2007


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Life after War: An Occupational Therapy Resource Guide for Returning Soldiers with Prosthetics

by

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A Scholarly Project
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This Scholarly Project Paper, submitted by Monica Lemoine and Andrea Longtin in partial fulfillment of the requirement for the Degree of Master's of occupational Therapy from the University of North, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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## TABLE OF CONTENTS

**ABSTRACT** ............................................................................................................... v

**CHAPTER I: INTRODUCTION** .................................................................................. 1
- Introduction ........................................................................................................... 1
- Terminology ........................................................................................................... 2

**CHAPTER II: LITERATURE REVIEW** .................................................................... 4
- Introduction .......................................................................................................... 4
- Early Post-War Amputations ............................................................................. 4
- Post-Operative Amputation Management .......................................................... 6
- Pain and Sensation ............................................................................................... 8
- Care for the Wounded of the Global War on Terrorism ..................................... 9
- Prosthetic Utilization ........................................................................................... 10
- Rehabilitation and Return to Active Duty ......................................................... 13
- Conclusion ............................................................................................................ 15

**CHAPTER III: METHODOLOGY** ........................................................................ 16

**CHAPTER IV: PRODUCT** .................................................................................... 19

**CHAPTER V: SUMMARY** ..................................................................................... 21

**APPENDIX** .......................................................................................................... 24
- Appendix A ........................................................................................................... 24

**REFERENCES** ....................................................................................................... 26
Abstract

There are a growing number of U.S. military soldiers medically discharged due to injuries sustained while on active duty. A number of these injuries result in limb amputation. The purpose of this scholarly project was to develop an evidence-based resource guide for a population of soldiers returning from war having an amputation and utilizing a prosthetic.

An extensive literature review was conducted in order to develop the occupational therapy role for this population. Three main areas of concern were identified: 1) a lack of information related to prosthetic use during instrumental activities of daily living, 2) limited information regarding reintegration back into work roles, and 3) minimal resources available regarding the process of returning to active duty following injury and prosthetic rehabilitation.

This evidence-based and user-friendly guide was designed for occupational therapists to be given to clients fitting the target population criteria. The aim of this guide is to provide further information on prosthetic usage in instrumental activities of daily living and direction for successful reintegration into work and life roles. It should be used as an adjunctive resource to supplement existing resources, and should be viewed collaboratively with the soldier when preparing to re-integrate into the community.
CHAPTER I
INTRODUCTION

There are a growing number of U.S. soldiers returning home following injuries sustained while on active duty. Among the injuries incurred, limb amputations are becoming increasingly more common. Soldiers have the choice to utilize prosthetics following amputation in order to increase functional independence. With the emerging need for prosthetics amongst this population there is also an increasing need for rehabilitative services in all areas of life. With the current Global War on Terrorism, there is a significant need for available rehabilitation resources and support for this targeted population.

Occupational therapy (OT) plays a unique and integral role in the rehabilitation process for the injured soldier. In the army, OTs have a high level of responsibility within the healthcare discipline. In addition to the traditional therapist role, OTs are considered Physician Extenders with duties such as screening and evaluation, diagnosis of injuries, ordering radiographic evaluations, and prescribing temporary medications (Carl R. Darnall Army Medical Center, 2002).

The purpose of this scholarly project is to develop an evidence-based guide for a population consisting of soldiers returning from war that have sustained an amputation and are utilizing a prosthetic. The guide is written for the soldier, but is intended as a rehabilitation tool to be used in discussions with an occupational therapist. The chosen frame of reference used to guide the content was the Model of Human Occupation
(MOHO) (Kielhofner, 2003). The relevancy of this model to the project and its entirety involves the three MOHO elements (i.e., volition, habituation, and performance capacity) and their close connection to the desired outcomes of the intended product. To illustrate, MOHO focuses primarily on personal motivation, daily routines, life roles and surrounding environments, and therefore, the resulting effects on returning soldiers’ ability to engage in various occupations. Correspondingly, returning soldiers are faced with a large amount of disruption in their lives; therefore, effective rehabilitation must emphasize the person, their environments, and the occupations in which they choose to engage. In addition, an advantage of this model is its ability to be implemented into community-based settings which is of particular value to the long-term rehabilitation of returning soldiers. The versatility of MOHO is advantageous to the components of the end product.

In conclusion, the described project will aim to provide relevant information to supplement current resources for a population consisting of soldiers utilizing prosthetics. The following chapters will describe in detail the findings identified within the literature review, methodology used, and the end product. The information will be presented in a logical format consistent with the succession of the topics of emphasis.

Terminology

The following is the primary terminology the reader will encounter throughout this document. These terms were compiled out of the following texts and articles:

*Casualties of War: Military Care for the Wounded from Iraq and Afghanistan.*

*Occupational Therapy Practice Framework: Domain and Process,* and *Mayo Clinic: Rehabilitation after Upper-Extremity Amputation.*
Activities of daily living (ADLs) – Activities that focus on taking care of oneself.

Adaptive Equipment – Any equipment or device used to modify individual’s performance in various occupations and promote independence.

Assistive Technology – Any device, service, strategy, and practice that compensates for the loss of function to increase independence.

Instrumental activities of daily living (IADLs) – Activities that focus on interactions with the environment that are more complex in nature (i.e. meal preparation, paying bills)

Improvized Explosive Device (IED) – Common name for landmines or suicide bombs.

Ergonomics – Adapting the environment and task to the worker

Forward Surgical Teams – Faster moving military units used to push surgical teams closer to battle and move directly behind troops.

