add value to the profession of occupational therapy and possibly improve outcomes of clients, recovering from a stroke, if their experience in rehabilitation better prepares them to return home.

Occupations are "activities that people engage in throughout their daily lives to fulfill their time and give life meaning" (Hinojosa & Kramer, 1997, p. 865). Occupations

are the essence of the intervention process as they create occupation-based practice with the client participating in occupations and are also the therapy outcome (Law, Baum & Baptiste, 2002). Occupational performance describes participation in occupations and is defined as the "dynamic experience of a person engaged in an occupation within an environment over time" (Strong, Rigby, Steward, Law, Letts & Cooper, 1999, p. 124). Participating in occupations to regain independence in meaningful roles is dependent on three elements and their interactions: the person, the environment and the occupation making up the PEO model (Law, Cooper, Stewart, Letts, Rigby & Strong, 1996). To attain optimal occupational performance, these authors (2002) speculate that the environment must be supportive of each specific occupation identified by the client.

In an inpatient rehabilitation hospital environment there are four typical spaces for occupational therapy intervention. Each has its own distinct features and may influence the opportunities for the client to participate in his/her preferred occupations. The first is the therapy gym, which usually has open spaces to maneuver wheelchairs, mat tables for body work, tables for clients to stand and work, weight machines, arm bikes, nets to shoot balls, and some may have purposeful activities such as clothes to fold and hang up, eating utensils to simulate eating and empty jars or bottles previously containing food or medications. Figure 1.1 is a picture of a therapy gym.

The second therapy space option is a combination room. This room usually contains some gym-like equipment but will also include home-like components, such as a living room or a kitchenette. Figure 1.2 is a picture of a combination room.

The third intervention space is a practice apartment or a space that is more natural to home. This space is very different than the ones previously described. It may include a

stove and oven, refrigerator, dishwasher, table and chairs, ironing board and iron, bed, closet, washer and dryer, recliner and microwave. A picture of a practice apartment is included in Figure 1.3.

Lastly, treatment can also occur in the client's hospital room, which usually has a bed, bed-side dresser, over- the-bed table, closet, mirror, sink, toilet and bathtub. Figure 4 is a client's room in an inpatient rehabilitation hospital. These rehabilitation environments can offer different opportunities for each client: exercise, stretching and teaching can occur in the gym; stretching, and then cooking, can occur in the combination room; cooking, cleaning, washing and making a bed is performed in the practice apartment; and dressing, grooming, bathing and toileting can be done in the client's room. What if, however, the occupational therapist is not accessing all available places to provide therapy or if only one space is available for treatment for the client during his/her admission? If intervention occurs in only one of the possible intervention spaces, like the gym, how does it affect the therapist's intervention choices and the client's ability to learn the skills needed to regain independence and return home?

Theoretical Framework: Person, Environment, Occupation

The PEO model calls for a shift from an interactive approach, addressing both the person and environment as independent entities (PEO), to a transactive model, focusing on occupational performance as an "interwoven relationship that exists among people, their occupations and roles, and the environments in which they live, work and play" ((Law, Cooper, Stewart, Letts, Rigby & Strong, 1996) p. 10). The premise of PEO came from many sources, including Lawton and Nahemow (1973), Cszentmihalyi and Csikszentmihalyi (1988), the Occupational Therapy Guidelines for Client-Centered

Practice (CAOT, 1991), and the Canadian Occupational Performance Measure (Law, Baptiste, Carswell, McColl, Polatajko & Pollack, 1994; Christiansen & Baum, 1991;Baum & Christiansen, 2005).

Law et al. (1996) describe PEO as being based on five concepts: the person, the environment, activity/task, occupations and occupational performance. Each person is unique and can assume many roles at the same time. These roles often are dynamic and ever-changing, with life experiences impacting the transaction among the environment, person and occupation. These transactions are defined as occupational performance. Another premise of the PEO theory is that every person possesses the innate capabilities to participate in occupational performance. The environment incorporates culture, socio-economics, institutional, physical and social components. The environment has an influence on the person and occupation and can, in turn, be influenced by them. The environment is usually also considered to be typically more adaptable than the person and is viewed "as an under-used resource for interventions" (Law et al., 1996, pg. 14). Activity, task and occupation are all interrelated as they are the intervention tools used to gain occupational performance (Christiansen & Baum, 1991).

The PEO model proposes that the person, environment and occupation all interact continuously over time and space. These three areas overlap as presented in Figure 1.5, demonstrating their fit or congruence with the area of overlap representing occupational performance. Intervention using the PEO model attempts to maximize the fit of the person, environment and occupation allowing for more overlap of the three circles and more efficient and effective occupational performance (Law et al., 1996). Figure 1.5 represents the PEO Model.

It is reasonable to think that a therapist must always keep in mind the client's desired roles, the occupations he or she wants to be able to participate in and the optimal environment to support occupational performance (Law et al., 1996). The PEO framework is the overarching theory for the occupation-based model for this study, with the Occupational Therapy Practice Framework (OTPF) (AOTA, 2008) providing the format for describing the occupation-based interventions in the occupation area of the model. The OTPF describes three stages of care: preparatory methods, purposeful activities and occupation-based interventions. These defined stages allow occupations to be categorized and studied.

Research Questions and Purpose

The purpose of this dissertation is to identify how rehabilitation environments influence interventions and, ultimately, occupational therapy practice. Three studies have been conducted to begin to examine this issue. Study one was a qualitative study exploring occupational therapists' perceptions of the rehabilitation environment and their influence on occupational performance and practice. Twenty-one occupational therapists participated in focus groups designed to explore their perceptions of practice environments.

Study 1 Specific Aims

Aim 1: Identify the perceptions of occupational therapists regarding optimal rehabilitation environments.

Aim 2: Identify barriers for occupational therapy practice in an occupation-based environment.

Aim 3: Explore how the environment influenced the decisions the therapists made regarding interventions.

Analysis of the transcribed data revealed that: the environment influenced intervention strategies; therapists felt that if rehabilitation environments had flexibility they would use more occupation-based tasks and be able to adapt to each client; and the environment had an impact on professional identity. Chapter 3 further describes the results of Study One.

Chapter 4 describes Study Two, which was an effectiveness study assessing three different intervention approaches occurring in two different rehabilitation spaces: traditional outpatient, modified constraint-induced and occupation-based in a therapy gym or a practice apartment. To distinguish these intervention approaches, the OTPF (AOTA, 2008) treatment techniques were used to describe the interventions completed during the therapy sessions, including occupation-based interventions, purposeful activities and preparatory methods.

Study 2 Specific Aims

Aim 1: The central hypothesis stated that high task repetitions (modified Constraint Induced Therapy) are a more effective intervention tool in the recovery of upper extremity movement with chronic stroke, even when

delivered at a lower intensity as compared to a traditional or occupation-based approach.

Goal 1: To maximize the recovery of upper extremity movement for clients recovering from chronic stroke by identifying the optimal occupational therapy intervention and environment.

Goal 2: To enhance the client's independence in activities of daily living and quality of life.

The study included seven participants each receiving 15 sessions of occupational therapy over five weeks and completed pre- and post-testing using behavioral, neurophysiological and descriptive assessments. Study results suggest that the hypothesis could not be rejected as all the clients increased their functional abilities, were satisfied with changes in their ability to perform meaningful roles and no significant difference was found in motor recovery between the different intervention or environmental approaches.

The first two studies resulted in the identification of two concepts: that there is an intersection between the environment and the interventions used by occupational therapists in a rehabilitation hospital, and that using occupation-based interventions can be an effective tool for an individual recovering from a stroke. A third study was needed to explore the relationship between the environment and the interventions used on an inpatient stroke program: specifically, to determine if choice of intervention changes when the environment is more similar to a home.

Implementation of PEO

The Person, Environment, Occupation (PEO) model was used for all three studies in this dissertation. Knowledge gained from the first two studies helped to evolve the PEO model for Study Three, to investigate the influence of the environment on occupational therapy interventions. Within the PEO model the person circle (therapist) overlaps with the environment and occupation circles, indicating the intersections of how the therapist interacts with the client, environment and occupations and captures information about the social and physical environment. Furthermore, the environment circle overlaps the occupation circle in the PEO model, representing the intersection between the therapy environments (gym, combination room and practice apartment) and occupational therapy interventions. The area where all three circles overlap indicates the congruence of these three areas and if a transactional relationship exists between all entities. Figure 1.6 represents how the PEO model was modified to apply in Study Three.

Chapter five describes Study Three, which investigated how the occupational therapists used the social and physical environment to provide interventions while working with clients recovering from a stroke in an inpatient hospital program. Data was collected on the environments and interventions during an inpatient admission.

Study 3 Specific Aims:

Aim 1: Identify what interventions occupational therapists are choosing when treating in a therapy gym or combination space.

Aim 2: Determine what happens to the interventions if the therapy environment is enhanced to be more home-like.

Aim 3: Explore how the environment influences the decisions that occupational therapists make on what interventions to use.

The study included five occupational therapists providing interventions to 16 different clients during a 14-month period. Study results suggest that interventions change when the environment changes. Therefore the environment does influence occupational therapy practice. Further information about this study is included in Chapter 5. The final chapter, six, of this dissertation summarizes the results of all three studies conducted and provides application to occupational therapy practice.

Operational Definitions

The person in this study is the occupational therapist providing intervention to clients recovering from a stroke in an inpatient hospital program. Data has been collected on the communication between the client and family in regards to interventions, the therapists' interests, training and belief system, and his or her communication abilities with the client during the intervention session.

AOTA (2009, pg. 1) proposes that the "environment refers to external physical and social aspects that surround clients while engaging in the occupation". **The physical environment** in this study is defined as the external surrounding and conditions in which something exists (New Oxford, 2001). Observations of this space will describe the physical environment, including lighting, temperature, sound and equipment. **The psycho- social environment** is defined as the "emotions, perceptions and attitudes" of the people and groups in the environment (Shalinsky, 1986). Observations for social environment describe who is in the gym, his or her interactions, distractions and social communication. The therapist chooses the space for each intervention session. In this

study the **therapy gym** is made up of open spaces with mat tables, tables to sit and stand at, weight machines, arm bikes, nets to shoot balls and may have clothes to fold, eating utensils, and occupation-based kits (Figure 1.1). A **combination room** is a therapy gym with home-like components, such as a couch, recliner, coffee table, end table with lamp and a TV (Figure 1.2). The **natural environment/practice apartment** is a home-like space with stove, washer, dryer, oven, ironing board, bed, closet, recliner, and microwave (Figure 1.3). A **client room** is the space the client sleeps, and has the equipment to complete their basic activities of daily living with an armoire, bathroom, shower space and sink (Figure 1.4). The **therapy environment** is the space that a client received occupational therapy treatment.

Interventions include what the therapist chooses to work on with the client during a treatment session. Interventions are defined from the OTPF (AOTA, 2008) and include preparatory methods, purposeful activities and occupation-based interventions. **Preparatory methods** are techniques that prepare a client to participate in occupations; such as, stretching, ROM, and strengthening. **Purposeful activities** suggest that the client participate in activities that help improve skills that would enhance occupational performance, such as practicing putting on clothes in the gym with adaptive equipment, opening resistive food containers in the gym and folding clothes on the table in the gym. **Occupation-based intervention** is when a client, in therapy, engages in occupations that match his or her identified goals, which may include cooking in a kitchen, getting dressed in his or her room, and going to the grocery store. Observations are made on how the therapist describes the interventions to the client and if they relate to the client's goals.

Summary

The influence of environment on occupational performance and occupational therapy is important and needs to be more fully described and better utilized. If the occupational therapy profession continues to challenge therapists to use occupation in practice, then there is a need for therapy environments to be flexible and offer the therapist what he or she needs to facilitate transactional relationships and optimal occupational performance. There is a need to understand and create therapeutic environments that enhance the client's journey home as quickly, safely and confidently as possible.

Figure 1.1 The Therapy Gym

Figure 1.2 The Combination Room

Figure 1.3 The Practice Apartment

Figure 1.4 Hospital Room

Figure 1.5 PEO Model

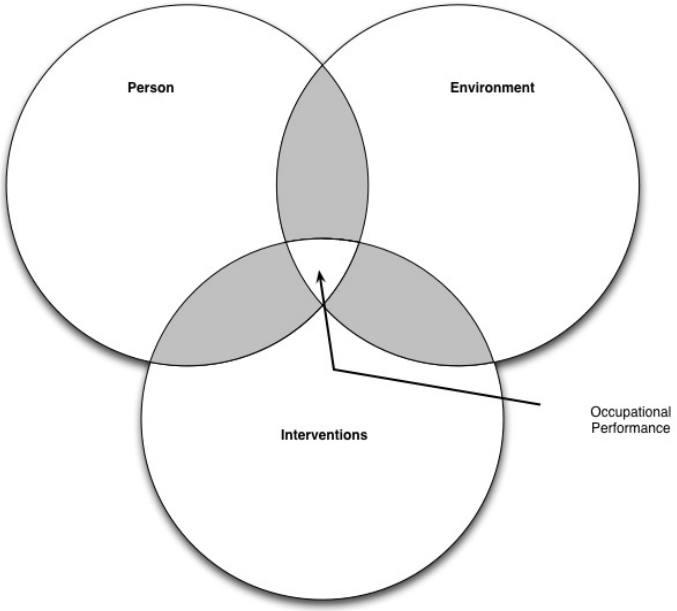
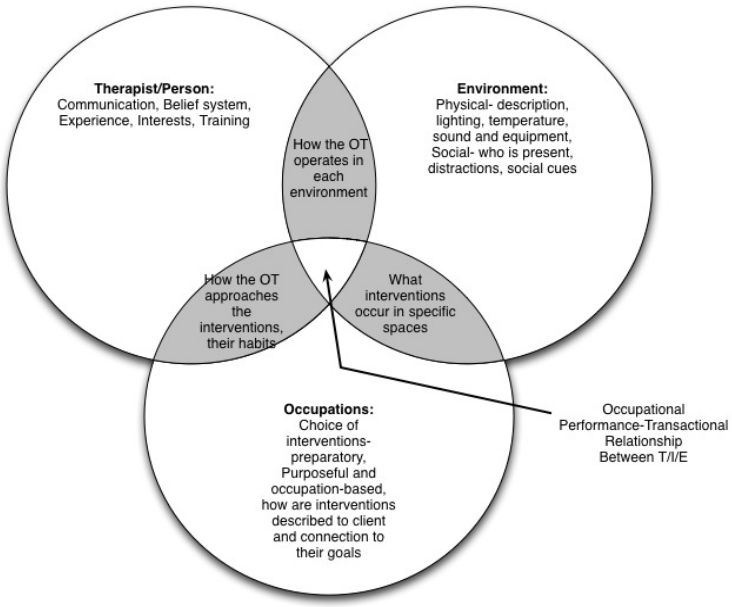


Figure 1.6 PEO Model



Chapter 2

The Interaction of the Therapist, the Rehabilitation Environment and Occupational Therapy Interventions

Literature Review

Literature was searched on several topics to support the three studies presented in this dissertation. Searches began with topics such as hospital environments, occupational therapy interventions and theories that supported the person, the environment and occupations. Further searches occurred regarding specific occupational therapy approaches to enhance motor recovery and then expanded into clinical reasoning and therapist decision making. Outcome tools were studied along with literature that discussed the relationship between the rehabilitation environment and well-being. Considerable time was spent understanding environmental theories starting in with the 1930's. Search strategies for the literature presented in this review included electronic databases, such as EBSCO Host and accessing the following databases within: Academic Search Premier, Ageline, CINAHL, Health Source, MEDLINE and psycINFO. Once articles were identified and secured then hand searches occurred with further investigation into the databases, journals and books.

Rehabilitation hospitals serve to foster independence so clients can be prepared to return home after an injury or insult. Having space in rehabilitation environments that is home-like and supportive for each client can facilitate participation in occupations and assist in learning and practicing the skills needed to transition to home more successfully. Cant (1997) wrote about his experience following a stroke noting that the odd smells, different schedules, new procedures and equipment tended to decrease his confidence and

sense of power, and overall made him feel like a manipulated object. After a stroke, clients may be disoriented and feel out of place, especially living in a hospital environment, as this can be an unfamiliar experience to most people. If there were more home-like spaces in a rehabilitation environment, would it increase a client's comfort and in turn help them to improve his or her ability to take care of themselves? If there were home-like environments in a rehabilitation facility, would therapists use them to help clients' relearn skills? How can rehabilitation professionals contribute to a smooth transition home for their clients? Pilot data indicates that there is a disconnect in the design of rehabilitation therapy environments and their use (Skubik-Peplaski, Rowles & Hunter, 2012). Effective physical and technical training is occurring, but the provision of home-like spaces for training used to promote a more effective transference of acquired skills to the home environments is not. The literature presented in this chapter will review pertinent research on rehabilitation environments, occupational therapy interventions, clinical reasoning and application to occupational therapy practice.

Rehabilitation Environments

The "environmental press" concept describes how a person adapts or reacts to his or her environment, either negatively or positively, and was originally proposed by Murray (1938). Lawton and Simon (1968) expanded this concept to the aging population, as a person realizes they are less capable and more vulnerable leading to the possibility that the environment can take control over his or her actions. When an individual is comfortable within his or her environment they are able to adapt and participate in positive experiences (Lawton & Nahemow, 1973). When an individual experiences a stroke he or she is less capable and more vulnerable, especially in an

unfamiliar hospital environment. Ideally, through rehabilitation, a client learns to positively adapt to the environment and his or her physical impairments to perform at a maximum level. If an individual is unable to adapt and demonstrate competency, an imbalance develops between the environment and person. Livneh (1987) postulates that rehabilitation intervention should attempt to either maximize the person-environment congruency or decrease the environment-person imbalance. The client's needs and the elements of the environment should be aligned to attain congruency (Kahana, 1982).

Environments have an impact on an individual's ability to recover from traumatic insult or injury (Deegan, 1988; Sadler, Keller & Rostenberg, 2009). Edvardsson (2008) interviewed several clients living in a variety of medical settings and asked them about the impact of the environment on their well-being. The participants suggested that being in a safe, supportive environment helped them feel like it was an extension of their home, improving interactions and decreasing confusion and anxiety. Neuman and Ruga (1995, p. 63) add that a supportive home-like environment has a positive impact not only on clients but on staff; they suggest that "physical environments can positively affect therapeutic outcomes, staff performance and patient satisfaction." Mitty and Flores (2009) found that if clients felt at home in their long-term care environment they were more apt to engage with others and envision a future for themselves. Even more important, the rehabilitation environment needs to be able to motivate the clients to engage and participate; if it does not, clients are more likely to merely sit and isolate themselves (Mackey, Ada, Heard & Adams, 1996).

Nursing has attempted to address this issue by advocating for the creation of hybrid spaces, a merging of home and hospital space, in order to facilitate more personal

relationships and reinforce each client's sense of identity, comfort and feelings of being "in-place" during the process of healing (Gilmour, 2006). A series of recent studies has revealed that the design of hospital environments that are home-like enables clients to maintain a sense of personal control, provide emotional support and speed recovery (Torrington, 2006; Dijkstra, Pieterse & Pruyn, 2006; Williams & Irurita, 2005; van de Glind, Dulmen & Goossen, 2003). Being able to complete tasks independently enhanced the individual's sense of control (Williams, Dawson & Kristjanson, 2008). If an environment is planned appropriately, and the optimal equipment is more fully home-like, the client may be able to engage, adapt and learn new tasks needed to return home.

Devlin (2007) suggests that occupational therapy practice environments should foster client participation, alleviate stress, support positive emotions and behaviors and similate home-like in order to maximize the effectiveness of interventions. The American Occupational Therapy Association (AOTA) has also expressed this view by proposing that occupational therapy interventions need to "support people where life is lived" (AOTA, 2009, p. 1). Kiernat (1982) stated that the environment is a subliminal modality that has the greatest influence on individuals with illness or disability. She further wrote that the environment could be changed to improve client outcomes. Typically, occupational therapists provide intervention to clients recovering from a debilitating illness or injury, through teaching and practicing strategies in a therapy gym or facilitating reacquisition of basic activities of daily living in the clients' room at a hospital. Therapy gyms often are lit with fluorescent lights, are temperature controlled for the general population, have shiny tile floors, large open spaces, mat tables and equipment lining the walls and shelves. Such gyms often do not adequately represent a

client's living environment and may limit the practice of direct occupations. Therapy gyms evolved from the Greek concept of a gymnasium as "a room or building that is equipped for gymnastics or sport" (Webster, 2008) and most gyms stay true to this exercise focus and ambiance. Historically, reduction of an impairment approach uses a medical model relying on the assumption that if an impairment was lessened it would improve function, a view aligning with a focus on exercise in a therapy gym (Baum & Baptiste, 2002).

Client rooms in the hospital also have fluorescent lights over the bed, universally controlled temperature, and sparse rooms (with a bed, chair and wardrobe, a sink, standard medical equipment and maybe a few items brought from home). Similarly, these rooms provide opportunities to practice bed, toilet and tub transfers, grooming, dressing and bathing, but these accommodations are designed to meet medical needs first and mirror a home environment secondarily. In a natural or home environment lighting and temperatures are comfortable to the individual because there are familiar objects, aromas and physical layout.

In recent years a number of options have been developed for providing therapy settings that align more closely with home and community settings. Options for "in context" therapy include several commercially available products such as Easy Street®, Independence Square®, Rehab 1-2-3® and Our Town®. These environmental systems simulate a self-contained event, representing an everyday situation and located in a familiar environment (post office, grocery store, department store, etc.). They provide opportunities for clients to practice skills of everyday living. Easy Street® was found to be an effective rehabilitation tool for therapists (Hecox Roach, DasVarma, Giraud, Davis

& Neulen, 1994; McNutt, 2006). When comparing groups that received intervention with Easy Street and traditional therapy in a gym, Richardson, Law, Wishart and Guyatt (2000) found that there was no difference in outcomes.

Occupational therapy environments in hospital clinics can be perceived as either supportive or inhibitive to a client's ability to adapt and recover. Rebeiro (2000) suggests that if an environment is perceived to provide limited choice and opportunity, it may lead to a negative effect on adaptation and decreased occupational performance. In contrast, she defines a supportive environment as one that is open to exploration, driven by the clients' needs and goals and accepting of the individual. In a subsequent publication (Rebeiro, 2001, p.80), she found that environments need to affirm the client as a "person of worth" and provide "a place to belong, and a place to be supported," and argued that this is what enables a client to perform their meaningful occupations. Law (1991) challenges occupational therapists to change environments that inhibit participation in meaningful occupations. Clients can reclaim their lives by participating in meaningful occupations in a meaningful setting, and through occupations, health and well-being can be enhanced by occupational therapists (Law, 2002; Rogers, 2007).

The therapy environment can be a positive support for occupation-based practice. McClusky (2008) proposes that a well-designed rehabilitation center can help clients connect their therapy goals to their life goals, which motivates them to work harder at their therapy. He further elaborates that typical therapy gyms do not help clients make the connection between their rehabilitation goals and the exercises they do while in therapy. Barker and Ziino (2009) suggest that therapists assess the goals during each treatment session and consider the environment for each intervention. "In context"

environments, however, have not been embraced by many rehabilitation hospitals to simulate real-world living situations, and literature to support this type of therapy tool is limited.

Occupational Therapy Interventions

Cox postulates that when a client participates in occupations in natural environments it contributes to the client's health and well-being (1995). She further espouses that engaging in occupations in natural environments gives a person purpose and goals promoting success in other areas of life, which is vital to health. It has been found that engagement in meaningful goal-directed tasks can improve motor performance and be more beneficial with clients recovering from a stroke than rote exercise or non-meaningful tasks (Dolecheck & Schkade, 1999; Ferguson & Trombly, 1997; Hsieh, Nelson, Smith & Peterson, 1996; Lang, Nelson & Bush, 1992; Trombly & Wu, 1999). In further support of using occupations during interventions, Trombly (1995) proposed that "purposeful is hypothesized to organize behavior and meaningfulness to motivate performance" (p. 960). Gray (1998) postulated that occupational therapists provide opportunities for clients to practice and adapt in occupational context to improve impairments, but more importantly provide greater opportunity for skill transference to the home setting. In summary, the above evidence suggests that engagement in meaningful occupations or occupation-based practice is motivating and can improve motor outcomes to make it a beneficial therapeutic strategy.

The strength of occupation-based practice comes from it being evidence-based, client-centered and aligns its users with the World Health Organization and the guidelines set up by the Center for Medicare Services (Chisholm et al, 2000; Rogers, 2007, Baum & Baptiste, 2002). Having a supportive natural environment further enhances the clients'

rehabilitation experience and supports optimal use of occupations during interventions. Pierce (2003) adds that therapists in her study struggled with offering occupations during therapy. They found that it was easiest to provide occupations if they were treating the clients' in their home environments, and the most difficult when environments had impairment-based equipment, like a therapy gym. These therapists revealed that their training and old habits using impairment-based interventions were hard to stop, and it was laborious to customize each session to offer appropriate occupations to clients.

Skubik-Peplaski, Rowles and Hunter (2012) found that therapists believed that it would be more beneficial if traditional rehabilitation environments offered therapy spaces that could be changed so that the environment could replicate the clients' home with a few items from a traditional therapy gym. The therapists in this study felt that offering opportunities to practice skills in the accessible gym and/or universal design settings did not help the clients generalize skills to their homes. The therapists recognized that, at their hospital, most of the clients lived in older homes with narrow doors and hallways, room-to-room floor plans, small bedrooms and several steps. These therapists stated that they preferred to work in a flexible therapy space that replicated a realistic environment and not a traditional therapy gym.

Occupational Therapy Practice Framework

The American Occupational Therapy Association (2008) developed the occupational therapy practice framework (OTPF) to describe how occupational therapy can contribute to an individual's health and participation in life through engagement in occupation. The OTPF defines occupation-based intervention as a " type of occupational therapy intervention- a client-centered intervention in which the occupational therapy

practitioner and client collaboratively select and design activities that have specific relevance or meaning to the client and support the client's interests, need, health and participation in daily life" (p. 672). The OTPF further recommends how to use occupation-based practice during intervention by creating a format with three stages of care: occupation-based intervention, purposeful activity and preparatory methods. Once the occupational therapist and client identify the meaningful roles they want to resume, they follow this format to deliver client-centered care with a focus on occupations.

Preparatory methods are used to prepare the client for purposeful and occupation-based activities. If a client has poor muscle strength and postural stability, then the therapist may work on sitting at the edge of bed in preparation for dressing. When a client reaches the next stage and is able to complete purposeful activities, in the therapy gym the client may use a reacher or dressing stick to practice picking out clothing items from the closet or donning socks and shoes. Once the client is able to engage in desired occupations, for occupation-based practice, then the therapist may encourage the client to dress and groom him or her self, in his or her room, in an appropriate amount of time.

An example of a preparatory method used in occupational therapy intervention is modified constraint-induced treatment (mCIT). Following a stroke, an mCIT approach would use task-oriented activities that focus on skill acquisition training, with the ultimate goal being to improve the functional use of the impaired hand. Activities may include strengthening specific muscle groups and completing patterns of movement, especially in the affected extremity (Page, Levine, Leonard, Szaflarski & Kissela, 2008). Therapists could have the client practice movement patterns as he or she performs, simple activities of daily living, moving the intervention into the purposeful category. Traditional occupational

therapy often would use purposeful activities when providing intervention for clients recovering from stroke. Jongbloed, Stacey and Brighton (1989) define this approach as one that practices occupational tasks, usually activities of daily living, and helps the client become more independent. The emphasis is on treating the symptoms, such as decreased balance or muscle power, rather than the cause of the dysfunction. The traditional approach can be subdivided into compensation and adaptation (Siev & Frieshtat, 1986). The client may learn to dress her or him self using a one-handed technique (compensation) or an adapted brush is made to be able to brush his or her hair (adaptation). These interventions are considered purposeful because they are components of an occupation, or they are practiced out of a natural context for the client. Interventions can also incorporate occupations in context. Law, Baum and Baptiste (2002) describe occupation-based practice as using client-centered activities that focus on the occupations that the client finds meaningful, and participation in these becomes the intervention process and outcome. Interventions will occur in more natural environments, such as the practice apartment or the client's room, and could include ironing, vacuuming, cooking, cleaning, making the bed and/or doing wash. The definition of occupation-based practice is aligned with the OTPF (Law, et al., 2002).

OTPF interventions give the therapist a beginning framework to work from and progress the client throughout his or her rehabilitation stay. The therapeutic environment that best supports the client's occupational pursuits can guide the therapist to incorporate the rehabilitation environment in his or her therapy decisions. The therapist must use clinical reasoning to continually assess optimal interventions and the best environment to direct the client to his or her highest level of independence.

Occupational therapists make choices daily on what intervention to use and in what environment. They rely on their clinical reasoning skills to progress a client throughout his or her admission. Clinical reasoning is the process that clinicians "plan, direct, perform, and reflect on client care" (Schell, 1998, pg. 90). Mattingly and Fleming (1994) consider clinical reasoning to be thinking in different forms, including how the therapist views the client, the client's impairments and how the therapist prioritizes the client's risks that interfere with occupational performance. Clinical reasoning directs action during intervention with the therapists basing their decisions on the understanding of the client's motivation, the assessment of the therapy environment, the therapist's knowledge of the disease process, previous experience, therapeutic partnership, and the client's goals for each session and long term (Mattingly, 1991). The OTPF (AOTA, 2008) presents that throughout the intervention the therapist continually practices clinical reasoning regarding the client's participation in desired occupations. In addition, Fleming (1994) comments that a large portion of clinical reasoning relies on tacit knowledge, an intuitive sense held by the occupational therapist. She further explains that occupational therapists often cannot describe why they do something during therapy, they just know it is the right action for each specific situation.

Overall, Fleming (1994) describes three different strategies to solve therapy issues and decide how the intervention session should flow: procedural, interactive and conditional reasoning. Procedural reasoning is when the therapist uses information about the client's diagnosis to identify problems, set goals and plan treatment. Following this strategy exclusively could lead the therapist to only address physical limitations during therapy. Interactive reasoning occurs during interactions between the client and the

therapist and is used when the therapist takes into consideration the client's perspectives, goals and abilities. Fleming revealed that this was not the main strategy for the therapists, but it is when the therapist attempts to individualize the therapy session. The author suggested that both of the strategies can be used together and " procedural reasoning guides treatment and interactive reasoning guides therapy" (pg. 1011). The last strategy that Fleming proposes is conditional reasoning. She defines conditional reasoning being when the therapist grades the therapeutic activity on the client's successes and failures, his or her goals and potential. The therapist evaluates the client's current condition during intervention and adapts the task to gain optimal results.

All three strategies are required to treat each client holistically and reach optimal occupational performance. Mattingly and Fleming (1994) state "it was not reaching the final goal per se that measured the success of therapy but the therapeutic experience along the way, where clients developed increasing confidence and commitment to take on challenges, even with their disabilities" (pg. 20). Assessing the occupational therapy interventions and the rehabilitation environments in which they occur requires all three aspects of clinical reasoning. The flow of therapy requires the therapist to guide treatment, while adapting to conditions. Therefore, clinical reasoning is one of the main tools to provide interventions to clients.

The Impact on Occupational Therapy Practice

Equipment in typical therapy gyms focuses on impairments of body functions and structures and resources that contribute to home-like activity and participation are not located within the gym. Is this type of therapy gym equipment influencing the decisions that occupational therapists make on what intervention they choose, and does the focus

on physical rehabilitation make occupational therapists more equipment-centered and less client-centered?

In a study with individuals recovering from a stroke during their inpatient rehabilitation, Smallfield and Karges (2009) found that out of 1,022 occupational therapy intervention sessions, 65% included pre-functional activities (preparatory activities) focusing on the clients' impairments and only 48% of the total sessions concentrated on activities of daily living (occupation-based interventions) attempting to enhance the clients' activity and participation in occupations. Richards, Latham, Jette, Coster, Richards, Smout, James, Gassaway and Horn (2005), studied clients recovering from a stroke and found that 37.5% of occupational therapy interventions focused on physical impairments and 31.9% addressed basic activities of daily living. Interestingly, they found that the clients who spent more time in therapy working on basic level activities- wheelchair management, sitting balance, grooming and feeding-demonstrated greater dependence in upper extremity dressing. Clients that spent more time on higher-level tasks, such as home management, displayed higher levels of independence in upper extremity dressing. These authors speculated that since upper extremity training focused on compensatory techniques it encouraged the use of the unaffected extremity more, ultimately decreasing overall upper extremity control. Vik, Lilja and Nygard (2007) found that clients felt pressure to perform basic activities of daily living while in occupational therapy, and not a focus on participating in instrumental activities of daily living, which were more valued by the client. When working with clients recovering from a stroke, Ma and Trombly (2002) suggest that occupational therapists; use client identified activities, adapt tasks to enhance participation, practice in a familiar context/environment and provide feedback. Even

though the results of their study indicated that familiar environments were effective for clients to relearn roles, the authors, in their literature review, were unable to find any studies that manipulated the environment for therapeutic interventions.

These studies suggest that many occupational therapists are not addressing all aspects of the rehabilitation environment or occupation-based interventions, including normal forms of participation in routine daily living experiences that should be the core of their interventions. Instead, the focus is more on regaining upper extremity control and using interventions that address impairments. The authors however, commented that very few studies were found describing the specific interventions used by occupational therapists in rehabilitation settings, especially in the United States (Latham, Jette, Coster, Richards, Smout, James, Gassaway & Horn, 2006). Ma & Trombly (2002) found little research evaluating the influence occupational therapy interventions in specific contexts or environments, and the authors recommend studies be completed with the focus on environments.

Person, Environment, Occupation

The Person, Environment, Occupation (PEO) model provides a foundational framework for the provision of occupation-based practice (Law, Cooper, Strong, Steward, Rigby & Letts, 1996). PEO allows the researcher to study the complexities of the interactions of the person, environment and occupation, especially across time, with an overall goal of guiding practice. The flexibility of this model aligns well with study three's design and supports the use of a systematic approach to investigate how the therapist's experience and belief systems interact with the environment and the occupations used during intervention. Metzler and Metz (2010) used the PEO model to

illustrate the translation of information across different levels of occupational practice and found that the therapist's attitudes, interests and skills can contribute to or inhibit health factors and outcomes. Ivanhoff, Iwarsson and Sonn, (2006) identified that the PEO model was effective to describe the relationship between the physical environment issues and technology used by clients. They recommend that more studies be completed, focusing on occupational performance and the transactional relationship of the person, environment and occupation.

The PEO model is the theoretical foundation for this study. Environment will describe the physical qualities: lighting, temperature, noise and equipment and the social qualities: who is in the room, distractions, and social cues. Occupations will include the intervention choices that the therapist uses; preparatory, purposeful and occupation-based.

Summary

The literature presented in this chapter defines the therapist, rehabilitation environment and occupational therapy interventions. This literature lays the groundwork to study these three concepts and demonstrates how they all relate to each other using the Person, Environment Occupation Model. The first study presented in this dissertation describes what an occupational therapist perceives as an optimal rehabilitation environment. The second study evaluates occupational therapy intervention and environment used in rehabilitation and the final study explores the interventions that are being used in a rehabilitation environment and the impact when the environment is enriched with homelike equipment. Chapter Three will describe Study one.

Chapter 3

Study One: Environmental Influence on Occupation-Based Interventions in Inpatient Rehabilitation

Introduction

To understand how a rehabilitation environment influences occupational therapy practice, on a stroke program, three components were studied: occupational therapists' perceptions of effective intervention environments (chapter 3): the effectiveness of occupational therapy interventions (chapter 4): and the influence of the rehabilitation environment on the types of interventions used by occupational therapists (chapter 5). The relationship between the environment and the interventions used within this environment is a fundamental component of the rehabilitation experience and can be strengthened with increased awareness.

An understanding of the occupational therapists' perceptions of the rehabilitation environment is critical to comprehend the options and thoughts that guide their practice. They decide daily what interventions to perform and which hospital setting to use. If there is a relationship between the environment and the intervention chosen and if the optimal environment supports the outcome of the intervention then knowing this relationship is important for client outcomes.

Occupational therapy is based on the holistic belief that health and well-being are closely connected to the occupations in which one participates and finds to be personally meaningful (AOTA, 2008). McLaughlin Gray (1998) advocates that the culmination of therapy should be restoration of "a client's occupational life" (p. 357). If the therapy reflects a client's life then there will be greater generalization of learned skills and ultimately improved occupational performance. The use of occupation in occupational

therapy is the fundamental tenet of the field (Baum & Baptiste, 2002). Many factors may influence the success of using occupation in the therapeutic process and the ultimate return to desired occupations after rehabilitation. In this chapter the influence of the built environment on the use of occupation-based interventions is explored.

Environment

The fact that treatment environments influence a client and their performance has been known for many years (Moos, 1974). In an occupational therapy intervention environment three key components are required for occupation-based practice the client, the occupation and the environment. These three elements and their interactions are also the foundation for the Person, Environment, Occupation Model (PEO) (Law, Cooper, Stewart, Letts, Rigby & Strong, 1996). The PEO model has contributed to a shift from the medical model of treating the client's impairments, to a transactional model focusing on occupational performance as an "interwoven relationship that exists among people, their occupations and roles, and the environments in which they live, work and play" (Law, et al., 1996, p. 10). The PEO model proposes that the person, environment and occupation all interact continuously over time and space. These three areas overlap with the level of fit or congruence representing occupational performance. Intervention using the PEO model attempts to maximize the fit of the person, environment and occupation allowing for more integration of the three domains and more efficient and effective occupational performance. This requires the therapist to address personal and environmental considerations in adapting the intervention environment (or choosing another environment) or modifying the occupation to maximize occupational performance (Law et al., 1996).

An important aspect of this model is the explicit inclusion of environment. Social and physical context is an important component in the therapeutic process. The built environment is a large part of practice and contributes to outcomes in healthcare. The idea that the physical environment is important in occupational therapy is not new (Rowles, 1991; Rowles, 2000; Rowles, 2008). Many theories including the model of Occupational Adaptation (Schkade & Schultz, 1992) and the Model of Human Occupation (Kielhofner, 2002), acknowledge the importance of the physical environment as an important part of effective therapy. Successful adaptation for occupational performance is defined by Schkade and Schultz as the client being satisfied and able to meet the demands of their environment. Yet, very little research on inpatient therapy and rehabilitation specifically addresses the impact of the physical environment on therapeutic outcomes (the client meeting the demands of their environment).

Hybrid spaces, a merging of home and hospital space, have been advocated by Gilmour (2006), a merging of home and hospital space, in order to facilitate more personal relationships and reinforce each client's sense of identity, comfort and feelings of being "in-place" during the process of healing. Indeed, a series of studies have revealed that the design of hospital environments that are home-like enables clients to maintain a sense of personal control, provides emotional support, and speeds recovery (Torrington, 2006; Williams & Irurita, 2005). Gesler's (1996) work with therapeutic landscapes also found that built environments that provide a sense of place contribute to healing and ultimately wellbeing. Therapeutic landscapes facilitate a positive transaction between the person and their environment. As Christiansen and Townsend (2004, p. 18) note, the "physical characteristics of landscape and objects invite participation in occupations."

A well-designed rehabilitation center can help clients connect their therapy goals to life goals, which motivates them to work harder at their therapy (McClusky, 2008). Typical therapy gyms do not help clients make the connection between their rehabilitation goals, the exercises they do while in therapy, and their life experience at home (McClusky, 2008). Even more important, the rehabilitation environment needs to be able to motivate clients to engage and participate: if it does not, clients are more likely to merely sit and isolate themselves (Mackey, Ada, Heard & Adams, 1996). Finally, if a hospital environment is perceived to provide limited choice and opportunity, it may lead to decreased occupational participation, while a supportive hospital environment is open to exploration, driven by the client's needs and goals and accepting of the individual (Rebeiro, 2000). If the hospital environment provides space to practice cooking, cleaning, doing the wash and/or shopping, the client is able to practice needed skills and build confidence before their discharge back to the community. A therapeutic environment, that is a good fit for the client, can facilitate progress toward specific goals as it provides a context for performance.

In inpatient rehabilitation, the therapy gym is a common location for occupational therapy. Typical therapy gyms have been described as institutional, with bright lights and lack of personal touches (Devlin 2007). Such gyms often do not represent a client's living environment and may limit the practice of direct occupations. Therapy gyms evolved from the Greek concept of a gymnasium as "a large room designed for various indoor sports, and usually equipped with gymnastic apparatus" (Webster, 2008). Historically, reduction of impairment approaches used a medical model based on an assumption that when impairment was lessened it would *de facto* improve function; a

view aligning with a focus on exercise in a therapy gym (Law, Baum & Baptiste, 2002). Hence, the treatment focus was on physical performance components such as increasing muscle power and energy and not directly teaching skills needed to return home or to work

Occupation Based Practice

From the field of occupational science, it has been posited that clients can be dissatisfied with traditional therapy that is not grounded in meaningful occupations (Molineaux, 2004). In contrast, Clark (1993) postulated that when occupations used in therapy represent the client's desired roles they are therapeutic. Lang, Nelson and Bush (1992) found that clients perform greater repetitions when participating in a meaningful occupation as compared to engaging in rote exercise.

The Occupational Therapy Practice Framework (OTPF) (AOTA, 2008) was developed to guide therapists to use occupations as the center of their practice**.** The Occupational Therapy Practice Framework is "a summary of interrelated constructs that defines and guides occupational therapy practice (AOTA, 2008, pg. 625). The concepts presented in the OTPF guide occupational therapists to promote health and participation through the use of occupation. Theoretically, occupation-based practice as proposed by the OTPF provides the occupational therapist with specific tools to move a client toward optimal occupational performance. There are three types of occupation-based interventions in the OTPF (AOTA, 2008), preparatory methods, purposeful activity, and occupation-based practice. *Preparatory methods* are used to prepare the client for purposeful and occupation-based activities. If a client has poor muscle strength and postural stability then the therapist may work on sitting at the edge of bed in preparation

for dressing. *Purposeful activity* as defined by the OTPF is when a client engages in specifically selected activities that allow him or her to develop skills that enhance occupational engagement. A purposeful activity in the therapy gym has the client using a reacher or dressing stick to practice picking out clothing items from the closet or donning socks and shoes. Finally, for *occupation-based practice*, clients engage in desired occupations. For example, the therapist encourages the client to dress and groom themselves, in their room, in an appropriate timeframe (morning).

Occupation has been the core of occupational therapy since its inception in 1917. Fisher (1998) recommends that occupation and activity should only be used when it is meaningful and purposeful to the individual and their goals and occupation-based practice uses occupation in practice. Pierce (2003) suggests that occupation is the *essence* of practice as using it in therapy promotes positive change in the performance of the occupations (p. 240). She also espouses that occupation-based practice needs to incorporate occupations that are valued and driven by the client and not the therapist. Her occupation-based process was described as free flowing with no set protocols and includes as many experiences as possible in the natural context or environment so it does not feel contrived to the client. Baum and Baptiste (2002) write that occupation-based practice creates the need for occupation to be at the core of the treatment process and participation is an outcome. When evaluating occupation-based practice in a hospital-based facility, Estes and Pierce (2011) found that occupation-based practice was an effective intervention because it allowed the therapy to be individualized but was difficult to implement due to time constraints and productivity demands.

The question arises, how do physical spaces in inpatient rehabilitation environments influence occupational interventions and the therapeutic process? This study was designed to explore the perceptions of occupational therapists regarding effective inpatient rehabilitation settings and the degree to which such environments influence occupational interventions and occupational therapy practice in an inpatient setting. After analyzing the data from the study, a conceptual matrix was developed to clearly connect the therapeutic environment with the therapeutic intervention, utilizing the OTPF, and the PEO model. The goal of the matrix is to clearly draw attention to potential interactions between types of environments and therapeutic interventions used in an inpatient rehabilitation setting.

Methods

Participants

Occupational therapists participating in this study were recruited from a 108 bed, Midwestern, freestanding rehabilitation hospital with inpatient, home health and outpatient services. Fifty-one occupational therapists working with adults in the hospital were invited to participate. Twenty-one (41%) were motivated to explore this topic and chose to participate in this study over the lunch hour, although other therapists could not participate because of treating clients or attending client related meetings during this time frame. Participants' experience ranged from 11 months to 33 years with an average of 8.8 years. Their ages spanned 24 to 55 years old with the mean of 28 years. Consistent with the occupational therapist population as a whole at this facility, all of the participants were female (there is only one male occupational therapist at the facility) and all were Caucasian.

Procedure

A qualitative descriptive methodology was utilized. Qualitative descriptive studies are able to offer a comprehensive summary of events, which is particularly useful in addressing questions of special relevance to practitioners (Sandalowski, 2000). Such studies allow the researcher to address questions such as: "What are the concerns of people about an event?" "What reasons do people have for using or not using a service or procedure?" Data collection involved minimally to moderately structured, open-ended questions to generate descriptive summaries of the participants' views and experiences. Such summaries result in working concepts and hypotheses for future grounded theory development or phenomenological study (Sandalowski, 2000). In addition, a funnel strategy of data collection and analysis took place. This entailed data collection from a study population, analysis of data, and follow up data collection with a smaller subset of the population, chosen on the basis of insights from the initial analysis, to increase the depth and richness of the data and insights (Bruce, 2007). Three initial focus groups (n=21) were conducted over four months. A follow up focus group (n=3) with a subset of key informants was completed eight weeks later.

Each 60-minute focus group was held during the participants' lunch period. Each group was recruited from the unit of the hospital where they worked. As a result, the therapists were among close peers who worked in a shared physical environment. This contributed to an environment that fostered and supported the participants' discussion of the topics. Each of the initial groups consisted of 5-8 participants. Focus group I consisted of therapists from the stroke program, focus group II included therapists from the brain injury, pulmonary and outpatient units. Focus group III consisted of therapists from the

spinal cord and general rehabilitation and outpatient units. Focus group discussions were audiotape recorded and transcribed verbatim for preliminary analyses. Findings from each completed focus group were used to inform the questions asked of participants in the subsequent focus group.

