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Cross-generational occupation-based interventions for upper extremity injuries

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CROSS-GENERATIONAL OCCUPATION-BASED INTERVENTIONS FOR UPPER EXTREMITY INJURIES

by

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This Scholarly Project paper, submitted by William B. Creel and Blake L. Sweney in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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Excelsior!
ABSTRACT

Decreased adherence to therapy protocols after upper extremity injury has been correlated with increased risk of re-injury and decreased general therapy outcomes. Occupation-based therapy has been shown to increase adherence to therapy protocol. To date, there have been several occupation-based protocols in upper-extremity musculoskeletal rehabilitation, but never one that addresses occupation across the lifespan and attempts to develop a tool to assist therapist in developing occupation based protocols specific to the developmental group.

The main theoretical background for the development of the clinical tool was the Model of Human Occupation (MOHO) and Erickson’s Developmental Stages Model. An extensive literature review was completed to discover the needs of the population. Once the literature was completed we began compiling the final product. The final product defines each development group in Erickson’s theory group using terminology from MOHO. Using this description, we organized activities into each developmental group. Each activity was analyzed and organized by the motions required to perform each activity.

The final product is a book of sections covering all upper extremity movements. Each movement is described in terms of starting position, ending position, and normal range of motion. Each page has a section with example activities that incorporate the motion, with activities being organized by developmental group. The appendix of the book contains copies of the pages with streamlined explanations to be utilized as patient handouts. This product
incorporates a more client-centered approach with a variety of occupation-based activities in
order to address upper extremity musculoskeletal injuries across a person’s lifespan.

Our hope is that the clinical aid will be utilized to usher in a paradigm shift in upper
extremity therapy that is less protocol based and more client-centered and occupation-based. The
finished product is to be utilized by an occupational therapist and the client to benefit the
recovery process of musculoskeletal injuries and incorporate occupation-based interventions into
the recovery process. Further research must be completed to assess the efficacy of the clinical aid
and to make adjustments based on results to maximize the effectiveness and increase patient
outcomes.
CHAPTER I
INTRODUCTION

Upper extremity musculoskeletal disorders and injuries can occur at any time throughout a person’s life and can occur at any age. These disorders and injuries can have a significant affect on a person’s ability to engage in and participate in meaningful occupations. Musculoskeletal disorders and injuries inhibit a person’s strength, range of motion, sensation, and are typically painful. Upper extremity injuries can affect the shoulder, upper arm, elbow, forearm, wrist, and hand. Jain et al. (2014) found that in 2006, there were around 1.1 million surgeries that were performed in the United States for musculoskeletal disorders and injuries. The statistic is even higher when considering the amount of musculoskeletal injuries that did not require surgical intervention. Weinstein and Yelin (2013) found that, in 2012, 33.5 million adults reported cervical/neck pain, which can also have an effect on the upper extremities. Currently, there is a strong focus on exercise-based treatment for these injuries despite the available literature that supports the significance of occupation-based treatment.

Musculoskeletal disorders and injuries can occur at any age and in any context. The workplace is a common context in which many musculoskeletal disorders and injuries occur. The treatment for these injuries tends to be focused on a specific exercise, which does not address the client’s interests or the age of the client. Focusing on an exercise and not addressing the client’s interests decreases the adherence rate of the client and will increase the amount of rehabilitation time.

In order to develop an occupation-based clinical tool to address upper extremity musculoskeletal injuries, we utilized the Model of Human Occupation (MOHO) to address the client’s motivation (volition), habits and routines (habituation), ability to perform occupations
(performance capacity), while incorporating the client’s environment (Kielhofner, 2008). The biomechanical frame of reference was utilized to organize the information about the musculoskeletal factors of each motion (Radomski & Trombly-Latham, 2008). Finally, we utilized Erikson’s Stages of Development to address common occupations and activities while considering the various age ranges. The ages we considered were Adolescent, Adult (Young Adult and Middle Adult), and Older Adult (McLeod, 2013).

We created a clinical tool that addresses the client’s age, motivation, routines, the client’s ability to perform meaningful occupations, the client’s self-esteem and self-efficacy, all while incorporating occupation-based interventions to increase the adherence of home exercise programs. This clinical tool is a product that is will make it easier for a therapist to show and educate a client about the treatment. It will also make it easier for a client to understand, perform, and complete the rehabilitation process.

Definitions

The following definitions are important to understanding typical occupational therapy language and common occupational therapy interventions. These definitions have been provided to ensure readers a uniform understanding of this scholarly project.


Client Factors – Refers to “specific abilities, characteristics, or beliefs that reside within the client and may affect performance in areas of occupation” (American Occupational Therapy Association, 2008, p. 630).

Instrumental Activities of Daily Living (IADLs) – Refers to “activities to support daily life within the home and community that often require more complex interactions than self-care used in ADL” (American Occupational Therapy Association, 2008, p. 671).

Musculoskeletal Disorder – Refers to “a variety of conditions that affect the muscles, bones, and joints. Pain and discomfort may interfere with everyday activities” (Cherney, 2013).

Occupation – Refers to “activities that people engage in throughout their daily lives to fulfill their time and give life meaning” (Hinojosa & Kramer, 1997, p. 865).

Occupation-based Interventions – Refers to “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, needs, health, and participation in daily life (American Occupational Therapy Association, 2008, p. 672).


Purposeful Interventions – Refers to “a goal-directed activity within a therapeutically designed context that leads to an occupation or occupations. Specifically selected activities that allow the client to develop skills that enhance occupational engagement” (American Occupational Therapy Association, 2008, p. 674).

Summary

Chapter I consisted of an introduction to the literature and an overview of the developed occupation-based clinical tool. Chapter II provides a more description of the literature introduced in Chapter I with an emphasis on the following areas: prevalence of musculoskeletal disorders, current interventions for musculoskeletal disorders, and benefits of occupation-based interventions. Additionally, Chapter II highlights the occupational therapy models and frames of reference used to develop the occupation-based clinical tool.
Musculoskeletal disorders of the upper extremity are prevalent within the healthcare sphere. As mentioned in Chapter I, a “musculoskeletal disorder” refers to “a variety of conditions that affect the muscles, bones, and joints. Pain and discomfort may interfere with everyday activities” (Cherney, 2013). In 2006, U.S. surgeons performed a total of 1,110,299 ambulatory surgeries including rotator cuff repair, shoulder arthroplasty, carpal tunnel release, and wrist arthroscopy during treatment protocols for people with various upper extremity musculoskeletal disorders (Jain et al., 2014). These numbers do not include the various non-surgical interventions used to treat people with these diagnoses during their visits. Overall, the prevalence of varying musculoskeletal disorders often differs by population. Osborne et al. (2012) examined lifetime prevalence of musculoskeletal disorders amongst farmers, of which 90.1% reported developing a musculoskeletal injury or disorder at some point in their lifetime that affected their ability to perform everyday activities. Within this sample of farmers, up to 71.4% involved the upper extremity and surrounding regions. Upper extremity injuries and disorders can affect any part of the hand, wrist, forearm, elbow, upper arm, and shoulder areas. Sometimes, the same diagnosis can present in markedly different ways in two patients based on other factors. An example of this would be focal hand dystonia (occasionally referred to as “writers cramp”), which is a disorder characterized by abnormal movements of the digits and hands during task-specific, rapid, skilled, and fine-motor movements (McKenzie et al., 2009). Engaging in certain tasks can lead to different presentations of focal hand dystonia, such as writers and “writers cramp”, or musicians
and “musician’s cramp”. Similarly, other diagnoses can present with great differences as well and are often influenced by an individual’s environment.

Upper extremity musculoskeletal injuries can happen in a variety of settings and can have a profound influence on the occupational participation of an individual. The terms occupation and occupational performance are defined in the Occupational Therapy Practice Framework: Domain & Process 3rd ed. (American Occupational Therapy Association, 2014, p. S6) as:

“... the daily life activities in which people engage. Occupations occur in context and are influenced by the interplay among client factors, performance skills, and performance patterns. Occupations occur over time; have purpose, meaning, and perceived utility to the client; and can be observed by others (e.g., preparing a meal) or be known only to the person involved (e.g., learning through reading a textbook). Occupations can involve the execution of multiple activities for completion and can result in various outcomes.”

Therefore, occupational performance would refer to one’s ability to successfully participate in desired and meaningful occupations, taking into account contextual factors facilitating or inhibiting performance (American Occupational Therapy Association, 2014).

Historically, musculoskeletal disorder research and literature has been situated in the workplace; a common setting that is often associated with musculoskeletal injuries. Authors of several studies have examined the relationship between musculoskeletal injuries and factors related to work. Van Eerd et al. (2009) explored common workplace environments and how often workers were exposed to certain tasks, as well as how these tasks may contribute to the likelihood of developing a musculoskeletal disorder. Van Eerd et al. (2009) found that throughout the day, workers are exposed to a great deal of tasks, which can lead to the development of various musculoskeletal disorders when not completed properly, leading to
decreased work productivity, increased days away from work, and a decrease in occupational performance in general. This incidence of occupational interruption can be applied to a number of scenarios other than work as well. Across the lifespan, musculoskeletal disorders account for a high number of instances of leaving workplace, as well decreased community and social involvement (Leclerc et al., 2014). Certain client factors such as age, gender, type of occupation, and pre-existing medical conditions can lead to a greater risk of developing a musculoskeletal injury.