Global War on Terror – U.S. military official name for military efforts against terror.

Phantom Pain – Pain experienced in a limb that no longer exists following an amputation

Phantom Sensation – Feeling and sensation present in an amputated extremity

Prosthetic – The actual artificial limb used to replace a previously amputated limb.

Commonly made of layers of plastic of metal tube covered with soft rubber foam.

Prosthetist – The person who makes your prosthetic.

Military Combat Support Hospitals – A mobile military tent hospital used to treat wounded soldiers.
CHAPTER II
REVIEW OF LITERATURE

Introduction

Amputation and prosthetic utilization is a broad topic. Therefore, boundaries related to a target population and key concepts were established for this review of literature. This literature review focuses primarily on prosthetics utilized by returning soldiers, amputation following battlefield injuries, post-war rehabilitation, psychosocial components affecting returning injured soldiers, and occupational therapy services in conjunction with these topics. A thorough search correlated with previously established boundaries provided information presented in the following literature review.

Early Post-War Amputations

Early post-war amputations date back as far as the 1800s (Figg & Farrell-Beck, 1993). According to the literature, the general focus was primarily on the potential need for amputation and other areas surrounding this topic. An article by Helling and McNabney (2000) focused on the methods of amputation utilized in previous wars. The amputation procedure was rarely done, and was primarily saved for severely infected extremities. If extremities were not amputated, it was likely that the rehabilitation process was poor.

In relation to battlefield wounds versus civilian wounds, it was noted that battlefield wounds were more complex and typically infected. Therefore, these wounds required quick, radical treatments. During this time, new dilemmas surfaced involving the
decision of whether or not to amputate. Supporters argued that amputations should be done immediately in order to increase comfort for the soldiers during transportation to hospitals. However, others felt it necessary to wait until after the first inflammation had subsided. Thus allowing additional time for the de-conditioned soldiers to recuperate and strengthen following injury.

Additional studies involving early war amputations specifically date back to the Civil War through the Vietnam era. An article by Dougherty (1993) focused on amputations performed throughout this era in regards to the indications for amputation, the techniques used when performing amputation and the care following operation for casualties experienced in the battlefield. As a result of the experiences occurring through World War I and II and into the Vietnam War, the amputation guidelines evolved. However, treatment did not advance as quickly as the changes occurred. Rehabilitation included fitting for prosthetics, involving both upper and lower extremity amputations. Discharge criteria consisted of permanent prosthetic fitting, and demonstration of the ability to complete basic activities of daily living (BADLs). Dougherty reported that there was little known about appropriate amputation techniques and rehabilitation treatments. Also, a lack of experienced personnel in the rehabilitation process as well as availability of temporary prosthetics was acknowledged. In addition to the physical aspects of amputations, other facets involving social aspects addressed in the following paragraph were considered.

Focusing on physical and social aspects of societal re-entry in early post-war amputations, qualitative research performed by Figg and Farrell-Beck (1993) described life experiences of individuals who underwent amputation. They reported life experiences
from the onset of injury through the time of discharge as well as the transition back into everyday life. Specific topics discussed included: weapons used, location of amputation, survival rate, and return to active duty. The main cause of battle wounds specifically requiring amputation occurred from expansive bullets, also known as minic balls. Correspondingly, prosthetics became more prevalent with the increased number of amputations. Figg and Farrell-Beck indicated that prosthetic limbs gave veterans the opportunity to conceal their absent limb, and permitted them to return to daily life. Although prosthetics allowed for a return to previous life activities, they were the source of additional problems. These included poor fit, inability to wear the prosthetic, weight, noise, appearance, cost, availability, damage to clothing, and pain. The additional problems described are also reiterated in a study by Sherman (1999), reporting that at least 25 percent of United States (U.S.) veterans are affected by ill-fitting prosthetics.

Post-Operative Amputation Management

An article published by Smith, McFarland, Sangeorzan, Reiber, and Czerniecki (2004) focused on individuals who had undergone transtibial amputations (TTAs). Specific measures of medical concern included the efficacy, safety, and clinical outcomes of various postoperative dressing techniques. Among the dressing types discussed were soft dressings, thigh level rigid dressings with no immediate prosthesis, thigh level rigid dressings with an immediate post-operative prosthetic (IPOP), short removable rigid dressings, and prefabricated pneumatic prostheses. Through review by Smith et al., it was established that currently there is no existing consensus on the ideal postoperative management strategy for those involved. However, Smith et al. provided a detailed
description regarding the various types of TTA dressings and management strategies that are used when treating amputations.

Amputations at the transfemoral level pose related medical and rehabilitative concerns. A long-term follow-up study conducted by Dougherty (2003) evaluated the outcome of persons with amputations at transfemoral levels treated at a U.S. Army General Hospital during the Vietnam War. The outcomes of this study indicated that there are participants who use and choose not to use prosthetics; as well as reported use of psychological services post-trauma. Psychological services were provided for reasons such as substance abuse and marital problems. This article highlights demographics that may be common to those who have served in the military and experienced a traumatic amputation.