In the initial three focus groups, open-ended questions were posed on the therapists' perceptions of therapeutic environment, the state of their current practice, and the manner in which they felt the environment influenced their interventions. The follow up key informant group included three therapists who had participated in the initial focus groups. These occupational therapists were chosen as they were considered to be especially perceptive and articulate senior rehabilitation experts. Prior to this group meeting, each of the three therapists independently read a summary of the identified themes generated in the first focus groups.

The focus groups and key informant meeting were conducted by the primary investigator. Approval to conduct the study was granted by the rehabilitation hospital's institutional review board. Written informed consent was obtained before data was collected.

Analysis

Transcriptions and data interpretation were undertaken after each focus group. Following standard practice, audiotapes of the focus groups were transcribed by the principle investigator and read and reread for coding and categorization (Glaser & Strauss, 1967). Inductive thematic content analysis procedures were employed (Gubrium, 1993; Kaufman, 1986; Rubinstein, 1988, 2001; Shawler, Rowles & High, 2001). Hand coding of transcripts facilitated nuanced understanding of meanings in the narrative text

(Schoenberg & Rowles, 2002). Coding and interpretation was an ongoing iterative process. Each transcript was read several times and line-by-line color coded by specific emergent content categories. Such *open coding* is defined as marking the segments of data with symbols, descriptive words, or category names. Categories were derived inductively—that is, obtained gradually from the data. All the data relevant to each category were identified and examined using the method of constant comparison, in which each item is checked or compared with the rest of the data to establish analytical categories (*axial coding*). Codes (words) and categories (ideas) were incorporated into separate topical files and then aggregated into more general emergent themes through a process of *selective coding*. This process enabled each subsequent focus group to be informed by and achieve increased focus from what had been learned previously. As this iterative process continued a deeper level of understanding developed (Dreyfus, 1995).

Rigor and credibility

Several steps were taken to ensure that the findings were faithful to the participants' descriptions. All of the focus group sessions were conducted to provide continuity across interviews and (reduce bias that might be attributed to differences among focus group moderators). Reflective journal entries were made throughout the study (Miller & Crabtree, 1999). Emergent themes derived from careful reading and re-reading of the transcripts were enhanced by two methods: Follow up with key informants and independent review of the transcripts by two experienced qualitative researchers (both were licensed occupational therapists, with no relationship to the project). Finally, the data were triangulated with the literature in order to assess compatibility with extant research.

Findings

Three primary themes emerged from the focus group data analyses.

Theme 1- Therapeutic environmental spectrum

Three different types of environments were identified by the focus groups. First was the *gym* environment, which included exercise equipment, and was used for cognitive tasks, fine motor activities and simple occupational task such as folding laundry or organizing medications. The second type of environment was a *combination* area, which was based in the gym but included some items such as a stove and refrigerator. The third environment was a more natural, *simulated home-like* environment, a practice apartment located in the study hospital. While there are more institutional components in a simulated home-like setting, such as fluorescent lighting and institutional tile floors there are also some home-like items, like a bed, washer and dryer, vacuum and full kitchen. The practice apartment correlates with what one might find at home. Each unit in the hospital has a therapy gym and a combination area but the facility as a whole has only one simulated homelike practice apartment, which is more conveniently located for two of the six units.

The therapists realized that no single environment would meet their needs and none were inherently superior to another; rather the notion of an environmental spectrum emerged. This range of settings would allow the therapist and client to conduct optimal, client-centered practice within a maximally supportive space. Flexibility in the environment would allow for the adaptation and transformation of the environment for each client in relation to their stage of recovery, their individual goals and the type of environment to which they are returning home. One therapist commented: "I think we

still need mats [in the gym] because you know when you're working on scapular exercises or mobility or weight bearing."

Within this environmental spectrum all of the occupational therapists answered that they ultimately would want to practice in a simulated home-like environment, one that was most similar to their client's home with a few items from a therapy gym. In a flexible, home-like environment, the client's specific home environment could be simulated through the client's home evaluation. Then, for example, the toilet could be placed right next to the tub and there might be little room to move in the bedroom, allowing the client to master the skills needed to perform tasks in their home in the community. As one therapist said:

> *…Sometimes they don't understand how hard it is, they think that it's going to be fine, or they will be able to get into their shower [at home] but then they can't step up the step on the shower door so they don't realize that is it going to be hard, so I think that it is better to have realistic.*

Another therapist commented about the need for a combination room: "…It would be great if you had a gym and practice apartment together."

Theme 2- Intersection of environment and intervention strategies

The therapists felt that a welcoming therapy environment is critical in empowering the client to engage in rehabilitation. They came to the conclusion that if the rehabilitative environment was filled with familiar occupational items it would entice the client to participate in their own care, improve motivation, and decrease their passivity, thus leading to client-centered care. The therapists mentioned that the environment would

potentially influence not only the behaviors of the client but also the intervention preferences of the therapist.

As the therapists reflected on how they made intervention decisions, they shared that the equipment in their physical environments dictated the tasks they completed with their clients and sometimes interfered with their ability to offer opportunities to participate in occupations. The therapists reported that before each session they would visually scan the therapy environment, process each client's goals and see if there was a match between the equipment available and goal. One therapist described how convenience influenced her clinical reasoning: she noted that she "…matched need to what I have at my finger tips that is going to be efficient for me to use."

Ironically, the therapists spent extended time discussing how they would set up a home-like environment and how important the environment was in therapy, but had difficulty identifying what stopped them from using the current simulated home-like practice apartment, located in the basement of their facility. Therapists were asked about their use of the home-like practice apartment since one was available for them to use. Time and location were identified as the biggest hindrance to using this home-like practice apartment. In this facility, the practice apartment is located a floor below the inpatient units. Therapists found it easier to use the more conveniently placed therapy gym located on each of the units. They reported several factors interfering with their use of the practice apartment; thirty-minute intervention sessions, time to walk there, pressure from insurance companies to demonstrate physical improvement in impairments and pressure to maximize reimbursement. A therapist commented: "It doesn't seem like it

would be that far but by the time you get the key, go on the elevator, get them down, unlock, I know it just seems like it's a lot."

Further questions were asked of the therapists to identify if they would extend their therapy session to accommodate for the time issue. Therapists commented;

> *I think it is feasible but I don't know [pause] it's not convenient [going to the practice apartment]. Cuz with speed [need to be fast] you always go back to things you're comfortable with or upper extremity exercises, endurance groups because it's easy and quick and it's helpful.*

The therapists realized that practicing in the therapy gym limited their potential to serve the occupational needs of the client. As one commented: "It makes us much more component based …because the equipment is component-based."

Theme 3- Professional Identity and Environment

The therapists in all the focus groups believed that having a more simulated home-like environment, including equipment that supported the practice of occupations, would facilitate improved expression of the particular expertise and skills that the occupational therapist brings to the client, their family and the rehabilitation team. During the key informant discussion group, the therapists shared the view that using a component based approach supported by the therapeutic environment, blurs the role of the occupational therapist because occupational and physical therapy look similar to clients and families. As one therapist commented: "I think that we use the same equipment; we do look like we are the same." Still others felt if we use occupations as our interventions,

it would make a difference. “If we start pushing in more of the occupational environment or the engagement in occupations during the therapy I think it would set us apart.”

The occupational therapists reported that they worked on different skills than the physical therapists but since much of this occupation-based therapy was done behind closed curtains/doors in a client’s room, other team members and families did not develop an understanding of what occupational therapy had to offer. They believed that if more people saw what they did routinely with the client there would be greater appreciation of the benefits of occupational therapy. All of the therapists interviewed felt it was very important for the client and their family to understand what occupational therapy has to offer and how it prepared the client for their return home. One therapist noted that: “It gives us more of a role, you know, where people actually identify what we all do…if they saw us using more [occupation-based] equipment they might get a feel of more respect for what we do.”

Some therapists in all the groups were concerned about insurance reimbursement and that, if roles are not clearly differentiated, referrals could inappropriately be made to physical therapy. As one stated: ”But if people aren’t aware of what we do as OTs then we are just shuffled to the back corner or PT can pick that up and unfortunately it happens more and more every day even in our own institution.”

Application to Practice

After completion of the analysis of the focus groups, an attempt to clearly describe the relationship of environment and intervention in an inpatient rehabilitation facility was undertaken. A conceptual matrix that explicitly connects the OTPF and PEO may allow for useful clinical use. Specifically, findings from the focus groups led to the

development of the concept of an *environmental spectrum* and confirmed the complexity of the environment/intervention relationship. It is not unusual for inpatient rehabilitation units to be like a gym. While the therapists acknowledged the need for the gym setting for certain clients and for certain goals, it was clear that a more flexible environment that provided for a spectrum of care would allow for better, ultimately more occupation-based client centered practice. As the focus group data revealed, therapists believe the environment influences not only how the client understands their therapy but also how the clinician makes clinical decisions. The physical environment was a powerful component of the therapeutic process.

Therapists' use of occupation-based interventions is designed to facilitate engagement in client-directed occupations that achieve identified therapeutic goals. As identified by the occupational therapists, the environment in which they provide therapy (therapy gym, combination room or home-like practice apartment) can influence the interventions available and chosen. This disconnect between theory and practice is not a new concern. Sass and Nelson (1998) recognized the productivity pressures that occupational therapists often face in a rehabilitation setting, and suggested developing a format to illustrate the actual application of theory into practice. Skubik-Peplaski, Paris, Boyle and Culpert (2009) have identified that therapists struggle to apply the OTPF in practice especially in terms of offering occupation-based approaches.

The matrix in Table 3.1 attempts to connect the OTPF and PEO in a clinically useful way, while providing an original perspective on occupational therapy practice as seen in different inpatient environments. By merging the frameworks three types of occupation based interventions (*preparatory*, *purposeful*, and *occupation-based*) with

common inpatient environmental options (*gym, combination*, and *simulated home-like*), the matrix provides an illustration of how person, environment and occupation actually intersect in a clinical setting.

The concepts have been merged to create the *Physical Environment-Occupational Intervention Matrix (PEOIM).* This matrix fits in the occupational performance area of the Person Environment Occupation model representing the point of intersection of these three concepts. The matrix provides a way to connect an environmental spectrum more concretely to the suggested OTPF types of interventions.

The Physical Environment-Occupational Intervention Matrix

The matrix organizes a spectrum of inpatient environments and OTPF suggested practice interventions that can be utilized after the client and therapist have worked together to establish meaningful goals. Through the intersection of environment and intervention, the client and therapist form a goal, then start intervention with the therapist constantly assessing the most effective environment and intervention. This process allows for the therapist and client to move from one environment to another as they transition among the three types of occupational therapy interventions as appropriate for each client. The variety of environment and type of practice can vary by time of a therapy session (beginning to end), the time of intervention (stage of diagnosis), or the stage of therapy (inpatient to outpatient). The matrix is flexible enough to include all diagnoses, all stages of disease and any stage of rehabilitation. The point is to always keep in mind that the environment can have a strong influence on the types of interventions used.

The purpose of the matrix is to concretely draw attention to and incorporate the environment in the therapeutic process. At this point the matrix is purely descriptive as

research has not been conducted to explore the different connections illustrated. Theoretically, the matrix could be used by a therapist as a tool to assess their service provision and to help coordinate the client's goals and abilities with the therapy intervention plan. There are a multitude of ways the therapist/client dyad may connect environment and intervention. This may look quite different by diagnosis or stage of recovery but still provides a conceptual framework for therapeutic decision-making that allows for optimal client-centered practice.

Case Study Example

The matrix can be illustrated through the case of Joe, a 65 year-old male who has had a right hemisphere stroke with left hemiparesis. Upon entering a rehabilitation hospital, Joe sets an occupational therapy goal of improved upper body dressing. He begins therapy in the gym sitting on the edge of a therapy mat and reaches for objects in all movement planes. Due to his physical impairments, Joe's occupational therapist started his intervention with preparatory methods. These preparatory methods are the precursor for the client to be able to dress himself and often occur in the therapy gym. In this process there is the possibility that the preparatory activities will take place in a combination type of environment, or even a simulated home-like environment, but most likely they will occur sitting on a mat in the gym. The therapy gym is primarily associated with preparatory methods due to the presence of equipment (weights, rickshaw, mat tables, and upper extremity bicycle, etc.) for physical rehabilitation. This environment is quite supportive for the use of preparatory methods and may in fact be one of the safest environments for these interventions (see Table 3.1, Scenario A).

A second component of Joe's therapy is working on purposeful activities. This may take place in any of the environments, but it can be conceptualized that this stage of therapy may be most effective in a gym-like setting with home-like objects (combination area). For example, Joe may be in the combination area using a reacher to access a shirt hanging from a coat rack (see Table 3.1, Scenario B). Purposeful activities may occur in all three environments as the client simulates the practice of their desired occupations making it the most flexible of the interventions in terms of environmental needs.

Along with the preparatory and purposeful techniques, using an occupation-based intervention, Joe may also retrieve clothes from his own closet and dress in his hospital room. Occupation-based interventions may be best supported in a more natural setting (see Table 3.1, Scenario C). As demonstrated through the matrix, the therapist has the choice of three types of environments and three types of interventions. It is crucial to allow for flexibility in treatment to provide the best client-centered intervention versus relying on habit or convenience as the driving force behind therapist decision making. At this point the matrix illustrates the options available to therapist in inpatient rehabilitation. Future research is needed to identify optimal use of each type of environment and each level of intervention.

Discussion

The connection of environment and intervention is complex and multifaceted. The issue of professional identity is separate from the idea of health outcomes but presents a valid concern related to environment and intervention in practice. In the focus groups the occupational therapists expressed concern that their roles were blurred and ill defined when they provided therapy in the gym. They realized that by providing preparatory

methods in the gym the client might recognizes them as a rehabilitation professional, but not necessarily as an occupational therapist. The occupational therapists also felt that, if they provided occupation-based intervention in a more natural environment, the client, family and rehabilitation team developed a much clearer understanding of their role and value. Said another way, the therapist that provides stretching on a mat in the gym could be from a variety of health professionals, but the therapist facilitating a client's ability to play guitar in the garden would clearly be the occupational therapist.

The focus groups revealed that, as far as these therapists were concerned, the rehabilitation environment had an influence on aspects of their practice. Environments that supported occupational performance facilitated client participation and goal attainment by allowing the client to practice the homelike skill. The environment has the ability to create a needed context for occupation and occupational therapy (Christiansen & Townsend, 2004). The data collected resulted in the creation of a matrix that addresses the complexity faced by therapists in providing appropriate, occupation-based and client-centered care. By acknowledging the importance of the therapy environment and considering the intersection of occupational interventions and environment, therapists may move beyond habit and convenience to offer different options for inpatient rehabilitation occupational therapy. The end result is enhancing the professional identity of occupational therapists in the eyes of the client and the rehabilitation team as well as providing optimal client centered care (Baum & Baptiste, 2002). It is unsurprising that the more a therapist can provide the environment an individual needs for optimal occupational therapy, the better the client-centered practice and more likely that a positive rehabilitation outcome will result.

While it is widely acknowledged that environment is important in occupational therapy, little research has been conducted to provide empirical insight into the link between the specific features of the environmental context and the effectiveness of the client/therapist interaction. Such insight provides useful direction to therapists as they seek to increase their effectiveness in client health and quality of life outcomes. This was a first step toward exploring and elucidating the relationship with the future goal of providing concrete, best practice results that can be translated to intervention quickly and clearly. Rehabilitation therapy gyms may not be as supportive as needed to foster the use of occupation-based interventions if used exclusively. On the other hand, more natural environments may not be necessarily the best settings for the preparatory aspects of occupational therapy intervention. If therapists view the environment as a spectrum of choices that coincides with the OTPF interventions, they may be able to better match the occupation being used to the most effective space available to increase the client's participation and ultimately contribute to the enhancement of occupation-based practice. The main point is that the role of the environment should not be relegated by the therapist to the level of convenience, time constraints or habit. It is an important factor that should be carefully assessed with each and every client. In the future, research findings may provide the support needed for inpatient rehabilitation facilities to more clearly focus on the therapeutic environment they offer and to influence the choices of environments available to clinicians.

Conclusion

Any study has limitations. This one involved participants from one rehabilitation facility, a principal investigator who works on a daily basis with the participants and

participants who were among their peers in the focus groups. This could bias the findings by shaping or constraining the comments of the participants. On the other hand, familiarity with the participants, and with their practice setting, may have generated a level of comfort that facilitated an open sharing of ideas and perhaps a more in-depth understanding of the issues. The specific information derived, led to the development of a conceptual matrix for guiding the occupational therapists' understanding and therapeutic use of environment over the course of a therapy trajectory. The Physical Environment-Occupational Intervention Matrix provides the scaffolding for empirically addressing an array of significant questions for future research. What is the optimal environment for the performance of each type of occupational therapy intervention: preparatory, purposeful and occupation-based? How does the environment influence clinician decision-making and practice? What is the best method to measure the influence of environment and treatment decision making on client outcomes? The influence of environment on occupational performance and occupational therapy is important and needs to be more fully described and defined. If the occupational therapy profession continues to challenge therapists to use occupation in practice, there is a need for therapy environments to facilitate this focus.

Summary

Chapter three presents a qualitative study exploring the occupational therapists perceptions of the rehabilitation environment and the influence of these perceptions on practice and occupational interventions. Traditionally, inpatient occupational therapists have a choice of intervention environments, ranging from a gym-like to a more home-like setting. Choosing to provide interventions in these different environments can have an

impact on occupational performance. Based on this data, a conceptual matrix of the intersection of environmental setting and occupation-based interventions is presented to highlight the importance of these two aspects of therapy. Chapter four illustrates a study evaluating occupational therapy interventions and environments used with individuals following a stroke to enhance motor recovery.

Table 3.1 Physical Environment-Occupational Intervention Matrix

	GYM	COMBINATION	NATURALISTIC
PREPARATORY METHOD	Scenario A-therapy entails sitting edge of mat and reaching; exercises to improve static and dynamic balance; and stretching,		
PURPOSEFUL ACTIVITY		Scenario B-sessions include folding and hanging clothes on rack in gym; medication management activity and picking up objects off the floor with a reacher	
OCCUPATION-BASED			Scenario C- therapy focuses on gathering clothes from closet and dressing in room; grooming at sink; cooking and cleaning

The paper with which this chapter is based has been accepted for publication in Occupational Therapy in Health Care.

Chapter 4

Study Two: Behavioral, Neurophysiological and Descriptive Changes Following Occupation-Based Intervention

Synopsis

Study one (chapter 3) demonstrated that the rehabilitation environment influences occupational therapy practice with some environments having a stronger relationship to specific interventions (preparatory in the gym and occupation-based in the practice apartment). In addition, clients, families and other team members had a clearer understanding of the role of the occupational therapist, if occupation-based interventions were used in therapy. The next step of this dissertation was to understand the influence of different intervention approaches being used in different environments. In this second study, the clients were recovering from a stroke, and the effectiveness of occupational therapy intervention approaches provided in two different environments was compared. *The beginning of this chapter includes a study with 8 participants written through the results section. But due to inconclusive results with the 8 participants, one participant, Will, was chosen for a case study, which concludes this chapter. At the start of the study, Will was 55-years old and 15 months post his first and only stroke. He experienced a right middle cerebral artery infarct with left hemiplegia. He was right hand dominant and required cueing to use his left upper extremity as a gross active assist. He had limited isolated finger movement and passive and active range of motion was dominated by flexor synergy.*

Introduction

One person in the United States experiences a stroke every 40 seconds leading to 795,000 strokes per year, making stroke the leading cause of long-term disability (Lloyd-Jones, Adams & Carnethon, 2009). After a stroke two-thirds of the individuals present with impairments to their upper extremities and have difficulty performing preferred occupations (Rosamond, et al., 2008). The prevalence of these impairments creates a need for rehabilitation and occupational therapy services. Occupational therapists have several different ways to provide intervention to individuals recovering from a chronic stroke. They could use a traditional occupational therapy approach focusing on adaptation and upper extremity movement, an occupation-based approach focusing on using meaningful occupations exclusively for intervention and/or a modified constraint-induced approach using forced use of the affected extremity and task oriented skill acquisition. There has been very little research comparing each of these techniques to deem the most effective at facilitating upper extremity movement for individuals recovering from a stroke. The purpose of this study was to evaluate the effectiveness of three different occupational therapy interventions used with clients following a stroke.

A pilot study was conducted to evaluate the effects of traditional occupational therapy, occupation-based therapy and modified constraint-induced (m-CIT) therapy with individuals recovering from a chronic stroke. A second variable was also assessed regarding the rehabilitation environments these interventions were delivered in: lab/gym, therapy gym and a simulated home-like space. The traditional occupational therapy and modified constraint-induced therapy were provided in a lab/gym and therapy gym with the occupation-based interventions being provided in the most home-like space in the

rehabilitation hospital, the practice apartment. Using only occupations as interventions in a home-like space is an innovative approach to rehabilitation.

When working with clients recovering from a stroke, Trombly and Ma (2002) suggest that occupational therapists use client-centered activities, adapt tasks to enhance participation, practice in a familiar context/environment and provide feedback. Law, Baum and Baptiste (2002) describe a process of using occupation as the center of intervention and moving beyond a focus of upper extremity impairments. The American Occupational Therapy Association (2008) developed the occupational therapy practice framework (OTPF) to describe how occupational therapy can contribute to an individual's health and participation in life through engagement in occupation. The OTPF defines occupation-based intervention as a " type of occupational therapy intervention- a client-centered intervention in which the occupational therapy practitioner and client collaboratively select and design activities that have specific relevance or meaning to the client and support the client's interests, need, health and participation in daily life" (p. 672). Estes and Pierce (2010) found that occupation-based practice was an effective intervention and allowed the therapy to be individualized but was difficult to implement in a hospital-based facility.

Method

For the pilot study the participants followed a screening process, obtained informed consent and completed baseline assessments before being randomized to one of the following groups: 1) traditional occupational therapy, 2) mCIT, 3) occupation-based occupational therapy. Participants received 55 minutes of occupational therapy intervention 3 times per week for 5 weeks for a total of 15 sessions. Following the

intervention all participants had post testing. Pre and post testing were completed by an experienced occupational therapist, who was blinded to the group assignment. In addition, descriptive data was collected from a daily journal and conversations during the intervention sessions to gain an understanding of the therapeutic process for both the client and the therapist. The study was approved by both the hospital and the university institutional review boards. The participants received verbal and written explanations of the purpose and the procedures including potential hazards.

Procedures

The study enrolled 8 clients with a single stroke and age range from 49-78 years old. The occupational therapies were administered by 3 separate occupational therapists in order to minimize variability within groups. The occupational therapists assigned to each group were extensively trained and fully qualified to deliver the assigned therapies. The therapists used any of the three types of interventions from the OTPF (AOTA, 2008) preparatory methods, purposeful activities or occupation-based. The intervention sessions were conducted in; lab/gym with a mat, table, and exercise equipment, a therapy gym with mats, a table, occupation-based kits, exercise equipment, fine motor and perceptual tasks and a practice apartment, which included: a table, stove, sink, bed, work bench with tools, vacuum, mop, ironing board, washer and dryer with a portion of the session in a nearby therapy gym to access the Baltimore Therapeutic Exercise machine (BTE). Operational definitions for the three types of interventions include:

Traditional occupational therapy- (Jongbloed, Stacey & Brighton 1989) This approach emphasized the practice of occupational tasks usually activities of daily living, which make the participant more independent in meeting his or her basic needs. These

tasks included dressing, grooming, bathing, toileting, mobility and homemaking. The emphasis was on treating the symptom rather than the cause of the dysfunction. The traditional approach can be subdivided into two aspects: compensation and adaptation (Zoltan, Siev & Frieshtat, 1986).

Modified-constraint induced therapy- (Page, Levine, Szaflarski & Kissela, 2008) defines m-CIT as intervention less than the 6 hours each day of treatment used in constraint-induced therapy. The focus of this intervention is forcing the use of the affected extremity. The unaffected hand will have its use restrained (if necessary with a padded mitten). Task-oriented therapy sessions will focus on skill acquisition training through the use of activities to improve functional use of the impaired hand. Tasks were selected from a list of 70 that are highly repeatable and have some functional components such as pinching, grasping, reaching, release and rotating. Participants performed general activities related to daily living, coordination and balance. Tasks were progressively made more difficult with the extended motor ability kept just beyond the performance already achieved with visual feedback being provided by a graph during the therapies.

Occupation-based practice- (Law, Baum, & Baptiste, 2002) defines a client-centered approach as one that focuses on the occupations that the client finds meaningful and participation in these becomes the intervention process and outcome. The participant directs their intervention from the results of the Canadian Occupational Performance Measure (Canadian Association of Occupational Therapists, 1997) with roles being identified to resume after intervention and these roles are practiced as part of therapy.

Instruments

Behavioral assessments. We completed 3 assessments of motor performance: the FMA, the Stroke Impact Scale (SIS), and the Canadian Occupational Performance Measure (COPM) (Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 1994); Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 1998). The FMA is a quantitative measure of motor recovery, balance, sensation, coordination, and speed. Extensively applied in stroke clients, it is based on the principle that motor recovery occurs in a predictable progression (Gladstone, Danells, & Black, 2002). The FMA has high inter-rater reliability (=0.886~0.984) and test-retest reliability (=0.99) (Duncan, Propst, & Nelson, 1983). We administered the upper extremity motor control portion of the FMA, which has a 66-point total score possible.

The SIS is a subject self-report that uses a Likert scale to assess hand strength, function, mobility, activities of daily living/instrumental activities of daily living (ADLs/IADLs), memory and thinking, communication, emotion, and participation. It also includes a percentile scale to assess the participant's perception of how much recovery has occurred. It has reliable psychometric attributes, including reliability (correlation coefficients ranging from 0.70- 0.92), and validity (correlation coefficients ranging from 0.82-0.84), (Carod-Artal, Coral, Trizotto, & Moreira, 2008; Duncan, Lai, Bode, Perera, & DeRosa, 2003; Duncan, et al., 1999). We administered all portions of the SIS.

The COPM is a subjective, quality-of-life measure that uses a 10-point scale upon which clients score their own occupational performance, as well as satisfaction with performance, in relation to up to 5 self-selected tasks (Law, 1998). In this way, the COPM reveals tasks that therapists may use to support clients' return to meaning-ful

roles. The COPM is completed in an interview format and is designed to create a client-centered intervention. The COPM, with a stroke population, had high test-retest for performance scores (=0.89, p< 0.001) and satisfaction scores (=0.88, p< 0.001), and discriminant validity has been established (Cup, Scholte, Thijssen & van Kuyk-Minis, 2003). When working with individuals living in a community, McColl, Peterson, Davies, Doubt & Law (2000) found that the COPM has moderate construct validity and high community utility. We administered all portions of the COPM.

Neurophysiological assessments. For this project, we used TMS to measure changes in resting motor threshold (rMT) and cortical motor map. TMS delivers noninvasive brain stimulation via a handheld coil that uses a rapidly changing magnetic field to activate pyramidal neurons. rMT is a measure of neuronal membrane excitability. In this study, we defined rMT as the minimum TMS intensity (measured to the nearest 1% of maximum stimulator output) required to elicit motor-evoked potentials (MEPs) of ≥50 μV in at least 5 out of 10 consecutive trials (Rossini & Caramia, 1988). Cortical motor mapping measures cortical representation of a given muscle (Liepert, Bauder, Miltner, Taub & Weiller, 2000; Liepert, Miltner, Bauder, Sommer, Dettmers, Taub,& Weiller, 1998). To measure cortical map change, we calculated change in the normalized map volume (nMV) and the center of gravity (COG). nMV is a simple measure of the spread of the motor representation over multiple scalp sites. The COG is an average of all active location vectors, each weighted by the MEP amplitude at that location (Wassermann, et al., 1992). If there are N locations, the COG is calculated by

$$\sum_{i=1}^{N} (x_i * nMEP_i) / nMV$$

for the *x* coordinate (COGx) and similarly for the *y* coordinate (COGy) (Liepert, et al., 1998).

To perform TMS assessments, we placed monitoring electrodes over the belly of the extensor digitorum communis (EDC) muscles bilaterally. We selected the EDC muscle because it is the primary effector of finger extension and has been extensively studied in multicenter longitudinal studies evaluating the effects of intervention in stroke motor recovery (Sawaki, et al., 2008). To ensure reproducibility of electrode placements at different time points, we created a plastic film template of the dorsal surface of the forearm for each subject. We continuously monitored relaxation of the target muscle by visual electromyographic (EMG) feedback and delivered TMS using a Magstim 200 stimulator fitted with a figure-eight coil (Magstim, Whitland, Dyfed, U.K.). With the coil at the frontoparietal region optimal to elicit reliable MEPs on the contralateral EDC muscle, we set TMS intensity at 110% of rMT and delivered stimulation at a rate of 0.2Hz to various sites on the scalp using a latitude/longitude-based coordinate system. In accordance with this system, subjects wore a tight-fitting, flexible cap (Electro Cap Intl., Eaton, Ohio) pre-marked with a 1cm coordinate grid referenced to the vertex (Cz) (Liepert, et al., 1998). We delivered 10 stimuli at each grid site until we encountered sites at which stimulation elicited no motor response. Such sites constituted the borders of the motor map. The EMG response to each TMS pulse was amplified and filtered (band-pass 10Hz to 1kHz) using an isolated bioelectric amplifier (World Precision Instruments, Sarasota, FL), digitized (3KHz sampling rate) for on-line display, and recorded for off-line analysis. We then calculated the average MEP amplitude of every series of 10 stimuli off-line.

Descriptive assessments. The treating therapist assessed and documented descriptive data about the subject's performance throughout intervention as it related to client's goals. To understand what was important and meaningful to the client minimally structured open-ended questions were used during the intervention sessions to explore the relevance of the client and his significant other's experiences. This process of data collection was consistent with the occupational therapy process (AOTA, 2008).

Results

Eight participants with chronic stroke consented and participated in the study. One participant withdrew as it was discovered that she was receiving occupational therapy services at the facility where she lived, which was an exclusion criteria. Seven participants completed the study. An analysis of variance was conducted between the three intervention groups but due to the small sample the results were not conclusive. Transcranial Magnetic Stimulation was not completed on all participants due to medical complications further limiting outcome data. All the participants made large gains in quality of life changes including their satisfaction and ability to perform meaningful roles after the study as identified by the COPM. Due to the limited comparable outcome data a case report of one participant in the study, Will, was chosen as the avenue to publish the results. Data comparing behavioral, neurophysiological and descriptive changes following occupation-based intervention has never been published. Therefore a participant that received TMS and was in the occupation-based group was chosen.

The case report follows as accepted for publication.

Case Study Introduction

Stroke occurs once every 40 seconds in the United States, resulting in 795,000 new strokes per year and making stroke the leading cause of long-term disability (Lloyd-Jones, et al., 2009). Two-thirds of stroke survivors experience upper extremity impairment (Rosamond, et al., 2008), which can lead to difficulty performing meaningful occupations (Trombly & Ma, 2002). Upper extremity motor function after stroke improves in response to activity-based movement therapy (Richards, Stewart, Woodbury, Senesac, & Cauraugh, 2008). This improvement has been linked to neuroplastic change (Cramer & Bastings, 2000; Johansson, 2011; Liepert, et al., 1998; Nudo, 2003). Occupation-based intervention is a form of activity-based therapy comprising client-directed occupations that match client-identified goals (American Occupational Therapy Association (AOTA), 2008). Principles of occupation-based intervention (Trombly & Ma, 2002) appear highly concordant with principles of interventions to drive neuroplastic change (Kleim & Jones, 2008; Nudo, 2003). Therefore, it is conceivable that occupation-based intervention would result in measurable neuroplastic change. However, no studies have directly measured neuroplastic change in relation to occupation-based intervention. Thus, the purpose of the present case study was to use transcranial magnetic stimulation (TMS) to investigate the nature and extent of neuroplastic change associated with occupation-based intervention and recovery of upper extremity motor function in one subject with chronic stroke. Researchers have made extensive use of TMS in measuring neuroplastic change associated with interventions to promote upper extremity motor recovery (Bastings, Greenberg, & Good, 2002; Liepert, et al., 1998; Classen, Wise, Hallett, & Cohen, 1998, Rossini, et al., 1998). By conducting the first investigation of

neuroplastic change associated with occupation-based intervention, we can establish further evidence on how occupation-based intervention affects mechanisms underlying functional recovery after stroke.

Methods

Research Design.

This single-subject case report reflects a pretest-posttest design. Informed consent was obtained per our institutions' Institutional Review Board mandates. Inclusion criteria included having had one stroke > 1 year prior to enrollment (i.e., chronic status). We structured exclusion criteria primarily to minimize risks associated with transcranial magnetic stimulation (TMS) and to control for potential confounding variables. Exclusion criteria included (a) history of head injury with loss of consciousness, seizures, severe alcohol or drug abuse, and/or psychiatric illness; (b) cognitive deficits severe enough to preclude informed consent; (c) ferromagnetic material near the brain; and/or (d) cardiac or neural pacemakers. To approximate the treatment frequency and duration typically mandated by outpatient rehabilitation reimbursement entities, we conducted 55-minute intervention sessions, 3 times per week for 5 weeks. An occupational therapist with graduate education in rehabilitation sciences and 26 years of clinical experience with neurological populations provided the intervention. This therapist had no involvement with administration of assessments.

Participant.

The subject, "Will," experienced a right middle cerebral artery infarct resulting in left hemiparesis. Will volunteered for our study in response to referral from his attending rehabilitation physician. Upon enrollment in our study, Will's age was 55 years. His first

and only stroke occurred 15 months prior to enrollment. Following his stroke, he received standard inpatient and outpatient occupational therapy. He completed his last round of outpatient therapy 4 months prior to enrollment. He had right-hand dominance before and after his stroke. With cueing, he used his affected upper extremity as a gross active assist. Visual inspection revealed limited range of motion in all joints, limited isolated finger movements, and flexor synergy. The subject also had a Modified Ashworth Scale score of 2. Based on his Fugl-Meyer Assessment Scale (FMA) score (see Table 4.2), we classified his hemiparesis as moderate.

Instruments.

Behavioral assessments. We completed 3 assessments of motor performance: the FMA, the Stroke Impact Scale (SIS), and the Canadian Occupational Performance Measure (COPM) (Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 1994); Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 1998). The FMA is a quantitative measure of motor recovery, balance, sensation, coordination, and speed. Extensively applied in stroke clients, it is based on the principle that motor recovery occurs in a predictable progression (Gladstone, Danells, & Black, 2002). The FMA has high inter-rater reliability (=0.886~0.984) and test-retest reliability (=0.99) (Duncan, Propst, & Nelson, 1983). We administered the upper extremity motor control portion of the FMA, which has a 66-point total score possible.

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Bauder, Miltner, Taub & Weiller, 2000;Liepert, et al., 1998; Wassermann, McShane, Hallett, & Cohen, 1992). To measure cortical map change, we calculated change in the normalized map volume (nMV) and the center of gravity (COG). nMV is a simple measure of the spread of the motor representation over multiple scalp sites. The COG is an average of all active location vectors, each weighted by the MEP amplitude at that location (Wassermann, et al., 1992). If there are N locations, the COG is calculated by

$$\sum_{i-1}^{N} (x_i * nMEP_i) / nMV$$

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(Liepert, et al., 1998). We delivered 10 stimuli at each grid site until we encountered sites at which stimulation elicited no motor response. Such sites constituted the borders of the motor map. The EMG response to each TMS pulse was amplified and filtered (band-pass 10Hz to 1kHz) using an isolated bioelectric amplifier (World Precision Instruments, Sarasota, FL), digitized (3KHz sampling rate) for on-line display, and recorded for off-line analysis. We then calculated the average MEP amplitude of every series of 10 stimuli off-line.

Descriptive assessments. The treating therapist assessed and documented descriptive data about the subject's performance throughout intervention as it related to Will's goals. She formatted this data into notes using the categories of "subjective," "objective," "assessment," and "plan." She also informally logged client and family comments regarding occupation during the intervention period. This process of data collection was consistent with the occupational therapy process (AOTA, 2008).

Intervention.

An occupational therapist who had no involvement with administering baseline and post-intervention assessments delivered the intervention. To maintain intervention fidelity, the therapist structured intervention primarily with reference to baseline COPM data and according to the client's changing occupational profile and performance throughout intervention. Also, the therapist used a restorative approach (AOTA, 2008)—i.e., to restore impaired abilities and skills, the intervention emphasized treatment and use of the affected upper extremity in a task repertoire that developed in keeping with return to desired roles (see Table 4.1). Intervention took place almost exclusively in a hospital-based practice apartment that simulated a home environment. Environmental features

included a table, stove, sink, bed, work bench with tools, vacuum, mop, ironing board, and washer and dryer. Some sessions took place in a nearby therapy gym containing the Baltimore Therapeutic Exercise Equipment (BTE) work simulator. This computerized device has various handle attachments used in simulation of activity demands associated with different jobs. The BTE identifies biomechanical variables of upper extremity movement and monitors progress throughout intervention (Bhambhani, Esmail, & Brintnell, 1994).

Client factors such as decreased range of motion and increased spasticity interfered with Will's participation in occupation. Thus, while sessions consisted primarily of occupation-based intervention, the therapist used preparatory methods (such as stretching or weight-bearing) and purposeful activity (such as turning a key to develop functional pinch for dressing tasks) as ancillary forms of intervention (see Table 4.1).

Data Collection.

To capture behavioral changes, an occupational therapist not involved with intervention administered the FMA, the SIS, and the COPM at baseline and upon completion of the intervention period. This therapist has formal training in administration of these assessments as well as 15 years of clinical experience working with patients with stroke. To capture neurophysiological changes, a biomedical engineer conducted TMS motor mapping procedures at baseline and upon intervention completion. This biomedical engineer routinely administers TMS as part of a multi-institutional stroke research program at the site of the present study. To capture descriptive changes, the occupational therapist who delivered intervention kept detailed documentation throughout the study regarding Will's response to intervention.

Data Analysis.

We used Statview software (SAS Institute Inc., Cary, N.C.), to analyze baseline and post-intervention data from the behavioral assessments (FMS, SIS, and COPM) as well as the TMS assessments (rMT, motor map volume, COGx, and COG y for both hemispheres). Comparisons were made between the baseline and post intervention descriptive data to identify changes in functional movement and occupation.

Results

Behavioral results.

Table 4.2 summarizes the results of the FMA and SIS data. The change in FMA score shows that improvement in upper extremity motor control occurred over the course of intervention. Improvement occurred in all SIS domains except "communication." The most notable increase in SIS scores occurred in the domains of "hand function" and "memory." Table 4.3 summarizes the results of COPM data. This data indicates Will perceived improvement in both occupational performance and satisfaction with performance. He reported a greater magnitude of change in his satisfaction than in his performance.

*Neurophysiological results***.** No notable difference existed between rMT at baseline (47% of maximum stimulator output) compared with rMT at post-intervention (54% of maximum stimulator output). We noted a considerable bilateral increase in cortical motor map volume post-intervention (Figure 4.1). More specifically, the contralesional motor map volume changed from 3.28 at baseline to 9.38 at post-intervention (measured normalized MEP x cm^2), while the ipsilesional motor map volume changed from 0 at baseline (indicating absence of MEPs) to .22 at post-

intervention. We observed no notable changes in contralesional COGx (3.66cm at baseline; 3.68cm at post-intervention). Contralesional COGy moved posteriorly (-0.16cm at baseline; -1.05cm at post-intervention).

Descriptive results.

Participant Report: Transforming vs. Surviving

Will's greatest desire was to return to playing his guitar. At the beginning of the study he expressed strong opinions that he was not interested in adapting his playing style for the left hand to strum and the right to chord. Therefore, no attempt to adapt was made and intervention focused on playing right handed. In this way therapy was practiced in context, during which time, Will expressed his sadness over the loss of his ability to play the guitar like he used to, "I am disappointed that I can't go right back to the way I played before." However, by the end of the 15th session he commented; "I am okay with where I am at because I think I am on my way to playing again."

Will's wife attended every intervention session and often shared her thoughts about his occupational performance at home. During the sessions, she made several comments reflecting the changes she was seeing in Will's behavior; "This is the first time I have seen him use both hands. His attitude is so much better, (during this study) it is more beneficial since he is working on things he wants."

Effects of Occupation-based Intervention

As his competency increased, Will's ability to perform his roles at home increased. With this new sense of confidence he began to look for challenges. His wife recognized the difference in this study's client-centered approach as well as the environment change to a home-like practice apartment as compared to his previous

experiences with therapy and stated: “It’s not just stretching; you’re working on goals and it’s really good. He is excited; he goes in every night and ties the bag (trash).”

After the study she wrote a letter to the primary investigator sharing the following: “It works; the patient will refine the small everyday life things. The things we all take for granted…We believe your study on everyday things should be a part of every stroke patients’ recovery program.” Toward the end of the study, Will volunteered to play a song for his doctor and reported that he told a friend that he was starting to play his guitar again.

In the first two sessions, Will reported what exercises he was doing at home and asked for modifications. He preferred to use a pulley system with Theraband over a door to facilitate increased stretching and range of motion in the affected extremity. He continued doing these exercises throughout the study and also added practice in valued occupations at home: taking out trash, washing dishes, doing laundry, dressing with fastener clothing, and playing guitar. An overall stretching protocol was also implemented to decrease the effects of his spasticity.

Clinician Report: Transforming to Occupation-based

The descriptions provided in the clinician’s report were taken from her journal of her experiences during the study. The therapist commented that most of her 26 years of experience as an occupational therapist was working in a traditional therapy gym, so working in a practice apartment and using only an occupation-based approach exclusively was new to her and presented several challenges. She was unsure how to address Will’s spasticity in a practice apartment environment and how to fill a 55-minute session with only occupational pursuits, especially when the client had little hand

function to start. After the first session she wrote; “Wow, I finished my first day of treatment and it was exhausting, I struggled every minute trying to come up with ideas that were occupation-based, as Will did not have any pinch and all his goals are pinch related.”

Over time, she realized that she could incorporate stretching as part of occupational performance; while spreading the towel out to fold, he could stretch by weight bearing into the table. Another concern she had was if she should have Will use repetitions with occupational performance. Her previous experience in a therapy gym included using repetitions during movement tasks to increase motor control and learning, but she was unsure how to apply these concepts to the performance of occupations. She commented at the end of the second session: “I was exhausted again, staying with the same task and only approaching it through occupation is very fatiguing. I am ‘on’ and having to think every second of the session.”

Another example of the therapist using different clinical reasoning was when she realized, through trial and error, that occupation-based equipment could be used to simulate engagement in a desired role. For example, Will used a mop handle in preparation for guitar playing. Slowly twirling the mop handle allowed Will to stretch and gain greater forearm supination with wrist extension and even sustain the supination while simulating chording. Preparatory methods and purposeful methods were effective as a precursor for occupation-based tasks. The therapist found many options in the practice apartment to be used for preparatory methods, purposeful activities and occupation-based tasks as reflected in Table 4.1.

Will’s sadness over his guitar playing abilities was often present during sessions.

She found that Will was not patient learning how to chord again and she wrote in her journal: “Can you work through someone’s disappointment and grief and have them stay patient to live and practice in failure while they build the motor skills to do what they really want?”

Fortunately, as Will’s abilities improved, his passion to return to playing guitar became more and more apparent and dominated the intervention sessions. All the tasks completed in the sessions shifted to support his hand function and playing. Many aspects of playing were discussed. It was only then that Will became open to adapting them; sitting position, arm and hand position, guitar neck width, guitar weight and style. Will seemed much more comfortable with discussing these variations as he did not feel they changed his style of guitar playing.

The therapist was very conscious of her energy level before and after each session. She commented that in the beginning of the study she was the leader and designed every activity. As each session progressed she noticed that Will became more active, in initiating activities and making requests for what he needed to be more successful. Will was able to engage longer in each activity and she commented: “In the beginning of the study I made the decisions of how we worked towards his goals, but by the end of the study I became passive and he guided me.”

Occupation-based Practice

Toward the end of the study, Will came in with ideas of what he wanted to do, what worked and what did not. He would base his requests on what he was practicing in at home. The therapist noticed a change in her abilities to provide occupation-based interventions. Initially challenged to only use occupations, the sessions became easier

when she realized how motivated Will was and she wrote:

> *I don't feel like I am doing a whole lot for the participant, I minimally stretch him but he knows how to do that now so is it just me cheering him on. Maybe its not what I do in therapy but that I am here believing in him. Before I thought I had to impart my knowledge and we had to follow all the component steps, maybe not. What kind of therapist am I from here on out?*

By posing this question to herself, she was able to be open and learn with Will, which was a new experience for her. She found herself reinventing herself as an occupational therapist.

> *I feel a different sense of satisfaction with this client, because it is just joy for him. This is a partnership, like I never felt before. I have given up working on his shoulder and it is okay, the participant wants that and I like working for him. It feels better and I am listening differently.*

As intervention progressed, Will reported several changes taking place. More specifically, he reported increased motivation, increased confidence, increased component factors of affected upper extremity function (including improved proprioceptive awareness), improved self-management of health routines (e.g., knowledge of effective stretching, pain management, and self-cuing supporting bilateral upper extremity use), increased role competence, and increased self-direction in occupational performance.

Discussion

The results of this case study indicate that a relatively brief period of occupation-based intervention in a hospital setting designed to simulate a home environment can considerably enhance affected upper extremity motor recovery, neuroplastic change, and occupational performance in one participant with chronic stroke. Will's FMA change in upper extremity motor control exceeded the threshold for clinically meaningful change, which research has established as 3 points (Lo, et al. 2010). Changes in SIS scores for the summary of all domains, as well as the hand function domain, meet or exceed the threshold (10 to 15 points change) for clinical relevance (Duncan, et al. 1999). Will's SIS measurement of perceived overall recovery shows a notable gain as well. Because a COPM change of 2 or more points reflects clinical relevance (Law, et al., 1998), Will's COPM change shows that he experienced clinically meaningful effects with regard to occupational performance and satisfaction. Likewise, the descriptive outcomes reflect that Will experienced positive change in both occupational profile and occupational performance, ultimately improving his health and wellbeing.