Musculoskeletal injuries can have a profound effect on not only physical health of an individual, but the psychological health of the individual can have an effect on the injury as well (Van Eerd et al., 2009). Roquelaure et al. (2009) found that while both physical factors and personal (psychosocial) factors played an influence on an individual’s risk of developing a musculoskeletal injury, personal factors, such as age and prior history of upper extremity musculoskeletal disorders, were significantly more likely to have a negative effect when compared to physical factors. Roquelaure et al. (2009) examined the effects of psychological distress on individual perception of pain as well as recovery time of individuals with orthopedic injuries. The researchers found that a combination of depressive and anxious distress plays an important role in impacting the person’s perception of pain, as well as the individual’s overall functional capacity when recovering from orthopedic lower extremity injuries.

An injury can have a weighty effect on not only the injured individual, but also the community and society surrounding the individual as well. Newnam, Collie, Vogel, and Kelleher (2014) found that there have been multiple research studies that link the effect of an injury to a decrease in certain personal factors, such as body factors, participation in activities of daily living (ADLs) and other functional tasks, decreased work participation, and even death. Newnam
et al. (2014) also identified the work of several researchers who linked injury to a decrease in the quality of relationships with family members and spouses, as well as other members in the individual's immediate community. Finally, Newnam et al. (2014) found there to be a significant influence on societal factors, including economical factors such as reimbursement and healthcare costs. This economic burden can be seen in not only personal economic factors (lost wages, lost employment, etc.) but in overall economic cost in the wider economic environment including lost productivity and decreased worker efficacy (Dall, Gello, Koenig, Gu, & Ruiz, 2013).

Current Interventions for Musculoskeletal disorders

Once a client receives the diagnosis of the musculoskeletal disorder from the appropriate healthcare team member, the rehabilitation process begins. Sometimes surgical interventions are necessary to treat the underlying causes of the musculoskeletal disorder or injury (Jain et al., 2014). However, there are other instances where non-surgical interventions are useful and other healthcare professionals often deliver these.

Regardless of the intervention a person with a musculoskeletal disorder or injury may receive, there are multiple professions involved in the recovery process. The process often begins with a physician who will diagnose the musculoskeletal disorder or injury, prescribe any necessary medication, and decide what treatment method to be taken and, if necessary, perform the surgical treatment. Occupational therapists and physical therapists are involved in the recovery process of many individuals. Occupational therapists provide interventions that typically fall into three main types: preparatory interventions, purposeful interventions, and occupation based interventions (Gillen, 2014; Willard & Spackman, 2013). The overall goal of occupational therapy is to assist the client in returning to engagement in his or her everyday occupations, which can be activities such as work, leisure activities, managing a home, raising a
family, etc. The more a client improves during treatment, the greater his or her occupational participation will be. Physical therapy is also involved in the rehabilitation process and focuses on musculoskeletal disorders or injuries by working to improve strength in weak muscles, gait training, and functional mobility.

As their name suggests, preparatory interventions are used to “prepare” a client to participate in either the therapy session or his or her desired occupation, as well as concurrently with purposeful activity or during occupational engagement (American Occupational Therapy Association, 2008). Some common interventions occupational therapists use with clients with musculoskeletal injuries that are considered “preparatory”, include physical agent modalities (PAMs), strengthening protocols, joint mobilization, range of motion (ROM) exercises, and manual edema mobilization (American Occupational Therapy Association, 2008; Bracciano, 2008).

PAMs are an example of preparatory interventions that can be used prior to, concurrently with, or following occupational engagement in order to address various client factors that may be affecting occupational performance. Superficial thermal agents, a classification of PAMs, are intended to change the superficial temperature of soft tissue (Bracciano, 2008). Superficial thermal agents are used often by occupational therapists with clients who are experiencing musculoskeletal injuries. Two common examples of these PAMs are hot and cold packs (thermo- and cryo-therapy). Contrast baths, in which a limb is systematically immersed in water switching from warm to cool, are utilized with individuals with a wide variety of diagnoses, including carpal tunnel syndrome (Janssen, Schwartz, & Velleman, 2009). Another type of PAM includes deep thermal agents, which is utilized to change the temperature of deep soft tissue in clients with musculoskeletal injuries (Bracciano, 2008). An example that is used in the treatment of
people with musculoskeletal disorders, such as arthritis, would be therapeutic ultrasound (Ekelman et al., 2014). Ciccotti et al. (2004) stated that corticosteroid injections, ultrasound, and electric stimulation are typically instituted if medications alone are not effective.

While it can be beneficial to utilize PAMs to treat numerous musculoskeletal injuries, these modalities are not to be used as a standalone treatment. Administering PAMs as a treatment method without application to occupational performance is not considered occupational therapy (Bracciano, 2008). Depending on the musculoskeletal injury and the client, PAMs may or may not be the most beneficial treatment due to a lack of evidence in the literature that supports the use of PAMs in all scenarios. Micholovitz (2005) found the use of phonophoresis via ultrasound and iontophoresis via direct-current electrical stimulation to transdermally deliver steroidal and nonsteroidal anti-inflammatory medications were not be well supported with regards to effectiveness.

According to Breger, Lazaro, and MacDermid (2009), there is an insufficient amount of evidence to support or refute the use of contrast baths for pain relief and fluid management. The findings from these researchers further address the point that though PAMs are widely used in the rehabilitation of individuals with musculoskeletal injuries, other preparatory interventions are imperative to the successful recovery of individuals with musculoskeletal injuries.

Specifically regarding musculoskeletal injuries, therapeutic exercise is and has been a mainstay of biomechanical rehabilitation, which focuses on improving strength, range of motion, and endurance (Cole & Tufano, 2008). The biomechanical rehabilitation frame of reference is common in home programs featuring strengthening and range of motion exercises, which are found in physical rehabilitation and prescribed by a number of professions. Home programs are prescribed for individuals with a variety of client factors, including strength, range of motion,
and even pain (Anderson et al., 2010). Home program application across a wide variety of therapy settings (e.g. inpatient, outpatient, and home health) is common. This particular therapeutic modality is the most common intervention choice for many orthopedic therapists (Anderson et al., 2010). Cullinane, Boocock, and Trevelyan (2014) completed a systematic review and found eccentric exercise to be an effective nonsurgical treatment for lateral epicondylitis. Eccentric exercises are commonly incorporated in a variety of home exercise programs.

Manual edema mobilization is designed to treat lymphedema and fluid buildup in the subacute and chronic stages of an injury. Untreated, edema can lead to settling of fluid in the soft tissue, leading to painful swelling and decreased functional movement of limb (Knygsand-Roenhoej & Maribo, 2011). Knygsand-Roenhoej and Maribo (2011) found that clients who exhibited edema after a traumatic orthopedic or musculoskeletal injury responded significantly better to a treatment protocol featuring a modified manual edema mobilization compared to traditional treatment, indicating that it is a strong addition to a treatment protocol.

While preparatory interventions are important for improving clients’ abilities for participation in occupations, purposeful interventions are the next step for moving toward the ultimate goal of occupational participation. These interventions incorporate steps or overall parts of the occupation into the therapy session. Purposeful activity, in other words, may not specifically be engagement in the occupation, but in component activities that would make up (or facilitate), eventual occupational performance. These can be useful for learning the specific tasks necessary before actually engaging in the occupation, and can be invaluable when considering the client’s needs for the ultimate goal of occupational engagement (Crepeau, Schell, Gillen, & Scaffa, 2014).
The highest level of intervention, and the arguable cornerstone of occupational therapy, is referred to as occupation-based intervention. These interventions attempt to incorporate the individual’s desired occupations into the intervention process with the end goal of full occupational participation in mind (American Occupational Therapy Association, 2014). Theoretically, occupation-based protocols address all areas of a client’s treatment by taking into account all the client factors that may inhibit or enhance performance in that person’s occupations (Gillen, 2014). A client factor is a person’s values, beliefs, and spirituality (American Occupational Therapy Association, 2014). A client factor also includes a person’s mental and physical body functions, such as memory, energy, muscle strength, and muscle endurance. Intervention protocols are, therefore, highly individualized and generally developed in collaboration with the client in order to fully utilize and understand his or her needs as an occupational being and as a person who engages in a variety of occupations. The use of occupations in interventions is often times complimented with combinations of preparatory and purposeful intervention to maximize benefits of the occupation-based intervention. In a case study featuring a client diagnosed with a cerebrovascular accident, Skubik-Peplaski et al. (2012) examined the application of a combination of preparatory interventions, including strengthening and range of motion exercises, as well as methods such as key turning to improve pinch strength, to a primarily occupation-based therapy protocol. Examples of occupation-based interventions used in the protocol included simulation of common ADLs and Instrumental Activities of Daily Living (IADLs) activities in a hospital-based “practice apartment”, as well as some work on Baltimore Therapeutic Exercise Equipment (BTE) work simulator (Skubik-Peplaski et al., 2012). The results indicated that despite the short stay and intervention period in the hospital, the client experienced significant improvements in upper-extremity motor recovery, neuroplastic change,
and overall occupational performance when compared to norms of traditional preparatory and purposeful interventions (Skubic-Peplaski et al., 2012).

In another study dealing specifically with a person with an upper extremity musculoskeletal disorder, Earley and Shannon (2006) examined the concept of occupation-as-means, meaning utilizing daily occupations as the interventions to improve a person’s ability, and how this concept could be utilized to the fullest extent in the therapy process. They examined the efficacy of using such a process in a therapeutic way when treating a client with shoulder adhesive capsulitis. Earley and Shannon (2006) found that by adding compensatory occupation-based techniques with the traditional preparatory methods immediately after the client received the diagnosis, the therapists were able to minimize tissue damage, decrease pain, increase range of motion, and ultimately help client improve general occupational performance.