Post-operative management involves high-risk techniques and treatment involving soldiers already weakened following injury. Therefore, mortality is taken into consideration upon treating soldiers with amputations. A 30-day study conducted by Feinglass et al. (2001) was completed to examine post-operative mortality, consequential morbidity, and survival rate of soldiers with above or blow-knee amputations. The study consisted of 4061 older male veterans who underwent amputations between 1991 and 1995 at Department of Veteran Affairs (DVA) hospitals. Mortality rates were reported to be low for above- and below-knee operations. Results indicated risk factors most prevalent to increased mortality were smoking and previous lower-extremity amputations. This study provides insight into the causes of morbidity as well as knowledge that the majority of soldiers do survive combat-related amputations, therefore requiring rehabilitative services.
Pain and Sensation

Individuals who have undergone amputation are largely affected by pain and sensation issues such as phantom limb pain and sensation, which could lead to future dilemmas. Wartan, Hamann, Wedley, and McColl (1997) conducted a study to determine whether these issues were related through establishing the anatomical location where amputees experienced pain and sensation. A mail-delivered questionnaire was sent out to randomly selected veterans, the items included: patient characteristics and amputation history, pain sensitivity and attitude towards the use of medical treatment for pain not related to amputation, stump pain, phantom sensation, and strategies to alleviate phantom pain. The participants experienced variations in the duration, frequency, and pain at its worst intensity in regards to phantom pain treatment. The main predictors of phantom pain and stump pain included stump problems, followed by ill health and clumsiness especially within upper extremity amputations. Overall, at least half of the participants in the study experienced either phantom and/or stump pain following amputation.

Also related to pain occurring following amputation, Lacoux, Crombie, and Macrae (2002) studied whether stump pain, phantom pain and phantom sensation were present among soldiers. Structured interviews focused on the following questions: demographics, details of injury, stump pain, phantom sensation, phantom pain, examination of limb, rehabilitation, mood and future plans. Although this study was cut short due to the safety of the participants, it identified common experiences related to their amputation. In regards to common experiences, those included experiencing stump pain, phantom sensation, sensitive areas and whether these were intermittently experienced or not. Dudkiewicz, Gabrielov, Seiv-Ner, Zelig, and Heim (2004) also
conducted a study of participants who suffered from phantom pain. They found that it is apparent that sensation and limb pain are extremely relevant topics to consider when providing rehabilitation services to soldiers post-amputation, as evidenced by articles cited above.

Care for the Wounded of the Global War on Terrorism

Currently, Occupational Therapists are part of the medical team that will serve the vast number of wounded soldiers returning from the Global War on Terrorism (GWOT). In his article regarding present military care provided to soldiers, Gawande (2004) reported that today’s military surgical strategies aim for damage control versus definitive repair due to time constraints and level of injuries. This may influence rehabilitation protocols such as duration and frequency of treatment, as well as extensive services needed. The average time from battlefield to U.S. is 4 days or less; therefore, several significant factors will be relevant to treatment. These factors include change in physical appearance, psychological aspects, and transition from war to civilian life. Since there has been an increase in the number of blast injuries from suicide bombs, also known as improvised explosive devices (IEDs), and land mines, rehabilitation facilities are witnessing more complex and unfamiliar injuries than ever before.

The multifaceted injuries occurring in the GWOT consequentially result in the need for increased immediate care. Medical care as discussed in an article by Peake (2005) described the military combat support hospitals and forward surgical teams in Iraq in comparison to typical emergency and operating rooms in the U.S. The use of body armor increases survival of soldiers with upper body wounds. This, however, is at the expense of severe injuries to proximal upper extremities, typically, an increased number
of upper extremity amputations. The injuries are, therefore, becoming more complex. This results in the need for increased services at the time of the initial injury. The above information reinforces the differences between the acute-care provided on the battlefield which is not as thorough or cosmetic versus traditional surgical care which is. Another factor to consider when predicting successful rehabilitation involves reconstructive procedures following amputation.

Prosthetic Utilization

A number of soldiers, following amputation, are choosing to utilize prosthetics to improve functionality in their lives. A pilot survey conducted by Sherman (1999) focused on soldiers who had received traumatic amputations over the preceding 10 years. It examined the experiences of individuals in the military who had incurred traumatic amputations while on active duty or shortly after leaving the military. The veterans in the study, overall, had difficulty using their prosthetic adequately due to poor fit. This is evident through supporting statistics: all participants’ experienced significant problems using their prosthetic for work, 29 reported problems were due to fit and attachment method, and 10 did not use their prostheses regularly usually because it was too painful. Currently, further research needs to be conducted regarding necessary improvements for prosthetic attachment methods.

An additional study concerning inadequate prosthetic usage was conducted by Bhaskaranand, Bhat, and Acharya (2003). The study aimed at evaluating the success of the rehabilitation process concerning individuals with traumatic upper extremity amputations fitted with body-powered prostheses. A hand surgeon, qualified prosthetist, and occupational therapist were involved in the rehabilitation process following fitting of
prosthetics. After participants were grouped into categories related to level of upper extremity amputation i.e., shoulder disarticulation, above-elbow amputation, and below-elbow amputation; they completed a questionnaire. Of significance was the finding that mechanical failure and financial constraints were the top reasons for inadequate prosthetic usage, followed by pain, poor fit, and cosmetic appearance.

Cosmetic appearance and various social meanings surround the use of artificial limbs. Murray’s (2005) study described the experience of what it means to use a prosthetic limb by prosthesis users themselves. Through semi-structured interviews and internet discussion groups, it was concluded that competent appearance is incredibly important for individuals with disabilities. Further, friends and family may have increased difficulty dealing with limb absence than the individual. A higher degree of social isolation was noted when individuals experienced negative responses of others regarding the absent limb and prosthetic. As a result of the negative experiences, depression often increased as the level of activity and satisfaction with social contacts decreased. Also related to the psychosocial adjustment period following amputation, Figg and Farrell-Beck’s (1993) article targeted returning soldiers who had undergone amputation. They identified that soldiers were apprehensive concerning their significant others’ responses when faced with their sustained wounds.