Neurophysiological evaluations also reflected marked improvement since baseline. As a result of intervention, Will exhibited not only expansion of the contralesional motor map but also the first-time emergence of ipsilesional MEPs. The initial emergence of MEPs on the ipsilesional brain after intervention, at which time Will was 18 months post-stroke, strongly indicates an association of ipsilesional neuroplastic change with intervention. That motor map expansion occurred in the absence of notable changes in rMT indicates that non-specific changes in corticomotor excitability are *not* likely to have confounded the interpretation of map area changes. The following points

may explain why corticomotor reorganization occurred bilaterally: (1) intervention entailed bimanual tasks, which may have led to neuroplastic change related to each upper extremity (rather than the affected upper extremity only); and/or (2) since stroke can unmask the 10% of the corticospinal tract that remains uncrossed, intervention could affect this normally latent tract—in which case the results of intervention would not be restricted to ipsilesional (i.e, unilateral) neuroplastic change.

In addition, the occupation-based intervention approach used in this study focused exclusively on Will's interests to increase his BADL and IADL's and evolved as his skill level changed over the 15 sessions. The interventions consisted of a blending of the OTPF occupation-based interventions and all components were required to ensure Will's success. This intervention range of preparatory methods, purposeful activities and occupation-based interventions provided rich contextual opportunities for Will and helped to ensure his motivation to participate. Because of this approach, in a supportive home-like environment, a transition occurred from the hierarchy of therapist/client, to a partnership between Will and the therapist.

Price and Miner (2007) proposed that by using graded occupational activities in a supportive environment, the client builds confidence in their ability to perform occupations. This occupation-based therapeutic process empowers the client to take on new challenges outside of therapy and live successfully and confidently. Will gradually developed confidence in his abilities and began to lead the intervention sessions with his passion to return to playing the guitar serving as the driving force. Will's frustration in his lack of ability no longer stopped him from engaging in meaningful tasks. Moreover, Christiansen (1999) proposes that by participating in meaningful roles one shapes their

identity, hereby contributing to a sense of self-competency. These concepts played out for Will in that as he was able to succeed in these roles he found purpose and a sense of meaning that promoted his wellbeing. Successful engagement in meaningful roles motivated him to rebuild his sense of self.

The therapist and Will's wife saw the value of occupation immediately and how it made intervention more meaningful and effective. In this study, the occupational therapist learned that it required different clinical reasoning skills to be occupation-based and client-centered. Clinical reasoning is the process that clinicians "plan, direct, perform, and reflect on client care" (Schell, 1998, pg. 90). Fleming (1994) postulates that in addition to procedural and interactive reasoning, conditional reasoning must also be used. This allows each therapy session to be individualized and grades each task completed so the client is successful. This case study fits with Estes and Pierce's (2011) call for studies that focus on clinical reasoning using occupation-based interventions and demonstrate a shift between approaches using creativity. This case report provides a description of an occupation-based approach including procedural, interactive and conditional reasoning within an OTPF infrastructure applied with an individual recovering from a stroke.

This case was challenging for the therapist in two aspects; 1) to provide occupation-based tasks when the client did not have the hand function to be able to participate in the meaningful roles he chose and 2) to change her traditional approach to intervention by only using occupations. Adapting her therapeutic approach took a significant amount of energy and time, which therapists in the field may not have in abundance. Occupational therapists and occupational therapy assistants recent to the

profession may be trained exclusively in providing occupation-based tasks but when they reach the rehabilitation clinic it may not be practical to used an exclusively occupation-based approach until such time that the client is able to participate in occupations. Using some combination of preparatory methods, purposeful activities and occupation-based interventions may be a viable option.

Limitations of the present study impact generalizability of our findings. First, evidence from a single case study cannot be generalized (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). However, single case studies have value in that they can provide preliminary evidence, as well as detailed descriptions, regarding specific interventions and outcomes. Second, it could be argued that the inclusion of preparatory methods and purposeful activity as ancillary techniques to occupation-based intervention may have confounded the results of this study. We believe that it is justifiable to regard these ancillary techniques as constituent parts of/necessary precursors to occupation-based intervention. This viewpoint necessitates ensuring that the recipient of intervention understands the essential connection between the preparatory method or purposeful activity and the occupation (Price & Miner, 2007). Notably, this approach helped facilitate the subject's engagement in the occupation of managing preparatory health-related habits and routines (i.e., self-stretching/spasticity reduction) for enhancing general occupational performance outside the study. To build on the present study, we recommend future, large-scale studies to compare behavioral, neurophysiological, and descriptive outcomes of various occupational therapy approaches for recovery from various levels of post-stroke motor deficit (i.e., mild, moderate, or severe). In addition, we recommend that such studies incorporate a longer follow-up period. We also

recommend ongoing critique of occupation-related terminology (such as "occupation-based") and its utility in therapy.

Conclusion.

- In one subject with chronic stroke, a restorative approach using occupation-based interventions with preparatory methods and purposeful activities, led to:
    - enhanced occupational performance,
    - resumed competence in desired roles,
    - improvement in affected upper extremity functional use, and
    - notable neuroplastic change.
- Our evidence demonstrates that TMS is a viable tool to measure results of occupation-based intervention and to build the occupational therapy evidence base. This case report serves as a guide for therapists to understand how occupation-based interventions provided in a home-like environment can be effective to improve occupational performance and upper extremity control for clients with chronic stroke.
- This case report also demonstrates the innovative use of TMS as a viable tool to measure occupational therapy interventions.
- Occupation-based interventions contributed to the client reclaiming his sense of self, while the therapist gained a greater appreciation of the power of occupation and a desire to create therapeutic partnerships with all her clients.

Summary

Chapter four described a study that evaluated the effects of occupational therapy interventions on upper extremity motor recovery, neuroplastic change, and occupational performance. In one subject with chronic stroke, occupation-based intervention delivered

in a hospital-based home-like environment led to neuroplastic change supporting increased functional use of the affected upper extremity and improved occupational performance. Chapter five presents a study that assessed the influence of the environment on occupational therapy interventions in an inpatient rehabilitation stroke program.

Table 4.1 Role Outcomes from Occupation-Based Interventions

Client goal	Role	Sample of approaches	Outcome
Meal preparation and cleanup	Husband	• Opening/closing and filling/emptying storage containers (such as Ziploc bags, jars, and bottles) • Removing food items from refrigerator • Putting away dishes after washing • Tearing aluminum foil/wax paper for placement on food containers. • Intermittently self-managing spastic response interfering with performance	Increased ability to support wife with meal preparation and cleanup
Taking out trash	Husband	• Opening/closing different trash bags • Removing trash bags from can with the affected hand • Carrying full bag a distance similar to that needed at home • Intermittently self-managing spastic response interfering with performance	Resumed taking the trash out at home.
Folding towels	Husband	• Folding/stacking towels with both hands • Folding clothes at dryer height • Hanging clothes on rack • Education of client and spouse in use of counter, table, and chairs in kitchen/living room for stretching.	Increased ability to fold laundry, with good carryover to home.
Playing guitar	Band member/ guitar player	• Strumming simple chords of E, G, and A; and strumming while singing. • Positioning (upper extremity; seating) and adapting task (selecting guitar with best width of bridge) • Intermittently self-managing spastic response interfering with performance; and self-increasing range of motion (supination) using a mop handle (available at home)	Played an entire song on final day of intervention.
Manipulate items related to occupations(i.e., manage fasteners/hold pieces and parts)	Community and family member	• squeezing out a wet sponge; • washing dishes with the affected extremity; • picking up soda bottle with left hand to drink; • opening a toolbox with a key; • holding nails with left hand and hammering with right; • pulling nails out of wood; • using an electric wood sander; and • self-managing spastic response interfering with performance.	Increased abilities in activities of daily living, instrumental activities of daily living, and leisure.

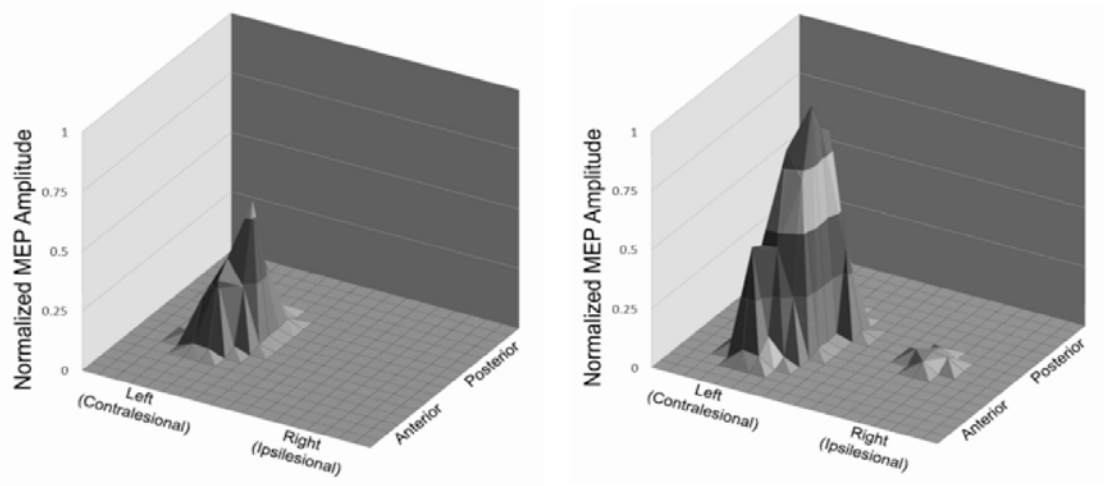
Table 4.2 Results of Fugl Meyer and Stroke Impact Scale

Assessment	Baseline	Post-intervention	Change
FMA (UE motor control)	40	53	+13
SIS (summary of domains)	53.3	68.4	+15.1
SIS (hand strength)	13	16	+3
SIS (ADLs/IADLs)	52	57	+5
SIS (mobility)	45	49	+4
SIS (hand function)	10	20	+10
SIS (memory)	26	36	+10
SIS (communication)	34	28	-6
SIS (emotion)	35	41	+6
SIS (participation)	52	57	+5

Table 4.3 Results of COPM

	Performance			**Satisfaction**		
Occupation	Baseline	Post-intervention	Change	Baseline	Post-intervention	Change
Managing fasteners	1	6	+5	1	10	+9
Opening containers	1	6	+5	1	10	+9
Tying trash bags, shoelaces	1	9	+8	1	10	+9
Folding towels	1	6	+5	1	10	+9
Playing guitar	1	7	+6	1	10	+9

Figure 4.1 Neurophysiological Change: TMS motor cortical mapping pre and post 15 sessions of occupation-based intervention



Motor responses at each scalp position are shade-coded by normalized MEP amplitude. Bilateral increase in cortical motor maps indicates that both ipsilesional and contralesional corticomotor reorganization played a fundamental role in recovery of function.

This case study (except qualitative portion) has been accepted for publication in the American Journal of Occupational Therapy. A small grant from the Rehabilitation Science department at the University of Kentucky was received to fund this study.

Chapter 5

Environmental Influences on Occupational Therapy Practice on an Inpatient Stroke Rehabilitation Program

Studies One and Two indicated that providing occupation-based interventions in a home-like therapy environment was an effective approach to improve upper extremity motor recovery and ultimately occupational performance in a client recovering from a stroke. The final step in this dissertation is to discern if the rehabilitation environment influences the interventions used by the occupational therapists on an inpatient stroke rehabilitation program.

Introduction

Rehabilitation hospitals serve to foster a client's independence in preparation to return home after an injury or insult. Having treatment space in rehabilitation environments that is home-like and supportive for each client can facilitate participation in occupations and assist in learning and practicing the skills needed to transition to home more successfully (Skubik-Peplaski, Rowles, & Hunter, 2012). Participation is the transaction between the environment, person and intervention, making it a critical component of occupational therapy intervention (Mallinson & Hammel, 2010). The American Occupational Therapy Association (2009) has identified that for therapists to improve participation in occupations, the environment and its contexts are critical factors. Likewise, the Canadian Model of Occupational Performance proposes that the environment can be used to increase client choice and control during rehabilitation therapy (2002). Questions remain, however, related to the relationship between the rehabilitation environment and intervention. How does the inpatient rehabilitation environment affect the interventions an

occupational therapist uses in practice? What if there were a variety of environments for the occupational therapists to use for therapy? If there were more home-like spaces in a rehabilitation environment, would it increase a client's comfort and in turn help them to improve their ability to take care of themselves? The purpose of this study was to investigate how the occupational therapist used the environment to provide interventions while working with clients recovering from a stroke in an inpatient hospital program. More specifically, the general aims of this study were to: 1) identify what interventions occupational therapists choose when they are treating in a therapy gym, gym/combination or practice apartment space, 2) determine if the intervention changes when the therapy environment becomes more home-like and, 3) explore how the equipment in the environment influences the decisions the occupational therapists make.

Background Literature

Murray (1938) originally proposed the concept of an "environmental press" describing how a person adapts positively or reacts negatively to their environment. The press represents the power the environment has over the adaptation process. Lawton and Simon (1968) expanded this concept to the aging population concluding that as a person realizes they are less capable and more vulnerable, the environment can exert more control over their actions. When an individual is comfortable within their environment they are more likely to adapt and participate in positive experiences (Lawton & Hanemow, 1973). When an individual experiences a stroke, no matter their age, they are less capable and more vulnerable, especially in an unfamiliar hospital environment. Yet, through rehabilitation, a client hopefully learns to adapt to their new impairments while performing at their maximal level in a hospital environment. Livneh (1987) found that if

an individual is unable to adapt and demonstrate competency in their activities of daily living, then an imbalance develops between the environment and person. She further postulated that rehabilitation interventions should attempt to either maximize the person-environment congruency or decrease the environment-person imbalance. The client's needs and the elements of the environment should be aligned to attain congruency that supports optimal occupational performance (Kahana, 1982).

Environments have an impact on an individual's ability to recover from traumatic insult or injury (Deegan, 1988; Sadler, Keller & Rostenberg, 2009). Edvardsson (2008) interviewed several clients living in a variety of medical settings and asked them about the impact of the environment on their well-being. The participants suggested that being in a safe, supportive environment helped them to feel like it was an extension of their home, improving interactions and decreasing confusion and anxiety. Neuman and Ruga (1995, p. 63) added that a supportive home-like environment has a positive impact not only on clients but on staff also; they suggested that "physical environments can positively affect therapeutic outcomes, staff performance and patient satisfaction." Rehabilitation environments need not only to have a comfortable environment, but also be able to motivate the clients to engage and participate; if it does not, clients are more likely to merely sit and isolate themselves creating further imbalance (Mackey, Ada, Heard & Adams, 1996).

Nursing has attempted to address the hospital environment issue by advocating for the creation of hybrid spaces. A merging of home and hospital space would facilitate more personal relationships and reinforce each client's sense of identity, comfort, and feelings of being "in-place" during the process of healing (Gilmour, 2006). A series of

recent studies has revealed that the design of hospital environments that are home-like enables clients to maintain a sense of personal control, provides emotional support and speeds recovery (Dijkstra, Pieterse & Pruyn, 2006; Torrington, 2006; van de Glind, Dulmen & Goossen, 2003; Williams & Irurita, 2005). Being able to complete tasks independently enhanced the individual's sense of control (Williams, Dawson & Kristjanson, 2008). If a rehabilitation environment offers spaces that are fully home-like, it may influence occupational therapy practice and it may allow the client to adapt and learn tasks needed to return home and to attain person-environment congruency.

Wolf, Baum and Connor (2009) have found that the occupational therapy profession needs to shift practice to meet the new needs of the stroke population. Based on their findings, the age of an individual with a stroke is decreasing; most individuals with a stroke are only minimally to moderately affected; and discharge destinations are being made based on level of client functioning while in the hospital. They recommend occupational therapists move past an impairment approach and focus on participation in basic and instrumental ADLs while in rehabilitation. Moreover, inpatient rehabilitation facilities are predominately reimbursed through the Centers for Medicare & Medicaid Services (CMS, 2012), which requires that clients staying in inpatient rehabilitation facilities (IRF) actively participate in therapy that progresses them toward their functional goals. These functional goals must relate to decreasing the client's burden of care and increasing their independence so upon discharge they may return to live, ideally, in the community. Consequently, therapy interventions and goals for clients in an IRF must be functionally driven and address the skills needed to go home. What type of rehabilitation

environment contributes to meeting these functionally based goals and increasing the person-environment congruency?

Occupational Therapy Environment

Occupation has been the core of occupational therapy since its inception in 1917. Over the last 100 years the profession has experienced several shifts in how occupation is incorporated in practice, including an art and crafts movement, a remediation of impairment approach, a focus on enhancing health and wellbeing, and the current emphasis on occupation as the focal point throughout the therapeutic process (Cole & Tufano, 2008; Gray, 1998; Friedland,1998). Currently the focus of occupational therapy is to provide interventions that improve occupational performance while engaging in occupations, which is a shift from addressing only underlying impairments (Baum & Baptiste, 2002). By participating in occupations, Fisher (1998) found that both occupational performance and body functions improve as an outcome. Employing an occupation-based approach to care allows the occupational therapist to support the client's person-environment congruency.

Devlin (2007) suggested that occupational therapy practice spaces should foster client participation, alleviate stress, support positive emotions and behaviors and be as home-like as possible in order to maximize the effectiveness of the interventions. The American Occupational Therapy Association (AOTA) has also expressed this view by proposing that occupational therapy interventions need to "support people where life is lived" (AOTA, 2009, p. 1). Kiernat (1982) proposed that the occupational therapy environment is a subliminal modality that has the greatest influence on individuals with illness or disability. She further wrote that if the environment was changed it could

improve client outcomes. Hubbard, Parsons, Neilson and Carey (2009) recommended that the rehabilitation therapy environment should be set up to reflect the standard home and/or community environment, in essence enriching the surroundings in preparation to go home. Thus, clients who received inpatient rehabilitation therapy in a home-like environment, such as Easy Street, a commercially available environment that simulates community settings (ie. Post office, grocery store, boat), demonstrated significantly higher levels of functional ability as compared to a control group (Hecox, Roach, DasVarma, Giraud, Davis & Neulen, 1994). When comparing commercially available simulated home-like settings to standard therapy settings in rehabilitation facilities, Richardson, Law, Wishart, and Guyatt (2000) found that there was no significant difference in client outcomes and the simulated settings may not be worth the cost. The authors suggested further investigation before purchasing the equipment.

The mounting evidence for occupation-based practice places the occupational therapist in a dilemma of how to provide the optimal intervention in current rehabilitation spaces. Most likely the occupational therapists working in a rehabilitation program provide therapy in a gym. Therapy gyms often are lit with fluorescent lights, are temperature controlled for the general population, have shiny tile floors, large open spaces, mat tables and equipment lining the walls and shelves. Such gyms often do not represent a client's living environment and may limit the practice of direct occupations. Therapy gyms evolved from the Greek concept of a gymnasium as "a large room designed for various indoor sports, and usually equipped with gymnastic apparatus" (Webster, 2008) and most gyms stay true to this exercise focus and ambiance. Historically, a reduction of an impairment approach used a medical model, relying on the

assumption that if an impairment was lessened it would improve function (Baum & Baptiste, 2002). The question remains: what is the optimal therapy environment to meet each client's goals?

Rebeiro (2000) suggested that if an occupational therapy environment is perceived to provide limited choice and opportunity, it may lead to a negative effect on adaptation and decreased occupational performance. In contrast, she defined a supportive environment as one that is open to exploration, driven by the client's needs and goals and accepting of the individual. Rebeiro (2001, p.80), in a subsequent publication, found that therapy environments need to affirm the client as a "person of worth" and provide "a place to belong, and a place to be supported," and argued that this is what enables a client to perform his or her meaningful occupations. Law (1991) challenged occupational therapists to change environments if they inhibit participation in meaningful occupations. Occupational therapists can help their clients reclaim their lives and well-being by fostering participation in meaningful occupations while in meaningful settings (Law, 2002; Rogers, 2007).

The therapy environment can be a positive support for occupation-based practice. McClusky (2008) proposed that a well-designed rehabilitation center can help clients connect their therapy goals to their life goals, which motivates them to work harder at their therapy. He further elaborated that for some clients, typical therapy gyms do not help them make the connection between their rehabilitation goals and the exercises they do while in therapy. Barker and Ziino (2009) suggested that therapists assess the client's goals during each treatment session and consider the environment for each intervention. Engagement in occupations promotes rehabilitation and ultimately health (Baum &

Baptiste, 2002). Occupation-based practice represents "simply good occupational therapy practice" as it is client-centered, allowing the client to have: choice, influence and power throughout the intervention process (AOTA, 2005, p. 1). If a therapy environment offers opportunities for participation in occupations, it supports and encourages occupation-based practice while aligning the rehabilitation environment with the client's function-based goals.

Occupational Therapy Interventions

Participating in occupations in natural environments contributes to health and well-being (Cox, 1995). It has been found that engagement in meaningful, goal-directed tasks can improve motor performance and be more beneficial with clients recovering from a stroke than rote exercise or non-meaningful tasks (Dolecheck & Schkade, 1999; Ferguson & Trombly, 1997; Hsieh, Nelson, Smith & Peterson, 1996; Lang, Nelson & Bush, 1992; Trombly & Wu, 1999). In further support of using occupations during interventions, Trombly (1995) proposed that "purposeful" tasks are hypothesized to organize behavior and meaningfulness to motivate performance" (p. 960). Gray (1998) postulated that occupational therapists provide opportunities for clients to practice and adapt in occupational context to improve impairments, but more importantly provide greater opportunity for skill transference to the home setting. To resume previous roles, Trombly (1995) espouses that a client must engage in all the components of that role within a natural setting.

The neuroplasticity literature also supports the use of meaningful functional tasks as part of rehabilitation. This recommendation is based on the corticomotor neural pathways being organized in relation to a specific task and not to a specific muscle

(Hubbard, Parson, Neilson, & Carey, 2009). Hence, rehabilitation should focus on task-specific training with repetition using goal directed meaningful activities instead of impairment-based approaches. Several studies have indicated that cortical reorganization is greater when repetition with complex meaningful tasks are used in therapy (Bayona, Bitensky, Salter & Teasell, 2005; Hubbard, Parson, Neilson & Carey, 2009; Muir, Jones & Signal, 2009). Meaningful occupation-based interventions were found to improve upper extremity motor outcomes for an individual recovering from chronic stroke (Skubik-Peplaski, Carrico, Nichols, Chelette & Sawaki, in press).

Despite evidence supporting occupation-based practice, Pierce (2003) found that therapists struggled with offering occupations during therapy. They found that it was easiest to provide occupations if they were treating clients in their own living environments and the most difficult when environments had impairment-based equipment, like a therapy gym. These therapists revealed that their training and old habits using impairment-based interventions were hard to stop and it was laborious to customize each session to offer appropriate occupations to clients. Skubik-Peplaski, Rowles and Hunter (2012) found that therapists believed it would be more beneficial if traditional rehabilitation environments offered therapy spaces that could be changed so that the environment could replicate the client's home with a few items from a traditional therapy gym. The therapists in this study felt that offering opportunities to practice skills in the accessible gym and/or universal design settings did not help the client generalize skills to their homes. The therapists recognized that most clients at this hospital lived in older homes with narrow doors and hallways, room-to-room floor plans, small bedrooms and

several steps. These therapists stated that they preferred to work in a flexible therapy space that replicated a realistic environment and not a traditional therapy gym.

Implementation of PEO

The Person, Environment, Occupation (PEO) model has been found to be effective to facilitate occupation-based practice (Law, Cooper, Strong, Steward, Rigby & Letts, 1996). PEO allows the researcher to study the complexities of the interactions of the person, environment and occupation, especially across time, with an overall goal of guiding practice. The PEO model was used in this study to investigate the influence of the environment on occupational therapy interventions. In the PEO model, three overlapping circles represent the 'Person', or client; the 'Environment' in which the client engages in occupation; and the 'Occupations' in which the client participates (see figure 5.1).

The PEO model was modified slightly for this study, in order to shift the focus of the model from clients to the study population of occupational therapists, and their provision of intervention in a rehabilitation environment. The revised model is called the TIE, which stands for 'Therapist', 'Intervention', and 'Environment'. 'Interventions' are the occupations and/or activities used during therapy, and 'Environment' represents what occured in the therapy space. Thus, TIE was created to describe the relationship between the therapist, the occupational therapy interventions, and the environment .

The TIE model, like the PEO model, consists of three overlapping circles that depict the relationships between each construct (see figure 5.1). The overlap of the 'Therapist' circle with the 'Environment' and 'Intervention' circles indicates how the therapist transacts with the environment and interventions signified in four overlaping

points labeled in figure 5.1. The first overlap point is where the therapist circle overlaps the interventions circle indicating how the therapist plans their interventions. In point two, the therapist circle overlaps the environment circle showing where the interventions will occur and how the therapist operates that the specific space. The environment circle overlaps the intervention circle in point three, representing the intersection between the therapy environments (gym, combination room and home-like space) and occupational therapy interventions (preparatory, purposeful and occupation-based). The last and central point is four, the area where all three circles overlap indicating the congruence of these three areas and the amount of occupational performance each client achieves. The TIE model focuses on the interactions of its three components and illustrates that when the environment supports the person and intervention then optimal occupational performance is possible (Law, Cooper, Strong, Stewart, Rigby & Letts, 1996). The TIE model promotes a client-centered approach to intervention while focusing attention on environmental influences.

In this study, the OTPF (AOTA, 2008) categories of interventions was used to organize the interventions chosen by the occupational therapists. The OTPF is an intervention process that describes how occupation can be used as the foundation of therapy and identifies three types of occupational therapy interventions:

- Preparatory methods- techniques to prepare an individual for occupational performance.
- Purposeful activities- tasks that facilitate skill development to improve participation in occupations.
- Occupation-based interventions- participation in meaningful occupations

Occupational therapists provide interventions to support "health and participation in life through engagement in occupation" (AOTA, 2008, p. 652).

Clinical Reasoning

Occupational therapists make choices daily about what intervention to use and in what environment. They rely on their clinical reasoning skills to progress a client from admission to discontinuation. Clinical reasoning is the process that clinicians "plan, direct, perform, and reflect on client care" (Schell, 1998, pg. 90). Mattingly and Fleming (1994) consider clinical reasoning to be thinking in different forms, including how the therapist views the client, the client's impairments and how the therapist prioritizes the client's risks that interfere with occupational performance. Clinical reasoning directs action during intervention with the therapists basing their decisions on the understanding of the client's motivation, the assessment of the therapy environment, the therapist's knowledge of the disease process, previous experience, therapeutic partnership, and the client's goals for each session and long term (Mattingly, 1991). AOTA (2008) posits that throughout the intervention the therapist continually practices clinical reasoning regarding the client's participation in desired occupations. In addition, Fleming (1994) comments that a large portion of clinical reasoning relies on tacit knowledge, an intuitive sense held by the occupational therapist. She further explains that occupational therapists often cannot describe why they do something during therapy; they just know it is the right action for a specific situation.

Overall, Fleming (1991) describes three different strategies to solve therapy issues and decide how the intervention session should flow: procedural, interactive and conditional. Procedural reasoning is when the therapist uses information about the

client's diagnosis to identify problems, set goals and plan treatment. Following this strategy exclusively could lead the therapist to only address physical limitations during therapy. Interactive reasoning occurs during interactions between the client and the therapist and is used when the therapist takes into consideration the client as a human being. Fleming revealed that this was not the main strategy for the therapists, but is utilized when the therapist attempts to individualize the therapy session. The author suggested that both of the strategies can be used together and " procedural reasoning guides treatment and interactive reasoning guides therapy" (pg. 1011). The last strategy that Fleming proposes is conditional reasoning. Conditional reasoning is when the therapist grades the therapeutic activity based on the client's successes and failures, their goals and potential. In essence, the therapist evaluates the client's current condition during intervention and adapts the task to gain optimal results.

All three strategies are required to treat each client holistically and reach optimal occupational performance. Mattingly and Fleming (1994) state "it was not reaching the final goal per se that measured the success of therapy, but the therapeutic experience along the way, where clients developed increasing confidence and commitment to take on challenges, even with their disabilities" (pg. 20). Assessing the occupational therapy interventions and the possible rehabilitation environments they occur in requires all three aspects of clinical reasoning. The flow of therapy requires the therapist to guide treatment, while adapting to conditions. Therefore, clinical reasoning is one of the main tools used when providing interventions to clients.

The Environmental Effects on Occupational Therapy Practice

Equipment in therapy gyms, such as mats and weights, is often used by therapists to improve impairments of body functions and structures. The gym does not typically contain equipment, furniture, or resources that readily contribute to occupation-based intervention plans. This begs the question: Is the type of therapy gym equipment influencing the decisions that occupational therapists make about their choice of interventions?

In a study with individuals recovering from a stroke during their inpatient rehabilitation, Smallfield and Karges (2009) found that out of 1,022 occupational therapy intervention sessions, 65% included pre-functional or preparatory activities focusing on the client's impairments and only 48% of the total sessions concentrated on activities of daily living or occupation-based activities attempting to enhance the client's activity and participation in occupations. Richards et al. (2005) studied clients recovering from a stroke and found that 37.5% of occupational therapy interventions focused on physical impairments and 31.9% addressed the performance of basic activities of daily living. Interestingly, they found that the clients who spent more time in therapy working on basic level activities (wheelchair management, sitting balance, and grooming and feeding) demonstrated greater dependence in upper extremity dressing; whereas clients that spent more time on higher-level tasks, such as home management, had higher levels of independence in upper extremity dressing. These authors speculated that since upper extremity training focused on compensatory techniques it encouraged the use of the unaffected extremity more, ultimately decreasing overall upper extremity control.

Vik, Lilja and Nygard (2007) found that clients felt pressure to perform only basic activities of daily living as directed by their therapists and not their valued instrumental activities of daily living. More specifically, the therapists tended to work on dressing and grooming although the clients wanted to return to skiing. When working with clients recovering from a stroke, Ma and Trombly (2002) suggested that occupational therapists should use activities that the client identified, adapt tasks to enhance participation, practice in a familiar context/environment, and provide feedback. Even though the results of their study indicated that familiar environments were effective for clients to relearn roles, in their literature review, the authors were unable to find any studies that manipulated the environment to enhance therapeutic interventions. Principles of occupation-based intervention (Trombly & Ma, 2002) appear highly concordant with principles of interventions to drive neuroplastic change (Kleim & Jones, 2008; Nudo, 2003).

These studies suggest that many occupational therapists are not addressing all aspects of the rehabilitation environment or occupation-based interventions, including normal forms of participation in routine daily living experiences that should be core of their interventions. Instead, the focus is more on regaining upper extremity control and using interventions that address impairments. Yet, the authors commented that very few studies were found describing the specific interventions used by occupational therapists in rehabilitation settings, especially in the United States (Latham et al. , 2006). Ma and Trombly (2002) found little research evaluating the influence occupational therapy interventions have in specific contexts or environments and the authors recommend studies be completed with the focus on the environment.

Problem Statement

Traditionally therapy gym environments on inpatient rehabilitation stroke programs focused on interventions that prepare an individual to perform occupations and address impairments. Yet, the profession of occupational therapy and the motor control literature espouses that therapy should focus on providing interventions that offer participation in occupations. Several factors seem to inhibit a therapist's ability to use all the OTPF intervention approaches and one may be the influence of the environment. Understanding how the environment influences the decisions that occupational therapists make may be crucial to the success of the client returning home and the profession of occupational therapy.

Purpose Statement

The purpose of this study is to identify how rehabilitation environments influence occupational therapy practice.

Research Questions

Given this review, the research questions for Study Three were to:

- Identify what therapy interventions occupational therapists choose when they are treating in a therapy gym, gym/combination or practice apartment space.
- Determine if the intervention changes when the therapy environment becomes more home-like.
- Explore how the equipment in the environment influences the decisions the occupational make.

Research Design

This was a three phase mixed method study. Phase One identified interventions that occurred during occupational therapy in a rehabilitation environment. In Phase Two, home-like equipment was added to the therapy gym and then interventions provided in the rehabilitation environment were observed. Interviews were conducted in Phase Three reflecting on the experiences of the occupational therapists during phase one and two. A concurrent nested mixed methods strategy was used to gain a comprehensive perspective at multiple levels including: the therapist's perceptions, interactions between therapist/client and therapist/therapist, interventions and space used. The qualitative methods formed the core of the study with the quantitative methods adding insight and further defining the outcomes. Qualitative studies offer a comprehensive summary of events, which is critical to understand how the results relate to practice (Sandalowski, 2000). Qualitative methods explored the meaning of how rehabilitation environments influenced the therapist's practice. Quantitative methods offered the frequency of use for each environment and intervention chosen as well as comparisons between the phases and the therapists.

Methods

Approval for this study was granted by both the hospital and university Institutional Review boards.

Setting

This study took place at a 108 bed, Midwestern, freestanding rehabilitation hospital with inpatient, home health and outpatient services. Participants were recruited from the inpatient stroke program. In phase one, the therapy gym was located on a 34-bed

stroke program with two therapy gyms, one for the occupational and one for the physical therapists (Figure 5.2). The combination room was the therapy gym and the kitchenette attached to it that had a stove, refrigerator and sink area. The home-like environment was a practice apartment with a bed and full kitchen and the client's room. In phase two, the therapy gym was located on a 35-bed stroke program that both the occupational and physical therapists shared. The combination room was a gym with three pieces of home-like equipment. The home-like environment was a practice apartment with a full kitchen and the client's room.

Participants

The primary participants of this three-phase study were five occupational therapists who worked on the stroke program. Therapists could be any gender, any age, or ethnicity. Exclusion criteria for the occupational therapists were having less than two years of experience and inclusion criteria were all full time working occupational therapists with an exception being made during baseline collections and all therapists with a minimum of two years of experience were observed.

Secondary participants were the clients who were treated by the five occupational therapists during the study. Clients were included if they had experienced a single stroke. Clients were excluded if they had a previous history of stroke, or if they had a premorbid condition that would affect participation in the study.

Recruitment

The primary investigator met with all the occupational therapists and informed them of the study, including verbal and written explanations of the purpose and procedures including potential hazards of the study. Each therapist identified their intent

to participate in the study on a form given to them. If they indicated that they wanted to participate then an informed consent was provided. All five therapists agreed to participate and signed the study consent with copies provided to them afterwards. Two more therapists consented to be observed during the baseline collections as both worked part time and did not qualify for the study. None of these individuals was considered impaired for consent.

The therapy and nursing coordinators on the stroke program used purposeful sampling to identify clients that met inclusion criteria and informed the primary investigator. The standard hospital process to assign clients to a therapist was followed with the therapy coordinator randomly matching a client to a therapist. A convenience method was used once clients were paired with their therapists. Once a therapist had been paired with a client, the primary investigator approached the client and their family members to describe the study. If interested, the client signed a study informed consent and a HIPAA consent form, with copies of each provided to the clients. Client participants received standard occupational therapy intervention and were observed throughout their admission.

Data Collection Procedure

Data collection started with first level descriptions of the environment and the people, including maps of the space. It was documented how the therapist moved within the space, what equipment was used and the time spent in varying areas to gain a richer description about the quality of the interventions.

At the beginning of the study each therapist was assigned a letter (A, B, C, D, & E) based on their seniority at the facility so that baseline observations could be conducted

and therapist/client could be tracked. Therapist A and D only participated in Phase One and therapist B, C and E participated in both phases.

The random process of matching therapists to clients dictated the order of therapist observation for this study. Therefore, therapist C was followed first during Phase One, since she received the first client that consented to participate in the study. The recruitment and observation process for Phase One and Phase Two are diagrammed in Figures 5.3 and 5.4.

Phase One

Phase One took place in a therapy gym, which was only used by the occupational therapists (see Figure 5.2), a combination room that contained a kitchenette and was connected to the therapy gym, and the natural environments of client rooms and the practice apartment.

Observations of general occupational therapy interventions were conducted a minimum of three times per week for 30 minutes for 24 sessions to establish a baseline. Then nine clients on the stroke program were followed for their full admission three times per week for thirty minutes each. Data were collected about what occupational therapy interventions were provided, and where the intervention took place. A tracking sheet (Figure 5.5) was used to collect data about each activity used in the environment (gym, combination room, natural environment) and the interventions (preparatory, purposeful, occupation-based) chosen. Qualitative observations in the form of field notes were taken on the types of interventions used, interactions among therapist/client and therapist/therapist, and the environment chosen by the therapist. In addition, the primary investigator maintained a self-reflective journal throughout the study, which was used as

a scaffolding tool (Engin, 2011). Outcome measures were also collected, which included: results of the Fugl Meyer Assessment (FMA) and the Functional Independence Measure (FIM), the length of stay, days since onset of stroke, and age.

Near the end of Phase One, the therapists were given a list of five to six pieces of equipment that they identified in Study One as equipment that they would prefer in the gym (couch, recliner, coffee table, armoire, bed and entertainment center) to encourage occupation-based interventions. The therapists chose three home-like pieces of equipment (recliner, couch and coffee table) to be placed in the gym to change the environment. Besides choosing what home-like equipment would be used, the therapists also chose how to design the gym with the added equipment at the completion of Phase One. At the end of Phase One, the entire stroke program moved into an attached, newly constructed rehabilitation hospital with two therapy gyms that were shared by both the occupational and physical therapists. The three pieces of furniture were placed in the new therapy gym for Phase Two.

Phase Two

In Phase Two, the therapists had the option to use either Gym A, a standard therapy gym used by both occupational and physical therapists (Figure 5.6), or Gym B, a gym/ home-like combination room used by both occupational and physical therapists (Figure 5.7). Gym A and B were 152 feet apart. Gym B was used by occupational and physical therapists from the stroke program as well as the pulmonary program. In Phase Two, as it was in Phase One, the natural or home-like environment was the client's room, dining room or the practice apartment.

At the start of Phase Two, baseline observations were completed for a total of 12 sessions, three times per week for 30 minutes as standard interventions were observed in both gym A and gym B. Then, clients were followed for three 30-minute occupational therapy sessions per week for their entire admission.

Phase Three

As soon as the last client was discharged from Phase Two, the three remaining therapists that participated in Phase One and Two were invited to participate in a group interview and an individual interview. Qualitative methods were used with open-ended questions, exploring the therapists' perceptions of how the therapy environment influenced their interventions. The themes that were identified during the first two phases of the study were also used to guide the discussion. A two-hour wrap up meeting was held at the hospital where the three therapists were employed after their workday in their educational meeting rooms. The primary investigator conducted the discussion while audio recording the information (see Appendix A for complete interview questions). She then transcribed the information verbatim to guide the questions for the individual interviews. Several days later the three therapists participated in an individual one-hour interview at the same location and after work. The primary investigator conducted the interviews while audio recording the information. Each interview was transcribed verbatim by the primary investigator.

Data Analysis

Data were collected and analyzed simultaneously to achieve constant comparison (Creswell, 2007;Glaser & Straus, 1967) (refer to Figure 5.8). During the baseline period of Phase One, general therapist routines were documented. Then the therapist/client

observations were collected throughout client admissions for Phase One. Field notes and journal entries were transcribed via Livescribe by the primary investigator and read and reread for reduction to codes and then combined into broader categories to create themes (Creswell, 2007). Hand coding of transcripts facilitated understanding of the subtle distinctions of the narrative text (Schoenberg & Rowles, 2002). Frequency data regarding the type of intervention and the specific environment used was collected for each therapist for each session observed. At the conclusion of the study, number of sessions, time of sessions and the ratio of time to the number of sessions was calculated and a t-test was run.

During the baseline periods of Phase Two, general therapist routines were documented. Therapist/client observations were also collected throughout client admissions for Phase Two. Livescribe was again used to transcribe field notes and journal entries with the results read and reread for reduction to codes and then combined into broader categories to create themes, which were compared to the themes of Phase One. Hand coding of transcripts was completed in Phase Two. The same frequency data was collected in Phase Two reflecting the environment and intervention used. Phase Two results were also used in the t-test calculations to compare both Phase One and Two.

Interviews and a wrap-up session were conducted in phase three with the information gained being transcribed to further provide a richer and thicker description of the overall themes. Due to the small sample size of three therapists and the data collected being interrelated the analysis was limited to frequencies and a t-test.

Trustworthiness

Multiple validation strategies were employed in this study. To begin extended observations, including baseline and therapist/client relationships, within the therapy environment occurred to ensure an in-depth understanding of the influence of the environment. This intimate account of daily happenings allowed the investigator to comprehend the challenges the therapists faced and to build trust for participation in the qualitative portion of the study. Developing a close relationship to the therapists and staff enabled the investigator to use rich and thick descriptions of therapist/client interactions and therapist planning. Maintaining a self-reflective journal throughout the study helped the investigator give thought to any bias and fostered honest narratives. An experienced researcher, who was also an occupational therapist, provided peer debriefing during all phases. Frequent dialogue with this peer increased the accuracy of the findings and provided a sounding board to contemplate the meaning of specific observations. Member checking occurred during Phase Three when data observed and themes were reported to the therapists in the wrap-up session. The therapists validated the information and then expanded sharing personal believes during the group session and the individual interviews. Quantitative data were collected during phase one and two providing information on the frequency of each intervention and environment used. Also quantitative comparisons between the phases were made for each of the therapists. Finally, the qualitative results were triangulated with the literature and the quantitative outcomes that were collected ensuring that the study was accurate and valid.

Results

Phase One

Phase One began with baseline observations. Seven of the possible eight therapists had more than two years of experience so were observed providing typical interventions sessions in the therapy gym for 24 sessions. All seven of the therapists consented to participate with four being employed full time continuing on in the study. Preparatory methods were used during 24 of the 24 sessions, purposeful activities were completed in 17 sessions, and occupation-based interventions were included in 5 of the sessions. The therapists did mat work but also played bingo and other games, completed medication management, provided education to clients and families and cooked in the kitchenette. Baseline observations provided general knowledge of what occurred in the therapy environment, including what interventions were chosen, how the space was used, interactions with the therapists and their clients, and daily routines. Observations continued until saturation in the understanding of how the interventions and evironments were used during therapy was reached. These observations were used to prepare the investigator for Phase One of the study and not included in the results section.

During Phase One, two of the four therapists moved to work in the outpatient program of the facility. Fortunately, a therapist that was working part time switched to full time status qualifying her for this study. She was invited to participate being observed with clients throughout their admission and consented. Once again a baseline period was conducted in Phase Two to observe general routines, especially since the therapy environment had changed since Phase One. Saturation was reached in fewer sessions than phase one due to the investigator familiarity with the therapists. The

information gained from phase two baseline observations informed the investigator of typical occupational therapy interventions and was not part of the results.

Following Phase One baseline, a total of five therapists were observed providing intervention to nine clients, for a sum of 90 therapy sessions. Therapist experience ranged from 2.5 years to 35 years with an average of 12.6 years. All of the therapists were Caucasian and female. For identification purposes, each therapist was identified with a letter (A, B, C, D, & E) denoting their seniority at the facility. The clients were each given a number associated with their therapist to identify their grouping for data collection. Demographic information and outcomes regarding the therapists and clients is included in Tables 5.1 & 5.2.

Quantitative results.

In Phase One, five therapists were observed to provide interventions to 9 clients for a total of 90 therapy sessions. Therapists could choose to spend the full thirty-minute session in one environment with one type of intervention or they could use more than one environment and intervention, essentially breaking up one treatment session into one or more "mini-sessions". Hence, 102 mini sessions of intervention were observed in Phase One. In those 102 mini sessions, therapists chose to provide their intervention in the therapy gym 78.4% of the time. Therapists used the combination room 5.9% and a home-like environment 15.7% of the therapy time. Gym use had the highest frequency overall by the occupational therapists (refer to Figure 5.9). The therapists used all three interventions when working with their clients, with the data indicating that overall they chose: preparatory methods 60.8%, purposeful activities 21.6% and occupation-based

interventions 17.6% of the time. Therefore, the therapists chose to provide interventions in the gym and use preparatory methods with the highest frequency (refer to Figure 5.10).

During the time spent in the gym (78.4%) the therapists chose to use a preparatory intervention 76.3% of the time. They used purposeful activities 18.8% and occupation-based interventions 5% of the time (refer to Table 5.3). When the therapist practiced in a combination room they chose preparatory methods 0%, purposeful activities 83% and occupation-based were chosen 16.7% of the time. Lastly, when the therapist worked in a home-like environment they chose preparatory methods as an intervention 6.3%, purposeful activities 12.5% and an occupation-based intervention 81.3% of the time. A relationship was revealed between the gym and preparatory methods, the combination room with purposeful activities and the home-like space with occupation-based interventions as these interventions are used most often in a specific environment. Figure 5.11 demonstrates the relationship between the environment and the specific intervention that occured within that space.

To visually represent where the therapist provided therapy and what intervention they chose during their sessions, over the time of the admission, all nine clients were graphed on the quadrant tracking form to compare trajectories (Figures 5.12-5.20). It is helpful to review each of the five therapist specific approaches to their clients. Therapist A provided therapy to client A1 and she used the gym (63%), the combination room (0%) and home-like spaces (36%). While in the gym she used preparatory methods in 57% of the sessions, purposeful activities in 28% and occupation-based interventions in 14%. When in the home-like environment she used purposeful activities 25% and occupation-based in 75% of the sessions. Therapist A had more than 15 years of experience and was

only observed with one client as she moved to another program in the hospital before a second client was recruited. The mini session frequencies with which the Therapist A used a specific environment and intervention over the time of the client's admission are included in Table 5.4.

Therapist B had more than 15 years of experience and was observed with three clients because her first client, B1 was discharged after only three sessions. Therapist B used the gym 66%, combination room 0% and a home-like environment (33%) in the sessions. While in the gym, she provided preparatory methods in 57% of the sessions, purposeful activities in 28% and occupation-based interventions in 14%. When in a home-like environment she used occupation-based interventions in 75% of the sessions and purposeful activities in 25%. The second client that Therapist B worked with, B2, was seen in the gym 69%, in the combination room 7% and in a home-like environment 23% of the sessions. While in the gym the interventions included 66% preparatory methods and 33% purposeful activities. Therapist B used the combination room with a purposeful activity 100% of the session. When she used a home-like environment she used occupation-based interventions in 100% of the sessions. The last client that Therapist B worked with in Phase One was B3. She used the gym 66%, the combination room 16% and a home-like environment in 16% of the sessions. Within the gym she used preparatory methods 50%, purposeful activities 25% and occupation-based 25% of the sessions. Occupation-based tasks were used in 100% of the sessions when in the combination room and in a home-like setting.