A major problem affecting the rehabilitation process for individuals following a musculoskeletal injury is adherence to a therapy home protocol. When clients do not follow the protocol set forth by their therapist, they may encounter slower healing time, and even an increased risk of re-injury or re-hospitalization, costing the individuals and hospitals more time and money (Toker et al., 2014). Karlsson, Takala, Gerdle, and Larsson (2014) discovered a low adherence to home exercise programs in their evaluation of pain and function in women with chronic neck pain. Karlsson et al. (2014) found adherence to the home programs to be low at the beginning of the study and participants reported barriers, such as low motivation, lack of time, and economic factors as reasons for their non-adherence. Medina-Mirapeix et al. (2009) researched personal characteristics that influenced patients’ adherence to home exercise programs during chronic pain. They found that when patients had pain, they were more likely to adhere to the home exercise program (Medina-Mirapeix et al., 2009). When the patients’ pain
decreased, the patients were more likely to participate in other activities and discontinue their exercises. Medina-Mirapeix et al. (2009) also found that when patients’ pain disappeared for a long duration, adherence was low to none. Occupational therapists, therefore, face a challenge to design and implement therapy protocols to which clients are more likely to adhere. James and Linatus (2013) hypothesized that one way to do this was by incorporating occupation-based interventions into the therapy protocol rather than only preparatory and/or purposeful intervention inclusion. The results indicated that there was a statistically significant difference in the adherence rate to occupation-based protocols compared to preparatory protocols (James & Linatus, 2013). This stronger client adherence to interventions also led to faster healing time, decreased need for hospital visits, and decreased likelihood of repeat hospitalization (James & Linatus, 2013).

Benefits of Occupation-Based Intervention

There is a marked lack of research into the specific benefits of occupation based-intervention in the realm of upper extremity orthopedic rehabilitation. There are, however, generalities that one can determine from the existing literature about occupation-based protocols in general. As previously mentioned, occupation-based interventions allow clients to engage in the rehabilitative process through their meaningful activities, which they are more likely to engage in than a simple biomechanical exercise home protocol (James & Linatus, 2013). Another purported benefit of occupation-based treatment is an increased client satisfaction from therapy (James & Linatus, 2013; Ma, 2012). By incorporating meaningful activities, clients develop an increased sense of self-efficacy and participation in the therapy process.

There are certainly challenges to implementing occupation-based interventions, especially in a physical rehabilitation setting. Prodinger, Shaw, Stamm, and Rudman (2014) examined the effect...
of institutional procedure on the occupational needs of women with osteoarthritis. They found that based on stringent institutional practices and the viewpoints of other professionals, the individual occupational needs of clients were sometimes ignored in order to better adhere to therapy protocols (Prodinger et al., 2014). This particular finding outlines the need for a product that can incorporate the therapy protocols for upper extremity musculoskeletal disorders into the meaningful activities of clients to ensure not only best-practice, but also that the therapy practitioners provide is as client-centered as possible.

Theoretical Framework

After establishing a need for the product, we attempted to select an occupational behavior model that would address the underlying needs of the population and offer a guide to understand how clients process the motivation to engage in occupation, their habits and routines (in which the protocols and concepts from traditional hand therapy regimens would be integrated), the various theories behind the manual therapy that will be a major part of the final product, as well as the guiding framework behind the selection of the occupations were the Model of Human Occupation, The Occupational Functioning Model, Erickson’s stages of development, the Biomechanical frame of reference.

The Model of Human Occupation

The main occupational behavioral model that was selected to guide the creation of the proposed product is the Model of Human Occupation (MOHO). Developed by Dr. Gary Kielhofner in the early 1980’s, this model provides a framework in which occupational therapists can explore, organize and make explicit the concept of human occupation (Turpin & Iwana, 2012). Kielhofner posited that each person is unique in the way he or she is motivated toward and choose to do various things, in his or her patterns of everyday life, and in his or her
individual capacities. He attempted to explain the complexities of human engagement in occupation with three main concepts: volition, habituation, and performance capacity (Kielhofner, 2008). These three aspects, he stated, make up an understanding of the whole person, along with influences from the individual’s environment that affect the occupations (Kielhofner, 2008).

The first concept, volition, essentially refers to the motivation of an individual to engage in occupation (Kielhofner, 2008). In order to establish this concept, Kielhofner cited various literature sources to put forth three assumptions about human motivation (Kielhofner, 2008). First, humans possess a complex nervous system giving them an “intense and pervasive need to act” (Kielhofner, 2008, p. 12). Second, humans possess a body that is capable of taking this need and acting upon it (Kielhofner, 2008). Finally, humans possess an awareness of this need and their own potential for engaging in action (Kielhofner, 2008). This underlying need, according to Kielhofner (2008), is a rudimentary understanding of the motivation to engage in occupation.

Another important concept that Kielhofner (2008) outlined when explaining volition was the concept of “personal causation”. In other words, Kielhofner attempted to describe one’s perception of knowing what one is capable of doing, as well as what kinds of effects one’s doing can produce (Kielhofner, 2008). Humans feel the need to engage in occupation, and when that need is not fulfilled serious deficits in one’s sense of self-efficacy and self-esteem can be negatively affected. Another concept Kielhofner (2008) described is the fact that individuals have “values” that will influence their occupational decisions. These values come from the clients’ experiences, and touch at the core of what individuals find meaningful when considering their desired occupations.
This concept of volition is important to address in the formation of the final product because of the issue of lack of adherence to traditional therapy protocols. The aforementioned evidence regarding intervention adherence clearly supported that individuals are more likely to adhere to protocols that are more occupation-based (Earley & Shannon, 2006; Skubic-Peplaski et al, 2012). Clients are more likely to engage in occupations that they value or onto which they can import a certain meaning (Kielhofner, 2008).

The second major concept, habituation, refers to the process in which occupations are organized into routines or patterns (Kielhofner, 2008). Habits preserve ways of doing things that individuals have internalized through repeated performance. In other words, individuals’ habits can be defined as acquired tendencies to respond and perform in certain consistent ways in familiar environments or situations (Kielhofner, 2008). These habits and routine ways of doing things also integrate with a concept that Kielhofner (2008) referred to as “internalized roles”. Internalized roles are defined as the result of incorporating socially and/or personally defined statuses and a related cluster of attitudes and behaviors (Kielhofner, 2008).

In summary, habituation is defined as internalized readiness to exhibit consistent patterns of behavior that are guided by individuals’ habits and role and fitted to the characteristics of routine temporal, physical, and social environments (Kielhofner, 2008). This combination provides stability and predictability to an individual’s life that allows for increased engagement in occupation. Once a task becomes ingrained, an individual can complete it automatically, allowing for the mind and body to focus on other tasks and occupations that one has not yet mastered.

When occupational therapists select the occupations that individuals value and incorporate those occupations into therapy, the clients are more likely to have these occupations
be a part of their already existing habits and routines. When clients can attach meaning to the occupations and connect them to the performance of their individualized and internalized roles, they are more likely to engage in the occupations (Kielhofner, 2008). An example of this would be a worker engaging in tasks and occupations that directly related to his perceived role as a worker, or a mother and father engaging in tasks and occupations related to child rearing. Through activity analysis, an occupational therapist could theoretically incorporate common exercises into these tasks and occupations and make them relevant for the client, increasing the likelihood of adherence because the client would already be doing these occupations in his or her normal routine.

The final major concept of this model is the idea of “performance capacity”. In order to engage in occupation, certain factors must be present. Kielhofner (2008) outlined two specific subsets: The first category includes musculoskeletal, neurological, cardiopulmonary, and other bodily systems necessary for acting on the world, and the second includes mental or cognitive abilities like memory and planning, also necessary for interacting with the world (Kielhofner, 2008). These two concepts exemplify what are referred to as “underlying factors” of occupation, and make up the subcomponents that must be present for the ultimate goal of occupational competence (Kielhofner, 2008). These concepts are often covered separately by different theories (such as the biomechanical and cognitive-behavioral frames of reference) that are useful when looking at these underlying factors individually. MOHO, however, uses a different approach to viewing this concept of performance capacity, looking at not only the objectively identifiable abilities and limitations a person has, but also how those abilities and limitations are subjectively experienced by the individual (Kielhofner, 2008). Kielhofner (2008) subsequently
defined performance capacity as the ability to do things provided by the status of underlying objective physical and mental components and corresponding subjective experience.

This concept is applicable in two ways during the creation of the final product. First, it is compatible with another theoretical framework, the biomechanical frame of reference, which seeks to explain and define the underlying factors associated with occupational performance and give an explanation of treatment protocols associated with treating limitations with these factors (Jack & Estes, 2010). It also takes this concept a step further by incorporating the subjective piece of the individual, examining the person and his or her occupations through a holistic, occupation-based and client-centered lens.

Biomechanical Frame of Reference

A basis for a majority of current upper-extremity therapy protocols (Jack & Estes, 2010), the biomechanical frame of reference is a way of looking at the biomechanical forces that act upon the body, and how to address these factors to increase or maintain strength, flexibility, and range of motion (Levangie & Norkin, 2011). These principles address the physical components of disease and injury, which is valuable for addressing the aforementioned physical factors. A downside of this is that it does not take into account cognitive or psychosocial factors that affect performance, and could thus lead to decreased quality of care (Jack & Estes, 2010).

Erikson’s Stages of Development

Commonplace in musculoskeletal disorder treatment is the tendency for professionals to focus only on the physical aspect of rehabilitation. There is a lack of research in the application of psychosocial principals in upper extremity musculoskeletal rehabilitation. To ignore the impact of personal and psychosocial influences, however, would be to ignore an important
therapeutic tool at the therapist’s disposal. Psychosocial variables are an important part of the therapeutic process.