In addition to psychological aspects related to prosthetic usage, research also addresses physical components. An interviewer-administered questionnaire by Gunawardena, Seneviratne, and Athauda (2004) collected information focusing on unilateral lower limb amputations with soldiers’ prosthetic use and relevant factors. The study included 461 unilateral lower limb amputee soldiers from both Anuradhapura and
Kurunegala of Sri Lanka. It was indicated that landmines were the most common cause of injury. Several predisposing, enabling, and reinforcing factors were identified for potential implementation to improve prosthetic use. Predisposing factors included: demographic characteristics, physical health status, prosthetic training, and motivation. Factors that were enabling included the ability to put on the prosthesis, locomotor abilities with prosthesis, and physical environment. The reinforcing factors consisted of satisfaction with the prosthesis, problems related to prosthetic use, social environment, social interaction, and maintenance of physical status. Overall, in order to improve future use of prosthetics, the factors listed above should be considered.

In order to identify which factors leading to improved functionality, a study by Dudkiewicz, Gabrielov, Seiv-Ner, Zelig, and Heim (2004) investigated possible predictors that guide successful rehabilitation of persons with upper-limb (U/E) amputation using prosthetics. This was accomplished by extensive review of medical records from 42 eligible patients with U/E amputations. It was identified that individuals with U/E amputations most often prefer cosmetic prosthetics over functional, most likely due to their subtle appearance i.e. less robotic-like. Additional deterrents for prosthetic use reported were stump hyperhidrosis, stump warming, prosthetic weight, and poor functioning prosthetics. Regarding successful rehabilitation predictors, it is unknown which specific factors will lead to successful prosthetic utilization. Therefore, a combination of several parameters must be utilized to provide optimal rehabilitative services to individuals with U/E amputations.

Managing reconstructive procedures and the use of prosthetics with upper limb amputation have important considerations in selecting the best possible outcome, as
identified by Beasley and de Bese (1986). Considerations include primary wound healing, conserving the usable parts, preserving the length, role of sensibility for manipulating small objects, the goal of reconstruction, and reconstruction versus prosthesis. In order to perform reconstruction, specific criteria must be met for the outcome to be superior to amputation. One major criteria that is considered involves making sure the result of reconstruction is socially acceptable. Social acceptance has been previously emphasized by Figg and Farrell-Beck (1993). There remains an absence of information related to returning soldiers and the commonly used treatments following amputation and/or reconstructive methods; including the outcomes.

Rehabilitation and Return to Active Duty

One outcome of successful rehabilitative services may be the return to active duty. A study by Dillingham, Braverman, and Belandres identified the deficits that impair functioning and the need for rehabilitation of soldiers who underwent amputations during the Persian Gulf War. This particular study compared soldiers with amputations during the Persian Gulf War at Walter Reed Army Medical Center with those involved in previous wars. Results indicated that 79 percent of the soldiers' injuries occurred during battle. In addition, the same percentage of amputees sustained at least one peripheral nerve injury. Training in activities of daily living (ADLs) and ambulation required rehabilitation strategies to be modified due to the coexisting injuries i.e., vascular disruptions, fractures, nerve injuries. Injuries can potentially impair function and require the need for modification of rehabilitative services as they pertain to each individual case. Modifications necessary will direct the rehabilitation process, as well as assist soldiers to meet personal goals.
Goals most likely vary within the target population; however, one goal may be to return to active duty following rehabilitation measures post-amputation. Pasquina and Fitzpatrick (2006) described that WRAMC currently serves returning soldiers, with a majority of them having sustained amputations. Therefore, ample opportunity is available to perform outcome measures in order to increase knowledge related to this population. As Pasquina and Fitzpatrick point out, current outcome measures consist of military specific, surgical, medical, rehabilitative, and military specific rehabilitation. Although several are available, there remains a lack of outcome measures focusing on how the environment and activities influence motivation and higher level activities as well as tasks unique to military personnel. As medical techniques and treatment coupled with improved body armor and evacuation techniques continue to advance, soldiers are surviving wounds they would unlikely have survived in earlier military conflicts. As a result, multi-disciplinary teams need to be prepared to be a part of these medical advancements and have the skills to provide rehabilitation services to soldiers suffering such extensive injuries. Current outcome measures, such as those used at WRAMC, are a necessity to ensure competency in providing rehabilitation services.

As stated previously, return to active duty is a potential reality for some soldiers. Kishbaugh, Sinnott, Dillingham, Belandres, and Howard (1995) determined the percentage of returning active-duty soldiers following an amputation. The levels of amputation were combined into seven categories including multiple amputations, above elbow, below elbow, hand, above knee, below knee, and foot. The results indicated that hand and/or finger amputations made up a majority of those who were able to return to active duty followed by foot and/or toe and below-knee amputees. Also, a correlation
between age and rank of those returning to active duty was noted; however, few soldiers actually returned to active duty. According to Kishbaugh et al. (1995), possible reasons for limited return to active duty included; motivation, soldiers’ ability to perform duties, command support, absence of skills, and policies and needs of the Army. The authors did not describe potentially useful rehabilitation treatments for those hoping to return to active duty. However, it is important for rehabilitation personnel, such as occupational therapists, to provide pertinent information to injured soldiers relating to the practicality of returning to active duty.

Conclusion

The information presented provides a foundational knowledge base concerning amputation, prosthetic use, rehabilitation, and returning soldiers of war. The current Global War on Terrorism illustrates the necessity for specific treatment measures and references materials as the number of complex amputations continue to grow. Therefore, a further need for higher level rehabilitation methods should be developed and implemented.