Therapist C had less than seven years experience and worked with two clients while in Phase One. Her first client, C1, was seen in the gym for 80% of the sessions,

and in a home-like environment for 20% of the sessions. When Therapist C was in the gym she chose to use preparatory methods for 75% and purposeful activities for 25% of the sessions. She did not use the combination room. When in a home-like environment she used preparatory methods for 25%, purposeful activities for 25% and occupation-based for 50% of the sessions. For her second client, C2, the therapist provided therapy in the gym 84%, combination room 7% and home-like 7% of the sessions. In the gym, preparatory methods were used for 72% of the sessions with purposeful activities for 18% and occupation-based interventions 9% of the time. In the combination room she used purposeful activities 100% and when in a home-like environment occupation-based interventions 100% of the session.

Therapist D had less than 7 years of experience and provided interventions to one client in Phase One before she moved to another program in the hospital. D1 received 80% of her therapy in the gym, 10% in a combination room and 10% in a home-like environment. While in the gym 87% of the interventions were preparatory, none were purposeful and 12% were occupation-based. When in the combination room and home-like environments 100% of the interventions were occupation-based.

Therapist E had less than 7 years of experience also. Her first client received 100% of her interventions in the gym environment with 100% of the sessions incorporating preparatory methods. The second client that E worked with, E2 was observed in the gym environment 100% of the sessions with the interventions being 91% preparatory and 8% purposeful.

In summary, 4/5 therapists provided occupation-based interventions in a home-like environment for 7/9 clients. Two of seven clients received occupation-based

interventions in a home-like setting before the mid point of their admission and all seven received them at the end of their hospital stay.

Qualitative findings

Four primary themes emerged from the observations following the baseline periods in Phase One.

Theme 1 - Intersection of the Environment and Intervention

This study helped to further validate the relationship between the rehabilitation environment (gym, combination room and natural setting) and the interventions (preparatory, purposeful and occupation-based) used by the therapist, that was first described in Study One of this dissertation. The therapists worked in the gym 78.4% of the time and while in the gym they were observed to use more preparatory activities (76.3%), such as mat work in supine and sitting, core strengthening exercises, weight bearing into the affected extremity, transfers, and reaching to targets as compared to using purposeful activities 18.8% and occupation-based 5% of the time. Preparatory methods required no or minimal set up, such as getting the mirror and/or the bucket of beanbags. These methods were often repeated with all the clients in the gym, especially if the client had a low FIM and Fugl Meyer score at admission. During one observation a therapist was in the gym with a client and stated:

"We're going to start by learning the steps of a transfer"

The therapist then proceeded to work on the client's core strength, standing and postural control while sitting on the mat in the gym and transferring to his wheelchair.

One preparatory method commonly used at this facility was beach ball volleyball. In this activity, a therapist stands in the middle of a circle of clients and the therapist tosses the beach ball or balloon to each client and they hit it back to the center. During

each client's turn they may hit the ball several times and then they wait for their next turn. The clients are cued to hit the ball a specific way, or to use a specific body part to hit the ball, or stand during their turn. The activity occurs in the center of the gym between the mats and the tables. This group occurs daily in the gym and therapists decide if their client would benefit from this method and if so, they schedule them for it. Therapists C, D and E were observed to have their clients in beach ball volleyball.

Less frequently used were purposeful activities (18.8% of the time) with equipment or kits that simulated occupation-based activities, which were found to occur in the combination room or in the gym. The gym in Phase One had ample storage closets for purposeful activities including: medication management, letter writing, cleaning, fishing, board games, emergency response, bingo and golf. These kits and activities were readily available in the gym to the therapists. During an observation a therapist commented to a client:

"You help your wife with laundry right?"

And proceeded to have the client perform the purposeful activity of practicing to fold clothes while in the gym.

In the kitchenette the therapist had clients wash dishes, reach into cabinets to remove/place items, take items out of refrigerator or do light cooking. Therapists would set up problem solving situations in the kitchen to assess client safety awareness; for example, leaving the oven door open or having the water running. They would also play cards or table games at the table in the gym. Therapist D had her client teach the other clients at the round table in the gym how to play "Gin" as this was a game that she often

played prior to her stroke. This client, who did not speak much, was able to describe how to play to the others at the table and shout out “Gin” to win the game.

A natural setting like the client’s room or practice apartment was found to compliment occupation-based tasks and supported grooming, dressing, practicing transfers to the toilet or cooking and cleaning. When in a home-like space the therapist used occupation-based interventions 81.3% of the time purposeful activities 12.5 % and preparatory methods 6.3% of the time. To implement occupation-based interventions it was observed that therapists had to plan ahead, especially to schedule the client for a longer session to use the natural settings and specific tasks in them. In the spring and summer every Tuesday morning a garden activity occurred, so Therapist C took her client outside after he stated: “I volunteered to go outside today.” Going to the garden did not require the therapist to plan ahead or set equipment up, as there were experts in the space to guide her.

Most often therapists provided therapy in a natural setting just prior to discharge to teach the client and/or caregivers the skills needed for the client to go home, such as practicing a toilet or tub transfer. Just prior to discharge Therapist C discussed plans for home and worked with a client in the bathroom, stating: “I know your wife is adapting the bathroom at home so we need to see what will work for you”, “How does the elevated toilet seat feel?” Two sessions later, with the wife in the bathroom, the therapist said: “I want you to listen to your wife, it’s up to you and her to keep you safe, make sure your hips and feet are aligned.” After the transfer the therapist said to the wife: “How did you feel about the transfer?” Therapist D fostered her client’s interest in reading by taking her to the recreation room where there were books on several shelves. Therapist D gave

directions: “Where do you want to start with the bookshelves?” Client pointed to the books she wanted. She proceeded to pull out the books and read the cover and put the book back in the shelves in the correct space if she was not interested.

Therapists spent 78.4% of their time in the therapy gym, 5.9% of their time in the combination room and 15.7% of their time in a home-like setting. When the therapists provided therapy in the gym they tended to use preparatory methods. A similar relationship was observed between home-like environments and occupation-based interventions. In addition, being in a home-like environment seemed to cue discussions for preparation to go home, such as resuming desired leisure roles, doing laundry and transfers in the bathroom. Illustrating the environment to intervention relationship is Figure 5.8, whereby the shaded area indicates where the intervention occurred.

Theme 2 - Clinical Reasoning vs. Habits

The occupational therapists planned their intervention sessions three different ways: before going to get the client, when picking the client up for therapy and during the session. Often this decision process was internal and observed through therapist actions of wheeling a client to the desired space. Some of the sessions that were planned ahead of time included: cooking, family teaching, bathroom and couch transfers, going to the library, painting, playing a specific card game, making a splint or doing a deep physical agent modality and going to the garden. These sessions matched the client’s interests to a specific intervention and therefore incorporated interactive reasoning. If the therapist went one step further and graded the intervention to ensure the client’s success then conditional reasoning was used. Generally the sessions that were planned ahead of time did not occur in the gym and required different procedures and time to set up or secure resources.

Therapists who had more experience used procedural, interactive and conditional reasoning and planned their sessions ahead of time. Therapist A worked with a client who was a carpenter so she incorporated tools, tool belts, tool boards, and electrical cords into the sessions. Therapist B had a client that delivered the mail so she had him sort letters and place in a large bank of mailboxes during a session. Therapist B, with another client, planned ahead by talking with the client about his interests in the garden early in his admission and later followed up by providing intervention in the garden. She said to her client:

"The hospital has a garden and since you like to be outside we could go weed or plant",

Client- "yeah",

Therapist- "Do you have a garden at home?

Client- "not now",

Therapist- "you had one before?"

Client- "oh yes".

On another occasion when working with the same client, it was obvious that Therapist B had planned her second session of the day by what had occurred in the first session, when she stated:

"When I helped you get dressed this morning you had trouble getting your socks on",

Client- "yeah",

Therapist- "so what about trying to us a sock aide?"

Client- " I have had trouble at home for a while getting my socks on before."

Sessions that weren't planned when they entered the intervention space, usually the gym, consisted of: coming through the door and scanning the space to assess where all the therapists were and moving towards an area to work or going to the same place that the therapist worked previously. This level of planning uses procedural reasoning as the therapist identifies problems, formulates goals and plans treatment accordingly, but the intervention does not specifically match the client's interests, or require grading and the tasks are often repeated for multiple clients. A therapist brought her client into the gym and had him transfer from his wheelchair onto a mat. Once they were seated she realized that there was a group playing cards at the table so she had her client stand up and use the walker to walk over to the table to join the group. On occasion the therapists encouraged the clients to participate in intervention planning by asking the client what they wanted to do once they were in the gym, as a therapist stated:

"What do you think we need to work on?"

Client- "I don't care…Dynavision"

Therapist- "Let me check to see if it is open (Dynavision) and we will go in."

"Somebody is in the Dynavision room, how is your shoulder today?"

Then the therapist shifted to work on the client's shoulder. Therapists were observed walking into the gym seeing a group at the round table and say: "Do you want to play a hand of

cards?" Client stated: "Yes." Then the client and therapist joined the group playing cards at the table. Cards may not have been an interest of the client but it was offered out of habit by the therapist. On numerous occasions the clients were unsure how to answer the question of "what they wanted to do for today in therapy" and answered: "I don't know" "anything with my arm" "whatever"

If the therapists made decisions during a session they would complete their first task and then look around to see what equipment was near them or what they needed to retrieve to move to the next task. A therapist was near the end of a session and stated: "Let's see here", when deciding what to do last in session. She visually scanned the space until she found the beanbags to use. In preparation for the move into the new building, during a session a therapist commented: "Forgive me, I'm trying to find something to work on, with all these boxes it's hard".

If clients were unsafe to be left on the mat, it further limited the therapist's ability to get equipment during a therapy session and ultimately what they could do. Therapists were also observed to come into the gym with their client and take all equipment needed for the session and then move to a space to work. On occasion therapists did plan the session ahead of time but the client did not want to participate or the task did not provide the client with the challenge that the therapist wanted and then the session was adapted. Different levels of time and clinical reasoning went into planning interventions and the therapist expenditure directly related to the personalization of the task. The gym environment did not require much advanced planning for interventions or personalization as habits seemed to override clinical reasoning skills.

Theme 3 - The Relevance of the Gym

The gym is where the therapists had their desks with personal items, information about clients, access to a phone, equipment options for therapy, their peers and a space that was exclusively for occupational therapy intervention. It was connected to a kitchenette and a dining room. On the other side of the dining room was the physical therapy gym. The client rooms and the nursing station were down the hall. The therapists provided therapy in the gym more than any other environment. For one session a therapist brought her client to the gym for therapy, but then she was called down to the clinic to see a different client. Since she was in the gym she asked her colleague, that was in the gym, to work with her client until she returned from the clinic. Therapists appeared to choose the gym as their therapy environment because there was support from their peers.

During their therapy sessions in the gym, they were observed to work with their clients individually and also in groups. If they chose to put their client in a group the therapist was observed to respond in a variety of ways including introducing the clients to each other, encouraging the clients to interact with each other, or during a few sessions the therapists talked amongst themselves while their client participated in the group activity. A therapist was working with a client that was participating in beach ball volleyball and because there were other therapists in the group hitting the ball to the therapist's client she was able to sit next to her client during the beach ball volleyball game and write notes while cueing on proper movement procedure. On another occasion a therapist had tried a new kind of ice cream outside of work and then discussed this topic with the other therapists. The few clients that were able to join the conversation did during the beach ball volleyball game. At another time a therapist had just returned from

an out of state trip and then proceeded to share details of the vacation with the other therapists during a volleyball game. Few clients joined the conversation but sat and waited their turn until the ball was hit to them. There was a strong draw for the therapists to want to treat in the gym as they socialized, wrote notes and shared life experiences.

While in the gym if they needed help with a client or a piece of equipment they would ask each other for assistance. Therapists would talk to their clients and to each other about travel, family, social occurrences, and/or current events. Some conversations were more among the therapists with only minimal conversations between the therapist and client. During a beach volleyball game a therapist stood in the middle of the circle and hit the ball to each of the three clients in the group. She talked to the therapists in the gym and to the clients but did not facilitate conversation amongst the clients with each other. Sometimes clients would add to a conversation or start a discussion with peers but routinely they would just answer questions posed from the therapists.

During individual therapy sessions the therapists talked to each other, especially if their clients were not able to engage verbally. They would hold a conversation between people on the mats, between someone on the mat and someone at the table or between the people at the tables. One of the clients got very excited when he overheard a discussion on the mat next to where he was about tools; their use and building with them. After several prompts from the client to the therapist about his tools, the therapist said: “Do you have a tool like that?’ Client followed- “I fix things around the house and built houses before, I love it.” Then the conversation about tools seemed to end. While the client was doing his exercises, the therapist was watching other occupational therapists in the room and toward the end of the session the therapist offered information about her own

remodeling project. The client did not engage in the conversation about the therapist's remodeling project.

Each therapist had a different way to utilize the space within the gym. Therapists with more experience used a variety of spaces within the gym accessing the tables, mats, clothes rack, tools, and the closets. Whereas, the therapists with less experience tended to use the space in the center of the gym more, including one or two mats, the space between the mats and tables where beach volleyball was played and the round table. Within a session, therapists went to a space and stayed there, (e.g., on mat, standing at table or playing beach volleyball). All the therapists were found to use other spaces in the hospital for interventions including the client's room, the garden, the dining and recreation room. Providing intervention in the gym allowed the therapists to have their own peer support, share experiences and options for clients to encourage each other in their recovery and to group clients but ultimately, the therapists may have chosen the gym because they found it supportive and comfortable for their needs.

Theme 4 - Communication in a Partnership vs. a Hierarchy

Clinical reasoning directs the therapist actions to design therapeutic experiences that benefit the client. In this study, the therapists discussed with their clients their plans for going home and then attempted to find the environment in the hospital that most closely matched it, for practice. It appeared that the equipment in each environment contributed to what was discussed in that space. For example when in a home-like environment discussion focused on returning home and when in the gym the conversation focused on exercise and body parts. One way the therapists demonstrated their decision-making skills was by communicating with their clients to prepare them to go home, for example:

"What is your plan for doing wash now? Can you move your washer and dryer? How many bathrooms do you have?" or

"I'm trying to have you think of how you do things, where you put your body so you don't fall when you do stuff, to keep you safe"

Often the therapists communicated with the clients about their goals, living situation, and current events as soon as they picked the client up each day to start the therapy session.

Therapists with more than seven years of experience often used compassionate statements paired with comforting touches when interacting with their clients, skills needed to build a therapeutic partnership. They also established eye contact and were often in close proximity to their clients. Therapist A was observed to explain why they we're working on a specific skill to her client while in the gym, stating: "Just because the muscles aren't working right now we are trying to teach your brain, so were working on getting this arm stronger, when you first came you lifted your arms to the side, does that make sense?" She was observed to verify if he understood what they were working on in therapy.

On the day before discharge, while in the gym, with the same client, Therapist A was noted to discuss what the client thought about therapy. The therapist focused on the client only, and she gave consistent eye contact and enough time for the client to answer questions. She asked: "Are you satisfied with the therapy for your arm", Client- "Yeah it scores a 10 out of 10". It appeared that the therapists used their communication skills to convey their clinical reasoning process to the client and this was an important part of building a therapeutic partnership.

Conversely, other communication styles included using strong tones when telling the client what to do in therapy, demonstrating a relationship more based on a hierarchy, as a therapist said: “Did I tell you what to do? No, take your time, slow down to be safer” and “This morning your standing wasn’t good, let’s see if you can do better.” When a client was struggling to stand, a therapist asked: “Did you eat cement for lunch?” The therapist then changed the activity to education on adaptive equipment as they were in the gym and the equipment was available nearby.

Other communication styles observed were the therapists using clear and concise information to foster engagement in therapy and support a partnership. For example, when educating the client on what to work on for homework, a therapist said: “This week’s work is to really use this hand, to open doors and anything else, it has gotten so much better, it’s ready” and “Start practicing using the toilet in your room without the arm rails, don’t use the arm rails on your bed to prepare for home” (where there are no rails). In comparison, therapists were also observed to communicate using vague and confusing wording, especially in regards to converting medical terms into lay language that the client could understand. Often these kind of comments were heard in the gym. For example therapists stated: “Look at that ulnar drift”, “You needed minimal assist with your pull ups” and “A lot of people come in and don’t know where their arm is on them.” A therapist used a vibrator during a session but did not explain to the client what it was for and how it would help, during the session she commented: “A little bit of initiation there” but gave no other information to describe her statement.

The therapist’s communication styles were observed to be supportive and engaging, as well as confusing and vague, further complicating the therapist/client

relationship and possibly inhibiting client participation. It appeared that the environment directed certain types of communication styles. When in the gym communication often focused on body parts and exercises and in a home-like space discussion related to returning home and completing activties of daily living.

Vignettes

To illustrate the influence of time and space during the admission and to give more detail on specific interventions, two therapist cases were chosen to highlight.

Vignette A

(Refer to Table 5.5, Figures 5.21 and 5.22)

Therapist B, with over 15 years of experience, provided intervention to her second client, B2. His therapy sessions were plotted on the quadrant tracking form in Figure 5.21. The environments where the therapist provided intervention were the gym (69%), combination room (7%) and home-like space (23%) of the sessions. The interventions that the therapist chose to use were preparatory methods (46%), purposeful activities (30%) and occupation-based interventions (23%). Therapist B used a variety of environments and incorporated activities that were important to the client, like the garden, washing dishes and sitting in a living room chair. The therapist initiated occupation-based interventions in a home-like environment by the fourth session with no specific sequence of how the client was progressed using the environment and interventions.

Vignette B

(Refer to Table 5.6, Figures 5.23 and 5.24).

Therapist E had less than seven years of experience and delivered eight sessions of therapy to E1. His therapy sessions were plotted on the quadrant tracking form in

Figure 5.23. While on the mat doing bodywork the therapist did talk to the client about generalizing the transfers in the gym to improving his transfers to the toilet. The therapist used the gym in 100% of the observed sessions and chose preparatory methods for her interventions in 100% of the sessions. The client in vignette A had higher FIM scores at initial and discharge and a higher length of stay efficiency than the client in vignette B.

Phase Two

Toward the end of Phase One the therapists on the stroke program chose three pieces of equipment that they believed would enrich their gym environment and offer other opportunities to their clients. The management staff decided that the furniture would go into gym B, but the therapists designed its exact location. Therefore, at the start of Phase Two a couch, recliner, coffee table, rug under the coffee table and lamp next to the couch were placed into the corner of gym B (Figure 5.7). The distance between gym A (Figure 5.2) and gym B was 152 feet with each gym on either side of the stroke program, making some of the client rooms closer to gym B and some to gym A. Gym A was shared by the occupational and physical therapists from the stroke program (approximately 15 people) and gym B was shared by the occupational and physical therapists from the pulmonary program (approximately 9 people). The therapists on the stroke program could also use gym B. During Phase Two the pulmonary program was temporarily housed in the client rooms near gym B, sharing some of the stroke program space. The plan was for the pulmonary program to move when their space was finished being renovated, but this did not occur during Phase Two. Therefore, gym B was ultimately a therapy gym on the stroke program.

The 12 sessions of baseline observations began 22 days after the program moved into the new building and as soon as home-like equipment was secured in gym B. Seven occupational therapists were observed providing therapy interventions in both gym A & B for the baseline phase. Both gym A & B were observed for 15 minutes of the 30-minute session and the investigator rotated which gym she started in for each session. On two occasions therapists from the stroke program brought clients in to use the home-like equipment in gym B for therapy during the baseline. The remaining time they provided therapy in gym A providing predominantly preparatory methods.

Upon completion of the baseline period, three occupational therapists participated (B, C and E) in Phase Two, seeing seven clients for three 30-minute occupational therapy sessions per week for their entire admission for a total of 72 sessions. Therapist B received her second client but after four sessions of therapy the family asked for a different occupational therapist and she was moved to therapist C, becoming 2 B/C, so these results (11 sessions) were not included.

Quantitative Results

In Phase Two, three therapists were observed providing interventions to seven clients overall. One client switched therapists after four sessions and therefore her results are not reported. Two clients from each of the three therapists were followed for a total of 76 sessions (Table 5.7). However, some of the therapy sessions were split between the environments or the intervention types creating 89 mini sessions. Of those 89 mini sessions of interventions the therapists chose to provide their interventions in the therapy gym 61.4% of the time (a decrease from 78.4% for Phase One). Therapists used the combination room 12.5% of the time (an increase from 5.9% for Phase One). Lastly, the

therapists chose to work in a home-like environment 26.1% of the time (an increase from Phase One at 15.7%) (Figure 5.25). The therapists continued to use all three interventions with the data indicating that overall they chose: preparatory methods 56.8% of the time (slight decrease from 60.8% for Phase One), purposeful activities 13.6% of the time (down from 21.6%) and occupation-based interventions 29.5% of the time (an increase from 17.6%)

(Table 5.8).

During the time spent in the gym (61.4%) the therapists chose preparatory methods 79.6%, purposeful activities 20.4% and did not chose occupation-based interventions (refer to Figure 5.26). The therapists chose the combination room 12.5% of the time and while in there used preparatory methods 18.2%, purposeful activities 9.1% and occupation-based interventions 72.7% of the time. Finally, when in a home-like environment which was 26.1% of the therapy time, the therapists used preparatory methods 21.7% of the time purposeful was not chosen and occupation-based interventions 78.3% of the time. A relationship between the environments and interventions continued to exist in Phase Two, but it appeared to have shifted slightly. The therapists continued to use the gym the most for their interventions but less than in Phase One, and while in the gym preparatory methods were the intervention used most. The combination room was used more in Phase Two but least of all the environments. When in the combination room occupation-based interventions were used more as compared to any other technique. Home-like environments also were used more in Phase Two but there was a decrease in occupation-based interventions from 81.3% in Phase One to 78.3% in phase two. A increase in

preparatory methods as an intervention was observed while in the home-like environment. (Refer to Figures 5.11 & 5.27)

To convey how the therapist progressed a client throughout their admission, including the chosen therapy environment and intervention each of the six clients followed were graphed on the quadrant tracking form to compare intervention trajectories overtime (Figures 5.28-5.33). When comparing therapist environment preferences from Phase One to Two, a change occurred with the therapists with less than seven years experience choosing more home-like environments to treat in and the therapist with greater than 15 years experience shifting to spending more time in the gym. Table 5.9 describes each therapist's choice for the environment and their intervention. In Phase Two, four of six clients received occupation-based interventions in a home-like setting by their third therapy session and all six of the clients just after the mid-point of their stay. In Phase Two, Therapist E provided occupation-based interventions in home-like settings to both of her clients by the second session and in phase one she was the last to provide this combination to both of her clients.

When practicing in the gym the therapists chose to use preparatory methods more than 75% of the time for five of the six clients. If the therapists chose to work in a home-like environment then they used occupation-based intervention more than 66% of the time for all of the clients. The combination room was chosen the least for five of the six clients and when in this space the intervention tended to be occupation-based most with some preparatory methods chosen minimally. In Phase One when the combination room was chosen, therapists mostly used purposeful activities and that decreased in Phase Two by 74% (from 83.3% to 9.1%).

In addition to the frequency data, the average number and standard deviation of mini-sessions, time spent in each environment (gym, combination and home-like) and a ratio of total amount of time divided by total number of sessions for each of the three therapists were calculated. Then a paired t-test was run comparing the Phase One and Phase Two data for the nine different dependent variables. Since the p and t values were strongly influenced by the small sample size, no significance was found for the p values on the t-test at a level of 0.05 (refer to Table 5.10). This data suggests that the number of gym sessions stayed relatively consistent between phases. However the average total time spent in the gym dropped by 100 minutes from phase one to two. When in the combination room the average number of sessions increased by three and the average total time increased by 50 minutes from Phase One to Two. In the last environment, home-like, the average sessions in this space increased by four and the average total time spent in a this space increased by 40 minutes from phase one to two. Due to the small sample size this quantitative data can only be considered preliminary information in support of future studies.

Qualitative findings.

Similar themes emerged from the observations after the baseline period in Phase Two as to how the therapists used their environment, communicated with their clients and made decisions for practice. Since the program was physically moved, in Phase Two new concepts emerged regarding how the therapists practiced.

Theme 1 - The Relationship of the Environment to the Interventions

The therapists were observed to use their therapy environment differently in Phase Two with increased use of home-like settings. In the mornings Gym A seemed to be more crowded with up to 20 therapists and clients. The afternoons were less with a

range of 6-9 people. Ancillary staff consistently walked through the gym to their offices or to speak to a therapist/client. Doctors and nurses came into gym A to see clients, too. Excessive noise was also an issue in gym A. The therapists often commented about it and chose to work elsewhere at times. For example: “Let’s just stay out in the dining room and work where it’s quieter”, “We should probably go to gym B because it’s more quiet. I went there a lot in the beginning.” Two therapists pushed their clients into the doorway to gym A, and said: “Let’s go in the other gym it’s not as crowded.” “We’re going to gym B.”

At times the noise level caused therapists to choose other intervention spaces, other times they acknowledged the noise issue but still went into gym A to provide intervention, and other times they didn’t seem to notice the noise. During the month of December, a CD player was placed on the table by the arm bike and continuously played holiday music in the gym. One of the therapists was asking a new client some questions about her home environment and the client hesitated to answer questions, even appearing not to have heard them. The therapist did not seem to notice the music playing behind her, or look to decrease the distractions or to move another space.

The relationship of the gym with preparatory methods, the combination room with purposeful activities, and a home-like environment with occupation-based interventions remained consistent for Phase Two, but more variability within the environments was observed. Therapists decreased their time spent in the gym by 17% % and increased their time in the combination room by 6.6%, and home-like environments by 10.4 %. At times, the therapists did not consider the gym an option for treatment due to the crowds so they became more creative in where they would treat. The therapists were observed to

bring tasks out of the gym and complete at a table in the dining room. Sometimes in the mornings the therapists would work in the client's room and they even used the combination room to practice transfers, fold clothes or complete a word puzzle while sitting on the couch.

In Phase Two, therapists were observed to provide interventions more in homelike environments, such as their client's room or in the dining room. Sessions were split more with clients being observed to use the bathroom, brush their teeth, wash hands, get a drink or make a sandwich during their therapy time. A client with Therapist E requested to brush his teeth after breakfast when he had therapy. Therapist E pushed him into his room and asked: "Can we stand to make brushing your teeth more therapeutic?" This same client was seen often at 9:00 am so a majority of their sessions began with brushing teeth and using the bathroom. In the dining room Therapist B had a client stand at the sink to wash dishes in preparation to return home. The client also dried the dishes and put them away. The dining room was right outside gym A and therefore used often. Therapist C and her student worked with their client to make pudding while in the dining room. The dining room was also used for beach ball volleyball as there was room between the tables to hold a group activity. On a few occasions the therapists also used the lounge, with its open space, to hold their beach ball volleyball groups as well, with its open space.

When the therapists treated in the home-like/gym combination room, gym B, and were sitting on the couch or recliner they often talked about the client's home environment, for example:

"What kind of furniture do you have at home? A couch and recliner? So you use both?"

"A rug would be good under the coffee table" and

Therapist- "Do you have a table like this at home?"

Client- "Yes, but bigger, I have a recliner at home"

Therapist- "Great we will have to come practice getting in and out of it to get ready to go home"

Clients practiced transfers on the furniture, folded laundry while sitting on the couch, practiced maneuvering around the coffee table and reached for objects on the table. During Phase Two the primary investigator heard several comments about how much all the therapists in the hospital valued the home-like equipment in the combination room. They said:

"Love the recliner"

"The other day there was a client here that was concerned about using their couch at home, we practiced, and it was so helpful to have the couch here"

"I just used the recliner with my client and it worked great"

Therapist E had a client who was going on a day pass for the Thanksgiving holiday and the family was concerned about his ability to transfer from his wheelchair to sit on any of their living room furniture. The therapist commented: "He is going on a day pass on Thursday so we are practicing getting on and off the couch". The client's wife watched and assisted with the transfers and stated: "Can you come home with me so I

don't hurt him?" After their home visit they reported a successful experience transferring and sitting on their couch. When Therapist C and her student were providing intervention in gym B the student was visually scanning the room and stated: "I wonder if the couch would be a good place to work with client…" (stated client's name).

The combination room was used as both a second gym to perform preparatory methods, purposeful activities and to offer occupation-based interventions with the home-like equipment. A therapist used gym B to fold laundry while sitting on a mat being shared with two other clients receiving therapy. All three clients used portions of the same mat that was 3 feet from the couch where no one sat. While in gym B, therapists had clients complete preparatory methods and purposeful activities; standing at the table and completing fine motor tasks, standing and hanging clothes on a rack and working on the mat.

Therapists also continued to use gym A for preparatory methods but more purposeful methods were also observed. Therapist E simulated feeding the dog with her client while in the gym as that was a meaningful role for the client at home. The same therapist had her client standing at the mat and folding clothes to support the client to go home and live independently. Other preparatory methods observed in gym A were: sitting edge of mat and reaching to target, physical agent modalities, body work on mats, standing at the table, manipulating small objects for fine motor coordination. Because of limited space in gym A, beach ball volleyball was completed in the dining room or in the lounge.

Initially, while in the gym, the therapists had difficulty finding equipment to use in their sessions because not all their equipment was moved from the old building. The

therapists went from four large closets to three smaller cabinets that were shared between the occupational and physical therapists. Choosing interventions was awkward and sometimes slow, yet in time the therapists became familiar with where equipment was kept and they developed a flow. During the client's admission it appeared that the therapist's environment and intervention flow began in the gym where the first few sessions were completed with a focus on addressing body function and structure impairments. It appeared to be an automatic response that therapists took their clients into the gym. On the first day that a therapist worked with her client in the gym she ended the session commenting: "Tomorrow we will take a look at your arm", suggesting a focus on the client's physical impairments. The therapists also worked with the client each day for a second session and the focus may have been different especially if the client was seen for a morning activity of daily living session to help them get dressed, groomed and bathed.

Once again the relationship of the environment to the intervention was identified in Phase Two of the study. A shift was observed with a decrease in the use of the gym and an increase of occupation-based interventions being provided in home-like environments. There were several factors that could have contributed to this shift especially the overcrowding and noise in the gym as new environmental patterns were created by the therapists. The relationship of the environment to the interventions in Phase Two is included in Figure 5.27.

Theme 2 - Clinical Reasoning vs. Habits

For Phase Two the same format that therapists used to plan the interventions was observed: the therapist decided before the session, when they first greeted the client for their session, and/or throughout the session. On occasion if there was an activity planned

at the beginning of the session but the client finished it before the time was up, then the therapist had to plan another activity during the same session. On several occasions therapists commented out loud about their planning for the session. Therapist E commented to her client while in his hospital room: “We’ll go down to the gym and do stuff with your arm”. After a few days of therapy therapist E was talking to her client about if he cooked and then she planned some of his therapy sessions from the information gained: Therapist: “Now you don’t do any cooking do you?” Client: “Yes, I like to make chili” Therapist: “Maybe we can try to make some chili here this week”. The client wrote down his chili recipe, the therapist went shopping for the ingredients and they cooked later in the week. For several sessions in a row Therapist E had a student observing and she was noted to plan more occupation-based interventions during this time, like the chili cooking.

Therapist B talked with nursing before her session with her client and they decided that together they would help the client transfer to the toilet for his first bowel movement since entering the hospital two days prior. Therapist B also shared how she had her next two therapy sessions generally planned with another client: “Right now I have her in a volleyball group but I may change her to a second individual session but she is so social that a group would be good for her”. Working with the same client on a different day she taught the client how to use adaptive equipment to help don her shoes and socks and planned for the next day by saying: “I’ll put these things in your room for you and when I come in tomorrow morning, we will use them, alright?” Therapist B also tried to plan a cooking session with her client ahead of time as she stated: Therapist: “Were going to make some bread tomorrow, I think you’ll enjoy that, don’t you?” Client:

"I think so". Therapist C was supporting her clients need to resume her ability to cook as she said:

Therapist: "One of these days we have to get you into the kitchen"

Client: "For what?"

Therapist: "To cook"

Client: "I don't cook, only on Sunday"

Therapist: "Do you make lunch for your son?"

Client: "Yes in the morning, peanut butter and jelly sandwich"

Therapist: "Okay we will practice that and I will get the ingredients"

Client: "I like that" and she smiled.

At times therapists planned the session when they picked up the client or first saw them for their session knowing what was going to occur in the gym at that time as they commented to their clients: "We're going to join this group playing bingo to work on visual scanning and weight bearing through your hand". A therapist approached her client in the dinning room when it was time for her therapy and said: "We're going to make a Christmas craft, is that okay?" During the following session, while in the gym, a therapist said to her client at the start of the session: "What do you want to do?" When the client did not answer the therapist stated: "Why we stand do you play cards?" "Do you play solitaire?"

On several occasions the therapist decided what interventions to do during the session. Therapist C and her student were working with a client in gym B, sitting on the couch folding clothes. When the student finished with the clothes she had time left so

she had the client reach for objects on the coffee table and attempt to turn the pages of the book on the table. When working with another client, Therapist C had a client with limited balance sitting at the edge of a mat. Once the client finished reaching to the target the therapist visually scanned the room to find something else to do, especially something that was within her reach as she could not leave the client to retrieve anything. There was a shipping box on a table sitting next to her and she reached into the box and pulled out a piece of therapy equipment and stated: "I was going to send this back (piece of equipment) but I guess I will use it".

The therapist had opened the box previously and decided it was not what she wanted. She proceeded to use the pegboard with her client as it was all she could retrieve. It appeared that more of the activities completed in the gym environment were planned at the start of the session or during the session and they incorporated preparatory methods. Occupation-based interventions were planned in advance in order to buy food resources or set up the environment for the intervention.

Theme 3 - The Relevance of the Gym

Gym A has counter desk space for all the therapists to share, client charts, phones and therapy equipment. Off one side of the gym the case managers and the therapy and nurse coordinators have offices. The nurse's station and doctors desk is connected to the other side of the gym making everyone on the stroke program connected by the space in gym A. Besides treatment the stroke team also used gym A at lunch to meet to discuss client status and progress two times weekly. Gym A (Figure 5.2) has three mats, two arm bikes, four steps with handrails, stall bars, a round table, a U shaped table, two Nustep bikes and a rickshaw within the treatment space. There are several desk chairs and stools that move around the space to use when needed. The three storage cabinets create a wall

to separate the desk counter and the treatment space. There is a large sky light over the round table and the sidewalls have the top half as windows for families to observe. Gym A was at the core of all the activity on the program and where the majority of the staff was at any one time.

Therapists used the gym in 61.4% of their intervention time, which was the most compared to other interventions, 12.5% in the combination room and 26.1% in a home-like environment. In the gym the therapists would have clients participate in groups together around the round table and work next to each other to share experiences. One therapist had a client standing at the table going through a recipe box to choose what she wanted to cook. Another therapist was also at the table working with a client and the first therapist kept engaging her in a conversation about good recipes for her to cook for her family. On another occasion a therapist believed that she needed help to manage her client sitting at the edge of the mat so she asked another occupational therapist to help her and they treated together in gym A. Therapists looked to group their clients especially when working at the round table under the skylight. For example, Therapist B and E each had a client standing at the round table playing a card game. Therapist B needed to respond to a scheduling issue and stepped away, but only because Therapist E was there to carry on the game.

Therapists worked together in the gym sharing equipment and helping each other out. One therapist had placed a vibrator on the mat and then left to get her client, when she returned it was gone but another therapist that was using it yelled over: “You can have the vibrator back soon”. On another occasion three therapists had clients standing at the table playing UNO. One of them was able to talk about their equipment to the other

therapists at the table asking: “Where did all the card holders go?” During the group the therapists joked with people in the group. One of the clients laughed 2-3 times during the session and the therapists laughed even more. They also discussed using mirror therapy, an evidence-based intervention technique, for clients recovering from a stroke. Yet this technique has not been observed occurring to date. The group ended with a discussion about animal cracker cookies that a family member brought in. While in a beach volleyball group, two therapists discussed one of the therapists son’s science fair project and how the science fair was at school. During one session near the end of the Study One a therapist was with her client at the table and another therapist had a client on the rickshaw machine 5 feet away and the two therapists had a conversation about their hair cuts and stated: “I know she was supposed to dry cut it” the other therapist said: “ she cut the front a little shorter than I wanted”.

One of the clients was able to propel herself in her wheelchair and read her paper schedule that was placed on her wheelchair armrest daily, which allowed her to meet her therapists for her therapy sessions. This client figured out where the best place was to meet her therapist so at the start of several sessions the client was observed to come into the gym and sit near a table to wait for her therapist or to be talking to her peers in the gym while they all waited for therapy. Her speech therapist also recognized that gym A was the best place to drop her off for her occupational therapy sessions and did so on several occasions when the speech session had concluded just before her occupational therapy session. Once in the gym they tended to stay there for her interventions. For this client, it appeared that if the environment was chosen such as the gym, preparatory methods followed. During another session the husband of this same client was observing

a therapy session and asked the therapist about his wife's results from a medical test. The therapist shared that she was not aware of the results yet, but just as she finished speaking the doctor walked into gym A and talked to the husband about the test results while the wife was participating in therapy.

New to this phase, were having both the occupational and the physical therapists treating in the same gym. For every session in the gym the therapists worked side by side. Clearly this set up could improve communication among the team, but often it just seemed crowded and noisy with sometimes more than 20 people in the gym. This would include therapists, clients, family members and students. In addition, medical staff would come in to see the clients. Therefore, being in the gym could foster a sense of being exposed to other clients, students and family members watching you, possibly making the client feel more vulnerable and increasing their person-environment imbalance. One day a worker from maintenance was in the gym installing a wire basket on the wall and he was talking loudly over the clients and therapists in the middle of the gym to a staff member on the other side of the gym about the placement of the next basket. The crowding appeared to limit the therapist's ability to move within the space, as all the areas were full, so they often worked in one place and stayed. The therapists seemed to be in a constant state of adaptation.

Clients come to gym A for both occupational and physical therapy services. Both therapies used preparatory methods to address impairments so it may have been difficult for the client to distinguish which discipline a therapist represented and which service they were receiving. For example, the occupational therapists often had their clients standing at the table engaging in a task, and the physical therapists had clients stand in

the stall bars, or they both had their clients work on the mats doing exercises. The gym was a place where most of the client's needs could be met from therapy, to case management with planning to go home, to medical needs.

Significant activity occurred in gym A for all the staff and clients on the stroke program, especially as compared to Phase One when only the occupational therapists predominantly provided intervention in their gym. Previously, the case managers, nurses and doctors would come into the occupational therapy gym at times but it did not occur daily and only for brief encounters. In Phase Two gym A was a shared communal space. The gym environment has a strong attraction for the therapists and once in the gym the intervention tended to be preparatory methods or purposeful activities, limiting occupation-based interventions.

Theme 4 - Communication in a Partnership vs. a Hierarchy

Therapists demonstrated the same communication styles as seen in Phase One: sharing of information, working as partners, telling a client what is expected or not clearly explaining a procedure being done. It appeared that communication styles in the gym focused on body parts or body movements. To start a session, while sitting at a table in the gym, one of the therapists asked her client what she wanted to work on and then while the client was working the therapist was solely focused on writing her notes. The client was observed to disengage in the activity while the therapist focused on her notes. While sitting on the mat exercising, during a different session, a therapist and her student discussed the client like she was not present in the session. The therapist said: "Make sure she isn't hiking her shoulder". While sitting on a mat in the gym unclear communication was observed as the therapist said to a client during range of motion exercise with his arm: "Looks like you have some energy in your arm", and nothing else to clarify this

statement. Another therapist said: “Put the baby in the cradle” referring to the client putting his affected arm into the arm trough on the wheelchair, or “We’ll work on your arm tomorrow”. On another occasion when working with a client in the gym in an attempt to increase the client’s ability to move their arm, a therapist stated: “Triceps not kicked in yet” and “She got a better stretch (after facilitation)” and after mispronouncing a few words to her client with aphasia, a therapist said to her client: “I can’t talk, you’re rubbing off on me”. After finishing a task in the dining room one of the therapists was talking to a client about her unsupervised self-transfer behavior and she laughed between her comments, decreasing the importance of the conversation, it went as follows:

> *“The nurse said she caught you yesterday going to the bathroom by yourself, she did say that your wheelchair looked good”, Therapist laughed,*
>
> *Client: “It was”*
>
> *Therapist: “Did you push your call light?*
>
> *Client: “No”*
>
> *Therapist: “Sometimes you forget to put on your brakes”,*
>
> *Client: “I’ll get em.”*

The therapist did not reiterate any safety precautions. On her way into the gym with a client a therapist was observed to invite her client to make a Christmas ornament at the table. A peer and another therapist were already at the table. The therapists did not introduce the clients that were doing the same activity sitting across the table from each other.

Therapists also communicated in positive ways, working to build a partnership, as a therapist commented: “What thing do you feel, you’re getting the most out of being here?” The client did not respond, so the therapist stated: “You’re getting stronger”, Client: “Yeah.” The therapist explained to her client what occupational therapy is, when she said: “I am your occupational therapist and I will work with you to get better at your self care skills and things you want to do better, you will have to fill me in on what that is later.” When working with another client the therapist was asked several times why she was doing a certain technique and she explained about applying some kinesiotape: “to decrease some of your pain”. The same therapist described why she was going to use the fluiodotherapy machine as an intervention: “Remember what we talked about the other day, the box that you can put your arm in to help you feel it better?” At the end of this session the client asked for this to be done every day. The therapist also described what she meant when she said:

> *“she is getting more” (range of motion in shoulder rotation), right now you have 2 ways to move your arm, one backwards and one forward, right now the ones that pull you forward are stronger which is normal for someone after a stroke”*

The information shared seemed to be enough for the client to understand, at that moment, what was happening and how she was progressing. While working with the same client the therapist was observed to make and sustain eye contact and talk very close to her client, appearing focused on the client and the conversation. She stated: Therapist- “ I will see you at 1:30pm, you have a busy schedule”, Client- “I love it”, Therapist- “I know you like to keep busy”, Client- “Yeah.” The therapist was aware what her client liked and

what made her feel good. The therapy gym environment was a space where before their stroke, the clients had very little exposure, but now where they spent most of their time in the hospital. The language and equipment used in this space seemed foreign to the clients and required more explanation and compassion for them to participate in and comprehend.

Therapists often joked and played with the client. For example, a therapist was attempting to motivate her client to perform a task correctly with her family watching. The client changed the task and made her movement in a shorter excursion. So the therapist said: “push, push, hit me, you’re cheating” to facilitate elbow extension. A family member said “She’s cheating, she is good at it”, and all laughed. Then one therapist called for the client to do a princess wave and everyone laughed again. The same client one day presented with a design on her wrist and the therapist said: “Is that a tattoo or did someone draw it”, Client- “my daughter did it”, Therapist- “it looks like a stamp from a bar and that she’s been out partying”, laughter followed from family. It was unclear if clients always understood that their therapist was joking. On one occasion the therapist was describing how to do a task, and a client with aphasia said something that was unrecognizable but said with a strong tone and inflection. The therapist responded by saying: “I don’t like your tone”, Client- “I don’t know what I am doing”, Therapist- “It helps you understand, it helps your hand and your sitting here by yourself we’re working on lots of things”, Client- “okay, okay”.

Therapists used a variety of communication styles to share their clinical reasoning skills to facilitate participation in therapy. Some were supportive and others not. Most often when in the gym talking about the client the therapist focused on the client’s body

part and not them as a holistic being. Also since the equipment in the gym was unfamiliar the clients needed more direction and guidance to learn how to use. Communicating to build a therapeutic partnership requires effective exchange of information in a supportive environment.

Vignettes

Once again to demonstrate the influence of time and space during the clients' admission and to give more detail on specific interventions, two therapist cases were chosen to highlight for Phase Two.

Vignette C

(Refer to Table 5.11, Figures 5.34 and 5.35)

Therapist C, with less than 7 years of experience provided intervention to her second client in Phase Two, C2. Her therapy sessions were plotted on the quadrant tracking form in Figure 5.34. This client was observed receiving occupational therapy for a total of 17 sessions and 21 mini sessions. Over 80% of the therapy sessions were completed in gym A with almost every activity occurring in one place within the gym for each session. While in gym A, 33% of the interventions were completed on the mats and 33% at the two tables and 14% in the open space in the gym. Therapist C chose to work in a home-like environment for four sessions or19% of the time. Three of the four sessions were completed in the dining room: filling out her menu, making a sandwich and playing volleyball. She was also in her room once working on transfers, going to the bathroom. Of the 21 sessions of occupational therapy, three interventions were occupation-based.

Vignette D

(Refer to Table 5.12, Figures 5.36 and 5.37).

Therapist E had less than seven years of experience and delivered 12 sessions of occupational therapy in Phase Two to E1. His therapy sessions were plotted on the quadrant tracking form in Figure 5.36. Only 41% of E1 therapy sessions were completed in gym A and 53% were offered in home-like environments, which was a change from Phase One when this same therapist used the gym 100% of the time to provided 100% preparatory interventions. This client did request to brush his teeth and use the restroom each morning after breakfast, which was when the client received most of his observed occupational therapy sessions contributing to more occupation-based interventions being used in therapy.

Both clients had similar initial FIM scores; 2C2- 74 and 2E1- 69 and discharge FIM scores; 2C2- 130 and 2E1- 138 but very different length of stay efficiencies; 2C2- 1.65 and 2E1- 2.65. Therapist C's client was admitted for 38 days and Therapist E's client was admitted for 26 days and each had a very different environment and intervention trajectory.

Phase Three

Qualitative Results

This phase consisted of the three occupational therapists participating in a wrap up meeting and individual interviews lead by the primary investigator. The therapists chose the time to meet after work with the wrap up meeting lasting two hours and the individual interviews lasting approximately one hour. All the interviews were conducted in the educational meeting rooms at the facility where they worked. Snacks and drinks were served during the interviews. The group and the individual interviews were held within a week of each other with each interview being transcribed, by the primary investigator,

immediately to guide the questions for the next meeting. In all of the interviews open-ended questions were posed about the therapists' perceptions of therapeutic environment, the state of their current practice, and the manner in which they felt the environment influenced their interventions, for example;

1. How you decide what interventions to work on with your clients?
2. How do you think the environment influences what you do in therapy?
3. How do you communicate with your client in terms of goals, and explaining activities?
4. How does habit influence your treatment sessions?
5. Can you talk about what gym A means to you and what do you think about when you are planning your interventions in this space?
6. What are your thoughts about this project, in particular the idea that the environment is such an influence on intervention, clinical decision making, and habit making, etc.?