In order to address psychosocial needs of the client, as well to remain in cohesion with the theoretical framework that has been laid out previously in this scholarly project, we chose Erikson’s stages of development as an additional tool to guide the development of the project. A large part of the background theoretical process of the Model of Human Occupation (Kielhofner, 2008) is the focus on the individual’s internalized roles and responsibilities. Erickson’s stages of development, similarly, focus on the subconscious needs of the individual. These stages outline normal psychosocial development in individuals, and failure to develop successfully into these stages can lead to various psychosocial deficits, depending on the specific stage (McLeod, 2013).

Specifically, we have chosen to focus on four developmental stages to focus on when looking at occupational engagement across the lifespan (McLeod, 2013). The first stage is the stage most commonly associated with adolescence, referred to as Ego Identity vs. Role Confusion (McLeod, 2013). This stage is characterized by the exploration and development of roles the individual will occupy as an adult (McLeod, 2013). The next stage is Intimacy vs. Isolation, in which adults (typically young adults) explore and form intimate and more committed relationships other than their immediate family (McLeod, 2013). The next stage, Generativity vs. Stagnation, occurs in middle adulthood and refers to individuals’ process of giving back to society through raising children, being productive at work, and becoming involved in community activities and organizations (McLeod, 2013). The final stage, which occurs in late adulthood, is Ego Integrity vs. Despair. This stage involved reflecting on one’s life in a positive way (McLeod, 2013). By taking into account the needs of the individual by looking through the lens
of these four stages, we can assure that the individual’s psychosocial needs are met through the application of the various therapy modalities.

Summary

In summary, there is a great deal of evidence supporting the use of therapeutic exercise protocols and other biomechanical techniques in the treatment of musculoskeletal disorders of the upper extremity (Cole & Tufano, 2008, James & Linatus, 2013, Levangie & Norkin, 2011). Similarly, there is an increasing body of evidence suggesting that implementing occupation-based interventions into the therapy process can increase positive outcomes from therapy (Karlsson, Takala, Gerdle, & Larsson, 2014; Kielhofner, 2008; Ma, 2012; Skubic-Peplaski et al., 2012). However, there is currently a need for more occupational-based protocols (Prodinger et al., 2014). The intention of this project is to create a tool that can assist therapist in developing client centered, occupation-based therapy protocols in increase outcome measures and adherence to therapy.

Chapter II consisted of a literature review covering the description of musculoskeletal disorders, the common treatments for said disorders, the need for more occupation-based protocols, and the theoretical background for the final product. Chapter III is a methodology comprised of a thorough description of the conception of this project, and the processes used to develop the project.
CHAPTER III

METHODOLOGY

The product of this scholarly project is an occupation-based clinical tool for clients with upper extremity musculoskeletal injuries. This clinical tool is to be utilized as an option for therapists treating clients who either dislike traditional exercises, are more motivated to utilize occupations, and/or who have a low adherence to current biomechanically-based protocols. This tool can be used to improve the current adherence rates of home exercise programs, to make treatment easier for the client to understand with regards to the relevance of the movements prescribed, and to utilize more occupation-based interventions while treating clients with upper extremity musculoskeletal injuries. The creation of this product began when we identified a need for occupation-based interventions in hand therapy treatments. This need was identified through a thorough literature review and our personal experience and that of our project advisor. The literature review focused on gathering information, reviewing, and collating evidence about the prevalence of musculoskeletal disorders, current interventions for musculoskeletal disorders, the benefits of occupation-based interventions, and adherence rates for home exercise programs.

In order to conduct this review of literature, there were various resources utilized to collect all the vital information. The Harley E. French Medical Library, located at the University of North Dakota (UND) campus, and the American Journal of Occupational Therapy (through the American Occupational Therapy Association website), were crucial sources for locating professional journal research articles. Other professional journal articles were located through various search engines, which include: Cumulative Index to Nursing and Allied Health (CINAHL), PubMed, Google Scholar, and ScienceDirect. Key search terms included: occupational therapy and musculoskeletal disorders, preparatory interventions, purposeful
interventions, occupation-based interventions, occupational therapy and client adherence, physical agent modalities, and home exercise program adherence. In addition, occupational therapy textbooks were utilized to assist in research for this scholarly project. Finally, Anne M. Haskins, PhD, OTR/L, an occupational therapy Associate Professor at UND, provided numerous valuable resources that she has collected over her time as a therapist, educator, and researcher.

Upon conclusion of the literature review, it was clear that there was a lack of occupation-based treatment for clients with musculoskeletal injuries and there was a lack of client adherence to currently prescribed occupational therapy home exercise programs. A strong focus on the Biomechanical Frame of Reference was noted with current occupational therapy musculoskeletal disorder-related protocols. Despite the benefits found on implementing occupation-based interventions during treatments in other areas of occupational therapy practice, there was no evidence of a clinical tool that had been developed to assist therapists in providing a more client-centered and occupation-based treatment plan for clients who typically receive traditional upper extremity occupational therapy exercise programs.

In order to begin developing an occupation-based clinical tool for upper extremity musculoskeletal injuries, we decided to research various occupational therapy models and frames of reference to find the best fit for this project. We decided that a combination of the Model of Human Occupation (MOHO), Erikson’s Developmental Stages, and the Occupational Functioning Model would provide a strong foundation for the development of a client-centered clinical tool.

The main focus of MOHO is to learn about the client through three holistic main concepts: volition (motivation), habituation, and performance capacity, as well as incorporating the client’s environment (Kielhofner, 2008). MOHO is an occupation-focused approach to
therapy practice, which fits with our goals of creating an occupation-based clinical tool. The concepts of this model assisted in the development of this clinical tool by providing a client-centered and occupation-focused approach. This was necessary to develop a clinical tool that would provide occupation-based interventions and increase the client adherence to home exercise programs. We utilized MOHO within the clinical tool by finding occupation-based interventions that address clients’ roles and habits (habituation), resulting in the clients valuing and understanding the importance of the intervention and making the treatment more enjoyable (volition), which will increase the client’s skills and improve occupational performance in a variety of contexts (performance capacity and environment) (Kielhofner, 2008).

Regarding the Occupational Functioning Model, the core concept is that people who are competent in their life roles experience a sense of self-efficacy, self-esteem, and life satisfaction (Radomski & Trombly-Latham, 2008). This model is a useful adjunct model to MOHO as it provided us these additional concepts to incorporate into our clinical tool. By increasing a client’s engagement in occupational participation, there will be an increase in self-esteem, self-efficacy, and life satisfaction from the client (Radomski & Trombly-Latham, 2008). This concept is applicable when looking at the application to the final product in that the goal of increasing occupational engagement is to increase the client’s sense of self-efficacy.

Lastly, Erikson’s Stages of Development was incorporated into the product design in order to address the age ranges of adolescent to older adult and differences in common occupations. Specifically, we have chosen to focus on four developmental stages to focus on when looking at occupational engagement across the lifespan (McLeod, 2013). The first stage we addressed in this project was the stage most commonly associated with adolescence, referred to as Ego Identity vs. Role Confusion (McLeod, 2013). This stage is characterized by the
exploration and development of roles the individual will occupy as an adult (McLeod, 2013). The next stage is *Intimacy vs. Isolation*, in which adults (typically young adults) explore and form intimate and more committed relationships other than their immediate family (McLeod, 2013). The next stage, *Generativity vs. Stagnation*, occurs in middle adulthood and refers to individuals’ process of giving back to society through raising children, being productive at work, and becoming involved in community activities and organizations (McLeod, 2013). The final stage, which occurs in late adulthood, is *Ego Integrity vs. Despair*. This stage involves reflecting on one’s life in a positive way (McLeod, 2013). By taking into account the needs of the individual by looking through the lens of these four stages, we can assure that the individual’s psychosocial needs are met through the application of the various therapy modalities.

For this product, we wanted to develop a clinical tool to usher in a paradigm shift in upper extremity therapy that is less protocol-based, more client-centered and occupation-based, and is consistent with occupational therapy’s scope of practice. By utilizing these models and theories, this product will also improve client outcomes by increasing client adherence to the home exercise programs recommended by the therapist.

Chapter III consisted of an overview of the conception of this project, the literature review process, the focus of MOHO, the Occupational Functioning Model, and Erikson’s Stages of Development, and how all of the models and theories were incorporated to develop an occupation-based clinical tool.

Chapter IV of this scholarly project provides an overview of the occupation-based clinical tool and the full product (tool) can be found in the appendix of this scholarly project. Within the product is an introduction, how to use the clinical tool, and what is included in the product.
CHAPTER IV

PRODUCT

The purpose of the project was to develop a manual to assist occupational therapists (OTs) who commonly work with clients who are diagnosed with upper extremity musculoskeletal disorders. The manual was structured to include guides and examples of how to include occupations in therapy protocols while still incorporating biomechanical components. Each page of the manual contains a certain motion of the upper extremity, the muscles involved, the starting position and movement, the normal range of motion, pictures of the motion, and a list of examples of occupations and activities that incorporate said motion. The list of occupations is broken up cross-generationally, with activities for adolescents, adults, and older adults present. The appendices for the product contains patient handouts for each corresponding motion with space for doctors to write in occupations from the client’s occupational profile, as well as a compiled list of all the occupations utilized in the final product.

Cross-Generational Occupation-Based Interventions for Upper Extremity Disorders is designed to bridge a gap that currently exists in upper-extremity rehab by demonstrating the efficacy of incorporating occupations into therapy while still addressing biomechanical factors. Each page details the common motions of the UE, and the suggestions of occupations across the lifespan allow for therapists to utilize this tool with a plethora of clients.