Future occupational therapy (OT) resources should focus on areas including instrumental activities of daily living (IADLs), work, and returning to active duty. These should supplement literature currently in existence related to activities of daily living (ADLs), psychological components, prosthetic management, and stump care. Previous literature provides evidence for the proposed product, as it highlights the complication injuries commonly seen following war, specifically amputations. The product to follow in Chapter IV emphasizes the areas identified above in relation to future OT resources. The following chapters will address the methodology utilized to guide the intended product.
CHAPTER III

METHODOLOGY

The product described in Chapter IV is a resource guide intended for returning soldiers with amputations utilizing prosthetics, provided by and in collaboration with occupational therapists (OT). The intended product was developed following an extensive review of literature. In order to conduct the review of literature, multiple search engines were used. These included PubMed, CINAHL, and OT Search.

The literature review focused on identifying occupational therapy’s role within the military, the rehabilitative process following amputation, current resources available, prosthetic utilization, and injuries resulting in amputation while on active duty. Findings from the review identified existing information regarding activities of daily living (ADLs), psychological issues, and prosthetic management and maintenance. It was determined that there was insufficient information regarding instrumental activities of daily living (IADLs), work, and return to active duty within the realm of OT.

Upon completion of the literature review, OT theoretical models were reviewed to determine the most appropriate model for the intended product and the target population. Through this process, it was concluded that the Model of Human Occupation (Kielhofner, 2003) was the most suitable due its the three key concepts. These include volition, habituation, and performance capacity. While other models could also facilitate the development of this product, MOHO specifically addresses individual habits, roles
and routines within one’s environment even during life’s interferences. Injured military personnel are faced with the transition period from soldier to civilian; therefore, the key concepts mentioned are important in facilitating successful rehabilitation and reintegration into life roles. After selecting the theoretical model, formulation of the product and its contents began.

The following product is sequentially organized to focus suggestions to enhance areas of a soldier’s IADLs, work, and return to active duty. Relevant resources are included throughout the product for use by soldiers, families, and caregivers. In addition, steps were taken to ensure readability in order to address a broad audience. Photos of adaptive equipment devices are included and described. It is anticipated that OTs in collaboration with the individual utilizing a prosthetic will identify the equipment most appropriate and feasible for their situation and needs.

The IADL portion consists of communication device use, community mobility, health management and maintenance. Communication device use is broken down with an emphasis on suggested techniques and equipment related to computers, telephones, and writing. Following IADLs, work is addressed by inclusion of ergonomic principles and vocational rehabilitation. Adaptive equipment is incorporated into the ergonomic section. The vocational rehabilitation section describes the role of a vocational rehabilitation counselor and services provided. Lastly, the process of returning to active duty is delineated. This section highlights relevant measures required by the U.S. military in order to remain eligible for active duty. A variety of credible military resources are cited to help direct inquiring soldiers to integrate the necessity of understanding legal issues.
In creating this product, a multitude of relevant amputation and military organization websites as well as published research and literature was used. The resulting information was incorporated within the scholarly project product with relevance for the target population needs and project purpose. The entirety of the product is highlighted in the following Chapter IV.
CHAPTER IV

PRODUCTS/RESULTS

This chapter is written for returning soldiers in relation to their work, instrumental activities of daily living (IADLS), return to active duty, and how their occupational performance affects these areas. The product will be presented in the form of a resource guide intended for soldiers provided by and within a therapeutic partnership with occupational therapists (OTs). The guide, Life after War, was designed to focus on the areas mentioned above because of the current lack of resources available on these areas for soldiers with prosthetics.

The OT Practice Framework (AOTA, 2002) was utilized as the foundation for development of the guide. Areas of occupation were chosen based on gaps identified in an extensive review of literature related to returning soldiers and prosthetics. The guide was formulated to be an adjunctive resource to the relevant resources currently in existence. It can also be used as an education-related resource for family members as well as assisting OTs in identifying potential areas of concern for the soldier.

Guiding the development of the resource guide, the Model of Human Occupation (Kielhofner, 2003) was incorporated. The application of MOHO is relevant to occupational therapy when providing services to specific populations, in this circumstance, soldiers utilizing prosthetics. MOHO's volition, habituation, performance capacity, and the environment are influential factors surrounding the unique role of the
soldier. MOHO recognizes the imperativeness of the inclusion of these factors in the treatment process.

*Life after War* is sequentially organized according to IADLs, work, and return to active duty. It is presented in a concise, easy-to-read format targeting soldiers utilizing prosthetics following amputation, their families, and caregivers. It is intended to assist OTs working in U.S. military hospitals, Veteran’s Affairs (VA) hospitals, or other community settings to extend services for soldiers into the work and community realms.
Life After War

http://www.amputee-coalition.org

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Introduction

Currently, there are numerous resources related to prosthetic use directed towards the general population who have an amputation and prosthetic. Additional resource information regarding existing resources that address activities of daily living (ADLs), psychological aspects, prosthetic management and maintenance, and stump care is provided on page. This guide was developed for returning soldiers using prosthetics and their families/caregivers. It will serve as a resource to answer questions about your health, communication, transportation, work, and returning to active duty. To obtain your highest level of satisfaction in life, it is necessary to discuss any concerns or issues about your injury with the treatment team. The team will consist of your doctor, Occupational Therapist (OT), Physical Therapist (PT), Prosthetist, Vocational Rehabilitation specialist, Counselor, Psychologist, involved military personnel, and Case Manager.