Four primary themes emerged from the interview data analyses.

Theme 1 - The Relationship of the Environment to the Intervention

The majority of the time the therapists chose to work in the gym when providing therapy to their clients. The therapists shared how they planned their therapy sessions, particularly which they decided first; the environment or the intervention. They commented: "The intervention", "I think the intervention I would say that I do the intervention first", "I would think intervention because I already have an idea in my head of what I want to do but it is constantly changing". Interestingly, after more time to reflect and listening during the interviews about the therapy environment, two of the three therapists realized that the environment had more an influence on their practice. When

asked again about what had an influence on their practice during their individual interviews, the two therapists answered: “Probably the environment, I see that I am going to change my thinking about the environment, it is important to include the environment in your planning of a session”, “Yeah probably the environment”. One of the two therapists shared that she predominately chose the gym to provide therapy and if she chose this first then more than likely the intervention would be, preparatory in nature. She said:

> *“So well if I am going with gym A which is usually 99.9% of the time…then um some kind of mat work, some kind of exercise wither it be Saratoga, rickshaw, theraband, theraputty, um standing activities, um energy endurance activities comes next.”*

The therapist with the most experience did not shift her belief during the interviews and chose intervention first on both accounts. She said:

> *“I still think though I do the intervention first, you mean I am going to think about what I want to do and maybe, I am not going to be in gym A, maybe I am going to be in the room, maybe I am going to be out in the dining area, I have even taken people down to the atrium, um so I still think though I do the intervention before I do the environment”*

This therapist’s perception was also aligned with what was observed as she chose to work in the gym the least 68% as compared to the other two, 71% and 74%. She also used the most occupation-based interventions (22%) with the other two therapists using them 19% and 17%. Therefore, if the therapists chose the gym to work in, they more than likely chose preparatory methods as the intervention, further validating a relationship amongst

the two. One therapist confirmed this thinking when asked if the gym supported more preparatory or more occupation-based, she said: "More preparatory". When sharing about how the current gyms supported their practice patterns, one therapist stated:

> *"um it provides I guess a lot of the basic, I mean the close environment to help if I need it and I have got the mats for the preparatory activities I have got a standing table um plus the rooms are close to the gym so if we need want to go back to the room to work on stuff so its and that the small kitchen area right there in the dining room where we have a microwave and sink like that are close so we can go there"*

Another therapist responded:

> *"Well I think their ever changing, I mean I think this is where the environment does sort of you know run the train"*

She further defined this as:

> *"I mean if you're put in an environment you know that where you have to work this is what it is, you still have to do what you feel you need to do but you have to change to change your habits to fit into that environment…"*

She then shared that her intervention habits had been adapted recently to a more of a preparatory approach.

The therapists described several benefits of gym A and how it contributed to their practice. One said:

"I think the proximity to the nurses station especially for people that is the one thing I am not looking forward to when we go to gym B, that is the one thing I am concerned about"

"It's great if we have a client that has medical needs, they are always there to help"

When speculating about the interventions completed in the gym a discussion revolved around if certain therapy tasks did not require clinical reasoning and allowed the therapist's attention to wander. One therapist commented that she believed this to be true and she commented on what those interventions would be:

"Probably yes, the ones that require less steps, require less something that a patient can work on a little more independently, um there is activity like um puzzles or parquetry, that someone can if I know have to work but its bad, but if I know I have to work on something I can set somebody, now some patients you can't so you have to be one to one with those activities it just kind of depends on the patient and some patients enjoy sitting and working especially if their not talkers, if their more alone kind of people they just kind of want to work on something till they get it right or something like that they like to sit and do that but ah Saratoga, rickshaw, things that require repetition um but yeah"

Since so much preparatory work was done in the gym a discussion occurred if the therapists ever considered using occupations as interventions to accomplish the same effect that preparatory methods did, especially core strengthening. They said:

"I think it is easier to do on the bed or mat then picking out a therapeutic activity (occupation-based) to address those things (core strengthening) and have it all but you have to be somewhat organized and have everything ready form end to end and planned (for occupation-based) but it would be much more therapeutic for it to be planned but its not always unless I have been able to get everything out and if you need to get anything at the store or wherever you now having it all together"

"You know I usually don't and you brought that up and I thought to myself you know I don't even know if I know how to do that (occupation-based) but I would say no"

"Usually you don't think about it (occupation-based) for the gym"

All the therapists valued the combination room to provide different opportunities for their clients. The therapists thought that gym B offered:

"A reality check"

"I mean a familiar environment"

"It gives them confidence that yeah I can do it"

"Um I mean for people that have been in the hospital for such a long time that is it gives them a sense of home just gives them something more home, like the light at the end of the tunnel…"

"Something like home, something like if I can do this it's that much closer I guess"

They also felt that it was important as a rehabilitation hospital to offer home-like environments, as they said:

> *"I think being a rehab center we are saying that you know, were wanting you to go home"*
>
> *"So it would behoove us, this is how replicating home you know"*
>
> *"Because then when we fill the hospital with what's in a house you know with things that are familiar"*

Lastly, when the conversation moved to a home-like natural environment they shared that everyone should use a home-like space for their interventions, but one barrier seemed to stop them the most from using it: "See it and use it". They commented in both the wrap up group and individual interviews that since the equipment was no longer out in the gym and visible in the new building, it was not being used. They reported that they needed to see the occupation-based equipment to plan to use it, as one said: "Occupations before were part of the space", When sharing their thoughts about the study, one of the therapists stated: "It is eye opening".

The therapists were thoughtful in their responses with each contemplating the challenge at hand. At the end of each individual interview, the therapists were asked to complete a metaphor; providing occupation-based therapy in a gym is like… They said:

> *"Difficult because it is an exercise gym and it's too crowded"*
>
> *"Swimming in the Sahara, … that is a little much I guess"*
>
> *"It's not always easy, it really isn't… it's like pulling a needle in a haystack if that is more metaphorical but it really take specific*

occupation-based, it takes a lot more thinking, lately, we have a lot less of our kits. I don't know if you necessarily need a kit like an occupation kit but we used to have those right at hand, but unfortunately we have become so scheduled based so time oriented that we have to, what is at our finger tips is what we use"

The therapists demonstrated that if they chose the gym to provide therapy then most likely the intervention was associated was preparatory methods and they may have selected it out of habit. A relationship was also identified between occupation-based interventions and home-like environments. Purposeful activities seemed to lend themselves to being used in all three environments with no specific relationship identified. Rehabilitation hospitals should provided home-like experiences as it builds confidence for the clients to return home and "provides a reality check".

Theme 2 - Clinical Reasoning vs. Habits

The therapists shared that they began planning intervention strategies based on the client's interests and possibly their level of functioning, as they shared:

"Give by what they want, I mean if they have specific things they want to work on in a given day"

"As they relate to their goals"

"For me its their level of functioning at that point, it they have a flaccid upper extremity its much different than if someone has active movement, if your someone who has trunk control, it's a different situation compared to someone who can't even hold their head up"

"So it's their level of functioning and where they are so that is the piece of the puzzle"

The therapists reported that sometimes they planned ahead, even as much as a day, and other times it was when they started therapy. The therapists discussed their different procedures as they said:

"I usually have some concept before I go in"

"I typically know what I want to work on in that treatment session"

"Yeah in general I pretty much know what I am going to work on in a three week period, so if you'reworking on sitting balance or trunk control and I am going to be working on those things"

In their individual interviews the same question was asked for clarification of when they plan their sessions, they stated:

"I probably plan 5% the day before when I am writing my notes, 5 % when I am making my schedule for the next day and 5% that morning, so that leaves 85% for when the session starts"

"Probably maybe 25% the day before, uh probably another 25% in the morning and then the rest probably closer to the specific session…if something came up if I have them later in the day and something came up in the morning and we need to address that rather than what I had planned uh, I mean things come up"

"You know I would say its 50:50, you know 50% after we do the session of the day I think well you know we need to continue on

working whatever, it's not there where I want it to be, um you know and a lot of times the day if I do an ADL and there are things I pick up from that, a lot of its okay either I do splinter ADL skills or more of the components and then 50% when you pick them up"

They also shared when during the day they plan their intervention sessions, and reported:

"When I am doing my schedule in the afternoon"

"Between 8 and 9"

"I mean if the client says something I will jot it down so I can make sure I can call it up for the next time or if the family member says something"

"Especially the day before if they say something, it will spark an idea so that the next day you can"

"It is the best day when I plan the day before when I am writing their note"

"I'm definitely a morning person I mean I just function better in the morning, um you know I like to look at my schedule and kind of do it before, so say 8:30-9:00 that period of time"

When asked what helped or interfered with their planning the therapists shared what hindered their ability to plan ahead, they commented:

"Not enough time, its always a time factor, um knowing what I want and not being able to find what I want now, you know, has anyone

seen this, you know was it here on the shelve, it was supposed to be here on this shelf in the cabinet, you know, where is it?"

"Other deadlines always interfere with planning interventions"

Then the therapists discussed how the environment influenced their decisions to plan interventions and stated:

"…I am like the same thing with the clinical decision making but again you have the environment that you know you have to work in so it does effect what decisions your going to make all the time…"

At the end of the individual interviews the therapists were able to reflect about the influence of the environment with a different perspective and said:

"The environment is important to make decisions"

"Well I think I don't know if it is something that I have ever give a whole lot of thought to, I mean you think about it but to really in such a structured way as you have been sort of questioning us, it really sort of thinking about like what do you do first, and how do you do that, so that has been interesting to me um because I have never given it that structured thought of how much the environment plays on it even though you know it does so that has been very curious to me to sort of um think about that a little bit more"

The therapists described their typical interventions used in gym A. They shared:

"Mat work, standing because with have that high low table"

"It's a good round table to start conversing with"

"Socialization"

"Sometimes we just do therapeutic ex, the Saratoga cycle, you know so…"

During the interviews the therapists often categorized their clients into two categories, higher and lower level, referring to their level of occupational performance, and stated:

"If I had someone higher level it would be easier to take them over there (gym B) and I just feel like the lower level people or I am not thinking there (gym B) with them…"

"Its kind of like a spectrum if you think of it, like the autism spectrum, its like a stroke spectrum, I mean you may have a right CVA then you have high end and low end and everywhere in between I mean its just or left its just all, but yeah we do classify them…"

"And you can have someone who is higher level motor wise and have lower cognition which really throws you for a loop and that something we preach to students all the time, there is no cookie cutter stroke, you have a million stroke patients and every single one is going to be different"

"But we do talk about it, now that I mean now that I am thinking about it, we do tend to classify them into levels"

When planning therapy sessions with their clients the therapists were able to share their decision-making processes. They started with how they chose the environment or the intervention and revealed:

"Well I only use the dining room lounge area if I am going to be doing a ball activity that I need space for or with a group"

"I use the kitchen to microwave, um activities, drink of water, getting the walker in to the fridge, stuff like that, being able to reach into high enough cabinets, um we have done some pudding, peanut butter sandwich, things that don't require an oven"

"Well it depends on what I am going to do with the person and what they need and what their weaknesses are, I mean obviously someone who doesn't do kitchen I don't typically although I might have em get water out of the refrigerator, or get themselves a glass of water from the sink you know"

"If you take longer to get into the gym or something else comes up and then you go to the gym and its full or busy or something is going on then we will change course and do something else or come up with a way to do that activity in their room or some where else or whatever um or if they have to go to the bathroom then you end up going back to their room or if there not feeling well then they need to lay down and see what you can do from bed level"

The therapists reflected on if they used a decision making process or relied on habits when providing interventions in the gym. They said:

> *"I think some days are so rushed and busy so you're not thinking about how can I adapt this therapy session pertaining to what they need to work on, lots of times it just convenience and quicker and easier to (fall back on habits)"*

> *"I think habits are an issue, I mean I know, I know myself I am a creature of habit, probably I have to constantly make an effort to break up that habit"*

> *"I think I have a tendency to choose the same thing because one I am a creature of habit and I know where they are"*

> *"I do think about it whether I always do it, I think I do tend to fall into a routine, it's a fall back just because time crunch and it becomes second nature, just to go which tends to be a bad thing but you get stuck in those cycles of this person comes in, you do this, do this, do this"*

The therapists further discussed what fostered their habits and how they were able to free themselves from relying on them, they said:

> *"By consciously, I mean it is a conscious decision, like where I would say okay I did weight bearing okay besides that what else can I do because you know you get into that sequence of you know, the activity and the treatment interventions"*

"It kind of lends itself to a person of habit, um I think sometimes when we get a client that is unusual or higher level or really lower level, especially the higher level than breaks you out of it, because its like it ain't going to work with him"

"Habits are strong"

"Convenience"

"Time factor"

"You know, nope that's not going to work, so sometimes the client themselves kind of sort of takes you out of that"

The therapists discussed that relying on habits to provide therapy may have an impact on their client's outcomes, as they shared:

"They (clients) probably could benefit if it was something more engaging (intervention) but um you know"

"I think that they have such trust and confidence in what we are going to do with them and it's almost like they don't know what there missing"

"Its almost like they're like a little kid, I don't know what that is, but hey you know I feel taken care of, I feel like they're listening to me I trust that you know what your doing, now in my head I am thinking okay like a parent does, you know I can do better on certain days, but you know I don't know that they know that"

Yet, the therapists felt that their clients valued the experiences they provided for them in gym A, more than in gym B, especially the groups, as they indicated with their comments:

"…Today with your lady, you know I want to do standing, over there is someone else and she is also aphasic"

"Needed to work on that so that's nice, because you kind of have that kind of group and I think patients that like to"

"And they both loved it"

"You know so it's very therapeutic for them also"

"Yeah you know they communicate and had similar interests and you know"

"I mean if we were in B (gym B) I don't know those people you know when you want to group people together and you know are going to work well"

"Like today one therapist said are you having that 9 o'clock person all the time because I have a lady that would get along well with your lady"

The therapists were able to recognize that if they didn't plan an intervention ahead of time then the session would become focused on one specific approach. One therapist stated: "If I don't plan, I fall into habits which is usually preparatory."

The therapists shared how they decided to progress a client during their admission, they said:

"I usually introduce more ADL's the week before when they're ready for discharge, I guess I should introduce them sooner"

"Um I think I definitely start with the preparatory to do a lot of assessment initially to see where their full deficits are to see what all we need to work on and then try to incorporate, I mean without the purposeful they tend unless someone is very exercise driven and you will se those right off the bat, you see okay how many repetitions you want me to do or you know keep going, lets, they will be very focused on how much how much strengthening and all that we need to do, but um" "I'll try to progress something purposeful something that they want to do versus just range of motion, um finding ways to incorporate, like if someone has a flaacid upper extremity that becomes difficult especially if they're there for a while just if your not seeing that progression you kind of hit a little bit of a rut"

"It's almost like a check off list, its kind of weird to think, okay they can do this so alright lets move onto this, okay so if I can dress myself so then we don't need to worry about that lets go on to okay, well what do they need to be doing, okay we need to be able to get so lets go there okay, if somebody gets stuck on being able to sit up that's where I am going to start and I stay there until we start you know, its more of like the basic"

At the end of the interviews, the therapists were able to discern the requirements for a valuable occupational therapy sessions or what is defined as a skilled service versus

a non-skilled service. They defined a skilled service as one with clinical reasoning and decision-making as compared to a session that relied on habits. They commented:

> *"To be able to make decisions and adapt during, attending the whole session and not being distracted"*
>
> *"You have to be in the treatment"*
>
> *"Exactly in that zone you have to be"*

They also commented that using communication skills was the way to share clinical reasoning skills with the client.

During the skilled service discussion the therapists shared that when they provide preparatory methods in the gym they often fall out of the zone and lose attention to the task. The therapists commented about their ability to attend to the task and said:

> *"Probably quite a bit, I mean I do tend, I know, when I am doing range of motion and things, if it's very not routine kind of routine, I mean, I just kind of get into the same doing certain repetitions, going um I'm may not be cueing them as much if I am doing a specific activity or I tend to daze off um if I am thinking about something that I need to be doing later in the day, um or if people come in and ask questions, I tend to be one of the people that knows all of the phone numbers, so hey, what is, what number is this what number is that so I am throwing those out while their working on activities, not exactly the best devotion to"*

One therapist proposed that occupation-based interventions required more from the therapist. She said:

> *"Ow, it takes a lot more skill and a lot more skilled service to figure out how to do the occupations, to meet the goals than it does just preparatory work, like you were saying you know it takes a lot more thinking and um being creative and trying to figure that out, I think"*

An important issue that came up for the therapists was the amount of space and its use since moving into the new building. In Phase One in the old building the occupational therapists had their own gym and were free to design it however they chose. In the new building all the equipment needed to be put away after its use and there were fewer closets to store items. Hence, there were fewer pieces of equipment for the therapists to choose from for interventions. Further limiting what was available in the gym. One therapist commented that she did not feel she could fill the gym with occupation-based activities like she used to bring in from home. She reported that this feeling was a change for her since Phase one. The therapists expressed their feelings about this situation, saying:

> *"I think that it is so…that you don't want to take up the space… I mean that is my value and maybe no one else feels that way"*

> *"…Don't think maybe I am being too respectful because PT's are in there so I am not going to bring in you know a popcorn maker or I don't just something you know and that's what I am saying to me I feel much more restricted"*

"And there is no where to put it"

"…That's why we didn't do any Christmas cards, so there is not a place to set that up, you know we don't have that anymore you know and patients could just go back and that was a staple you know you just don't feel like you can take up space. I mean we have the round table and that other table that we can use"

"A client got us a wooden plaque and said it would be really nice for you guys to put it up in here, we were told, you can put it back in the back storeroom where all you're, the junk room, I don't know what to call it, the storage room, so actually what it is it's pushed up against the desk, but I mean its not hung and we were like that is from a patient you know, so, so I mean its still there"

Ironically, the therapists were able to move past this thinking when they had a student observing as their interventions were more occupation-based.. The therapists were asked if they prepared differently when they had a student with them, they stated:

"Absolutely, more occupation-based and I try to explain what I am doing more"

"Um I try to have more prepared, before hand, so I can spend more of my time instead of me thinking of what I need to get, I can have it already so I can be explaining and be able to just takes a little less brain power"

"I can divide my attention differently, I try to do more occupation-based because I feel it is what I should be doing, laughter, even though I tend to fall into the rut of um you know there still is a time and place for all the different, but they, I mean that is definitely I am definitely preparing for I try to think through everything before I go in"

"A difference in (pause), um, I'm trying to think of even how to answer this, I guess a little more as thought of what is going I guess I thought of going more into ahead of time, than during the actual session so thinking before hand what is going what will they want to do what will they um what do they like to do where do they need to be challenged what do they need to be doing and is there something if this happens what am I going to need to grab um so all that that thought is going in before versus during"

Therapists identified that habits were the driving force for their intervention sessions in the gym unless they planned their interventions ahead of time. On average, the occupational therapists planned their interventions 38% of the time before the session. By the end of the study the therapists acknowledged that the environment influenced their interventions and if they chose the gym to practice in most likely they used preparatory methods as that was their routine. In addition, providing preparatory methods was risky because the therapists may "fall out of the zone" during a session.

Theme 3 - The Relevance of the Gym

Gym A was at the center of the stroke program. The gym was surrounded by half walls with windows on the top, and the client rooms bordering all sides. The gym was a

hub, where therapy occurred and all staff converged. The gym could be overcrowded and overwhelming yet it provided great support and a sense of camaraderie for the therapists. The therapists spoke about the location of gym A:

"It's huge"

"You see it its just right there in the midst in the center and the nursing unit is right there so you can see everybody, you know what all is going on and in gym B, is off the hallway its out of site"

Then they referred to gym B, as a place where the camaraderie does not exist. They said: "I mean people don't even know its there", "Yeah its out of sight out of mind". One therapist gave an example of the nurses not knowing where gym B was, as she said:

"Because there was a code the other day, up in gym B and the nurses didn't even know where to go to the code"

"So it might be if their looking for a client they don't even go into gym B and that is why I stopped, one of the reasons I stopped going down there"

"Because they couldn't find the patients, because they only go to A"

"And it is considered off the unit (gym B), yeah we have to sign them out" (to go to gym B)

The therapists were asked what they thought the client perceived while being in gym A, and they stated: "Well I feel like I am in a fish bowl", "I can't stand all the windows around there", "It's a lot", "People go stand at the window, like family members,

strangers, visitors". One therapist concluded about gym A that: "I feel that it absolutely squelches my creativity".

The therapists were also asked about the ambiance of the new building while comparing it to their old program, they said:

"I like it (new building) I think it looks very nice, the patients love it, I mean I have not heard one person complain about, I mean everyone has commented on how nice it is, much more spacious, more homey"

"It hits me when I go back" (to the old building)

"And you never realized"

"And I used to think it looked really nice" (the old building)

"And I thought it looked nice" (the old building)

Throughout the study it was clear that the therapists had a strong desire to provide therapy in gym A. When asked where would they treat if they needed help with a client they empathically answered: "Gym A", "Gym A", "Um hm" (in agreement of gym A). Therefore, they said that they didn't always have a choice when treating some of their clients and had to go into gym A. If there was ever a question of possibly needing help they went to gym A, they said: "Sure I am not going to take any chances", "Absolutely" (going into gym A).

There was a strong camaraderie amongst the team as the therapists talked about their work together in gym A:

"I think it's the old adage you know that were all in this together"

"And life is getting hard, you know if she gets in a bind, hey I can, I am ready to do, I think anyone of us are ready to do that for anyone of us, and I think that is one of the nice things about being on the stroke unit its that like I did that for you and so you do for you know all… "

Having extra people around them in gym A was a bonus compared to when they were treating by themselves in a client room. A therapist commented about her need for physical and emotional support for her to be able to modify tasks during her session. She said:

"If it is safe for us to get up and leave then we will get up and get the equipment or use an aide, some days it is a luxury of having how many therapists in the gym, is nice to have the extra hands"

The therapists believed that they could find help in other places but it was not as convenient. If they had to move environments, they talked about how they would adapt, they said:

"You have to make different arrangements I mean"

"You would have to, I mean we could arrange for an OT to come down with you, if you wanted to go to the other gym"

"I am sure if I was in gym B someone would come"

The therapists were hesitant to put themselves in a situation where help was not readily available. They commented.

"Where in the other gym you may not always feel as comfortable asking people you're not always working around"

"I mean if we were in gym B, I don't know those people, you know, when you want to group people together and you know who is going to work well"

"Yeah you know they communicate and had similar interests and you know"

When both occupational and physical therapists used similar activities and environments there was not a clear delineation between the roles and disciplines. The therapists said:

"I think, also I feel though like OT should look different than PT, you know now it is the therapy gym but I still like it to look different, you know that is just my own"

"'You know …I don't think there is anything that is unique that says either discipline that is just my feeling"

"There is no poster, we used to have posters and stuff up around the room so at least we had it identifying OT and a couple of you know OT kind of looking things"

"I mean in the long down the road, I am afraid we are going to lose out, I really am."

"Well, I mean I think that if a facility has an opportunity to hire an OT or a PT they would select a PT. I mean that's just my feeling and I see in the future I'm just not sure with the way health care and everything is going, um where are we going to come out in the whole deal."

"Yeah to me, yeah if I looked in there I would think that is the PT gym"

When asked if the current environment (gym A) supported what they wanted to do in practice, one said:

"I think that there is a community there which I think is important for the client to feel"

The therapists preferred to provide interventions in gym A as they had the support of the medical and therapy staff and were in the center of the program. The gym environment influenced the interventions conducted in gym A as they were preparatory in nature. The therapists were able to provide interventions elsewhere in the building but they did not feel that they had the same kind of support. It was also observed that there was little distinction between occupational and physical therapy practice when treating in a typical gym space.

Theme 4 - Communication: Whole vs. Part

The therapists in this study were observed to have varying communication styles, spanning from clear directives with compassionate comments, to using strong tones and vague directions during their therapy sessions. When asked if they were good communicators the therapists responded:

"I would like to think I am"

"I would like to think I am too"

"I think that I am but I think there is room for improvement on figuring out how best to communicate with those lower level patients, I mean with the higher level patients I think I communicate well but"

The therapists were confident that their client's understood what was communicated to them, as they shared: "Because they can attempt to give you a return demonstration of what you requested", "Yeah and if they continue to carry that on without you having to every time ask during the ADL". When asked what do they if the client had expressive communication issues, common in the stroke population, and were unable to respond verbally, they all agreed and stated: "You read their body language."
Nonetheless when asked if they had any training in communication skills while in their professional programs, they said:

"No I don't think so"

"That is something that I learned to do from working here and watching others, I don't think that I remember going through that in school"

"I think it is not something that I learned in OT school per se…"

On several occasions the clients were observed not to respond to the therapist's humor or sarcasm. As a matter of fact, a client demonstrated loss of facial expressions and difficulty responding to a joke. Being able to clearly communicate the therapeutic process is imperative to achieve occupational performance. When initiating therapy, the therapist and client formulate goals to strive for while in occupational therapy. The therapists were asked how they communicated to their clients so they can make the connection between their goals and the interventions used in therapy to share their clinical reasoning skills.They said:

"I try to always talk through, lets say were doing body work on the mat I am going to explain why I am having them do that for "

"That is why I really think that the ADL's are so important in the morning because you can pick up from there and say now do you remember this morning when we were sitting on the edge of the bed and we couldn't do this, is why we are doing this"

"You know and I mean and during the ADL I will say okay when you come down (to the therapy gym) I am going to work on your balance so when you start your pants your not going to fall over like you're doing now"

"Kind of makes the link in both places"

Practicing ADL's helped the client connect the impairment work in the gym to the occupational performance required during their ADL.

Since the therapists in the gym predominately chose preparatory methods as their intervention approach, one of the therapists was asked how they connected preparatory interventions with self care based goals, and she stated:

"Um I think we try to explain it to especially if they're like why am I doing this if they don't, some of them do question that or ask then we explain to them and like some make the connection um it also depends on how cognitively if their impaired or not um, I don't know"

The therapists shared if they thought communicating this was easy or hard, and one therapist stated:

"I think its not hard to do, but I think we more often than not have lower level patients, where we're not used to feeling like they care for us to explain and we have to think about how to explain when we actually have someone that is higher level, that does want to know why we are doing what we are doing, so it's a little bit more of"

Another therapist had a different thought when working with a client that was at a lower level possibly physically and cognitively as she said: "If they're not cognitively as intact then I won't waste the energy explaining it to them". The therapists recognized that their communication skills did affect their client therapy outcomes and how comfortable a client was in their therapy, as one commented:

"I mean I know I would want to have a say in what I was doing if I was in their shoes, I would want be able speak up in therapy, um … I would like them to say if there is something they want to do "

When the therapists were conversing with their clients, giving them instructions on how to move or sit in their wheel chair they spoke of the body part that was affected by the stroke instead of the client as a whole person. If the therapist had a student or family observing a therapy session, the same reference to the body part was made with a discussion of what therapy was doing to assist that body part. When the therapists were asked about the part vs. whole concept they commented:

"It could very well be, they I mean they get very focused on that especially the arm because they can see it…"

"It probably happens quite a bit"

"Yeah especially if your doing range of motion or if you're standing and explaining positioning of yourself and the positioning of the person and what's the best place for you to be versus where you know the pro and cons of everything"

"Yeah because they don't think about what they use that arm for before, I mean they don't think about where that hand comes into to steady an object or where the you know you need both feet to be able to stand or to walk around a kitchen safely, be able to keep your balance to carry a cup across the you know from the sink to the wherever, um I mean, I notice on myself you cut your thumb and you all of a sudden can't use your thumb and now there is a million things you can't do."

One therapist felt that it was the client's focus on their arm that directed her to make it a focal point for therapy, she said: "Yeah and their yeah, their focused so we get focused on it so and since that is what they want to do, we go with what their driven for".

Therapists believed they were good communicators and they learned their communication skills on the job by observing others. Some styles were observed to be effective and others led to client confusion impacting the therapeutic relationship. During therapy the occupational therapists were observed to refer to their clients more as body parts than a holistic being, which did not foster a therapeutic partnership. Different environments seemed to foster different conversation. Effective communication skills are an essential component to facilitate clinical reasoning skill and the interaction amongst the therapist, the intervention and the environment.

Discussion

The purpose of this study was to: 1) identify what interventions occupational therapists chose when they were treating in a therapy gym, gym/combination or practice apartment space, 2) determine if the intervention changed when the therapy environment became more home-like and, 3) explore how the equipment in the environment influenced the decisions the occupational therapists made. The discussion will focus on the outcomes that relate specifically to the research questions posed even though all the results are important for the future of occupational therapy practice.

Interventions Used in Rehabilitation Environments

The occupational therapists provided therapy in the gym environment most and predominately used preparatory methods in both phases of the study. Preparatory methods are "interventions used in preparation for and concurrently with the client for engagement in purposeful or occupation-based practice (AOTA, 2008). Next the therapists chose occupation-based interventions in a home-like environment. Least used was the combination room with purposeful activities. Other studies (Richards et al., 2005; Latham et al., 2006; Smallfield & Karges, 2009) also concluded a higher rate of preparatory methods compared to occupation-based interventions being used on an inpatient rehabilitation program. Unfortunately these studies did not reflect on the specific environment in which these interventions were delivered. Yet, one can speculate that therapy in these rehabilitation hospitals was conducted in either a therapy gym or a client room. Therefore the preferred rehabilitation environment was the therapy gym, which supports the use of preparatory methods and conversely, decreased opportunities to participate in occupations.

The standard intervention protocol for a client on an inpatient rehabilitation program is to receive a minimum of 60 minutes of occupational therapy five out of seven days per week. At this facility each therapist provided interventions to five to six clients per day. This study followed a client for one out of their two sessions per day for three days per week. Since this study only observed therapy in the gym, combination room or the home-like space the morning activity of daily living (ADL) session was not observed. These ADL sessions always focused more on occupation-based interventions, such as: clothes selection, dressing, grooming, bathing and using the bathroom. Due to the size of a therapist caseload and time allocation required, a client had roughly a 33% chance that they would receive an ADL session each day and a weekly average of one to two times to participate in an ADL. Therefore, it was possible for a client to have two sessions of therapy in one day and both occur in the gym. Would this give the client enough opportunity to apply the improvements made to their impairments from preparatory methods (ie. range of motion) to improve participation in occupations and increase the client's environment-person congruency (Livneh, 1987)? By the same token, is it beneficial for the occupational therapist to progress to purposeful activities, which are "interventions that facilitate the skill development that will ultimately enhance occupational engagement or performance (AOTA, 2008)? Even if the therapist introduces purposeful activities, AOTA (2005, p. 2) espouses that "isolated use of preparatory and purposeful activities is not occupation-based practice". AOTA champions the use and the connection of all three intervention approaches; preparatory methods, purposeful activities and occupation-based. Yet, the therapists in this study had never considered using occupation-based interventions in the gym.

Therapy Environment Becoming More Home-like

A shift in practice occurred from Phase One to Two with the therapists using more occupation-based interventions in home-like environments. They accomplished this shift by using the dining room and client rooms more as they felt the combination room that was available was not conveniently located and did not provide the physical support they thought they needed for their clients. The therapists liked how the combination room was set up but only used it when they specifically needed to practice transfers with the couch and recliner. Purposeful activities did not seem to be associated with a specific environment as they occurred in all three environments in both phases. Interestingly the therapists felt they provided less purposeful activities and occupation-based interventions in Phase Two since they did not have the same equipment in the gym. Interventions changed in Phase Two but it is difficult to conclude if it was because there were more occupation-based opportunities or the limitations of the gym such as noise, distractions, overcrowding and not feeling like they belonged may have contributed to this shift. Either way new practice patterns were developed to accommodate environmental changes in Phase Two.

The environment itself seemed to cultivate different behaviors for both the therapist and the client. The mere ambiance of the environment facilitated discussions regarding the context of the space; in the gym conversations consisted of impairments to body functions and structures and discussions in the home-like settings revolved around the client's home and their plans to return there. The clients seemed to be more engaged when completing occupation-based tasks in an home-like environment as they understood what was required and needed more direction to complete unfamiliar preparatory

methods in the gym. Providing occupation-based interventions in a home-like environment appeared to benefit the occupational therapists also. It captured the therapists' full attention so they were available to grade the task and interact with the client to build a therapeutic partnership.

The therapists believed that offering home-like environments provided a reality check for their clients and was imperative to use before the client was discharged. The therapists wanted to provide occupation-based interventions but the environment created challenges. Changing the environment to create a home-like space provided further evidence that a relationship exists between the rehabilitation environment and the interventions used by the occupational therapists. Occupational therapists need to realize that the gym, where most therapy occurred, was found to support preparatory methods and home-like spaces promoted occupation-based interventions (Figures 5.11 & 5.27). Moreover a therapist needs to understand that the environment creates a context for specific interventions and that they need to strive for therapist, intervention and environment alignment, to maximize occupational performance for clients recovering from a stroke.

The Environmental Influence on Decision-Making

During the interviews the therapists reported that they mostly chose their interventions first when planning their therapy sessions; not the treatment environment. Two of the therapists had the revelation that when they chose the intervention first, the intervention then dictated the environment for therapy. This contributed to possibly missing out on addressing specific client goals and may have created as stronger reliance on habits than on clinical reasoning skills. The therapists spoke of initiating therapy by

choosing interventions that would improve the: client's core strength, sitting balance, and arm and hand function, which are all components needed for the outcome of occupational performance and they relied heavily on preparatory methods. One therapist discussed a timeline for therapy, in which she addressed components until one week before the client was discharged and then focused on occupational performance in preparation to go home. Choosing the environment first in the therapeutic process offers a wider range of interventions and greater opportunities for environment/intervention congruency. Furthermore, the repetitive nature of preparatory methods can lead to habitual use by the therapists, and inhibit the clinical reasoning process.

In the study, the therapists consistently demonstrated the use of clinical reasoning skill with procedural reasoning to identify problems, set goals and plan treatment. Yet, Fleming (1991) cautions that when a therapist uses procedural reasoning exclusively they tended to only address physical components. This was true in the therapists in this study. Interactive reasoning was also observed when interventions were customized to the clients but at times it appeared that the interventions were provided in a rote manner. For example, providing interventions in a rote manner, was more apparent with the therapists with less than seven years experience and when the therapist determined that the client was performing at a lower functioning level. The therapists treated clients functioning at a lower level in the gym.

The preparatory methods provided in the gym tended to incorporate interactive reasoning and conditional reasoning to a lesser degree. The therapist may have begun the session using conditional reasoning but after the first task was completed the most convenient task was offered that addressed physical components. Lee and Miller (2003)

have entitled this concept intuitive and parsimony strategies to plan interventions. Intuition and parsimony strategies employ choosing an intervention based on what feels right and when deciding between two valuable activities, going with the simpler due to time and equipment availability. The authors further postulate that therapists have to be committed to implementing evidence-based decision-making to foster participation in occupations, requiring four strategies: intuition, parsimony, consensual validation and cross validation. Consensual validation is when the therapist consults with the client and colleagues to reach agreement with the therapy plan. Cross validation is defined as collecting evidence to endorse the therapy plan. In this study, the therapists talked about using consensual and cross validation strategies, but it was not a common occurrence. The gym environment may limit opportunities for clinical reasoning and consensual and cross validation which is postulated to be a critical part of evidence-based practice and client-centered care.

Two of the therapists shared that sometimes when they provided preparatory methods in the therapy gym, the task did not sustain the client's attention or even their own. The therapists found that working in the gym was sometimes distracting for them and may not be as meaningful to the client as other activities. The therapists commented that due to time constraints and job demands, going to the gym to provide interventions became more of an automatic reaction or habit for them. Estes and Pierce (2011) found that providing occupation-based interventions was difficult because of time constraints and productivity demands. At the completion of the interviews the therapists with less that 7 years experience comprehended that resorting to providing preparatory interventions in the gym may limit the client's opportunities to participate in occupations

and ultimately preparing to go home. Client needs and environmental elements should be aligned to reach congruence and support optimal occupation-based practice (Kahana, 1982)

Other Contributing Factors

Further complicating the relationship between the environment and the intervention is the culture of the therapy gym. In Phase One the therapy gym was a place that the occupational therapists thought defined them and the role they had within the stroke team. They designed and controlled the space. The occupational therapists were independent but interrelated with the rehabilitation team. The therapists filled their gym with activities they valued and the gym provided security and camaraderie. The occupation-based kits that simulated occupational performance where valued by the clients as they helped them apply their newly learned skills. In Phase Two, the therapists transitioned to a shared gym where they had no control and they questioned their worth within the environment. The therapists valued their own peer group as their support system and that changed in Phase Two when their gym became a focal point and the hub of the program with the therapists, nurses, case managers and doctors all convening within this space.

The gym offered security, camaraderie but also created an interdependence amongst the team. Grady (1990) proposed that interdependence cultivates equality and respect leading to better outcomes for the client. Providing interventions in the gym space ensured medical and therapy support at all times as well as the therapists could collaborate with their peers and share the demands of caring for their clients. The team was observed to work closely together, socialize and support each other emotionally but,

the occupational therapists reported having concerns that other team members would not help the same way as another occupational therapist. They commented that they continuously scanned the gym to be aware if someone was in a difficult situation and this was not a common practice for the physical therapists. Another factor in Phase Two was that both occupational and physical therapists were in the gym treating together, using the same space, similar equipment and techniques causing their roles to blend and making it difficult for the client to distinguish that occupational therapists have a focus on occupational performance. Paired with giving up their independence with their gym, in phase One, the occupational therapists felt their identity was in jeopardy. This loss of identity may have encouraged the occupational therapists to leave the gym to provide occupation-based interventions or it could have fostered staying in the gym and providing interventions just like their peers. Gray (1998, p. 354) found that occupational therapists face challenges to shift from component-based interventions to occupation-based interventions or an "understanding and expression of the field's expertise". Thriving with the medical support but grieving the loss of their space and identity caused conflict for the occupational therapists. Despite this, the therapists hesitated to leave the gym to provide interventions if they might need help with their client.

Occupational therapists possess a core belief that engagement in occupations is essential to well-being and health (Kanny, 1993). When planning their sessions the occupational therapists may question themselves if they should provide occupation-based interventions because that is what is expected professionally or alternately, choose the gym, their habits and their team. This study identified that implementing occupation-based interventions required more time and energy than preparatory methods. Yet, if the

therapists remain in the gym it may be difficult for them to reach the therapeutic success that Mattingly and Fleming (1994) propose. They state that it is through the therapeutic experience of using clinical reasoning that clients are able to develop increased confidence and commitment to take on challenges and perform occupations. Choosing the therapy gym to provide interventions may limit the client and the therapists' therapeutic experiences.

Another striking outcome of this study was the communication skills observed to be used by the occupational therapists with their clients. The therapists believed that they had good communication skills, which were learned on the job and not in their professional programs. It appeared that the therapists with over 15 years of experience used more eye contact and listened to their clients. They worked to build a partnership and constantly incorporated the client's goals into the therapy session. However, all the therapists at times resorted to using medically based language to describe a procedure or referred to the client's body part (a component of the body) and not to the client as a whole person. Treating a client like a human being is the essence of interactive reasoning phase of clinical reasoning skills and is required to guide therapy (Fleming, 1991). Focusing only on a body part diminishes the client's contribution to the therapeutic process and disempowers them to be only the owner of the body part. Kuehn (2012, p. 441) espouses that health care workers must provide "seamless care, providing for the patient's physical and emotional comfort".

Vignette B demonstrated that providing interventions in the gym perpetuated preparatory methods with the therapist relying on habits during her sessions, which limited the use of clinical reasoning skills. The vignettes captured interventions over

time as every therapy session for E1 was in the therapy gym and all were preparatory in nature with little variety in the space used in the gym. In vignette A, the client was introduced to occupation-based interventions by the second session as the therapist used a variety of therapy environments to provide different interventions. Her client exhibited a higher length of stay efficiency at discharge. During Phase Two a shift occurred as both therapists provided occupation-based interventions earlier in the client's admission and as a result both clients had higher length of stay efficiencies. In Phase One, the therapists' lack of experience or strong habits may have been factors that contributed to the extensive use of preparatory methods in the gym, but in Phase Two, Therapist E provided more occupation-based interventions in a variety of spaces than preparatory methods. Therapist E was in the client's room relatively quickly, where she used the couch and recliner and cooked with her client. It appears her client benefitted from her increased use of occupation-based interventions as he had the highest length of stay efficiency of 2.65. The vignettes also illustrated that Therapist E did not wait until one week before discharge to introduce occupation-based interventions. For four of the sessions provided to this client, Therapist E had a student watching and she provided occupation-based interventions in home-like spaces in every session observed. The vignettes in this study serve to demonstrate in a visual manner how the space in the gym environment influenced interventions over time.

The concept of the environment contributing to the therapeutic process seemed novel to the therapists, even though the neuroplasticity and environment literature posits that clients benefit from participating in meaningful tasks in a natural context (Baryona, Bitensky, Salter & Teasell, 2005; Hubbard, Parson, Neilson & Carey, 2009; Lang, Nelson

& Bush, 1992; Muir, Jones & Signal, 2009). It was through the interview discussions that the therapists gained an appreciation for how the environment was found to support the person and the intervention, which could lead to optimal occupational performance. For two of the therapists a realization occurred when they discerned that focusing on the intervention limited the client's opportunities and reflected more on their own habits. Whereby focusing on the environment opened up opportunities to address the client's goals, the therapist/client partnership and occupational performance.

The TIE model will be used to elucidate the influence of the environment while highlighting the role of the therapist, the intervention and the environment. This study revealed that if the therapist chooses the therapy gym the intervention of choice will be preparatory methods (Figure 5.38). Therefore, the area of overlap between the three circles represents performance of preparatory skills and not necessarily occupational performance. Clients who have a goal to resume the desired role of exercising may benefit from this model due to their person-environment congruency. If therapists automatically pick the gym to provide therapy then they are directing their interventions towards a preparatory performance model. Conversely, the study also demonstrated that when the therapist worked in a home-like environment, the therapist used occupation-based interventions (Figure 5.39). Optimal occupational performance is achieved when therapy is provided in a home-like environment. If the client has a goal to return home then therapy in a home-like environment may be more conducive for the client to attain person-environment congruency. The client's goals should serve as the indicator of which environment is the best therapeutic space for the client.

Inadvertently, the inpatient rehabilitation environment that houses a traditional therapy gym may be directing the intervention approach that occupational therapist are using when working with individuals recovering from a stroke. This study revealed that working in the therapy gym provided benefits for the occupational therapist but not necessarily for the client that wants to return home. In fact leaving the gym to provide intervention seemed formidable for the occupational therapist. When deciding the environment and the intervention the therapist stands at a crossroads. On one side the safety and comfort of the gym, parsimony and a more component-based approach and on the other, a home-like space that requires effort, advanced planning, cross and consensual validation and occupation-based interventions (refer to Figure 5.38). Constant demands are placed on the therapists for their time, energy and thoughts for clinical reasoning. A supportive environment that offers occupational opportunities, safety and camaraderie gives the occupational therapist the freedom to choose the optimal intervention for each client.

Implications for Practice

Occupational therapy practice on an inpatient stroke program can be improved if therapists are aware of the influence of the environment on interventions. This study demonstrated that even though therapists know they should be providing occupation-based intervention, they resort to the habit of relying on preparatory methods. Initially, when the home-like equipment was secured in gym B, the therapists valued what the equipment offered their clients and they incorporated it into their interventions. But, with time the 152 feet that separated the gym spaces became insurmountable and the therapists decreased taking clients to the gym. The therapists shared that if they did not see the

equipment they didn't use it. Both the therapist and client benefitted from a rehabilitation environment that provided a variety of choices, including home-like environments that are convenient and are set up to "see it, use it". A supportive environment is, in essence, taking the first step for the client to go home.

Therapists appeared to rely on one or two types of intervention approaches in one or two environments and never considered using occupation-based interventions in the gym. The study in chapter four indicated that it was the combination of the intervention approaches in a home-like environment that was effective for the client. Therefore, therapists need education on how the intervention approaches can be used in combination in any environment depending on the clients needs. Being able to access all the resources a therapist has, increases the congruency of the therapist/intervention/environment triad.

Students could also benefit from learning about the contributions and barriers of the rehabilitation environment while in their professional programs so they are aware of the influences and risks to practice. A gap exists between what the students learn in their professional programs, that occupational engagement is essential to well-being and what they observe in a traditional rehabilitation therapy gym, preparatory methods. Often the student sides with the therapists in practice and discounts their educational preparation. By understanding the influence that the environment has on interventions gives the student the knowledge and the tools to narrow this gap and improve practice.

Appreciating the influence of the gym on therapist behavior is valuable information for hospital administrators to use when designing future environments. Providing different spaces that support different interventions may be helpful for role delineation between the disciplines, yet ensuring that each space has the medical support

needed. Rehabilitation hospitals are driven to improve client outcomes, which include increased activities of daily living scores. As a therapist in the study said:

> *"…I mean for people that have been in the hospital for such a long time, that is, it gives them a sense of home just gives them something more home, like the light at the end of the tunnel…"*

Creating spaces that value and enhance participation in meaningful activities can contribute to improved motor recovery and overall client outcomes. Lastly, providing home-like spaces closes the education/practice gap and supports the occupational therapist to align with their core belief.

Implementing communication skills training would be beneficial for students and therapists to gain knowledge on client-centered communication styles. Medical and dental professions have undertaken a campaign to implement better physician-client communication models shifting from a hierarchical relationship to a partnership (Gorawara-Bhat & Cook, 2010; Kuehn, 2012) One possible communication program is the SPIKES course (Curtain & McConnell, 2012) which teaches communication skills using the following key points: S= communication in a quiet space, P= learn what the patient perceives, I= an invitation to find out how much the patient wants to know, K= use simple language to provide knowledge, jargon is a barrier, E= explore and empathize, S= summarize key points. Lastly, placing home-like equipment into therapy gyms that is visible and convenient to use and educating therapists on using occupation-based interventions to increase motor recovery creates opportunities for participation in occupations and benefits the clients that want to return home.