The theoretical framework which guides this product (The Model of Human Occupation, Biomechanical Frame of Reference, and Erickson’s developmental stages) seek to address a
holistic view of the client; Such a view is necessary when developing occupation-based interventions with a client (Jack & Estes, 2010). As demonstrated in the literature review of this paper occupation-based intervention shows similar efficacy rates and higher adherence rates to traditional biomechanical exercises. With the structure of the product (i.e. the inclusion of the biomechanical components of the movement as well as specific suggestions of occupations that incorporate said factors), it is the hope of the writers that therapists who work in upper extremity rehabilitation feel more comfortable prescribing occupation-based protocols. It is also our hope that this product increase interprofessional awareness of the efficacy and value of occupation-based treatment and usher in a paradigm shift in the profession from one of strictly biomechanics to a more holistic and client-centered focus.

Chapter IV was comprised of a descriptions of the product. Chapter V is comprised of a summary of this paper.
CHAPTER V
SUMMARY

Chapter V is composed of a review of the purpose of this scholarly project, an overview of the upper extremity musculoskeletal injury clinical tool, limitations of the clinical tool, and recommendations for further product development and research. The purpose of this scholarly project was to develop a useful clinical tool that could help bridge the gap of hand therapy and utilizing occupation-based interventions for treatment. The development of this clinical tool was also intended to increase client motivation and, therefore, increase adherence to home exercise programs. After completing a review of current musculoskeletal injury literature, we also concluded that there was a need for a clinical tool that incorporated a wide age range as well as meaningful occupations that could be utilized in place of current treatments.

This clinical tool was developed through an extensive review of literature on the prevalence of musculoskeletal disorders, current musculoskeletal disorder interventions, and the benefits of occupation-based interventions. We also completed a review to analyze which models and theories would best assist us for the development of the final product. By completing this review of literature, we were able to create a tool with multiple strengths for clinical practice. The first strength is that this clinical tool can be utilized in unison with the typical biomechanical approach depending on what the client would enjoy participating in. Another strength is that this clinical tool is separated into different age ranges, which allows for a more client-centered approach. A third strength is that the format in which the clinical tool was created allows for future additions and alterations to be easily made. Lastly, this clinical tool has a list of
occupations that can be utilized to improve range of motion, strength, or coordination for movements in the shoulder, elbow, wrist, and hand.

Along with the strengths, there were also limitations to this scholarly project. The first limitation is that there was no comprehensive compilation of occupations by age available in published literature. Along with that limitation, we did not assess current occupations from a variety of age ranges through the use of a survey, which would have created a more extensive list of meaningful occupations. Another limitation is that we were not able to assess the efficacy of the clinical tool and the effect it has on client outcomes and home exercise program adherence.

The occupational therapist that implements this clinical tool should focus on the ability to incorporate occupation-based interventions into the treatment of upper extremity musculoskeletal injuries. The implementation relies on the therapist’s ability to educate clients on proper form and how meaningful occupations can be just as effective as the typical biomechanical approach to treatment. The occupational therapist should also focus on allowing the client creating the home exercise program. By allowing the client to choose which activities he/she would enjoy participating in, despite what age range the activity is in, this will assure higher client motivation and an increase in adherence to the home exercise program. The therapist will also need to monitor progress and assess the improvements of the client. The clinical tool is broken down into four areas of the upper extremity, all with varying movements. Each movement has suggested occupation-based interventions that will incorporate that specific movement. The occupational therapist should also be able to analyze any occupation-based intervention, which the client states he/she enjoys, and determine if it could be utilized in the client’s home exercise program to assist with progress.
This clinical tool provides as a quick occupation-based reference for implementing occupation-based interventions into upper extremity musculoskeletal injury treatment. In terms of providing our clinical tool to practicing therapists for implementation, we will allow other practicing therapists to utilize our product with stipulations that they record and report to us the effectiveness of the clinical tool and that they do not make copies of the clinical tool without our permission. Additionally, we will be utilizing this clinical tool in our own everyday practice. The overall product has been created in the form of a durable booklet that is categorized by age and by upper extremity movements. There also are handouts of the various movements that are to be used as customizable home exercise programs.

It is recommended that the therapists using this clinical tool create a list of additional occupation-based interventions that could be added to the compiled list. Another recommendation is that research must be completed to assess the efficacy of the clinical tool, in order to make adjustments to the tool and maximize the effectiveness and increase client outcomes. The occupational therapist should also assess the client outcomes, level of adherence to the home exercise protocol, the client’s perception of the clinical tool, and the client’s level of satisfaction.
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CROSS-GENERATIONAL OCCUPATIONAL INTERVENTIONS FOR UPPER EXTREMITY INJURIES

William Creel, MOTS, Blake Sweney, MOTS, & Anne Haskins, OTR/L, Ph.D.
Choosing Occupations

It is important to assess the occupational needs and preferences of the client before planning an individualized occupation-based protocol. Some example occupational therapy intervention strategies that can help understand the client's occupational profile:

- Informal Interviewing
- Modified Interest Checklist
- Canadian Occupational Performance Measure
- Volitional Questionnaire


Employment related tasks.

An important occupation for young adults and middle-age adults is employment. As each specific job carries with it unique occupational needs, it is a unique opportunity to incorporate into the occupation-based protocol. When a client describes his/her job during the initial occupational profile formation, utilizing online resources to get a job description. An activity analysis of the job can help to add to the protocol.

- Occupational Information Network: https://www.onetonline.org/
- Job Accommodation Network: https://askjan.org/

Refer to appendix A for complete list of occupations.

Space is also provided to add in occupations as the therapist sees fit.
Theoretical Background

Erickson’s Stages of Development

In order to characterize the age ranges and develop an understanding of what occupations would be common to said age groups, the concepts from the model of human occupation were applied to Erickson’s stages of development to develop profiles of each stage.

- Adolescents: Identity vs. Role Confusion
- Young Adult: Intimacy vs. Isolation
- Middle Adult: Generativity vs. Stagnation
- Older Adult: Ego-Integrity vs. Despair


The Model of Human Occupation

The model of human occupation was developed by Dr. Gary Kielhofner in 1986 as a way to explain human occupation behavior in a controlled environment.

The major components of the model include:

- Volition: Patterns of thought and feelings about oneself as an active participant in one’s world. As one anticipates, chooses, experiences and interprets
- Habituation: Internalized Readiness to exhibit consistent patterns of behavior guided by our habits and roles and fitted to the characteristics of routine temporal, physical and social environments.
- Performance Capacity: An individual’s subjective version of his or her performance and the objective aspects of said performance.
- Environment: External Forces that affect occupational performance.


Appendix A contains handouts for clients with space for the inclusion of personally meaningful occupations.
ERICKSON’S STAGES OF DEVELOPMENT

APPLYING PSYCHOLOGICAL THEORY TO PHYSICAL REHAB

Adolescence: Identity vs. Role Confusion
The focus of this stage is on the development of social relationships, developing a sense of self, and beginning to explore interests. Activities in this stage may include increased social activities such as school extracurriculars, sports teams, or social activities with friends.

Young Adulthood: Intimacy vs. Isolation
The focus of this stage is development of ability to make personal commitments and form healthy relationships. Activities in this stage may include participation in social activities, academic activities, and beginning to explore possible employment opportunities.

Late Adulthood: Ego Integrity vs. Despair
The focus of this stage is the development of satisfaction with one’s life, and transitioning into an acceptance of one’s inevitable decline in function and end of life. Activities may include employment/volunteer opportunities, social activities, solitary leisure activities, and child rearing/homemaking tasks.

Middle Adulthood: Productivity vs. Stagnation
The focus of this stage is taking an active role in guiding the next generation, either by raising one’s own children, contributing to the community, or teaching and mentoring others. Activities may include Work related activities, social activities with family and friends, and childrearing/homemaking tasks.

Adolescents: Identity vs. Role Confusion

In MHO Terminology
Stages of development defined

Subjective: Reflecting on "Who am I?"

and self-reflection

Objective: Expanding capabilities for interaction

Roles: Dependent on context (social and

specifically peer group (social cues and

Routine: More independence leads to

Occupational Performance: Building a

circumstances.

Habits: New habits acquired from changing

Habituation: Transformation of roles and habits.

Obligation: Ideal values and realities of

increased freedom of choice.

Personal values.

Values: Increased autonomy drives formation of

repertoire of occupational forms.

Self-Efficacy: Maintaining self-efficacy while

capably based on future goals.

Personal Capability: Beginning to assess

talents.

Personal Caution: Choosing activities and oc-

Volition: Increasing drive for autonomy drives

everyday life.
Stages of development defined in MOHO terminology

Young Adults: Intimacy vs. Isolation

**Volition:** Increasing drive to succeed and work autonomously
- **Personal Causation**
  - **Personal Capacity:** Acquiring and refining abilities in one's line of work.
  - **Self-Efficacy:** Increased sense of self-efficacy through work and formation of social relationship.
- **Values:** Values become increasingly important for self-evaluation.
- **Personal Convictions:** Focused on instrumental and material goals.
- **Obligation:** Social and work obligations. Possible familial obligations as individuals form new relationships.
- **Interests:** Many adults pursue vocational and employment interests based on their interests explored in adolescents.