This guide is geared to provide information specifically related to the identified areas, but is not meant to be an all inclusive resource for soldiers with prosthetics. It is a guide to follow when learning the ins and outs of your prosthetic as well as the military healthcare system.
Instrumental Activities of Daily Living (IADLs)

Communication Device Use:

Communication devices used throughout the day can have advantages to help assist current abilities when using a prosthetic. Here are some adaptive equipment/modification suggestions that your therapist or employer may recommend. The pictures within this section are used with permission from www.enablemart.com.

Computer:

* Alternative keyboards
  * One-handed keyboards
  * Large-key keyboards
* Trackballs – a large ball used to control curser movements
* Head pointing systems – used for typing, page turning, drawing, and painting
* Voice Recognition Software
* Typing tutorials
* Single switch access

* Foot mouse – foot operated; one pedal controls cursor, other pedal controls mouse clicking

* Touchpads – operates computer programs and commands

Telephone:
* Speaker-phones
* Phone holders – keeps phone in place on hand

* Telephone headsets – hands free with a wireless connection
* Programmable number storage

Writing:

* Grip aids – used to keep writing tool firmly in hand

* Writing cuffs

* Action arm orthotic devices

* Recording devices for note-taking

* Clipboards

Community Mobility:

Your means of transportation in the community may include driving and accessing public transportation such as buses and taxicabs. Adaptations may be necessary to enhance your access or performance.

Driving: In order to enhance driving abilities, various legal requirements may be required following the receipt of your prosthetic. These can be obtained through the Department of Transportation, and your therapist can assist in accessing additional information through the American Occupational Therapy Association (AOTA) website, and finding a driving specialist in your area. Adaptive driving training
resources can be found on www.fairfaxcounty.gov.

- Driver Rehabilitation Programs consist of:
  - Clinical evaluation – testing physical, visual, and cognitive ability
  - Driving evaluation – on the road testing in an actual driving environment using suggesting equipment
  - Vehicle modification – based on needs identified during driving process
  - Driver education – includes practice and training in operating vehicle with prescribed equipment
  - Final fitting – a final review of your driving abilities with modified equipment

* Available Adaptive Equipment: No matter what type of transportation is being used, it is important to practice skills necessary in a home setting or off public roads on flat surfaces if possible. The pictures were taken from www.deanjoyce.com.

- Automatic transmission
- Power brakes/steering
- Modification to driver’s area
- Grip gloves
- Remote control starter engines
- Hand controls – operates brakes and accelerator with a single lever
* Locate a cycle shop with a craftsman who can modify your cycle, or customize a new cycle to fit your specific needs and abilities

* Before starting adaptive motorcycling, consider a motor cycle safety foundation class

* Check for additional testing or driving requirements

* Buy and use a helmet

* Start on side roads, and move up to higher speeds and traffic as skills progress

**Below knee amputation/injury:**

* Add a heel extension to allow changing gears

* Move shifter to non-affected side

* Purchase hand gears

* Operate a modified brake pedal with prosthetic

* Mount a second brake hand lever in alignment with front brake lever on handle bar

* Anti-lock brake system

**Above knee amputation/injury:**

* Choose a prosthetic knee that is stable and in an extended position

* Link the side stand to a hand lever extender below the tank

* Ride a motorcycle with a side car or trike to improve stability
www.amputee-coalition.org

Arm amputation/injury:

* Need to choose whether to modify the cycle or the prosthetic

* Re-route the standard brake, throttle, or clutch controls to be operated with one hand (within legal limits)

* Specialized terminal device or glove of the prosthetic hand

* Bike kits and solutions are available online

* Front steering dampener

Train and bus:

* Practice at quiet times during the day

* Try with a friend or relative first

* May require quick, long strides to climb steps or across gaps
• At least 48 hours before you leave, call the Greyhound ADA hotline at 1-800-752-4841 to make any necessary arrangements
• Make reservations and disability arrangements at least 2 weeks before travel date if possible
• Amtrak offers a rail fare discount to passengers with disabilities who can provide written documentation of their disability
• You can contact Amtrak by calling 1-800-872-7245 or visiting their website at www.amtrak.com

Airplane:

• Plan in advance to check accessibility into plane, restrooms, and available leg room
• Ask airline in advance to provide wheelchair for connecting flights if needed
• Have awareness of changing air pressure which may cause fitting difficulties with prosthetic.
• Check location of accessible seats and restrooms
• May require quick, long strides to climb steps or across gaps
• Walk through security metal detector and explain that you have a prosthetic limb

Boat:

• May require good balance for wet deck surfaces; wear appropriate footwear
• Identify location of seat in advance

• Be prepared for steep stairways

• May require quick, long strides to climb steps or across gaps

Health management and maintenance:

Focusing on your daily routines will help to promote a healthy lifestyle. This will also aid in increasing physical wellbeing and enhance adjustment to lifestyle changes.

• Taking care of the prosthetic device

• Cleaning and maintenance of the device included in daily routine

• Refer to www.advancedprotheticscenter.com for cleaning and maintenance of prosthetic device

• Creating a balance related to home life, work, leisure, and spirituality

• Joining local gyms, getting involved in community events, taking breaks for personal time

• Increase stamina

• General muscle strength

• A well-healed and less sensitive limb

• Maintaining balance

Social aspects:

• Connecting with other injured soldiers

* Developing a physical fitness routine

Managing stress:

* Keeping regular schedules
* Relaxation techniques
* Exercise
* Anger management classes
* For additional stress management techniques, contact 88th Regional Readiness Command www.usarc.army.mil/88thrc or phone 1-800-THE-ARMY

* Refer to www.advancedprotheticscenter.com for wellness and fitness programming
* Refer to www.advancedprotheticscenter.com for wellness and fitness programming
* Joining support groups: possible suggestions include Families of Injured Soldiers with Helping Hands (www.forthoodsentinel.com)
Ergonomics:

Upon your return to work/active duty, it is important to have safe work habits and proper body mechanics. Here are some tips and possible workplace accommodations to help ensure your personal safety.