Limitations

Several limitations may have influenced this study's results as data was collected from one facility with a small sample size, limiting the generalizability to other settings (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Thus, one cannot assume that all inpatient stroke programs use predominantly preparatory methods for occupational therapy interventions. Second, the therapists may have been uncomfortable having an observer in their therapy environment for a total of 16 months especially during the move when there was added pressure to perform in an unfamiliar space. Throughout the study the therapists sought out the investigator to share schedule changes and their plans for interventions indicating a level of support. Third, changing therapy and program environments between phases could have altered the experiences of the therapists but could not be controlled. Fourth, observing the early morning ADL session was more invasive to the clients' personal space so it was not included in this study and only intervention sessions in the therapy gym, combination room and home-like environments were collected, which could affect the therapist experiences. Finally, the investigator held a supervisory role at the study facility but did not have any management responsibilities for the staff that participated. The investigator believes that prolonged observation within the environment with a consistent approach for client observation provided control for these limitations.

Future Research

The concept of this study should be expanded for future research to evaluate how the rehabilitation environment influences interventions with other populations. There is also a need to assess how the three intervention approaches (preparatory methods,

purposeful actitivities and occupation-based) can be combined and varied to reach optimal occupational performance and improve occupational therapy practice.

Conclusions

This study found that rehabilitation environments on inpatient stroke programs do influence occupational therapy interventions:

- A relationship exists between the specific rehabilitation environment and the type of intervention used in each space: preparatory methods with therapy gym, purposeful activities in a combination room and occupation-based interventions in a home-like setting.
- If a therapist chooses to provide therapy in the gym then the intervention will most likely be preparatory methods. The gym was the preferred treatment environment and preparatory methods were preferred intervention approach for the occupational therapists in this study.
- If a therapist decided to work in a home-like environment then occupation-based interventions were used most often.
- The therapy gym has a culture that provides camaraderie, support and safety making it difficult to leave to choose other environments or occupation-based interventions for therapy.
- Implementing clinical reasoning skills creates the transactional relationship between the therapist, the intervention and the environment to achieve occupational performance.
- Effective communication is the avenue by which the therapist shares their clinical reasoning process with their client.

Central to occupational therapy practice is the environment. This study revealed the importance of the environment and that it was a factor in each therapist's clinical reasoning process. The environment must support the therapist, who creates the intervention opportunities. Every therapist stands at the environmental crossroads waiting to make a crucial decision: go down the comfortable, safe path toward the therapy gym or take the road less traveled to the home-like space. With the knowledge gained from this study, therapists have the opportunity to say in regards to which road they took: "I took the one less traveled by, And that has made all the difference" (Frost, 1931).

Table 5.1 Demographic Data of the Occupational Therapists

Occupational Therapist	Years of Experience	Years on the Stroke Program	Phase Participation
A	17	17	Phase 1
B	35	15	Phase 1, 2, 3
C	2.5	2.5	Phase 1, 2, 3
D	2.5	2.5	Phase 1
E	7	5	Phase 1, 2 3

Table 5.2 Outcome data for the Client Participants Phase 1

Therapist/ Client	FIM Initial	FIM Discharge	Fugl Meyer Initial/Discharge	Age	Days Since Onset	Length of Stay Efficiency= FIM change over length of stay
A1	77	145	67/126-105/126	60	7	3.7
B1	126	151	2/66 only done at initial	56	5	3.5
B2	81	126	6/126 to 66/126	66	9	1.8
B3	114	152	31/126 to 58/126	35	16	5.4
C1	33	74	53/126 to 54/126	51	7	.82
C2	46	101	87/126 to 100/126	61	19	2.2
D1	42	103	79/126-97/126	73	6	2.65
E1	30	51	66/126-70/126	63	14	1.0
E2	73	130	61/126-77/126	67	10	2.47

Table 5.3 Intervention Choices within a Therapy Environment- Phase One

Environment	Overall Time Spent	Use of Preparatory Methods	Use of Purposeful Activities	Use of Occupation-based
Gym	78.4%	76.3%	18.8%	5%
Combination Room	5.9%	0%	83.3%	16.7%
Home-like Space	15.7%	6.3%	12.5%	81.3%

Table 5.4 Frequency by Therapist for Environment and Interventions Used during Therapy- Phase One.

Therapist/ Client	Mini Session #	GYM	COMBINATION ROOM	HOME-LIKE
A1	11	63% 57% preparatory 8% purposeful 35% occ-based	0%	36% 0% preparatory 25% purposeful 75% occ-based
B1	3	66% 100% preparatory 0% purposeful 0% occ-based	0%	33% 0% preparatory 0% purposeful 100% occ-based
B2	13	69% 66% preparatory 33% purposeful 0% occ-based	7% 0% preparatory 100% purposeful 0% occ-based	23% 0% preparatory 0% purposeful 100% occ-based
B3	6	66% 50% preparatory 24% purposeful 25% occ-based	16% 0% preparatory 0% purposeful 100% occ-based	16% 0% preparatory 0% purposeful 100% occ-based
CI	20	80% 75% preparatory 25% purposeful 0% occ-based	0%	20% 25 preparatory 25% purposeful 50% occ-based
C2	13	84% 72% preparatory 15% purposeful 9% occ-based	7% 0% preparatory 100% purposeful 0% occ-based	7% 0% preparatory 0% purposeful 100% occ-based
D1	10	80% 87% preparatory 0% purposeful 12% occ-based	10% 0% preparatory 0% purposeful 100% occ-based	10% 0% preparatory 0% purposeful 100% occ-based
E1	8	100% 100% preparatory 0% purposeful 0% occ-based	0%	0%
E2	12	100% 91% preparatory 8% purposeful 0% occ-based	0%	0%

Table 5.5 Vignette A Outcomes

Therapist	Client	Age	# of Mini sessions	Days Since Onset	Length of Stay	Length □of Stay Efficiency	FIM Initial/Discharge Score	Fugl Meyer Initial/Discharge Score
B > than 15 years experience	#2	66	13	9 days	25 days	1.8	81/126	66/126, 66/126

Table 5.6 Vignette B Outcomes

Therapist	Client	Age	Number of Mini Sessions	Days Since Onset	Length of Stay	Length of Stay Efficiency	FIM Initial/Discharge Score	Fugl Meyer Initial/Discharge Score
E > than 7 years experience	#1	63	8	14 days	21 days	1.0	30/51	66/126, 70/126

Table 5.7 Outcome data for the Client Participants in Phase 2

Therapist/ Client	FIM Initial	FIM Discharge	Fugl Meyer Initial/Discharge	Age	Days Since Onset	Length of Stay Efficiency= FIM change divided by length of stay
2B1	23	62	50/126 to 72/126	59	11	1.18
2B3	47	108	34/126 to 58/126	76	4	2.54
2C1	86	121	57/126 to 95/126	79	4	2.058
2C2	74	130	32/126 to 51/126	52	10	1.65
2E1	69	138	55/126-65/126	59	7	2.65
2E2	54	94	63/126-63/126	67	6	2.10
2B/C* (not reported)	54	127	64/126-72/126	66	4	2.92

Table 5.8 Intervention choices within a Therapy Environment- Phase Two

Environment	Overall Time Spent	Use of Preparatory Methods	Use of Purposeful Activities	Use of Occupation-Based
Gym	61.4%	79.6%	20.4%	0%
Combination Room	12.5%	18.2%	9.1%	72.7%
Home-like Space	26.1%	21.7%	0%	78.3%

Table 5.9 Frequency by Therapist for Environment and Interventions Used during Therapy- Phase Two

Therapist/Client	Mini Sessions #	GYM	COMBINATION ROOM	HOME-LIKE
2B1	13	62% 100% preparatory 0% purposeful 0% occ-based	15% 50% preparatory 0% purposeful 50% occ-based	23% 0% preparatory 0% purposeful 100% occ-based
2B3	13	77% 80% preparatory 20% purposeful 0% occ-based	7% 0% preparatory 0% purposeful 100% occ-based	15% 0% preparatory 0% purposeful 100% occ-based
2C1	10	40% 75% preparatory 25% purposeful 0% occ-based	30% 25% preparatory 0% purposeful 75% occ-based	30% 33% preparatory 0% purposeful 66% occ-based
2C2	21	81% 76% preparatory 23% purposeful 0% occ-based	0%	19% 25% preparatory 0% purposeful 75% occ-based
2E1	17	41% 75% preparatory 25% purposeful 0% occ-based	6% 0% preparatory 0% purposeful 100% occ-based	53% 33% preparatory 0% purposeful 66% occ-based
2E2	13	54% 57% preparatory 43% purposeful 0% occ-based	30% 0% preparatory 25% purposeful 75% occ-based	15% 0% preparatory 0% purposeful 100% occ-based
2B/C	13	69% 78% preparatory 22% purposeful 0% occ-based	0%	31% 50% preparatory 0% purposeful 50% occ-based

Table 5.10 Therapist Summaries of Total Number of Mini-sessions, Total Time and Ratio of Time/Mini-sessions

Statistic	**Gym** mini-sessions-phase 1	**Gym** mini-sessions-phase 2	**Gym** # of total time-phase 1	**Gym** # of total time-phase 2	**Gym** ratio-time/session	**Gym** ratio-time/session
Average	20.66	18	560	456.66		
Standard Deviation	6.02	3	155.24	106.92		
Paired t-test	0.447		0.385		0.412	

Statistic	**Combo** mini-sessions-phase 1	**Combo** mini-sessions-phase 2	**Combo** # of total time-phase 1	**Combo** # of total time-phase 2	**Combo** ratio-time/session	**Combo** ratio-time/session
Average	0.66	3.66	36.66	86.66		
Standard Deviation	1.15	1.15	32.14	30.55		
Paired t-test	0.121		0.290		0.252	

Statistic	**Home-like** mini-sessions-phase 1	**Home-like** mini-sessions-phase 2	**Home-like** # of total time-phase 1	**Home-like** # of total time-phase 2	**Home-like** ratio-time/session	**Home-like** ratio-time/session
Average	3.66	7.66	103.33	143.32		
Standard Deviation	3.21	3.05	90.73	46.18		
Paired t-test	0.372		0.609		0.956	

Table 5.11 Vignette C Outcomes

Therapist/ Client	**FIM Initial**	**FIM Discharge**	**Fugl Meyer Initial/Discharge**	**Age**	**Days Since Onset**	**Length of Stay Efficiency= FIM change divided by length of stay**
2C2	74	130	32/126 to 51/126	52	10	1.65

Table 5.12 Vignette D Outcomes

Therapist/ Client	**FIM Initial**	**FIM Discharge**	**Fugl Meyer Initial/Discharge**	**Age**	**Days Since Onset**	**Length of Stay Efficiency= FIM change divided by length of stay**
2E1	69	138	55/126-65/126	59	7	2.65

Figure 5.1. TIE Model Applied in a Rehabilitation Environment.

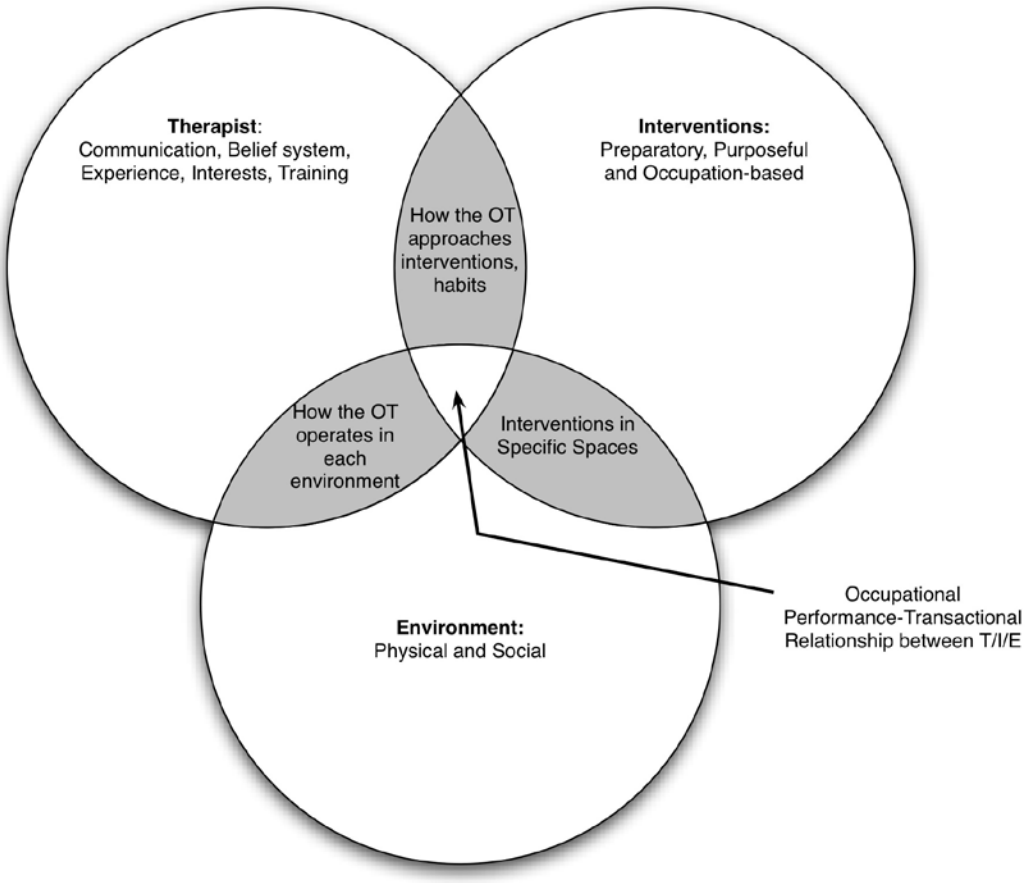


Figure 5.2 Occupational Therapy Gym Phase One

Figure 5.3 Recruitment Phase One

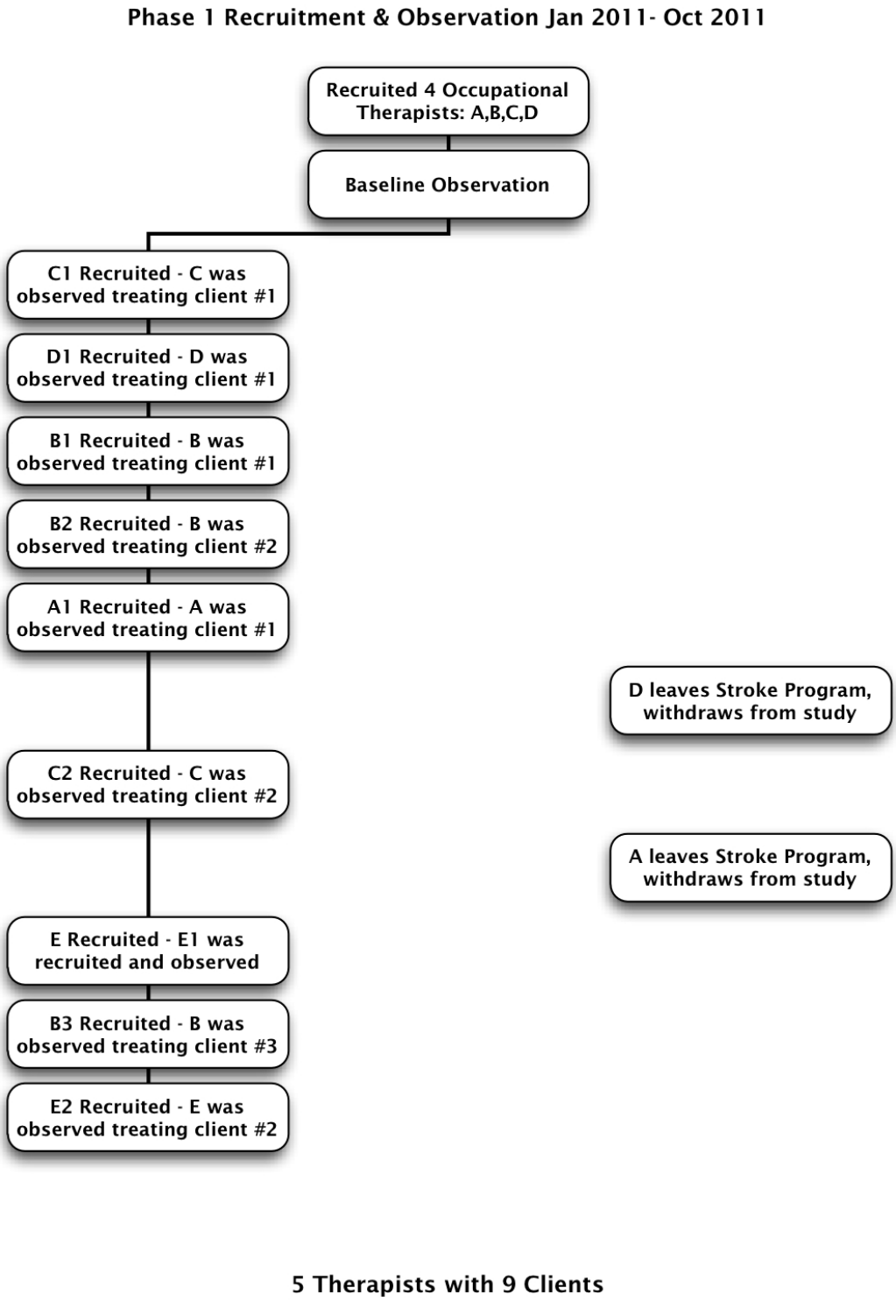


Figure 5.4 Recruitment Phase Two

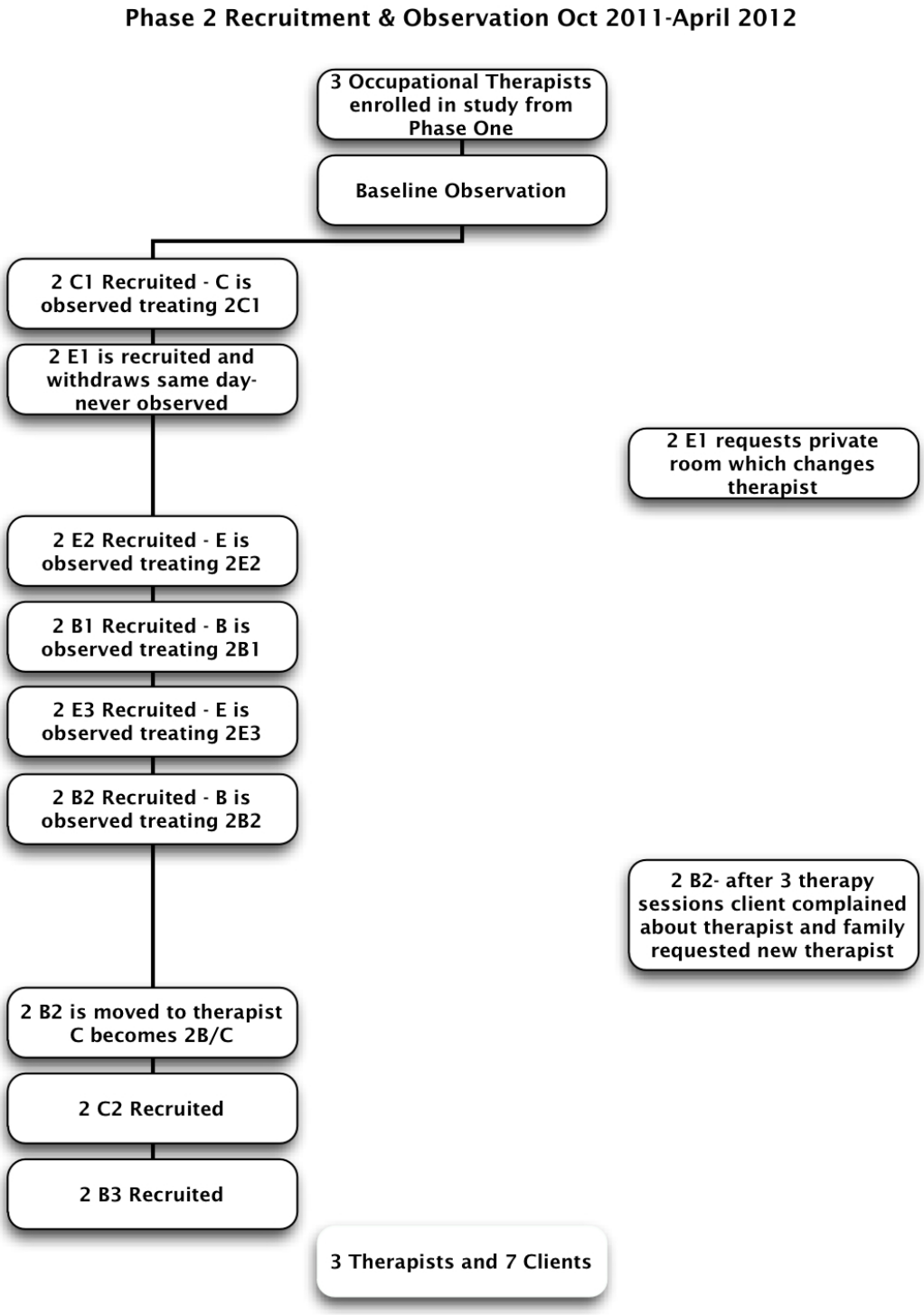


Figure 5.5 Environment/Intervention Interactions- Tracking Sheet

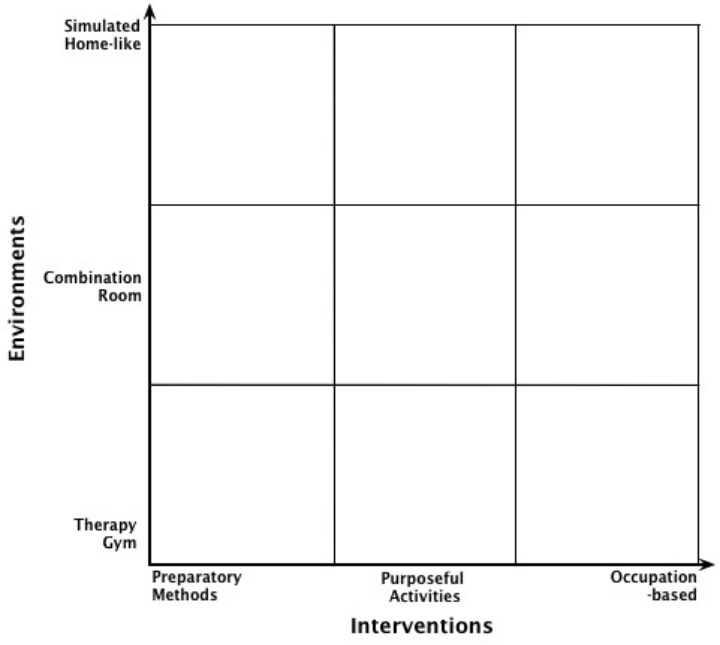


Figure 5.6 Standard Occupational Therapy Gym for Phase Two

Figure 5.7 Gym/Home-like Environment for Phase Two (creating combination room)