**Habituation:** Transformation of roles and habits
- **Habits:** Concerned with time allocation to new roles.
  - **Occupational Performance:**
  - **Routine:**
  - **Style:** Dependent on contextual factors (social, family-related, work-place norms, etc.)
- **Roles:** Increased variety and intensity of roles.
- **Performance Capacity:** Individuals are still gaining new abilities.
  - **Objective:** Continued learning of new skills and continued peak mental and physical capacity.
  - **Subjective:** Continued development of personal identity, specifically about forming long-lasting relationships.
Stages of development defined in MOHO terminology

Middle Adulthood: Generativity vs. Stagnation

Volition: Increased drive to leave a legacy behind.
- Personal Causation
  - Personal Capacity: Individuals generally have recognized their capacity and continue to work to refine skills and abilities.
  - Self-Efficacy: Increased role tasks (child-rearing, financial management, etc.) are sources of success and challenge.
- Values: Humanitarian and themes of legacy
  - Personal Convictions: Some shift of convictions changes from young adults to older adults.
  - Obligation: Social and work obligations. Possible familial obligations as individuals form new relationships.
- Interests: Many adults pursue vocational and employment interests from young adulthood. Increased leisure participation.

Habituation: Transformation of roles and habits
- Habits: Concerned with time allocation to increased number of roles (depending on contextual factors).
  - Occupational Performance: Depends heavily on contextual factors.
  - Routine: Time allotment between increased number of roles.
  - Style: Dependent on contextual factors (social, family-related, work-place norms, etc.)
- Roles: Increased variety and intensity of roles.
- Performance Capacity: Individuals are still gaining new abilities.
- Objective: Beginnings of a decline in physical and mental capacities, but refining existing capacities based on roles.
- Subjective: Increased focus on legacy and leaving something behind once one is gone.
Stages of development defined in MOHO terminology

Older Adults: Ego Integrity vs. Despair

**Volition:** Changes in lifestyles affect changes in motivation and interests.
- **Personal Causation**
  - **Personal Capacity:** Aging generally is accompanied by a decreased capacity.
  - **Self-Efficacy:** Decreased capacity may lead to decreased independence but also ingenuity in changing activities to foster enjoyment and independence.
- **Values:** Changing values from instrumental to terminal.
  - **Personal Convictions:** Values are important for retaining morale
- **Obligation:**
  - **Interests:** Similar interests remain from previous stages, but may shift as changing environmental and personal factors change ability to participate.

**Habituation:**
- **Habits:**
  - **Occupational Performance:** Some individuals continue to work or volunteer in similar occupations to previous stages.
  - **Routine:** Family and friendships become a way to connect with occupation.
  - **Style:** Dependent on social factors (family, social groups), and changing physical and mental capacity.
  - **Roles:** Changes may be involuntary and unpleasant. It is important to support existing roles.
  - **Performance Capacity:** Overall decrease in physical and mental capacity.
  - **Objective:** Decreased mental and physical capacities, may be mitigated by remaining physically and mentally active.
  - **Subjective:** Approach of death may change outlook on individual’s capacity.
SHOULDER MOVEMENTS
Muscles: Biceps Brachii (both heads), Pectoralis Major, Anterior Deltoid, Coracobrachialis

Starting Position: Arm at side, palm facing medially

Movement: Move the arm anteriorly through full range of motion

Normal Range of Motion: 0-180°

Common Activities

Adolescents
- Shooting a basketball
  - With friends or family
- Bean bag toss
  - With friends or family

Adults
- Work related activities
- Upper body yoga poses

Older Adults
- Dusting Household
  - At waist height or above
- Playing board games
  - Seated at a table
Shoulder Extension

Muscles: Posterior Deltoid, Latissimus Dorsi, Teres Major, Teres Minor, Subscapularis, Infraspinatus

Starting Position: Arm at side, palm facing medially

Movement: Move arm posteriorly through full ROM, bending elbow to prevent restriction of ROM due to passive insufficiency of the two-joint biceps brachii muscle

Normal Range of Motion: 0-60°

Common Activities

Adolescents
- Pushing a wheelbarrow
- "Lifting and carrying" activities

Adults
- Work related activities
- Upper body yoga poses

Older Adults
- Playing catch (underhand)
- Swimming
  - Breaststroke
Muscles: (0-15°) Supraspinatus; (15-90°): Middle Deltoid; (90-120°) Scapular movements

Starting Position: Arm at side, elbow flexed to 90°

Movement: Move the arm laterally away from body through full ROM

Normal Range of Motion: 0-(90-120)°

Common Activities

Adolescents
- Pushing a wheelbarrow
- Dusting Household
  - At waist height or above

Adults
- Work related activities
- Shooting a basketball
  - With friends or family

Older Adults
- Wiping off cabinets
  - Above chest height
- Lifting & carrying tasks
Muscles: Pectoralis Major, Latissimus Dorsi, Teres Major, Coracobrachialis, Subscapularis

Starting Position: Arm abducted laterally, elbow flexed to 90°, forearm in midposition

Movement: Move arm medially until at side of body

Normal Range of Motion: (120-90)-0°
Muscles: Subscapularis, Pectoralis Major, Latissimus Dorsi, Teres Major, and Anterior Deltoid

Starting Position: Shoulder adducted, elbow flexed to 90°, forearm in midposition, palm extended

Movement: Patient brings forearm laterally across midline through full ROM

Normal Range of Motion: 0-70°
Shoulder
External Rotation

Muscles: Infraspinatus, Teres minor, Posterior Deltoid

Starting Position: Shoulder adducted, elbow flexed to 90°, forearm in mid-position

Movement: Patient moves forearm away from body laterally through full ROM

Normal Range of Motion: 0-90°

Common Activities
Adolescents
- Pet care
  - Brushing
- Extracurricular Activities
  - Baseball

Adults
- Work related activities
- Throwing Frisbee
  - With family and friends

Older Adults
- Wiping counters
- Driving
  - Turning steering wheel

Shoulder
Muscles: Posterior Deltoid, Latissimus Dorsi, Teres Minor, Infraspinatus

Starting Position: Shoulder abducted to 90° and neutral rotation. Elbow flexed and forearm is in midposition

Movement: Move arm posteriorly through range of motion

Normal Range of Motion: 0-45°

Common Activities

Adolescents
- Playing catch
  - With friends or family.
- Backpacking

Adults
- Work related activities
- Yardwork
  - Raking

Older Adults
- Wiping counters
- Hanging clothes
  - Placing on hangers
**Shoulder Horizontal Adduction**

**Muscles:** Pectoralis Major, Coracobrachialis, Anterior Deltoid

**Starting Position:** Shoulder abducted to 90° and neutral rotation. Elbow flexed and forearm is in midposition

**Movement:** Move arm anteriorly across midline through full ROM

**Normal Range of Motion:** 0-135°

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**Common Activities**

**Adolescents**
- Throwing a Frisbee
- Wiping counter-tops

**Adults**
- Work related activities*
- Putting dishes away
  - Cabinets at chest height

**Older Adults**
- Swimming
  - Breaststroke
- Gardening tasks
ELBOW

MOVEMENTS
Elbow Flexion

Muscles: Biceps Brachii, Brachialis, Brachioradialis, Pronator Teres, and Extensor Carpi Radialis Longus and Brevis

Starting Position: The arm is at the side, the elbow is extended, and the forearm is supinated

Movement: Flex the elbow through full ROM

Normal Range of Motion: 0-150°

Common Activities

Adolescents
- Throwing a Frisbee
- Wiping counter-tops

Adults
- Work related activities
- Social Leisure
  - Bowling

Older Adults
- Putting away dishes
- In overhead cabinets
The shoulder is internally rotated and flexed to 90°, the elbow is flexed, and the forearm is supinated.

Movement: Extend the elbow through full ROM, ensuring the patient does not lock the elbow in full extension.

Normal Range of Motion: 0-15° (hyperextension)

Common Activities

Adolescents
- Video Games
  - Holding controller
- Extracurricular activities
  - Band/Music

Adults
- Work related activities
- Upper Body Yoga Poses

Older Adults
- Social Leisure
  - Softball
- Water Aerobics
Forearm Supination

Muscles: Supinator and Biceps Brachii

Starting Position: The arm is at the side, the elbow is flexed to 90°, and the forearm is pronated

Movement: The patient supinates the forearm through full ROM

Normal Range of Motion: 80-90° from mid position

Common Activities

Adolescents
- Extracurricular activities
- Art
- Solitary Leisure
- Video Games

Adults
- Work related activities
- Driving
  - Turning steering wheel

Older Adults
- Sweeping floors
- Home maintenance
  - Turning screws/hammering

The arm is at the side, the elbow is flexed to 90°, and the forearm is pronated.
Forearm Pronation

**Muscles:** Pronator Teres and Pronator Quadratus

**Starting Position:** The arm is at the side, the elbow is flexed to 90°, and the forearm is supinated

**Movement:** The patient pronates the forearm through full ROM

**Normal Range of Motion:** 80-90° from mid position

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**Common Activities**

**Adolescents**
- Wiping counter tops
- Food Preparation

**Adults**
- Work related activities
- Social Leisure
  - Basketball

**Older Adults**
- Pet care
- Folding Laundry
WRIST MOVEMENTS
Wrist Flexion

Muscles: Flexor Carpi Radialis, Flexor Carpi Ulnaris, Palmaris Longus, Flexor Pollicis Longus, Flexor Digitorum Superficialis, Flexor Digitorum Profundus

Starting Position: Elbow flexed, forearm resting in pronation, wrist in neutral position, fingers relaxed

Movement: Patient flexes wrist through full ROM

Normal Range of Motion: 0-80°

Common Activities

Adolescents
- Extracurricular Activities
  - Art (Painting)
- Social Leisure

Adults
- Work related activities
- Social Leisure
  - Basketball

Older Adults
- Dusting/Wiping counters
- Solitary leisure
  - Knitting/Needlework
Muscles: Extensor Carpi Radialis Longus, Extensor Carpi Radialis Brevis, Extensor Carpi Ulnaris, Extensor Digitorum, Extensor Pollicis Longus, Extensor Indicus, Extensor Digiti Minimi