Work-site accessibility:

* An OT can complete a job analysis to assess your job duties and work station set-up

* Close parking to work-site
* Adjust desk height if wheelchair or scooter is used

* Proper ergonomic desk arrangements and tips taken from www.osha.gov

* Desk quick tips:

  * Desk surface should allow you to place the monitor directly in front of you, at least 20 inches away

  * Avoid storing items, such as a CPU, under desks

  * Desks should be able to accommodate a variety of working postures

* Make sure materials and equipment are within reach in your workspace

* Move workstation close to other work areas, break rooms, and restrooms to conserve your energy

* Top of the monitor at or just below eye level; head and neck balanced and in line with trunk; shoulders relaxed; elbows close to body and supported; lower back supported; wrists and hands in line with
forearms; adequate room for keyboard and mouse; flat feet on the floor

* Tool use
* Grasping cuffs, grasping orthoses, ergonomically designed tools, pistol grip attachments, foot controls
* Lifting items
  * Portable material lift equipment, tailgate lifts, hoists and lift-tables, cranes, hoists, lift carts, wheeled carts
* Filing Papers
  * Lateral files, carousel-rotary files, reduce number of files per drawer
* Climbing
  * Stair lifts, wheelchair platform lifts, climbing wheelchairs, rolling safety ladders, work platforms, hydraulic personnel lift
* Standing
Vocational Rehabilitation:

Vocational Rehabilitation (VR) is a program designed to assist individuals with disabilities in finding employment and training in various job positions and careers. This may include exploring alternative job options following amputation. The following information highlights important services provided by VR professionals in collaboration with an OT or upon referral. VR services can be obtained through the Department of Veterans Affairs (DVA) at www.vba.va.gov.

* Vocational counseling and planning
* Restoration – healthcare treatments to increase your work potential
* Job preparation – includes on-the-job training and education
* Support services – includes Case Management, counseling, and referral
* Employment services – job seeking skills, resume development, and work readiness assistance
* Job Placement – may require training in alternative military occupational specialty MOS to better match current abilities
* Assistive Technology Services

* Sit/stand stools, stand supports, anti-fatigue matting, and rest/stretch breaks
* Independent living services – may include help using community services, money management and time management

* Post-secondary training

* Related civilian occupations for military skills found at www.O*NETonline.com

Eligibility Requirements:

* Must have received a discharge other than dishonorable

* Have a service connected disability rating of at least 10%

* Submit a completed application for VR and employment services
Return to Active Duty

It is important to employ a realistic decision-making process regarding return to active duty following amputation and receipt of prosthetic, which should include consideration of family members. The following provides necessary steps to be followed if return to duty is a reality for you and your situation.

This information was taken from www.amputee-coalition.org.

* Characteristics traits of military personnel who have an amputation who seek to remain on active duty:

  * Strong individual motivation for continued military service
  * Desire to meet MOS standards
  * Strong support from close family and friends
  * Possession of highly valued military specific skills
  * Strong service records prior to injury
  * Unit has special MOS related needs that service member can fulfill

* When the decision has been made to return to active duty, it is followed by a complex process of evaluations and screenings to determine if the soldier is fit for duty. The process consists of:
* Injured soldiers are assigned or attached to a Medical Holding Company (MHC).

* This is the link between your doctors and health professionals, and the Physical Evaluation Board Liaison Officer (PEBLO).

* Next, the Transition Office prepares discharge documentation which is required for the soldier to receive Veterans Administration benefits.

* Soldiers with significant limb loss must be evaluated by a Medical Evaluation Board (MEB), which decides if the soldier meets medical standards. The MEB may decide that the soldier be referred to the Physical Evaluation Board (PEB).

* The PEB determines if the soldier is physically fit or unfit for continued military service.

* An injured soldier who is cleared for active duty will have additional weeks or months of rehabilitation to achieve higher levels of function.

* There may be a possibility of amputee soldiers rejoining their units to resume military training in a real-world environment.

* If amputee soldiers are found unfit by the PEB, there are alternative options for appeal through Human Resources Command or the Army Reserve or National Guard. A soldier may contact these resources if this situation occurs.
Related Terms

- Activities of daily living (ADLs) – activities that focus on taking care of oneself
- Adaptive Equipment – any equipment or device used to modify individual’s performance in various occupations and promote independence
- Assistive Technology (AT) – any device, service, strategy, and practice that compensates for the loss of function to increase independence
- Battle Buddy – receiving assistance from a fellow soldier
- Ergonomics – adapting the environment and task to the worker
- Instrumental activities of daily living (IADLs) – activities that focus on interactions with the environment that are more complex in nature (i.e., meal preparation, paying bills)
- Medical Evaluation Board (MEB) – evaluates the soldiers medical condition to determine whether they meet medical standards
- Medical Holding Company (MHC) – where soldiers are assigned or attached while recovering from injuries
- Military Occupational Specialty (MOS) – job classification used in the military to identify jobs of military personnel
* Phantom Pain – pain experience in a limb that no longer exists following an amputation