Figure 5.8 Data Collection and Analysis Flow

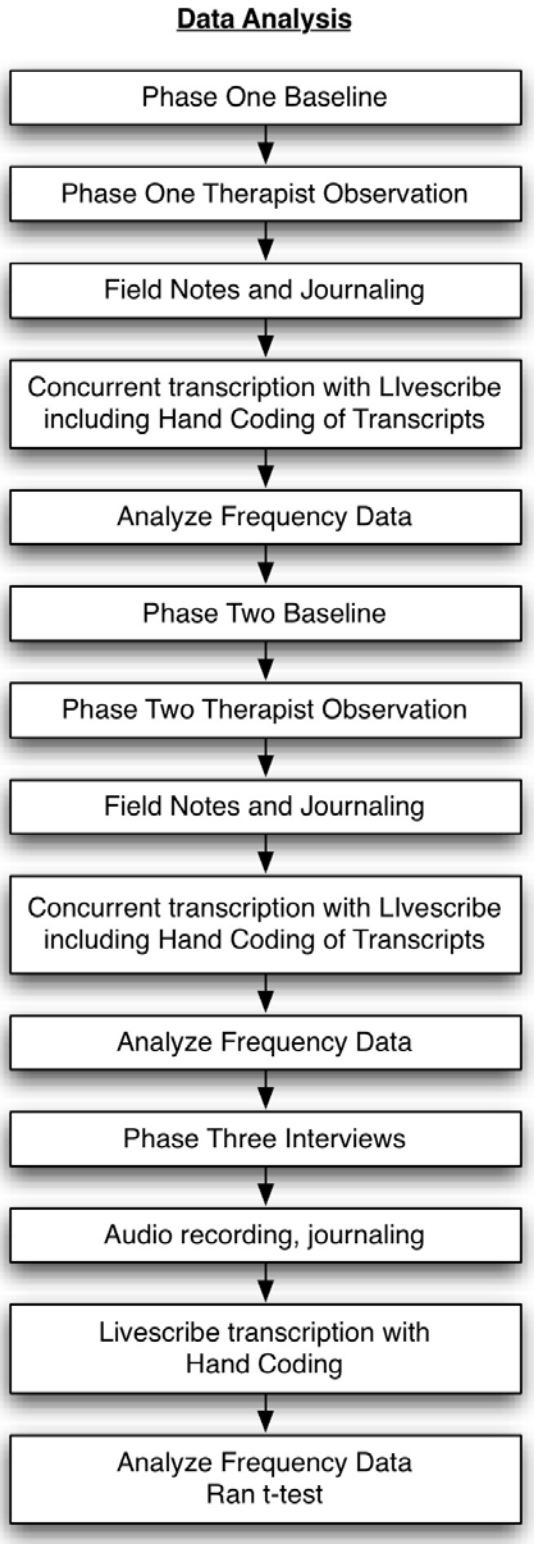


Figure 5.9 Environmental Frequencies- Phase One

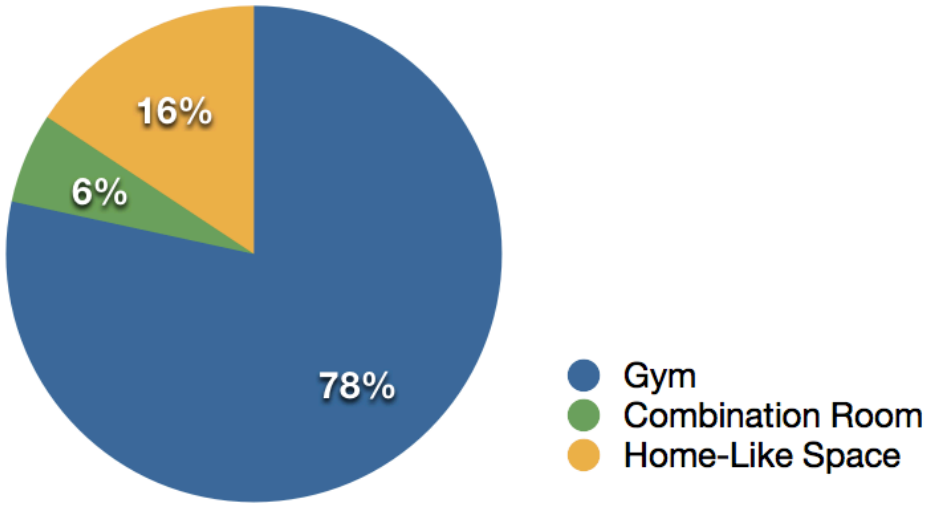


Figure 5.10 Intervention Frequencies- Phase One

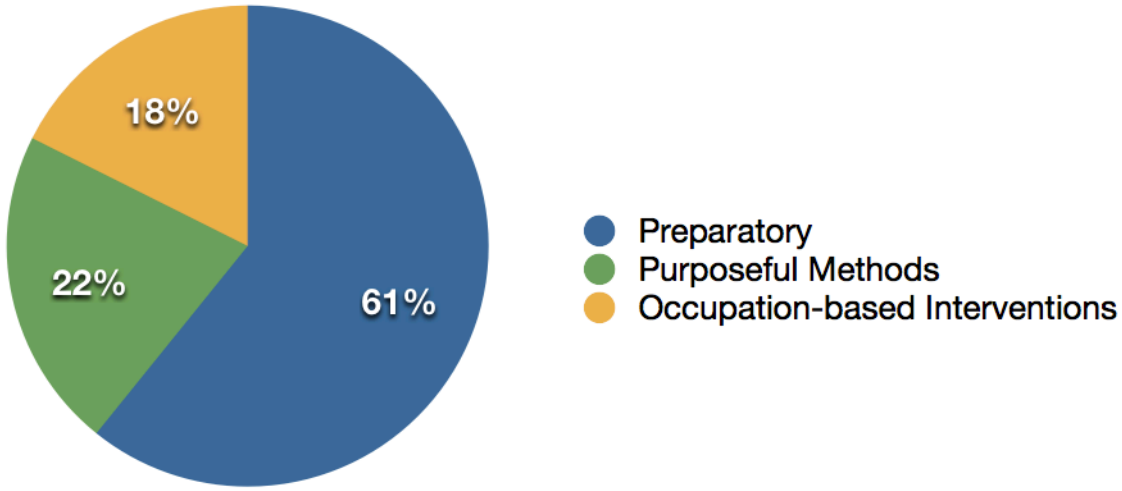


Figure 5.11 The Relationship of the Environment to the Interventions

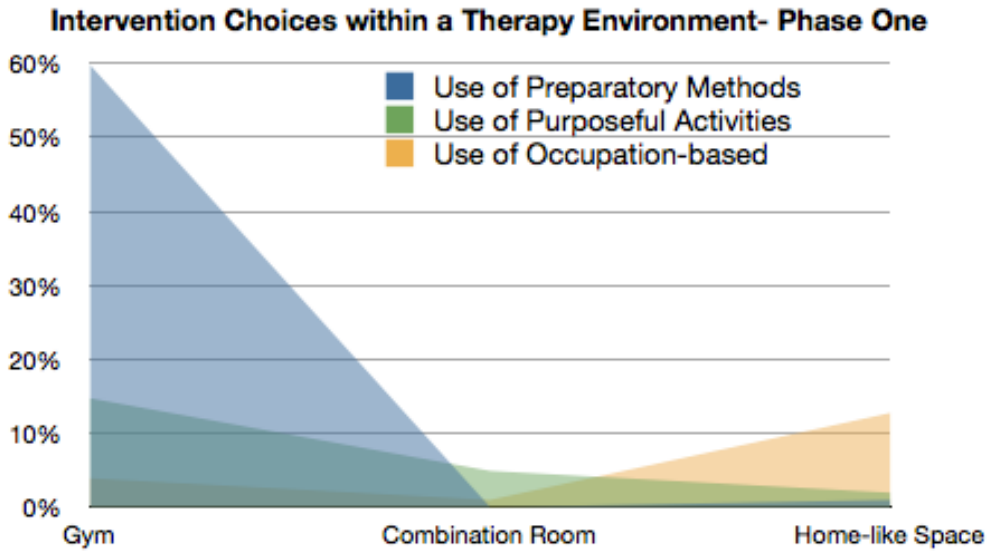


Figure 5.12 Therapy Quadrant Trajectory A1-Phase One

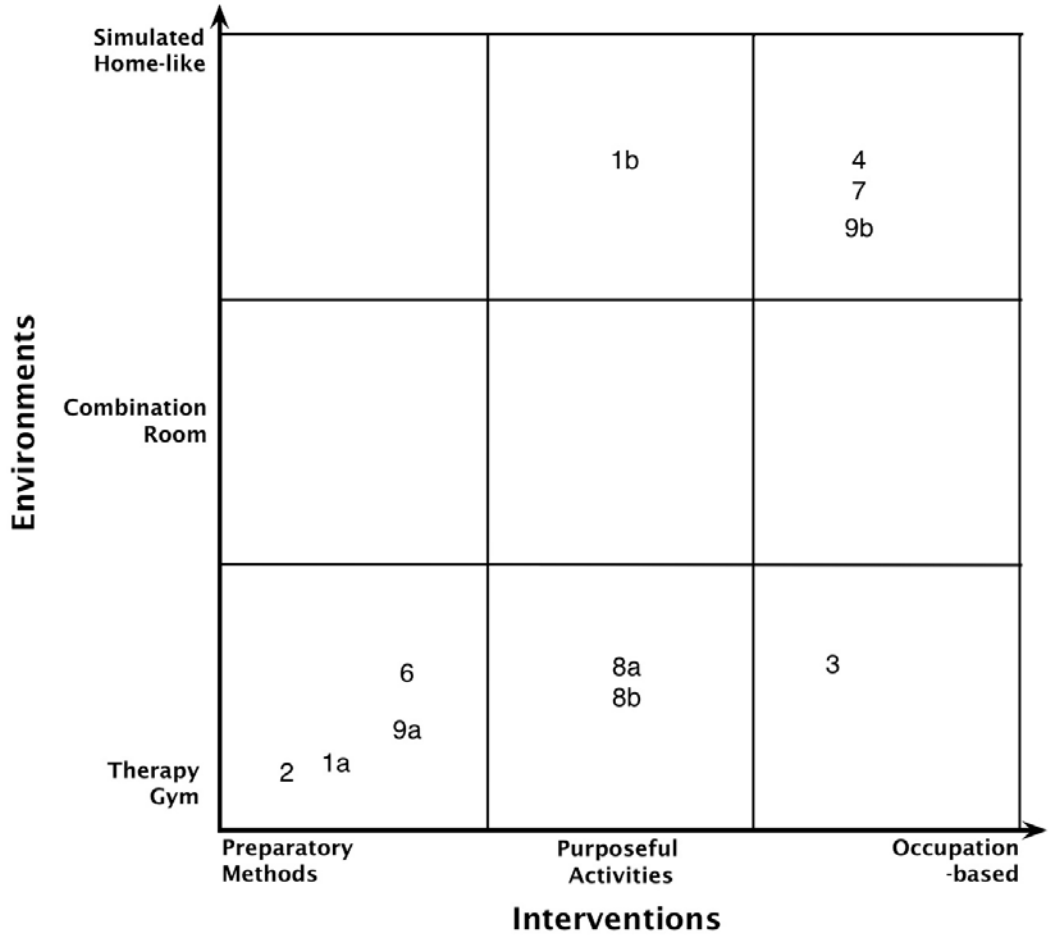


Figure 5.13 Therapy Quadrant Trajectory B1- Phase One

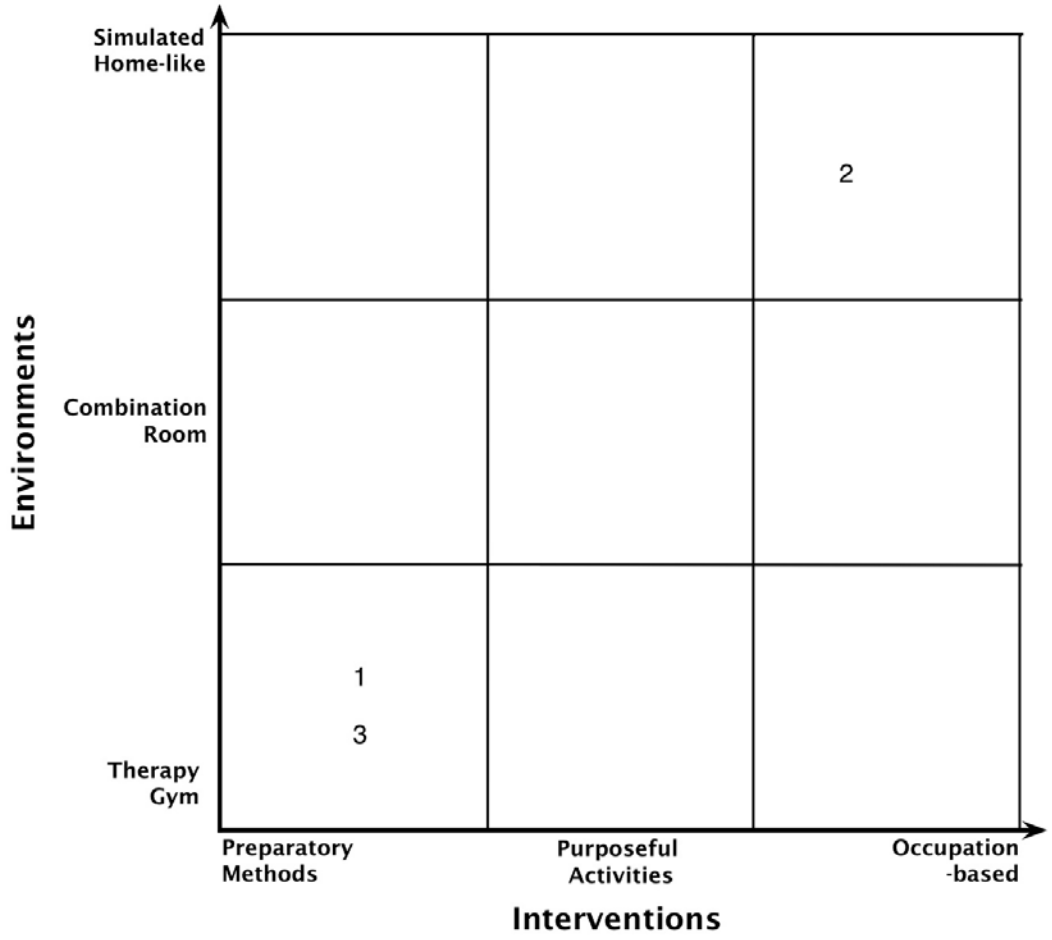


Figure 5.14 Therapy Quadrant Trajectory B2- Phase One

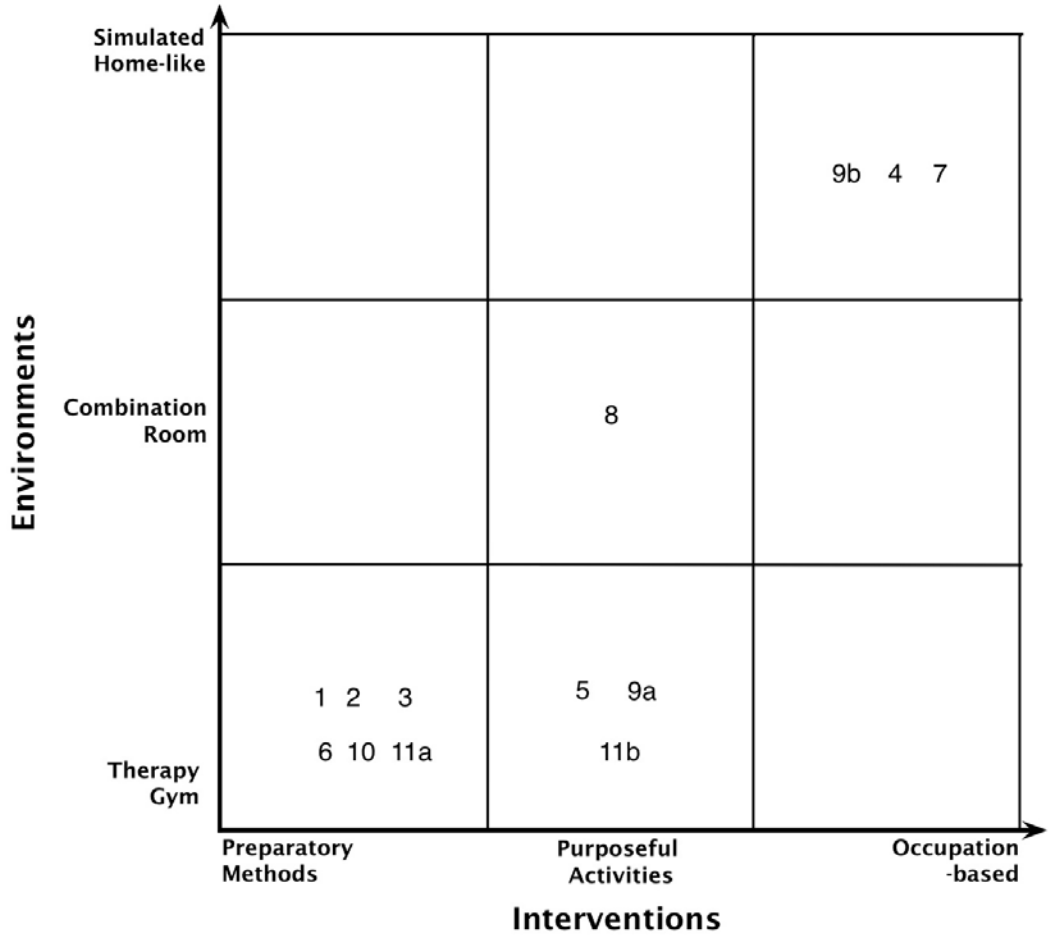


Figure 5.15 Therapy Quadrant Trajectory B3- Phase One

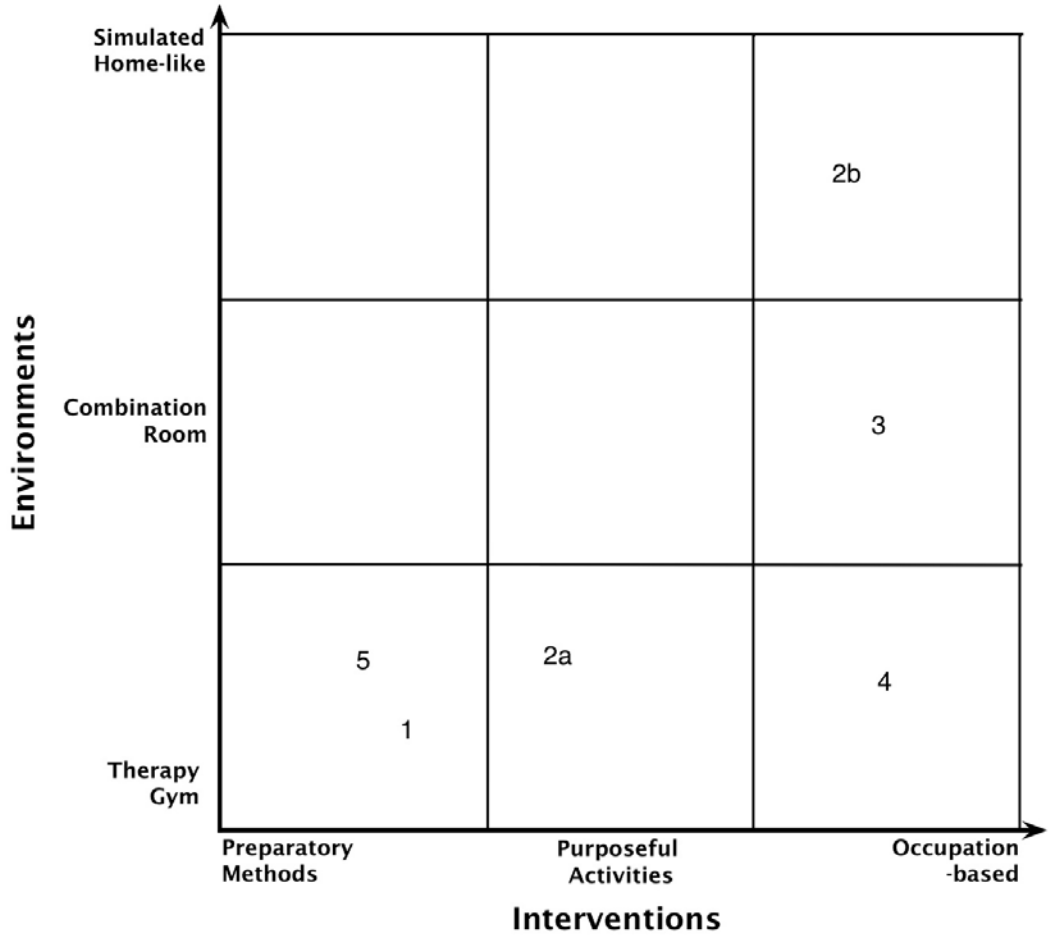


Figure 5.16 Therapy Quadrant Trajectory C1- Phase One

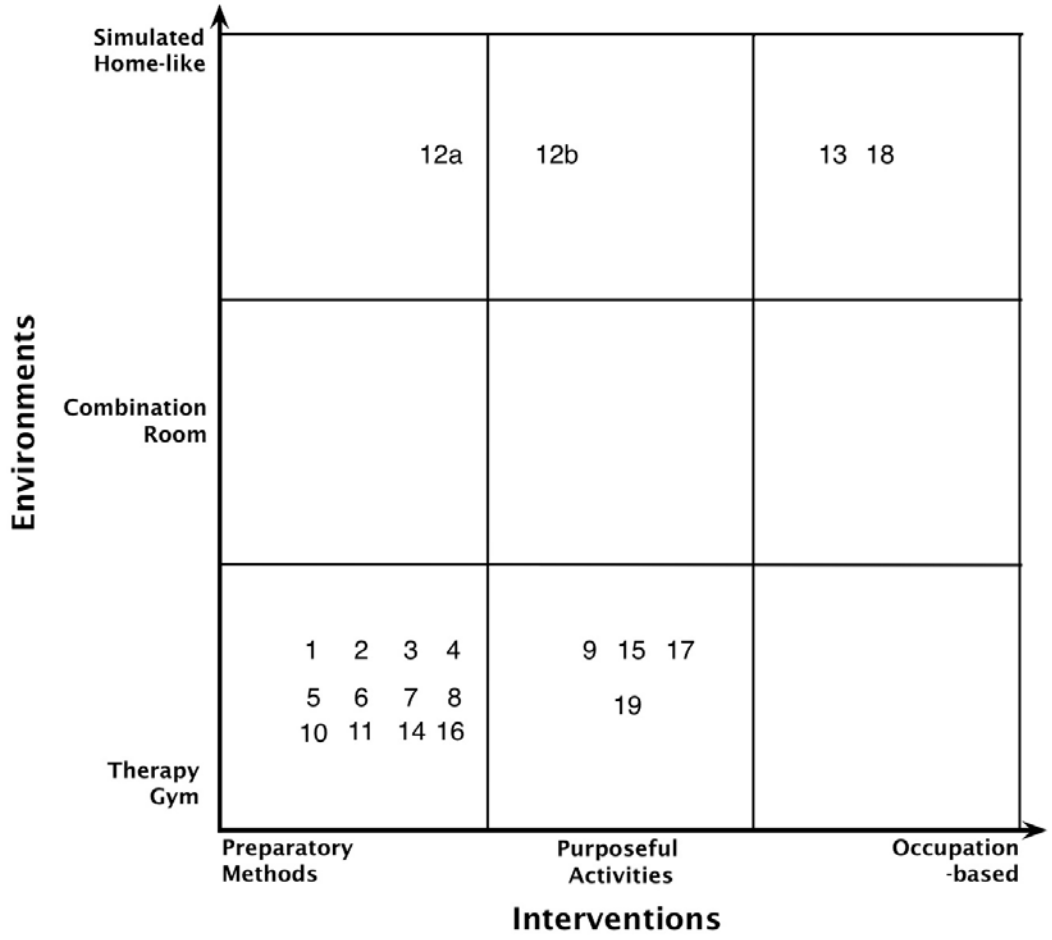


Figure 5.17 Therapy Quadrant Trajectory C2- Phase One

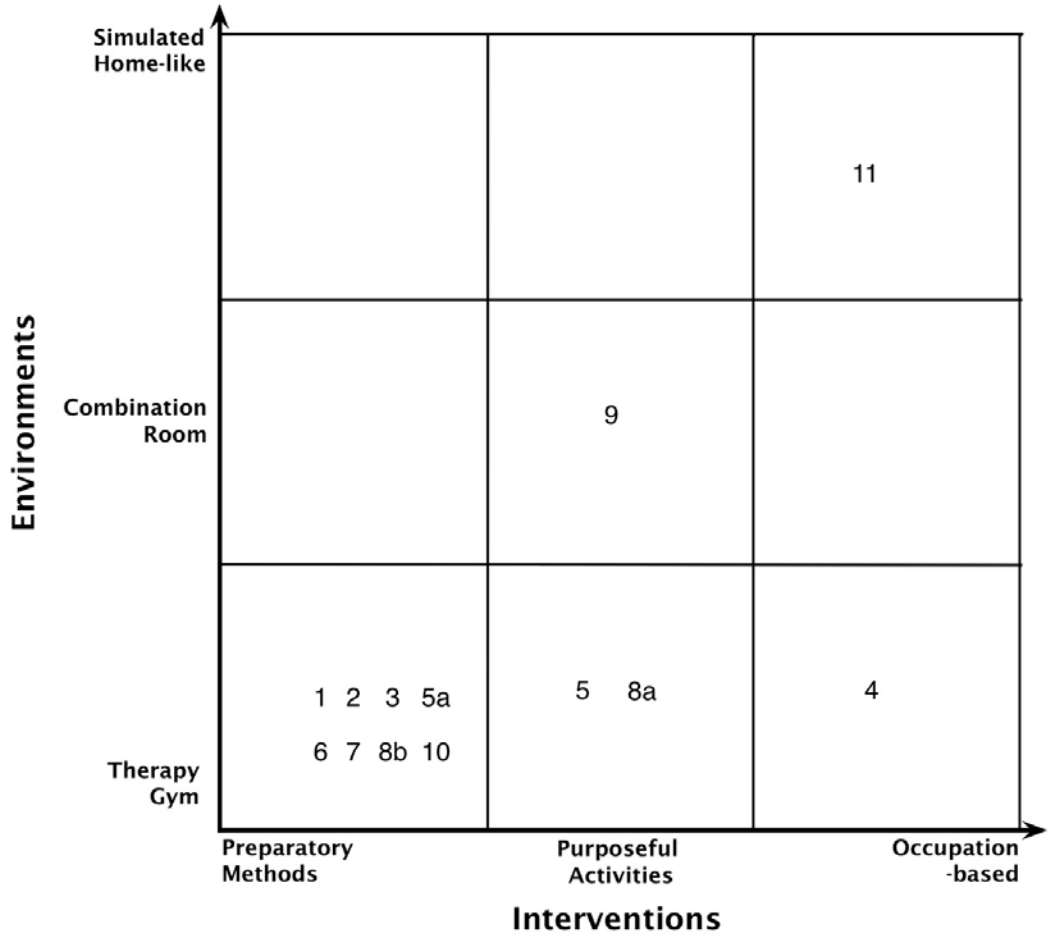


Figure 5.18 Therapy Quadrant Trajectory D1- Phase One

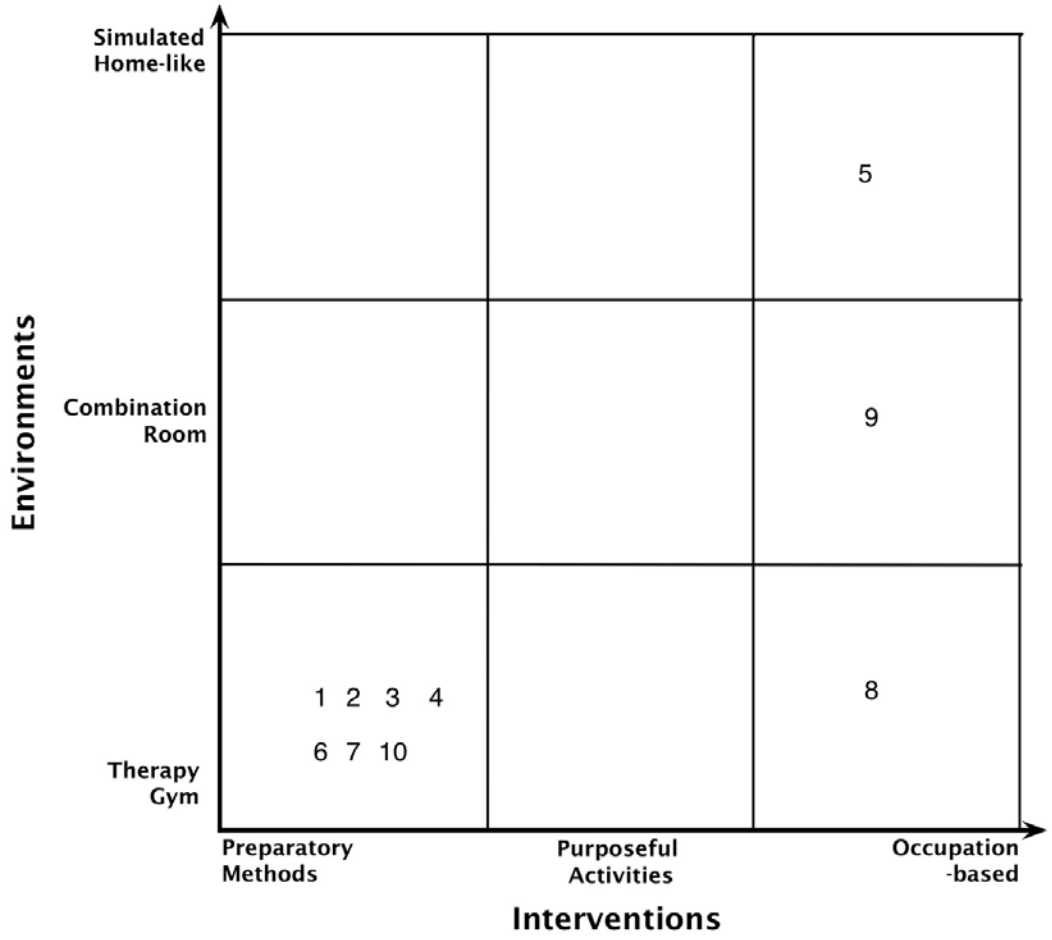


Figure 5.19 Therapy Quadrant Trajectory E1- Phase One

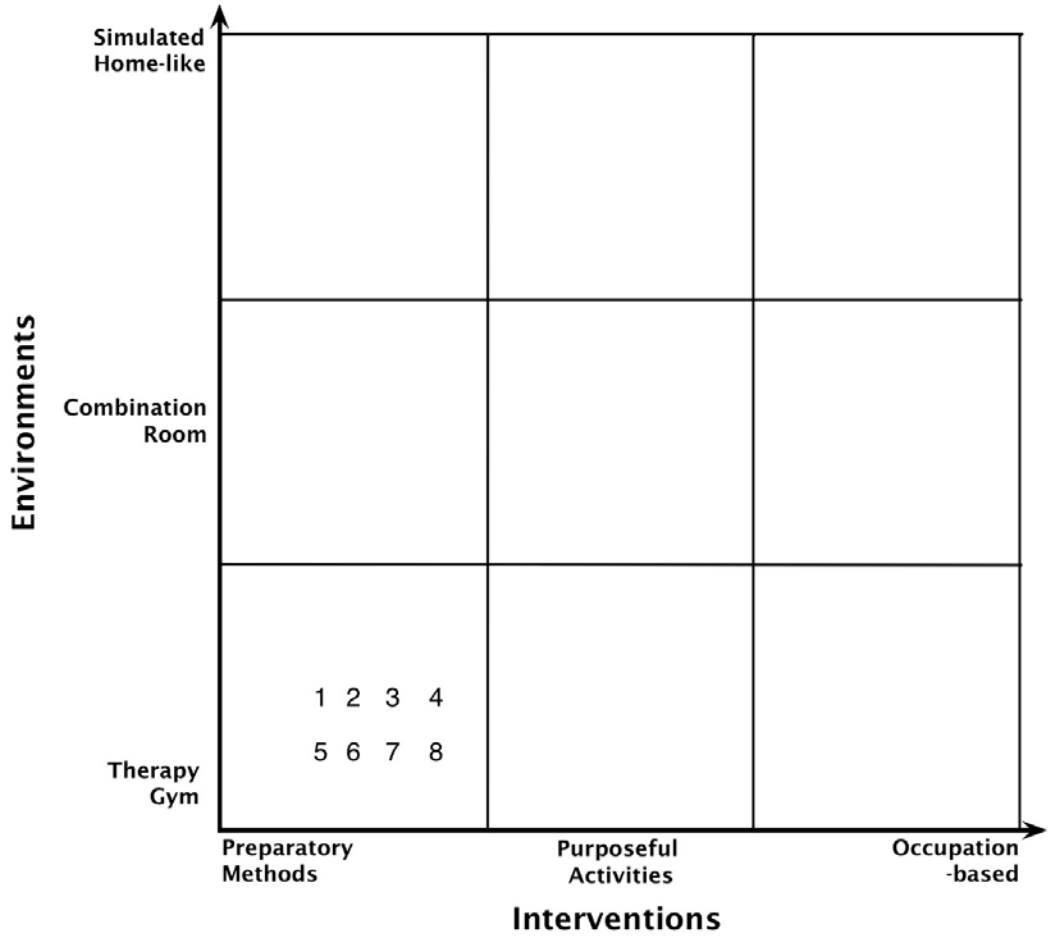


Figure 5.20 Therapy Quadrant Trajectory E2 - Phase One

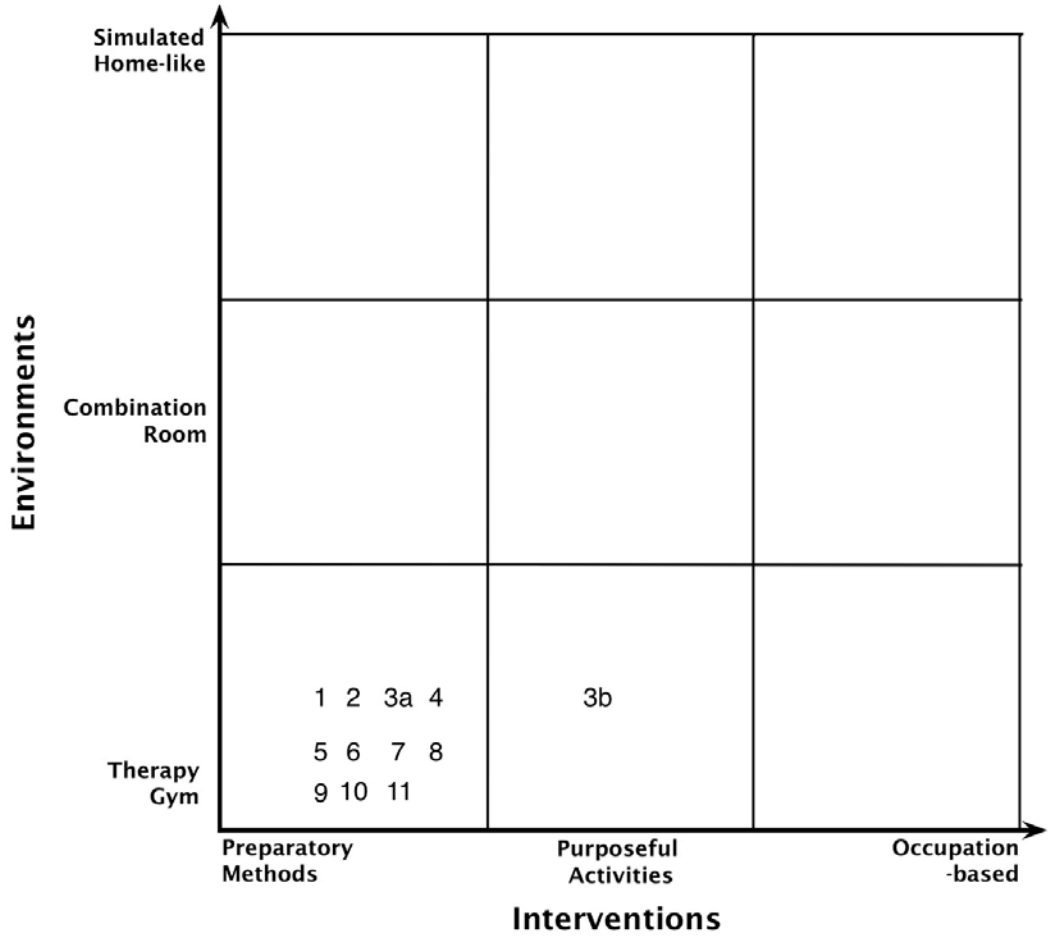


Figure 5.21 Environment and Intervention Choices for Vignette A (shown in sessions)

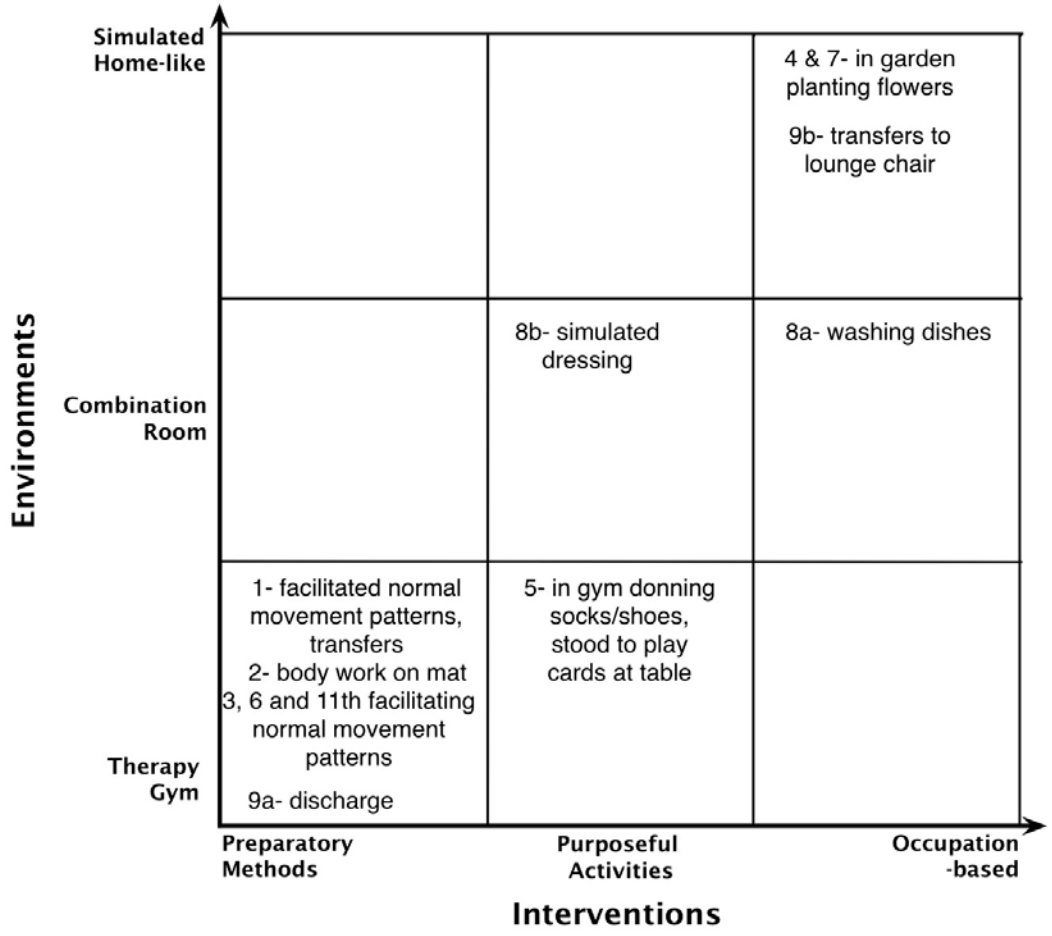


Figure 5.22 Vignette A Environment Use (Vignette - Phase One)

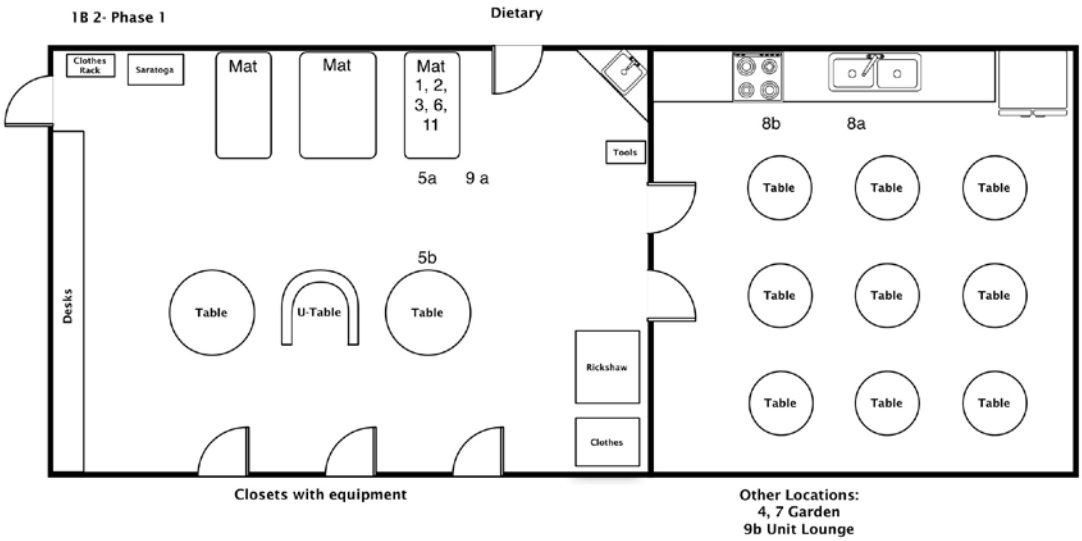


Figure 5.23 Environment and Intervention Choices for Vignette B (shown in sessions)

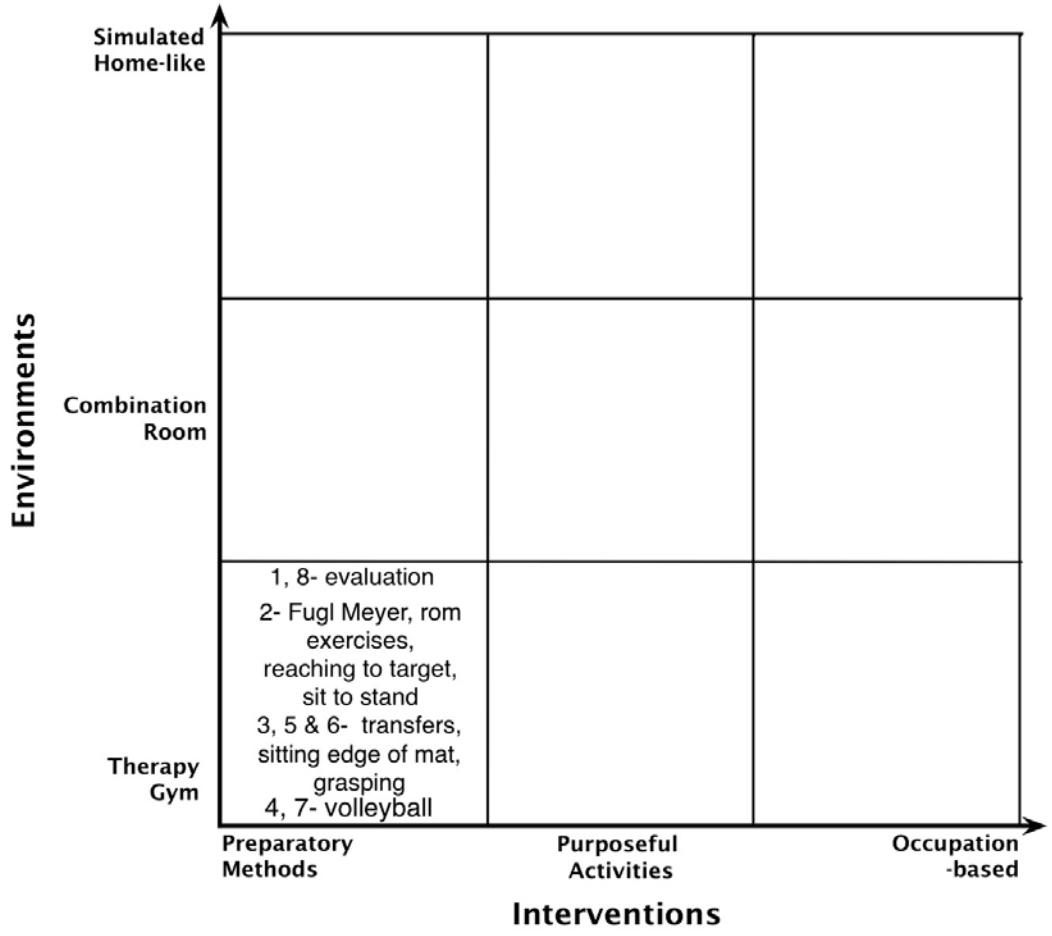


Figure 5.24 Vignette B Environment Use (Vignette - Phase One)

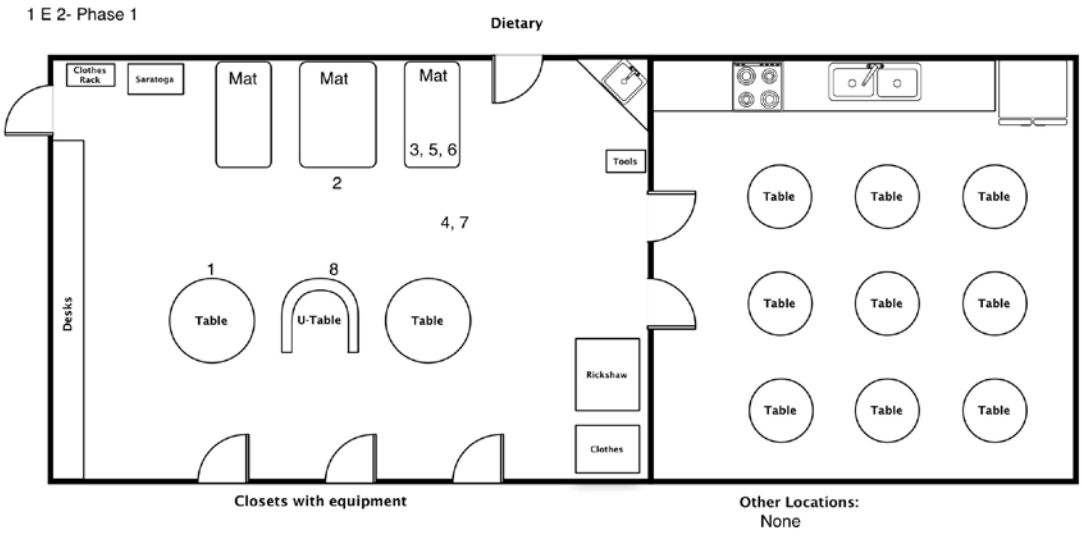


Figure 5.25 Environmental Frequencies - Phase Two

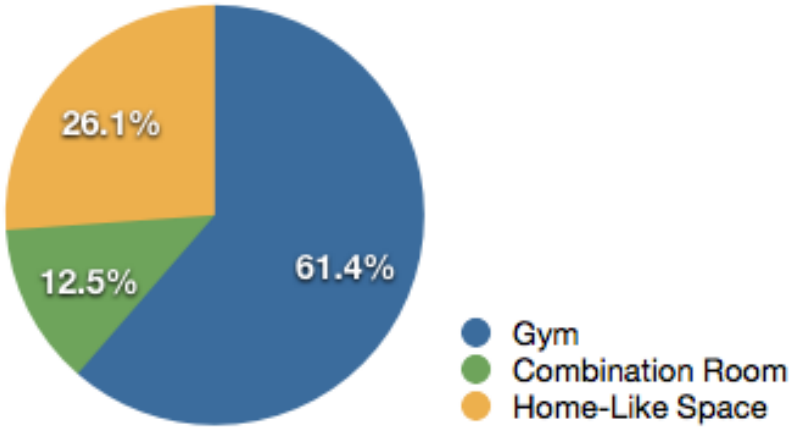


Figure 5.26 Intervention Frequencies - Phase Two

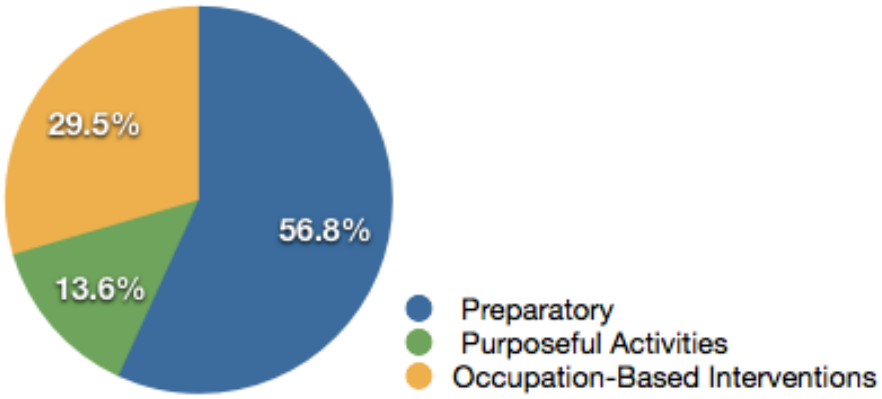


Figure 5.27 The Relationship of the Environment to the Interventions

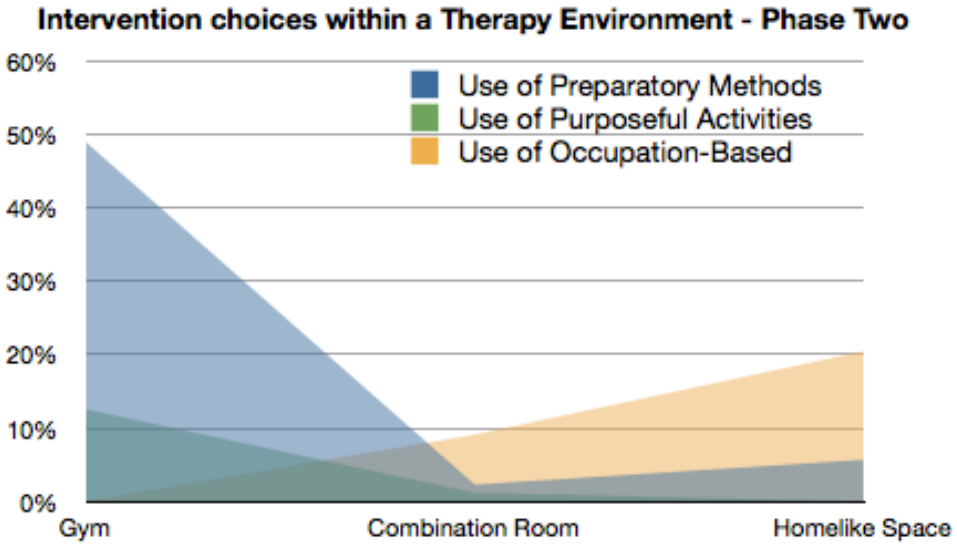


Figure 5.28 Therapy Quadrant Trajectory 2B1

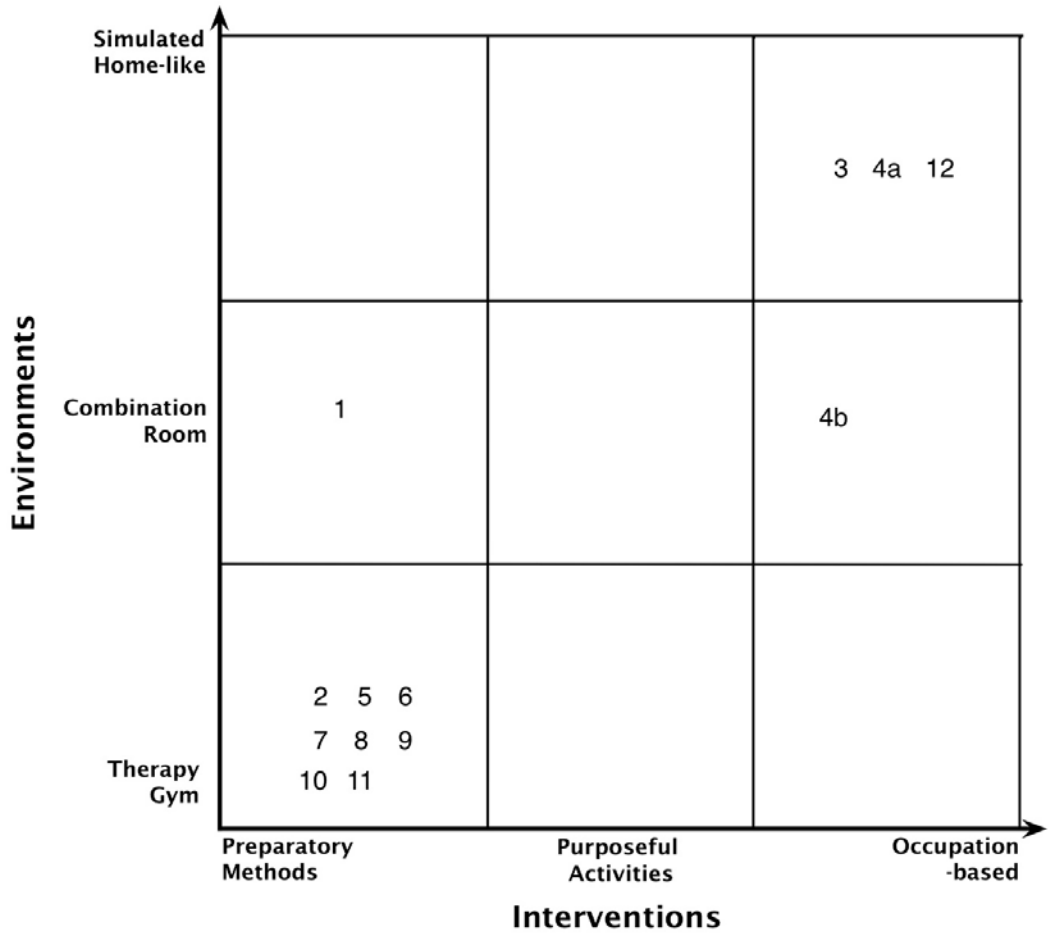


Figure 5.29 Therapy Quadrant Trajectory 2B3

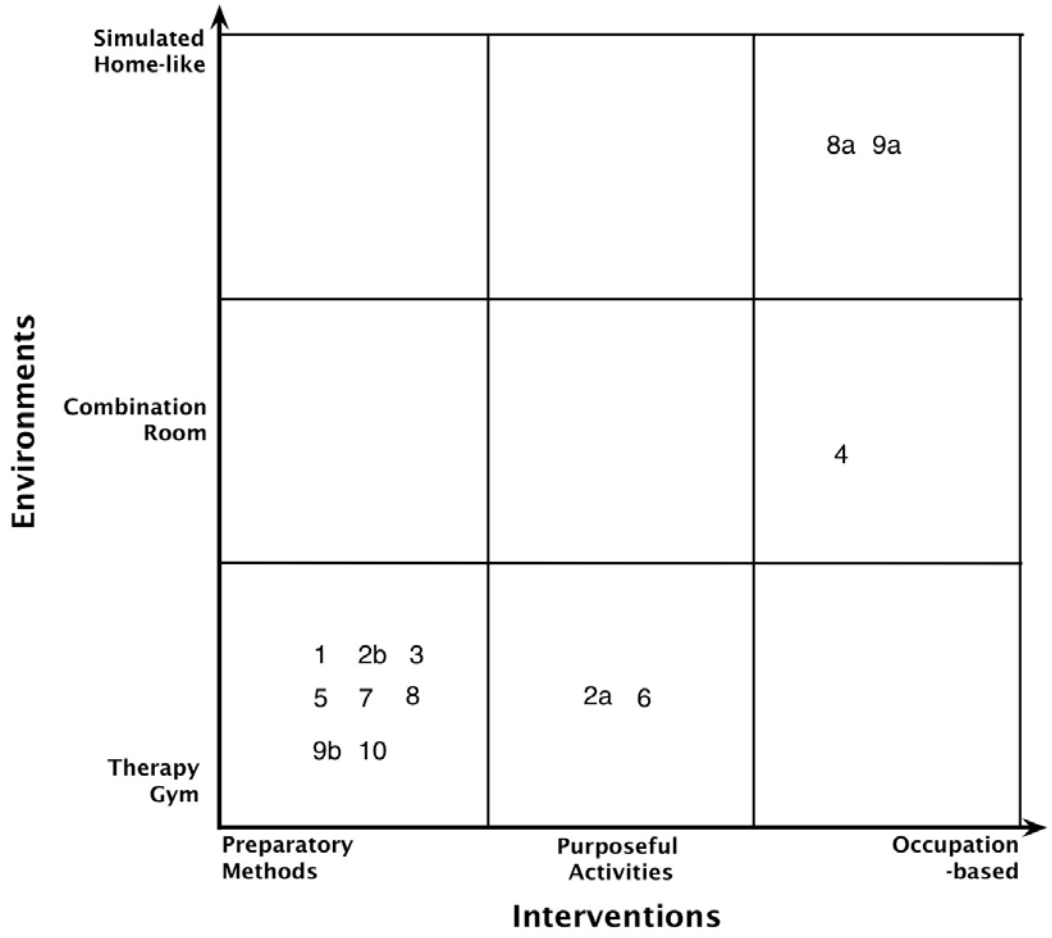


Figure 5.30 Therapy Quadrant Trajectory 2C1

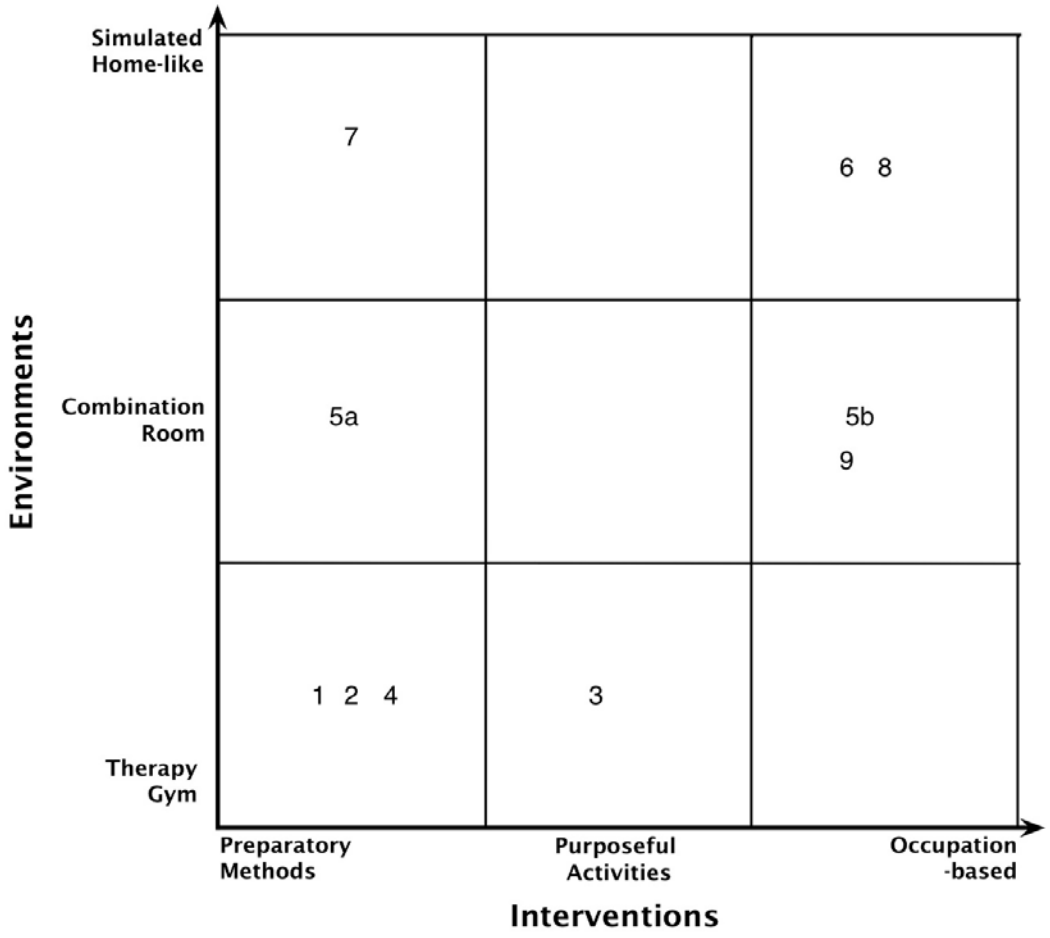


Figure 5.31 Therapy Quadrant Trajectory 2C2

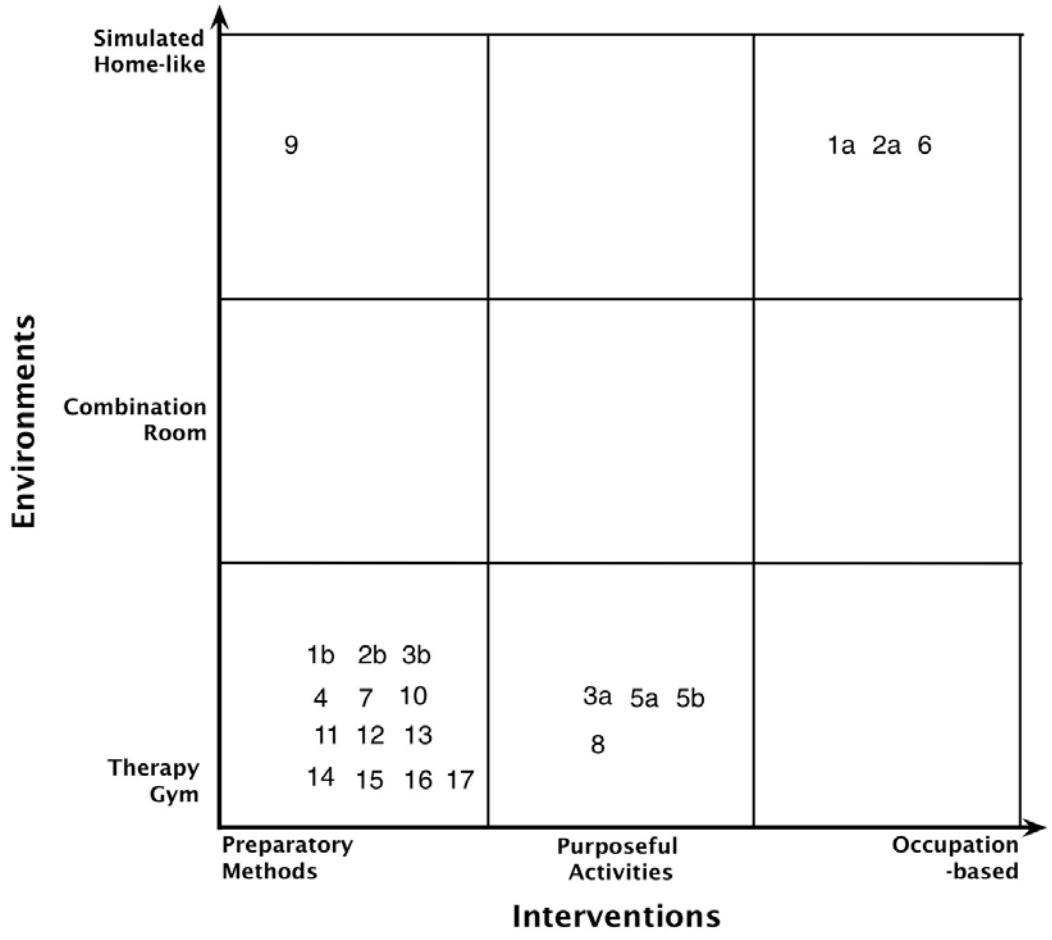


Figure 5.32 Therapy Quadrant Trajectory 2E1

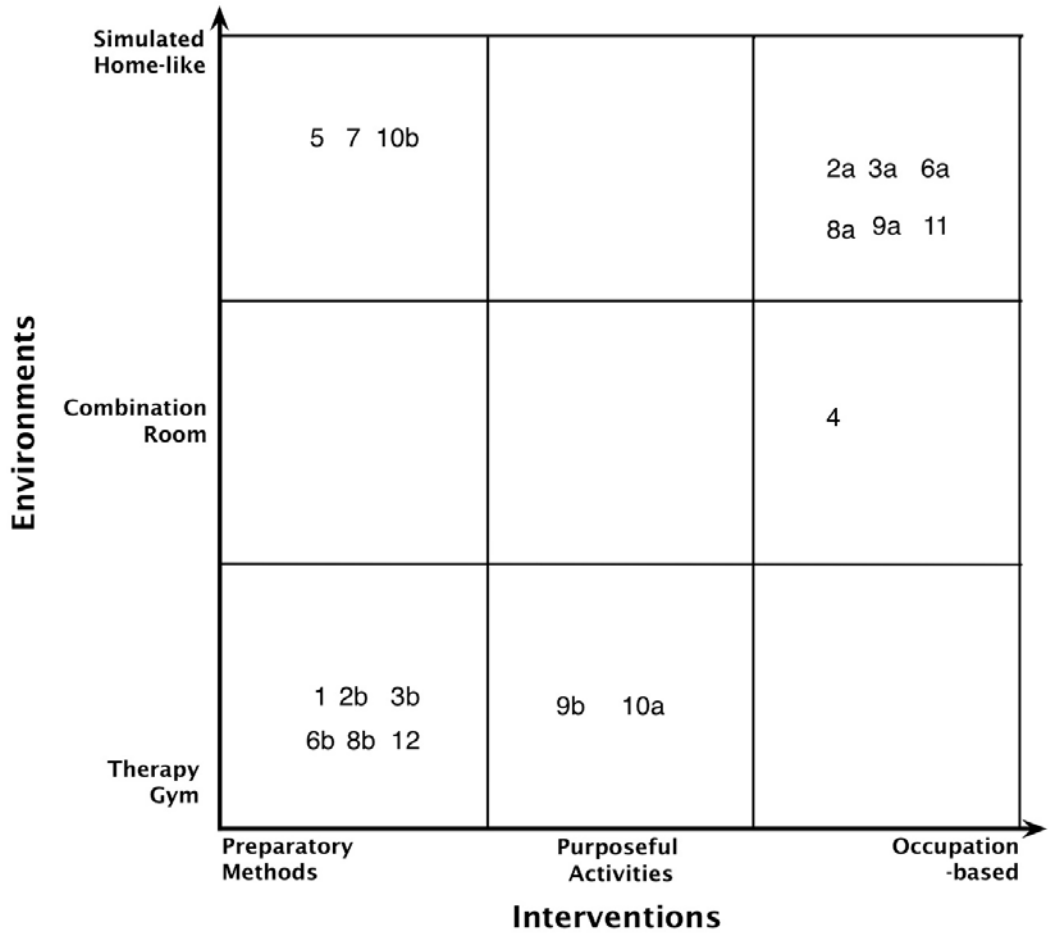


Figure 5.33 Therapy Quadrant Trajectory 2E2

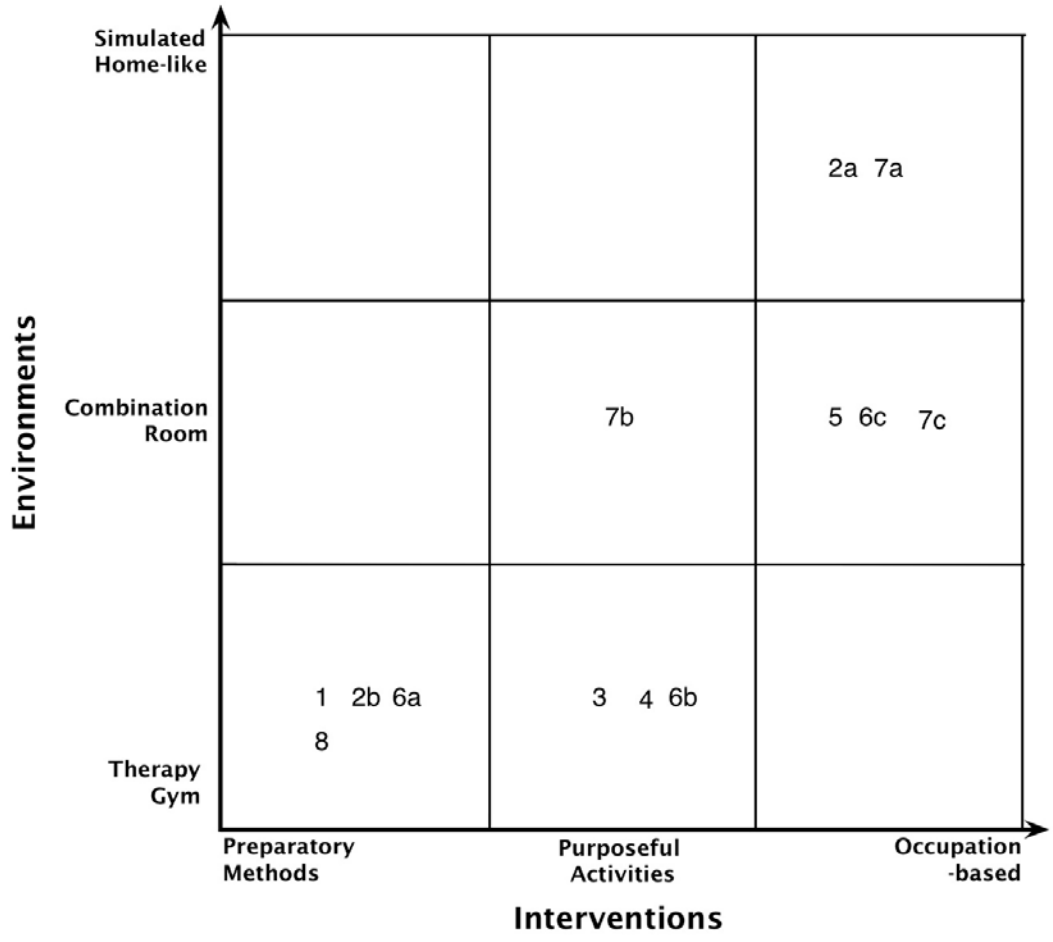


Figure 5.34 Environment and Intervention Choices for Vignette C (shown in sessions)