Starting Position: Elbow flexed, forearm resting in pronation, wrist in neutral position, fingers relaxed

Movement: Pt extends wrist through full ROM

Normal Range of Motion: 0-70°
Muscles: Flexor Carpi Ulnaris, Extensor Carpi Ulnaris

Starting Position: Elbow flexed, forearm resting in pronation, wrist in neutral position, fingers relaxed

Movement: Patient moves hand laterally (ulnar side) at the wrist

Normal Range of Motion: 0-30°
Muscles: Extensor Carpi Radialis Longus, Extensor Carpi Radialis Brevis, Flexor Carpi Ulnaris, Abductor Pollicis Longus, Abductor Pollicis Brevis

Starting Position: Elbow flexed, forearm resting in pronation, wrist in neutral position, fingers relaxed

Movement: Patient moves hand medially (radial side) at the wrist

Normal Range of Motion: 0-20°

Common Activities

Adolescents
- Extracurricular activities
- Sports (Tennis)
- Meal Preparation

Adults
- Work related activities
- Driving
- Turning steering wheel

Older Adults
- Dusting
- Solitary Leisure
- Vehicle Maintenance

Radial Deviation
HAND & FINGER MOVEMENTS
Finger Metacarpophalangeal Extension

**Muscles:** Extensor Digitorum Communis, Extensor Indicis Proprius, and Extensor Digiti Minimi

**Starting Position:** The forearm is pronated, the wrist is in a neutral position, and the fingers flexed

**Movement:** The patient extends all four MCP joints while maintaining flexion at the IP joints

**Normal Range of Motion:** 45° extension

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**Common Activities**

- **Adolescents**
  - Social Leisure
  - Bowling
  - Video Games
  - Holding Controller

- **Adults**
  - Work related activities
  - Wiping Counters

- **Older Adults**
  - Social Leisure
  - Shuffling cards
  - Social Leisure
  - Holding Tennis Racket
Finger Metacarpophalangeal Flexion/Interphalangeal Extension

Muscles: Lumbricals

Starting Position: Forearm is in mid-position, the wrist is in neutral position, the MCP joints are extended and adducted, and the IP joints are slightly flexed

Movement: The patient flexes the MCP joints while simultaneously extending the IP joints

Normal Range of Motion: 90˚

Common Activities

Adolescents
- Folding Laundry
- Extracurricular Activities
  - Band/Music

Adults
- Work related activities
  - Social Leisure
    - Racquetball

Older Adults
- Carrying items
  - With handles
- Cooking
  - Holding Pan
Finger Metacarpophalangeal Abduction

**Muscles:** Dorsal Interossei and Abductor Digiti Minimi

**Starting Position:** DI: Forearm is pronated and supported on a stable, the wrist is in neutral, the fingers are extended and adducted. ADM: The forearm is supinated.

**Movement:** DI: The patient abducts the index finger toward the thumb, the middle finger toward the index finger and then ring finger, and ring finger toward the little finger. ADM: The patient abducts the little finger.

**Common Activities**

**Adolescents**
- Extracurricular Activities
  - Basketball
- Social Leisure
  - Touch football

**Adults**
- Work related activities
- Social Leisure
  - Sand Volleyball

**Older Adults**
- Washing/Drying dishes
- Gardening
  - Planting flowers/shrubs
Finger Metacarpophalangeal Adduction

Muscles: Palmar Interossei

Starting Position: Forearm is supinated and supported on a table, wrist is in neutral, and fingers are abducted

Movement: The patient adds the index, ring, and little finger toward the middle finger

Common Activities

Adolescents

- Extracurricular Activities
  - Basketball
- Upper body yoga poses

Adults

- Work related activities
- Solitary Leisure
  - Swimming (front crawl)

Older Adults

- Water Aerobics
- Kneading dough
Starting Position: The forearm is supinated and supported on a table. The wrist is in a neutral position or slight extension and the fingers are extended.

Movement: The patient flexes the PIP joint of each finger while maintaining DIP joint extension.

Normal Range of Motion: 0-100°

Muscles: Flexor Digitorum Superficialis

Common Activities

Adolescents
- Solitary Leisure
  - Music (Piano)
- Extracurriculars
  - Golfing
- Work related activities
- Home maintenance tasks

Adults
- Writing tasks
- Gardening
  - Manipulating tools

Older Adults
- Gardening
  - Manipulating tools
Finger Distal Interphalangeal Flexion

Muscles: Flexor Digitorum Profundus

Starting Position: The forearm is supinated and supported on a table. The wrist is in a neutral position and the fingers are in extension

Movement: The patient flexes the DIP joint through full ROM

Normal Range of Motion: 0-90°

Common Activities

Adolescents
- Solitary Leisure
  - Music (Piano)
- Extracurriculars
  - Golfing

Adults
- Work related activities
- Home maintenance tasks

 Older Adults
- Writing tasks
- Gardening
  - Manipulating tools
**Muscles:** Flexor Pollicis Brevis

**Starting Position:** The forearm is supinated, the wrist is in neutral, and the thumb is extended and adducted

**Movement:** The patient flexes the MCP joint while maintaining extension of the IP joint

**Normal Range of Motion:** 0-50°

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**Common Activities**

**Adolescents**
- Social Leisure
- Frisbee
- Extracurriculars
  - Fast pitch softball

**Adults**
- Work related activities
- Child Care Activities
  - Changing diapers

**Older Adults**
- Writing
  - Gripping writing utensil
- Leisure
  - Bingo
Movement:
The patient extends the MCP joint of the thumb while maintaining slight flexion of the IP joint.

Normal Range of Motion: 0° extension

Muscles: Extensor Pollicis Brevis

Starting Position: The forearm is in midposition and the wrist is in neutral. The thumb MCP and IP joints are flexed.

Movement: The patient extends the MCP joint of the thumb while maintaining slight flexion of the IP joint.

Common Activities

Adolescents
- Social Leisure
- Tetherball
- Solitary Leisure
- Shifting gears

Adults
- Work related activities
- Home maintenance
  - Hammer

Older Adults
- Solitary Leisure
  - Woodworking (sanding)
- Writing tasks
Thumb Interphalangeal Flexion

Muscles: Flexor Pollicis Longus

Starting Position: The forearm is supinated, the wrist is in neutral, and the thumb is extended

Movement: The patient flexes the IP joint through full ROM

Normal Range of Motion: 0-80°

Common Activities

Adolescents
- Video games
- Operating controller
- Extracurricular Activities
- Baseball

Adults
- Work related activities
- Social Leisure
- Fishing

Older Adults
- Social Leisure
- Dealing cards
- Home maintenance tasks
Thumb Interphalangeal Extension

**Muscles:** Extensor Pollicis Longus

**Starting Position:** The forearm is in mid-position and the wrist is in a neutral position. The thumb is adducted with the MCP joint extended and the IP joint flexed.

**Movement:** The patient extends the IP joint through full ROM.

**Normal Range of Motion:** 0° extension (10-30° hyperextension)

**Common Activities**

** Adolescents **
- Video games
- Operating controller
- Extracurricular Activities
  - Baseball

** Adults **
- Work related activities
- Social Leisure
  - Fishing

** Older Adults **
- Social Leisure
- Dealing cards
- Home maintenance tasks
Thumb Radial Abduction

Muscles: Abductor Pollicis Longus

Starting Position: The forearm is in supination and the wrist is in neutral. The thumb is adducted against the volar aspect of the index finger

Movement: The patient abducts the thumb in a radial direction through full ROM. The thumb is taken away from the index finger at an angle of 45° toward extension

Normal Range of Motion: 0-70°

Common Activities

Adolescents
- Video Games
- Holding Controller
- Extracurricular activities
- Art

Adults
- Work related activities
- Driving
  - Turning Steering Wheel

Older Adults
- Child Care Tasks
- Wiping/Dusting counters


The forearm is in supination and the wrist is in a neutral position. The thumb is adducted against the volar aspect of the index finger. The patient abducts the thumb through full ROM. The thumb is taken away at a right angle to the index finger.

**Normal Range of Motion:** 0-70°

**Common Activities**

**Adolescents**
- Extracurricular activities
  - Music/Band
- Social Leisure
  - Grasping a ball (catch)

**Adults**
- Work related activities
- Driving
  - Turning Steering Wheel

**Older Adults**
- Solitary Leisure
  - Knitting/Needlework
- Typing on a computer

**Muscles:** Abductor Pollicis Brevis

**Starting Position:** The forearm is in supination and the wrist is in a neutral position. The thumb is adducted against the volar aspect of the index finger.

**Movement:** The patient abducts the thumb through full ROM. The thumb is taken away at a right angle to the index finger.

**Thumb Palmar Abduction**
Thumb Adduction

**Muscles:** Adductor Pollicis

**Starting Position:** The forearm is supinated and the wrist is in a neutral position with the fingers extended. The MCP and IP joints of the thumb are flexed and the thumb is in palmar abduction.

**Movement:** The patient adducts the thumb while maintaining flexion of the MCP and IP joints.

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**Common Activities**

**Adolescents**
- Extracurricular activities
  - Music/Band
  - Social Leisure
  - Bowling
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**Adults**
- Work related activities
  - Vehicle maintenance
  - Grasping tools
- 

**Older Adults**
- Solitary Leisure
  - Knitting/Needlework
- Childcare tasks.
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Muscles: Opponens Pollicis and Opponens Digiti Minimi

Starting Position: The forearm is supinated and the wrist is in a neutral position. The fingers are extended and the MCP and IP joints of the thumb are extended. The thumb is in palmar abduction because the opponens pollicis cannot oppose effectively until the thumb is abducted.