* Phantom Sensation – feeling and sensation present in an amputated extremity

* Physical Evaluation Board (PEB) – the military board that determines if a soldier is fit or unfit for continued military service

* Prosthetic – an artificial limb used to replace a previous amputated limb

* Transition office – prepares necessary documentation to achieve assistance from veterans administration
Additional Resource Information

www.mayoclinic.org

* The purpose of the website is to provide health information, new advances, and services offered at the Mayo Clinic.
* Additional patient education handouts
  * Rehabilitation After Upper-Extremity Amputation

www.amputee-coalition.org

* The goal of this website is to educate, support, and provide advocacy for individuals with limb loss. There are numerous links on this website to provide resources regarding physical, emotional, technological, and any other issues experienced by amputees. Also, the website includes online support groups sponsored by the National Peer Network.
* Phone 1-888-AMP-KNOW

www.nationalamputation.org

* A national foundation with programs aimed towards helping individuals with amputations as well as other disabilities
* Programs involve Amps to Amps, Medical Equipment Give-A-Way, services focusing on providing additional information, contact information, referral services, and providing booklets and pamphlets.
www.wramc.amedd.army.mil

* The official site for Walter Reed Army Medical Center. It provides a description of services available at the facility.

* Offers a handbook for families of wounded soldiers titled Our Hero Handbook. Included in the handbook, is an excellent question and answer section regarding the military process following injury.

www.va.gov

* The Department of Veteran Affairs main website. Specifically use to locate a VA facility in your area.

www.usarc.army.mil/88thric or phone 1-800-THE-ARMY

Army information line 1-800-833-6622

* Provides information links for soldiers, families, and employers involved in the military.
Summary

This information will help meet your needs in your rehabilitative process and to return to work and life. The goal is for you to become aware of situations or issues that typically arise with the use of a prosthetic in your unique role of a soldier. Again, direct any additional questions to any individual of your treatment team as well as using the resource list previously mentioned in this guide. Good luck with your road to recovery!
REFERENCES


CHAPTER V

SUMMARY

With the growing number of U.S. military soldiers discharged following injury, it is imperative that healthcare providers and rehabilitation professionals direct them to relevant resources to assist the recovery process. The purpose of the scholarly project was to determine areas of daily life affecting the target population that are not being sufficiently addressed. Current research and literature illustrates an abundance of resources and information related to the psychological components, activities of daily living, prosthetic management and maintenance, and stump care, all affecting individuals with amputation. A significant amount of the available resources are intended for civilians. In addition, the current Global War on Terrorism has identified an increase in injuries resulting in amputation due to use of body armor and improved military strategies (Peake, 2005). Consequentially, there is a need for increased efforts focused on the target population and the rehabilitation process.

While the current literature is important to the rehabilitation process, the unique roles and routines of today’s soldier entail further components relating to performance in meaningful occupations. Through an extensive literature review process, it was identified that information related to IADLs, work, and return to active duty following amputation was insufficient. As a result, these areas were highlighted in the included product Life after War.
Occupational Therapists (OTs) play an important role in rehabilitation for the vast number of returning soldiers utilizing prosthetics. According to the Carl R. Darnall Army Medical Center website, OTs’ role, in addition to traditional therapy services, includes screening and evaluation, diagnosis of injuries, ordering x-rays, and prescribing temporary medications.

A potential limitation for this project involves the difficulty in obtaining current resources and information regarding today’s military soldier following amputation and receipt of prosthetic. Due to the distinctive and ongoing Global War on Terror, research related to the specific target population is limited. Another limitation is the minimal literature related to OT and beneficial interventions for the target population. Lastly, the complexity of the Veteran’s Affairs and healthcare system for soldiers impacted the structure and organization of the product’s content. In consideration of the potential project limitations described, future research and development could involve practice guidelines for OTs serving the military population. Further research could also include the examination of outcomes measures found at military rehabilitation facilities such as Walter Reed Army Medical Center. This would assist OTs in more effectively meeting the needs of the soldier population.

It is intended that the implementation of Life after War will consist of a therapeutic partnership between the OT and the client to serve as an adjunctive resource. It will supplement additional resources and treatment strategies involved in the rehabilitation process for the target population. It is suggested that when presenting the information in Life after War OTs will collaborate with the client to identify personal goals and realistically evaluate and consider their situation. For example, when analyzing
the need for adaptive equipment, OTs should involve the client in identifying the particular piece of equipment and its pertinence to their lifestyle. It is imperative that the OTs will consider consultation or referral to other disciplines such as driving specialists, vocational counselors, psychologists, prosthetists, and physical therapists.

Returning soldiers are faced with a certain degree of disruption in their lives following injury, wherein their habits, roles, and routines are often altered. It is necessary to address these aspects in the development of the therapeutic alliance. *Life after War* is an important tool in the communication efforts between the OT and soldier in the road to recovery.
Hello Andrea,

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Please feel free to contact me with any additional questions or concerns you might have and I would be more than happy to assist you.

Best of luck with your thesis!

Sara

Sara K. Derkacht
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Hello,

My name is Andrea Longtin, and I am a student at the University of North Dakota. I have currently been working on my thesis, along with my partner Monica Lemoine, and we are requesting the approval of referencing assistive technology products from Enablemart. Pictures of specific equipment is presented and
will be correctly referenced to Enablemart within our final product. If my request is granted, please send a signed copy of your approval to Andrea Longtin fax: 777-2212 as soon as possible. Thank you for your time.

Sincerely,

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REFERENCES