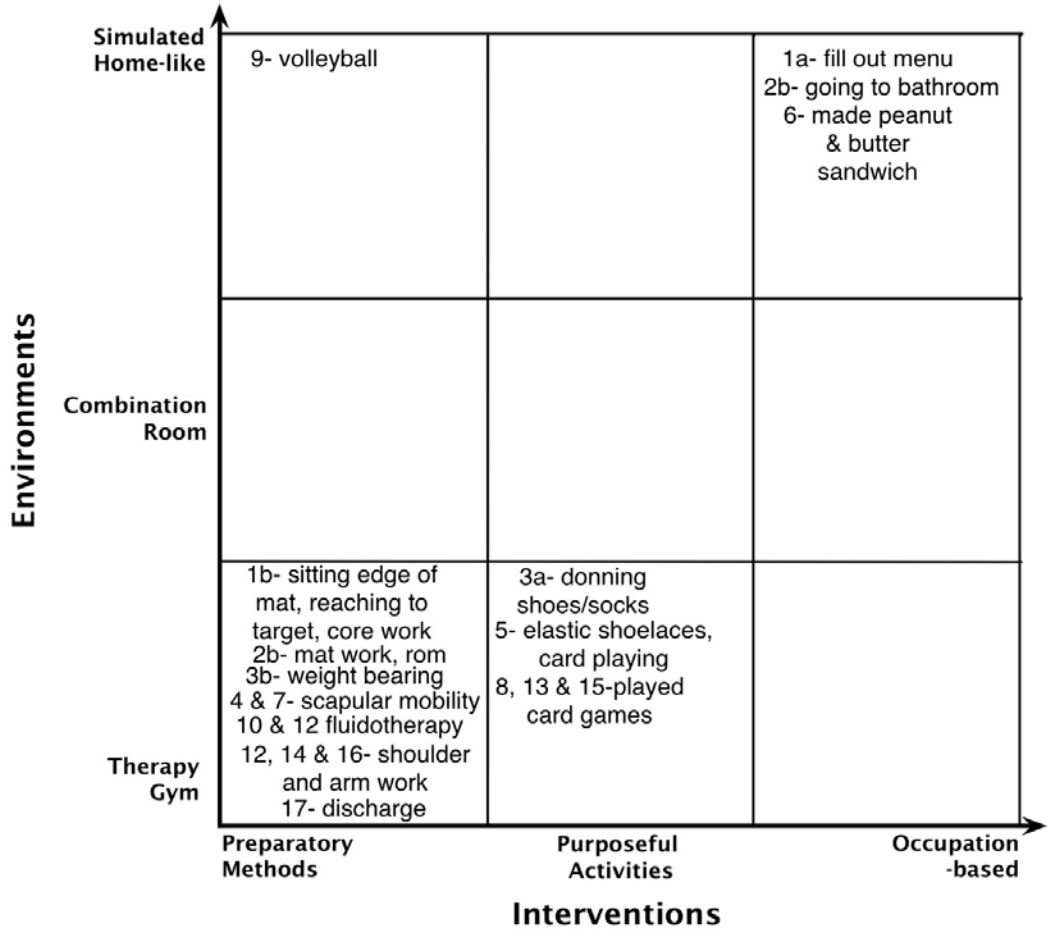


Figure 5.35 Vignette C Environment Use (Vignette - Phase Two)

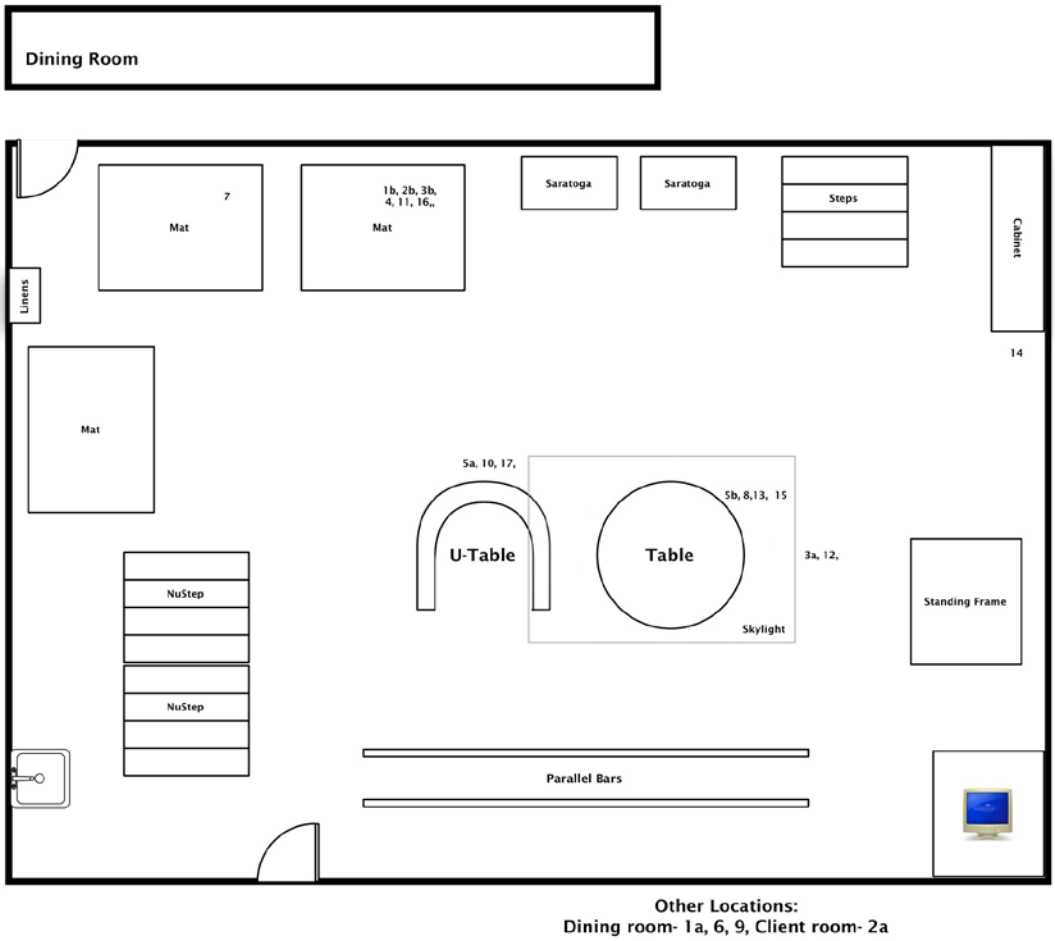


Figure 5.36 Environment and Intervention Choices for Vignette D (shown in sessions)

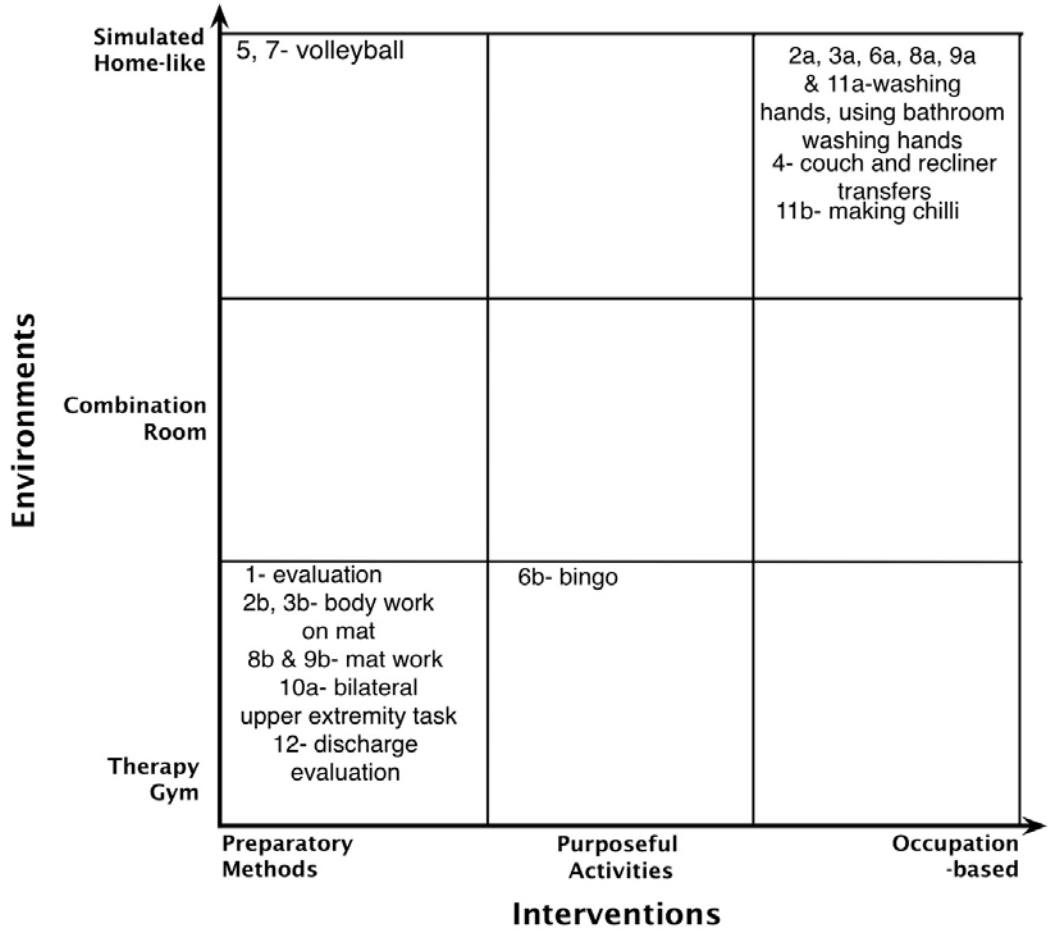


Figure 5.37 Vignette D Environment Use (Vignette - Phase Two)

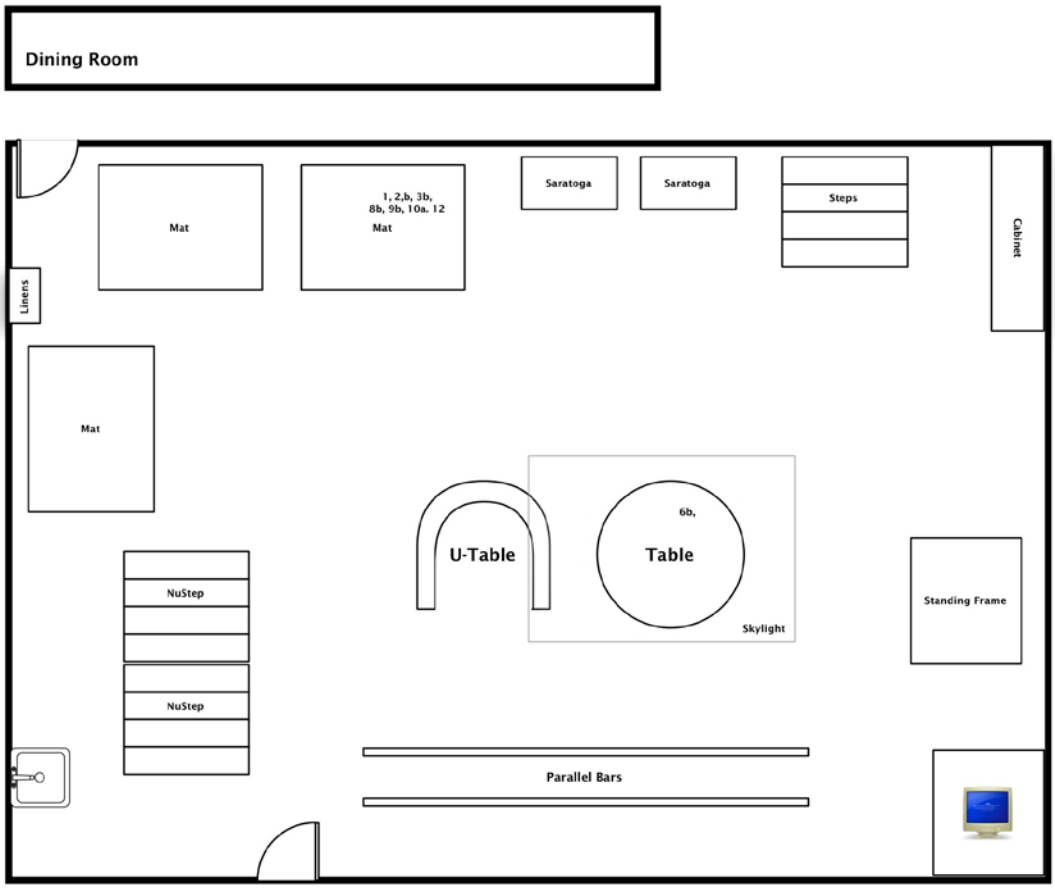


Figure 5.38 TIE Model with a Therapy Gym Environment

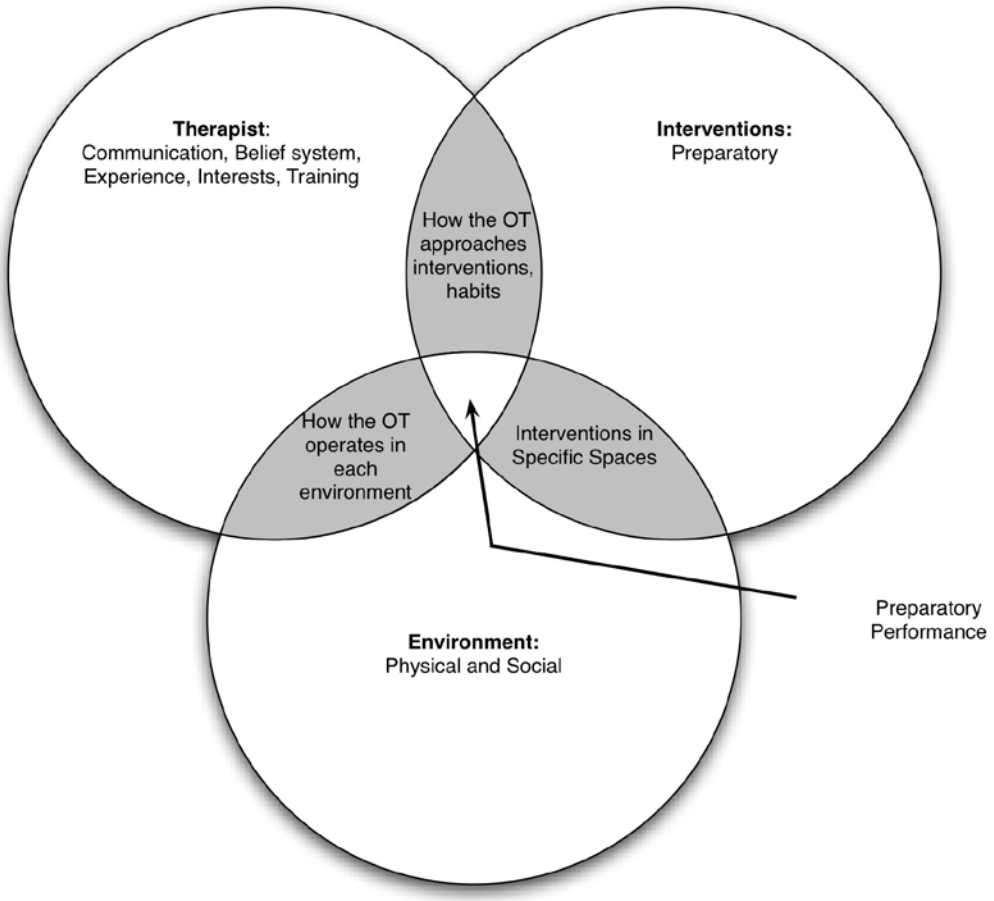
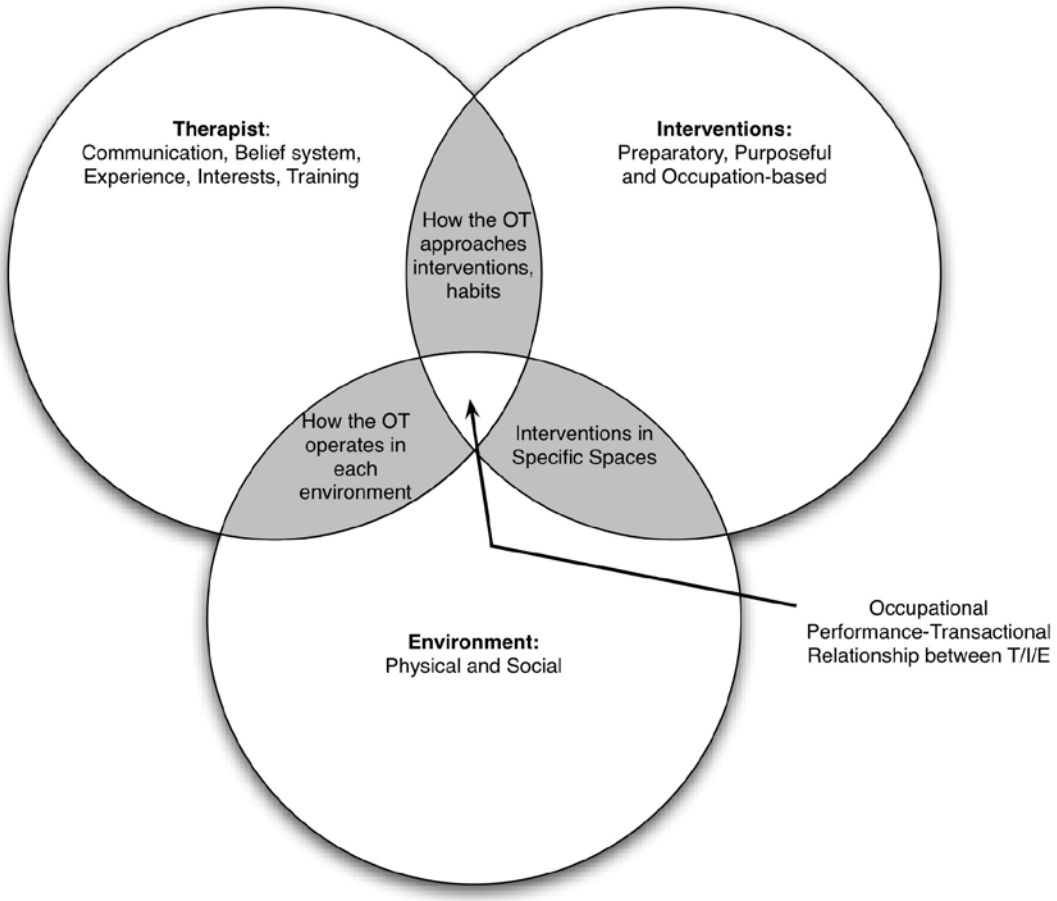


Figure 5.39 TIE Model with a Home-like Environment



Appendix A

Wrap Up Group Questions

1. When you're working in the gym with a client what techniques do you tent to choose for your interventions?
    a. If you were in gym B what interventions would you tend to pick to use with your client? Explain what having the home-like equipment in your gym has meant to you.
    b. If you were in a more home-like environment like the client's room, dining room or the practice apartment what interventions would you choose to use with your client?
2. If a client comes in after a typical stroke how do you prioritize what to work on?
    a. What is most important? Arm function, being able to dress etc.
    b. How does this change with each client?
    c. How do occupations play a role in your thinking?
    d. What role do the client's goals play in your decision-making?
3. After all this time watching you provide therapy I was wondering how you decide what interventions to do?
    a. When do you decide what to do with a client? What about each therapy session?
    b. How does the client participate in this process?
    c. If something needs to be modified during the activity what do you do?
    d. Do you ever consider changing something in the environment?
4. I am interested in finding out what gym A means to you and how you use it?

a. What are the benefits of working in this space?

b. What are the detriments of working in this space?

c. When your in the gym what do you think your client's experience is?

d. Where do you consider your idea environment is and why?

Individual Interview Questions

1. Do you think that your current environment supports what you want to do with your clients?
2. When do you find yourself planning the treatment session for your client?
    a. When is the best time to plan?
    b. What helps or interferes with your planning time?
3. When you have a student with you observing do you do anything different with your interventions?
4. How do you decide what is most important for the client to be able to do when they go home so they work on it in therapy during their admission?
5. What do you think comes first the environment or the intervention?
6. What are your thoughts about this project…in particular the idea that the environment is such an influence on intervention, clinical decision-making, habits?
7. If you could change one things about the therapy environment in which you treat a client it would be?
8. Providing occupation-based interventions in the gym is like…

Chapter 6

TIEing it Together

The three studies in this dissertation have built upon one other, with each focused on a different facet of the therapist, intervention, environment model (TIE). Each study will now be briefly reviewed and its relationship to the TIE model summarized. The chapter will conclude with overall clinical implications and recommendations for practice and future research.

Study One

The first study explored occupational therapists' perceptions of the rehabilitation environment and how these perceptions influenced their interventions. Twenty-one occupational therapists participated in focus groups designed to explore their perceptions of their practice environment. Analysis of the transcribed data revealed: the environment influenced their intervention strategies; therapists felt that if rehabilitation environments had flexibility, they would use more occupation-based tasks and be able to adapt to each client; and the environment had an impact on professional identity.

The first study brought definition to the therapist's circle within TIE representing the therapist role in a rehabilitation environment. The occupational therapists saw themselves as occupational performance experts and recognized that if they provided occupation-based intervention in a more home-like environment, the client, family and rehabilitation team would better understand their role, creating value for the profession. But when they provided interventions in the therapy gym, their role and value was less apparent because in the gym, the occupational and physical therapists tended to blend into more of a general rehabilitation specialist. The occupational therapists wanted to be

associated with providing occupational opportunities and facilitating a successful return home. The results of the study helped define the "T" as occupational expert.

In Study One, the therapists also helped to define the "E" circle in the TIE model. The therapists described an optimal therapy space that consisted of a traditional therapy gym but was enhanced with home-like equipment, creating a combination room. The therapists felt a combination environment offered more to the client because the therapists could address impairments as well as facilitate practice of skills in a natural context. The therapists envisioned the optimal environment as supporting their transition from preparatory methods, to purposeful activities, to occupation-based interventions and ultimately making their interventions more client-centered. Lastly, the study revealed a relationship between the environment and the intervention used in a specific rehabilitation space. It provided the first glimpse that the therapy gym environment had a strong association with preparatory methods for interventions, and that home-like spaces were associated with occupation-based interventions.

Study One provided an introduction to understanding how the therapists described their role and value in the rehabilitation environment, and their perceptions of the relationship between the environment and the interventions. These concepts are reflected in the TIE circles in Figure 6.1. Questions derived from Study One that guided Studies Two and Three were: Are environments that offer in context practice with home-like equipment effective? Which intervention approaches are most effective with individuals recovering from chronic stroke? How does the environment influence occupational performance and occupational therapy? And how does the occupational therapist decide which environment and intervention to use when providing therapy?

Study Two

Study Two evaluated the effectiveness of three different intervention approaches occurring in two different rehabilitation spaces: traditional outpatient, modified constraint-induced and occupation-based in a home-like environment. The study included seven participants with chronic stroke who received 15 sessions of occupational therapy over five weeks and completed pre- and post-testing using behavioral, neurophysiological and descriptive assessments. All the clients increased their functional capabilities and were satisfied with changes in their ability to perform meaningful roles, but due to the small sample size no significant differences were found in motor recovery between the different intervention or environmental approaches. A case study of one participant who received a combination of occupation-based interventions, preparatory methods and purposeful activities in a home-like environment was presented in Study Two. This client had success in resuming his desired roles because he practiced them in context as part of his therapy. The results of this case study indicated that occupation-based intervention in a home-like environment enhanced upper extremity motor recovery and occupational performance. The home-like environment was key as it provided opportunities to create flow between preparatory, purposeful and occupation-based interventions and in context practice experiences. For this client there was absolute therapist, intervention and environment congruency with the client's goals, which produced optimal occupational performance.

Thus, Study Two defined the intervention circle of the TIE model, to include flow between preparatory methods, purposeful activities and occupation-based interventions. More importantly, the study exemplified the power of a supportive environment that is

aligned with the client's goals and therefore supports both the therapist and the intervention (refer to Figure 6.2). Study Two identified the effectiveness of occupation-based interventions and illuminated how the environment can influence occupational therapy interventions, further defining the three circles in the TIE model. This study provided an understanding that when the therapist, intervention and environment are aligned, congruency increases, maximizing optimal occupational performance. But, a gap still existed in the knowledge of: how the environment influences occupational performance, and how occupational therapists choose an environment and intervention when working with clients. In essence, it remained unclear how the TIE model becomes dynamic and for the therapist to apply these concepts in practice.

Study Three

Study Three was a mixed methods study that identified what interventions occupational therapists choose when they are treating in a therapy gym, gym/combination or practice apartment space, if these interventions change when the therapy environment becomes more home-like and how the environment influences the decisions the occupational therapists make. Three occupational therapists participated in the 16-month study for a total of 162 sessions. Study Three defined the interwoven relationship between the three circles of TIE by defining: what interventions occurred in a therapy gym, a combination room and in a home-like environment; if interventions changed when the environment was changed; and finally, how the therapists made decisions about the environment and interventions when providing therapy. The results indicated that the environment was a critical factor in the therapeutic process as it could support or hinder clients from meeting their goals. The culture of the therapy gym interfered with the

therapist's ability to choose the best therapeutic environment as it provided limited intervention choices and fostered habitual practices. In addition, the results of Study Three validated the relationship between the gym environment and preparatory method interventions and the home-like environment with occupation-based interventions. Lastly, effective communication skills were found to be vital aspect of clinical reasoning skills as they were the method by which the therapist engaged the client and disseminated the therapeutic process.

Study Three had implications for understanding the TIE model. Being able to comprehend the environment/intervention relationship, the importance of good communication skills, and the knowledge about the gym are fundamental for the occupational therapist to use clinical reasoning skills. When planning therapy, ideally the occupational therapist chooses the supportive environment for the client and then matches the optimal intervention to it. Clinical reasoning is used to create a relationship between the circles as represented in their overlap, making the circles transact with each other. The border of occupational performance is bolded, signifying the effects of clinical reasoning, which generate a three-circle connection (Figure 6.3).

Law, Cooper, Strong, Steward, Rigby and Letts (1996, p. 16) postulate that the PEO model "is the outcome of the transaction of the person, environment and occupation" The PEO model is a dynamic process with the quality of the experience being assessed by the persons satisfactions demonstrating the fit between the three circles (Strong, Rigby, Stewart, Law, Letts & Cooper, 1999). For the TIE model clinical reasoning facilitates the transaction between the therapist, intervention and environment making the model dynamic and successful for the client. Study Three therapists used

clinical reasoning to propel the TIE model to become dynamic, interactive and transactional. Clinical reasoning serves as the bond between the therapist, intervention and environment to sustain congruency.

Interestingly, the issue of professional identity returned in Study Three. Several factors seemed to contribute to the functioning of an occupational therapist. The relationship between the gym and preparatory methods did not create any distinction for the role of the occupational therapist, as compared to the other professionals working in the gym. The gym culture made it difficult to leave the space to provide purposeful and occupation-based interventions elsewhere. Furthermore in Study Three the space was smaller and shared with physical therapy, leaving the occupational therapists with little control over how to define their space or role.

Summary

In this dissertation each study built on the next to illustrate a model that represents the influence of the environment on occupational therapy practice in a rehabilitation hospital. The TIE model illuminates the environmental influence with the optimal fit defined as: an occupational therapist who is an occupational expert and is committed to providing client-centered care; the Interventions as using combinations of all the OTPF intervention approaches based on the client's goals; and the Environment as being supportive to the client's specific goals (Figure 6.4). The TIE model fosters an understanding of the therapist's role in the rehabilitative process and challenges them to:

- Recognize the influence of the rehabilitation environment on occupational therapy practice.

- Understand the relationship between the environment and the intervention and make choices that contribute to client goal achievement.
- Practice as an occupational expert providing client-centered care.
- Continually transition between preparatory methods, purposeful activities and occupation-based interventions to establish a therapeutic flow.
- Champion clinical reasoning to create the dynamic interaction of the three interdependent entities (TIE) in order to achieve maximal occupational performance.

Clinical Implications

Occupational therapy practice on an inpatient stroke program can be improved if therapists are aware of the influence of the environment on interventions. Therapists identified that the optimal rehabilitative environment is home-like so they can offer occupation-based interventions, and providing interventions in the gym inhibits this practice. Therapists think they should be providing occupation-based interventions, yet they often resort to the habit of relying on preparatory methods in the gym. Both the therapist and client benefitted from a rehabilitation environment that provided a variety of choices, including home-like environments that are convenient and are set up to "see it, use it".

Therapists appeared to rely on one or two types of intervention approaches in one or two environments and never considered using occupation-based interventions in the gym. This dissertation demonstrated that it was the combination of the intervention approaches that were meaningful to the client in a home-like environment that was effective for recovering from a stroke. Therefore, therapists need education on how the

intervention approaches can be used in combination in any environment. In addition, providing these combination intervention approaches in a variety of environments may be beneficial to a client earlier in their stroke recovery.

Students could also benefit from learning about the contributions and barriers of the rehabilitation environment while in their professional programs so they are aware of the influences and risks to practice. A gap exists between what the students learn in their professional programs, and what they observe in a traditional rehabilitation therapy gym. By understanding the influence that the environment has on interventions it gives the student the knowledge and the tools to narrow this gap and improve practice.

Appreciating the influence of the gym on therapist behavior is valuable information for hospital administrators to use when designing future environments. Providing different spaces that support different interventions may be helpful for role delineation between the disciplines and add to the well-being of the client. Rehabilitation administrators should look to follow nursing hybrid designs to enhance client health.

Implementing communication skills training would be beneficial for students and therapists to gain knowledge on client-centered communication styles. Effective communication is essential for sharing clinical reasoning plans and is crucial for the formation of a therapeutic partnership. Supportive environments enhance the use of all components of clinical reasoning, which facilitates client-centered care and evidence based practice. The environment should serve to support the therapist to create a partnership and successful interventions for the client to recover from a stroke.

Future Research

The concept of this study should be expanded for future research to evaluate how the rehabilitation environment influences interventions with other populations, (e.g. spinal cord injury, and traumatic brain injury). In the facility where this study was conducted the environment was the same for all the rehabilitation diagnoses so it would be beneficial to learn if there were different effects with different populations. The intervention trends identified in this study indicated that the therapists did not consider using combinations of approaches (preparatory, purposeful and occupation-based) during therapy. Therefore, it is important to conduct future research that evaluates how the three intervention approaches can be combined and varied to reach optimal occupational performance and improve occupational therapy practice, including using Transcranial Magnetic Stimulation as a tool to evaluate the effectiveness of the environment/intervention combinations. It is also recommended that research be conducted on effective communication styles and clinical reasoning skills to educate therapists working with clients recovering from neurological insults. Yet, even more critical to the future of the occupational therapy profession is increasing the use of occupation-based interventions. Occupational performance is promoted as the foundation of the profession but this study showed that it has limited implementation in the clinic. It is recommended that studies addressing the effectiveness of occupation-based interventions in a rehabilitation setting be conducted to further build on the findings of this dissertation.

Conclusion

This dissertation began by exploring the occupational therapists' perceptions of an ideal rehabilitation environment and ended by elucidating the influence of the

rehabilitation environment on occupational therapy practice. The TIE model symbolizes the powerful contribution that the environment brings to the therapeutic process and represents one of the greatest influences on occupational therapy practice in a rehabilitation setting for an individual recovering from a stroke. The TIE model serves as a guide for occupational therapists in a rehabilitation setting to prepare people to go home and live their lives fully. A therapist should strive to be: an occupational expert, to provide treatment that combines preparatory methods, purposeful activities and occupation-based interventions and finds supportive environments to maximize occupational performance. Effective clinical reasoning and communication skills are the tools to drive this transactive model. After reading this study the therapist has the knowledge needed to find a road less traveled, as a therapist commented in the study:

> *"…I see that I am going to change my thinking about the environment, it is important to include the environment in your planning of a session"*

And that made all the difference.

Figure 6.1 TIE Model-Study One

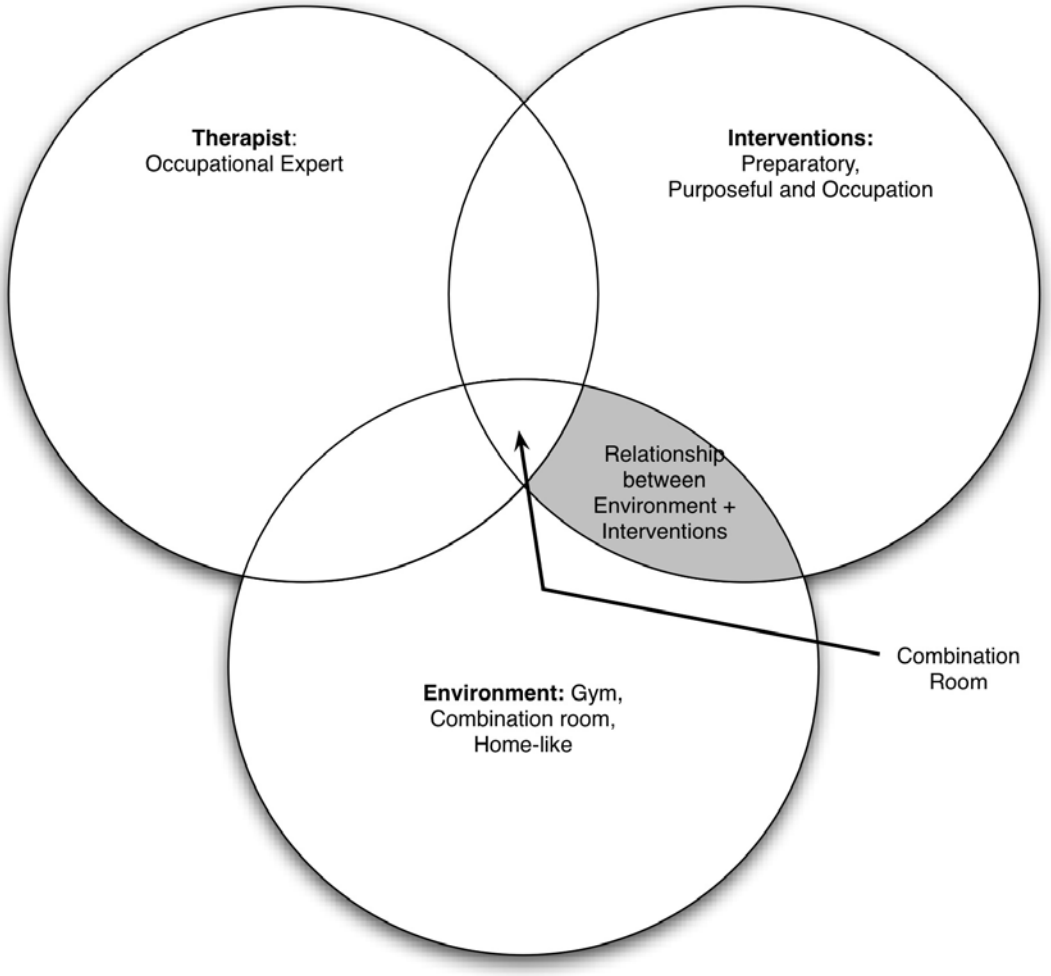


Figure 6.2 TIE Model-Study Two

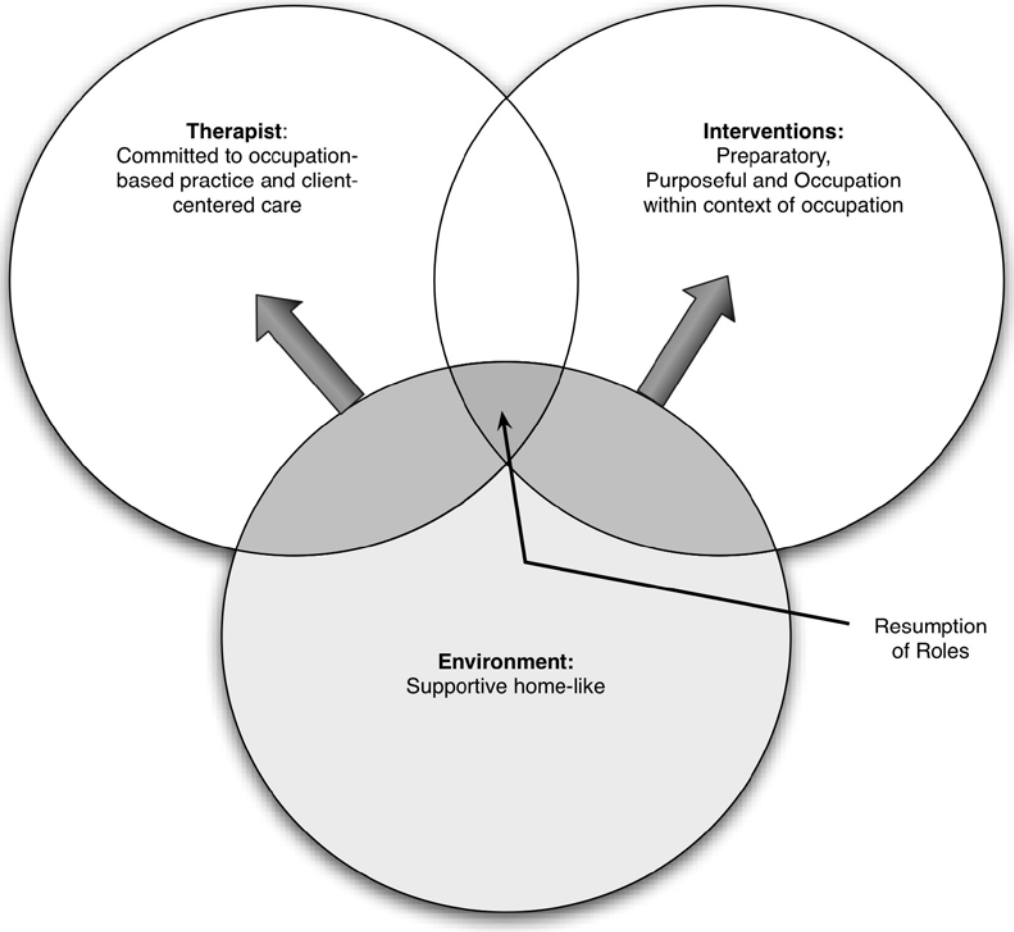


Figure 6.3 TIE Model-Study Three

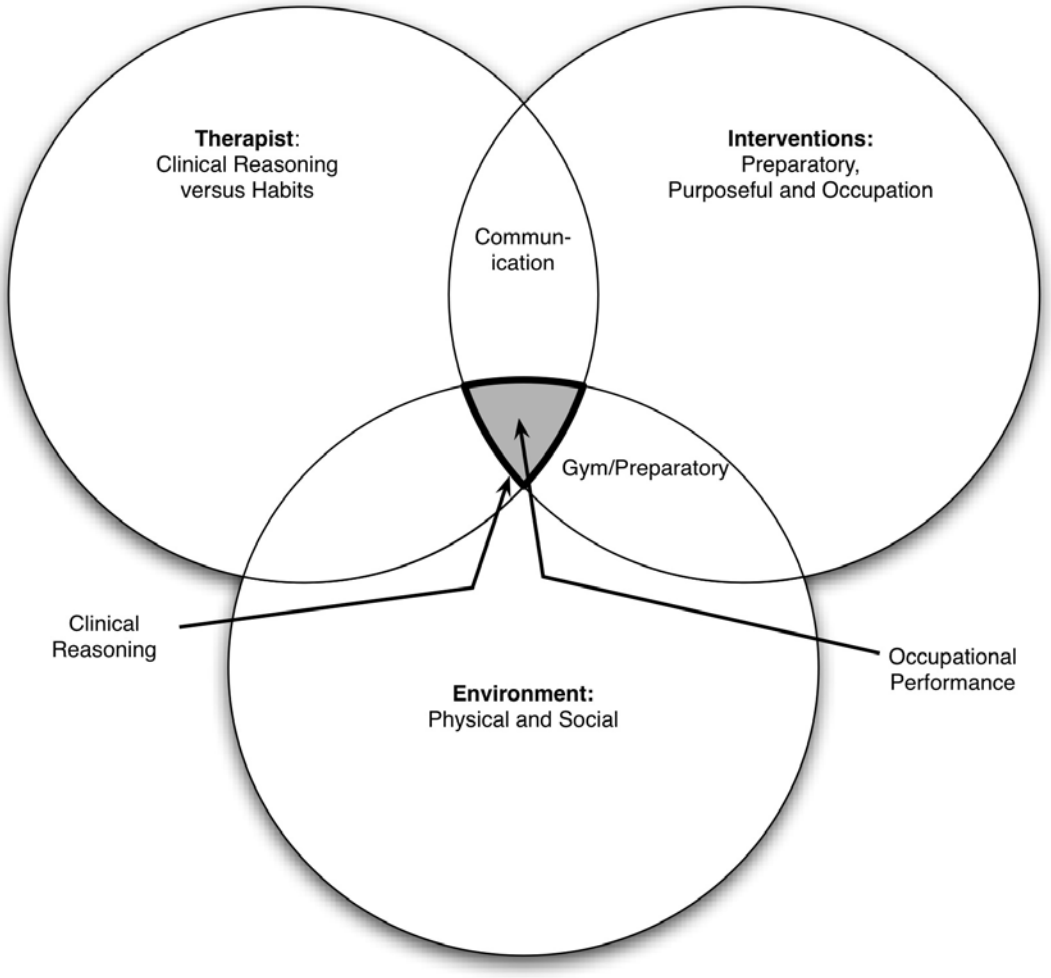
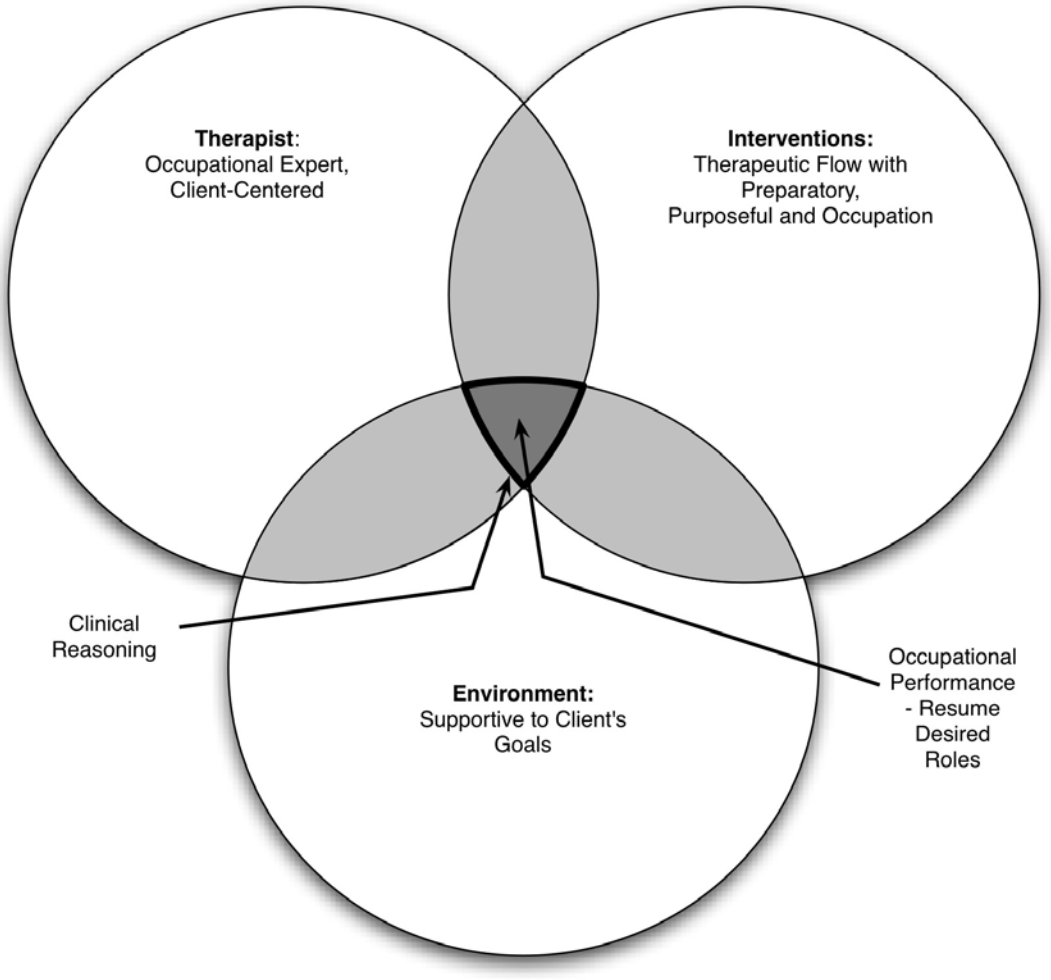


Figure 6.4 TIE Model-Rehabilitation



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Publications

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