Movement: The patient flexes and medially rotates the thumb metacarpal toward the little finger, and the little finger flexes and rotates toward the thumb so that the pads of the finger and thumb touch.
Appendix A
Appendix B
SHOULDER MOVEMENTS
Starting Position: Arm at side, palm facing your body

Movement: Move your arm forward and up above your head through full range of motion.

Do this motion:
Starting Position: Arm at side, palm facing your body.
Movement: Move arm backward through full range of motion.
Do this motion: During activities 3-5 times a day.
Shoulder Abduction

**Starting Position:** Arm at side, elbow flexed to 90°

**Movement:** Move the arm out to the side through full range of motion.

**Do this motion:** During activities 3-5 times a day.
**Shoulder Adduction**

**Starting Position:** Arm moved out to the side, elbow flexed to 90°

**Movement:** Move arm inwards until at side of body.

**Do this motion:** During activities 3-5 times a day.
**Shoulder**

**Internal Rotation**

*Starting Position:* Arm at side, elbow flexed to 90°, forearm positioned with palm facing sideways.

*Movement:* Move forearm across body, bringing your hand to the stomach.

*Do this motion:* During activities 3-5 times a day.

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**Common Activities**

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Starting Position: Arm at side, elbow flexed to 90°, forearm with hand facing sideways.

Movement: Move arm out away from the side of your body.

Do this motion: During activities 3-5 times a day.
Starting Position: Shoulder is raised and neutral rotation. Elbow flexed and palm is facing the floor.

Movement: Move arm backwards through full range of motion.

Do this motion: During activities 3-5 times a day.
**Shoulder**

**Horizontal Adduction**

*Starting Position:* Shoulder raised out to the side. Elbow flexed and palm facing the floor.

*Movement:* Move arm forward across chest through range of motion.

*Do this motion:* During activities 3-5 times a day.
ELBOW MOVEMENTS
Elbow Flexion

**Starting Position:** The arm is at the side, the elbow is extended, and the forearm is turned facing upwards.

**Movement:** Flex the elbow through full Range of Motion

**Do this motion:** During activities 3-5 times a day.
Elbow Extension

Starting Position: The shoulder is at the side, the elbow is flexed, and the forearm is turned upwards.

Movement: Extend the elbow through full ROM.

Do this motion: During activities 3-5 times a day.
Forearm Supination

Starting Position: The arm is at the side, the elbow is flexed to 90°, and the hand is turned sideways.

Movement: Turn the forearm upwards.

Do this motion: During activities 3-5 times a day.
Forearm Pronation

Starting Position: The arm is at the side, the elbow is flexed to 90°, and the hand is turned sideways.

Movement: The patient turns the forearm downwards

Do this motion: During activities 3-5 times a day.
WRIST

MOVEMENTS
Wrist Flexion

Starting Position: Elbow flexed, wrist in neutral position, fingers relaxed.

Movement: Patient flexes wrist through full ROM

Do this motion: During activities 3-5 times a day.
Starting Position: Elbow flexed, wrist in neutral position, fingers relaxed.

Movement: Extend the wrist outwards

Do this motion: During activities 3-5 times a day.
**Ulnar Deviation**

**Starting Position:** Elbow flexed, wrist in neutral position, fingers relaxed.

**Movement:** Move hand outwards at the wrist.

**Do this motion:** During activities 3-5 times a day.
Radial Deviation

**Starting Position:** Elbow flexed, wrist in neutral position, fingers relaxed.

**Movement:** Patient moves hand inwards at the wrist.

**Do this motion:** During activities 3-5 times a day.
HAND & FINGER MOVEMENTS
**Finger Metacarpophalangeal Extension**

*Starting Position:* The forearm is turned downward, the wrist is in a neutral position, and the fingers flexed.

*Movement:* Extend fingers at the bottom knuckles.

*Do this motion:* During activities 3-5 times a day.
**Finger Metacarpophalangeal Flexion/Interphalangeal Extension**

*Starting Position:* Forearm is in mid-position, the wrist is in neutral position, fingers extended.

*Movement:* Flex fingertips while keeping rest of fingers extended.

*Do this motion:* During activities 3-5 times a day.

**Common Activities**

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Starting Position: Elbow flexed, hand facing sideways, fingers extended and held together.

Movement: Move fingers outward, keeping them straight.

Do this motion: During activities 3-5 times a day.
**Finger Metacarpophalangeal Adduction**

**Starting Position:** Elbow flexed, hand facing sideways, fingers extended and moved apart (see picture)

**Movement:** Bring fingers together, keeping them straight.

**Do this motion:** During activities 3-5 times a day.
Starting Position: Forearm is in mid-position, the wrist is in neutral position, fingers extended.

Movement: Flex fingertips while keeping rest of fingers extended.

Do this motion: During activities 3-5 times a day.
**Finger Distal Interphalangeal Flexion**

*Starting Position*: Forearm is in mid-position, the wrist is in neutral position, fingers extended.

*Movement*: Flex fingertips while keeping rest of fingers extended.

*Do this motion*: During activities 3-5 times a day.
**Thumb Metacarpophalangeal Flexion**

*Starting Position:* The forearm is turned inwards, the wrist is in neutral, and the thumb is extended and on the side of the hand.

*Movement:* Bring them across the palm

*Do this motion:* During activities 3-5 times a day.
Thumb Metacarpophalangeal Extension

Starting Position: The forearm is turned inwards, the wrist is in neutral, and the thumb is across the palm.

Movement: Bring thumb back across palm to side of hand.

Do this motion: During activities 3-5 times a day.
**Thumb Interphalangeal Flexion**

*Starting Position:* The forearm is turned to the side, the wrist is in neutral, and the thumb is extended.

*Movement:* Flex the knuckle of the thumb while keeping thumb straight.

*Do this motion:* During activities 3-5 times a day.

**Common Activities**

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**Thumb Interphalangeal Extension**

**Starting Position:** Thumb is flexed at the first joint while extended at the palm.

**Movement:** Extend thumb away from hand.

**Do this motion:** During activities 3-5 times a day.
Thumb

Radial Abduction

Starting Position: Thumb is straightened and lying along the side of the hand.

Movement: Bring thumb out away from hand.

Do this motion: During activities 3-5 times a day.
**Thumb Palmar Abduction**

*Starting Position:* Palm facing upwards, thumb on side of the palm.

*Movement:* Bring thumb directly upwards away from palm.

*Do this motion:* During activities 3-5 times a day.
**Thumb Adduction**

**Starting Position:** Palm facing upwards, thumb brought up away from palm.

**Movement:** Bring thumb back towards hand.

**Do this motion:** During activities 3-5 times a day.
Opposition of Thumb and Fifth Finger

Starting Position: Hand and fingers extended, thumb at side of hand.

Movement: Bring thumb and little fingertips together (see picture)

Do this motion: During activities 3-5 times a day.
COMMON ACTIVITY LIST

Below is a list of common activities broken apart by type of activity. Space is left in order to add activities afterwards based on common occupations. Once common meaningful activities are identified by forming an occupational profile, therapists should perform an activity analysis on each activity identified to determine appropriateness to treatment plan based on necessary motions.

**Household Tasks**
- Take out trash
- Water plants
- Make bed
- Sweep floor
- Wash dishes
- Wipe dishes
- Wipe counters
- Pack lunches
- Make breakfast
- Make lunches
- Make dinner
- Handle mail
- Pet care
- Vacuum
- Mop Floors
- Dusting
- Laundry (washing/folding)

**Adolescent Leisure Activities**
- Extracurricular activities
  - Team Sports
  - Solo Sports
  - Band/Music
  - Arts
  - Social interest clubs
• Social Activities
  o Games (Board, card, etc.)
  o Social outings
  
• Social leisure activities.
  o Video Games
  o Personal interests (hobbies, art, music, etc.)
  o Reading
  o Computer work
  
Adult and Older Adult Leisure Activities
• Solitary Leisure Activities
  o Gardening
  o Photography
  o Knitting
  o Needlework
  o Art (Painting, crafting, pottery)
  o Swimming
  o Fishing
  o Volunteering
  o Outdoor activities
  o Personal hobbies/music/art/etc.
  
• Social Leisure Activities
  o Dancing/Exercise
  o Games (Board, Cards)
  o Social Sports (Bowling, Tennis)
  o Exercise Groups
  o Community involvement groups
  o Volunteering
  o Outdoor activities
Childrearing tasks
  - Dressing tasks
  - Feeding tasks
  - Leisure activities with children (dependent on shared interest child and parent)
Appendix C
**Therapist Product Questionnaire**

1.) What difference did you observe in the patient’s motivation to complete the home program?

2.) What were the changes in the patient’s habits?

3.) Did the patient’s performance skills and/or occupational performance improve by using activities over exercises?

4.) Was there a change in patient adherence while using the product?

5.) What would you recommend to change about this product?

6.) What did you like about this product?
Patient Product Questionnaire

1.) Did you like the activities available?
   a. Yes b. No

2.) Did you like having options of either doing activities or exercises?
   a. Yes b. No

3.) While using this product, what would you rate its ease of use?
   o Excellent
   o Good
   o Average
   o Poor
   o Very Poor

4.) Did you feel more motivated to complete the home program with the activities?
   a. Yes b. No

5.) What would your suggestions be to improve this product?