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Prosthetics Guide for Occupational Therapy Students and New Graduates

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Prosthetics Guide for Occupational Therapy Students and New Graduates

By

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A Scholarly Project

Submitted to the Occupational Therapy Department

of the

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In partial fulfillment of the requirements

for the degree of

Master of Occupational Therapy

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APPROVED

This Scholarly Project, submitted by Chelsea de Bruto, MOTS and Kayla Oates, MOTS in partial fulfillment of the requirement for the Degree of Master 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.

[Signature]

December 16, 2016
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Title Prosthetics Guide for Occupational Therapy Students and New Graduates

Department Occupational Therapy

Degree Master of Occupational Therapy

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Chelsea de Bruto, MOTS
November 29, 2015

Kayla Oates, MOTS
November 29, 2015
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First off, we would just like to thank Dr. Lavonne Fox for all of her help along this journey. She was a tremendous help with the creation of our guide and we could not have done it without her! She helped us reach our goals for our scholarly project, but she also helped us grow as students in the process. This will only help us be better occupational therapists in the future.

We would also like to thank our family and friends as we could not have came this far without their continuous support. Dr. Fox, friends and classmates, and our family were there for us during the most stressful, and the most rewarding, parts of our scholarly project. We will forever be grateful to all of them!
ABSTRACT

"The prosthetic technology is effectively an interface between that person and the life they wish to lead" (Gallagher, 2004, p. 828). Occupational therapy can help individuals with prosthetics deal with psychosocial and physical aspects of his or her condition (Gulick, 2011). Current literature covers all aspects of prosthetics, but it is scattered in many different places. The results of a study conducted by Mitchell, Gorelick, Anderson, and Atkins (2014), approximately 3-5 hours or less are spent on prosthetic training, while 85% of respondents felt that it was considered to be “very important”. This scholarly project focuses to bridge this gap even when additional education cannot be provided in school.

An extensive literature review was conducted on topics relating to prosthetic guides, Occupational therapy, prosthetics guide for occupational therapy, orthopedic prosthesis, psychosocial, and prosthesis. The search databases used include Pubmed, Google Scholar, cinahl, and psychinfo. The literature review provided the authors with the introductory tools to competently treat an individual with a prosthesis as a novice student/therapist.

The finished product is the Prosthetics Guide for Occupational Students and New Graduates. This guide includes resources for occupational therapy students and new graduates in regards to, but not limited to, useful assessments, psychosocial components, physical aspects, and care of prosthetics.
CHAPTER I
INTRODUCTION

"The prosthetic technology is effectively an interface between that person and the life they wish to lead" (Gallagher, 2004, p. 828). Occupational therapy can help individuals with prosthetics deal with psychosocial and physical aspects of his or her condition (Gulick, 2011). Mitchell, Gorelick, Anderson, and Atkins (2014) reported that approximately three to five hours or less is spent on prosthetic training in school, even when 85% of respondents felt that it was considered to be “very important” information. Based on that statistic, the question was raised regarding sufficient academic preparation to meet the needs of occupational therapy students. Current literature covers all aspects of prosthetics, but for occupational therapy students it is diffused throughout various sources which is a primary reason this guide was created. This scholarly project strived to bridge the education gap by developing a guide to enhance prosthetic training for the novice student/therapist.

Population

This guide is intended for occupational therapy students and new graduates. It is designed to be used at the individual's discretion for different activities such as case studies, homework assignments, or for personal interest. This guide can be used as an additional tool to enhance learning about, or the implementation of, prosthetic rehabilitation to make up for the gap in prosthetic education previously mentioned.
Theory

When deciding how this guide would best be used, time was taken into account. It is understood that occupational therapy programs may not be able to add more information into their current curriculum, so an adult learning theory was chosen. Andragogy is an adult learning theory that was developed by Malcolm Knowles. This theory is based on five assumptions: Self-concept, experience, readiness to learn, orientation to learning, and motivation to learn (Knowles, 1980; Smith, 2010; TEAL Center Staff, 2011). When looking at the assumptions of andragogy, adult learners are self-directed, meaning they seek out information on their own; they use experiences to learn; they orient their learning with social roles; they want learning to be immediately applicable; and learning is internally driven (Knowles, 1980; Smith, 2010; TEAL Center Staff, 2011).

The prosthetics guide created targets all of these assumptions in different ways, with hopes of bridging the education gap students are facing so they feel more prepared as new graduates when working with this population. Because limited time is often spent during academics on prosthetic education, this theory was an appropriate choice for those students who are motivated to learn on their own. If occupational therapy schools are not be able to implement this guide, students and new graduates would at least have a resource to enhance their knowledge when working on assignments related to prosthetic rehabilitation.
Key Terms and Concepts

There are key terms and concepts used that the reader may not be as knowledgeable about. These have been identified and defined in the following to ease understanding of the information presented.

- **ACOTE** or Accreditation Council for Occupational Therapy Education is defined as the group that creates the standards that all occupational therapy programs must meet in order to provide that adequate level of education that is expected of the profession and the population served (AOTA, 2015).

- **Amputation** is defined as “a surgical procedure that involves removal of an extremity or limb (leg or arm) or a part of a limb (such as a toe, finger, foot, or hand), usually as a result of injury, disease, infection, or surgery (to remove tumors from bones and muscles)” (Johns Hopkins, ¶ 1, 2015). For the purpose of this scholarly project, the research used and information provided pertains to upper limb amputations.

- **AOTA** or American Occupational Therapy Association is a national association that represents the profession of occupational therapy, including students and practitioners to continually improve the profession (AOTA, 2015).

- **Andragogy** was the theory chosen to guide this project. It is defined as “the art and science of helping adults learn” (TEAL, p. 1, 2011).

- **Bloom’s Taxonomy** is a hierarchy of learning. Bloom’s taxonomy is organized into six major categories that learners move up like a ladder from basic knowledge to more abstract synthesis and evaluation (Armstrong, 2015).
- **Occupational Therapy Framework** a framework that was created to delineate or define the occupational therapy process and create a uniform and structured system (AOTA, 2014).

- **Prosthesis** is defined as “a device, either external or implanted, that substitutes for or supplements a missing or defective part of the body” (Dictionary.com, 2015).

- **Prosthetics** are defined as “referring to a prosthesis, an artificial substitute or replacement of a part of the body such as a tooth, eye, a facial bone, the palate, a hip, a knee or another joint, the leg, an arm, etc.” (MedicineNet, ¶ 1, 2012).

- **Prosthetist** is defined by Dictionary.com (2015) as “a person skilled in making or fitting prosthetic devices.”

- **Novice Beginner** is defined as a practitioner that has no experience with individuals with a specific diagnoses. A novice is not confident in their abilities to provide safe intervention and needs a mentor for judgement calls and cueing (Benner, 1984).

- **Advanced Beginner** is defined as a practitioner that has acceptable performance due to experience. A novice is skillful in areas of practice, but may need support periodically (Benner, 1984).
Chapter II is a review of current literature that supports the creation of the Prosthetics Guide for Occupational Therapy Students and New Graduates. This section includes evidence that supports the need for the guide, including the gap in education that is occurring, as well as what other programs are doing to enhance students knowledge on this topic. This section also includes research describing the theoretical backgrounds chosen that support this guide and a summary of what is included in the Prosthetics Guide for Occupational Therapy Students and New Graduates.
CHAPTER II
LITERATURE REVIEW

Introduction

Prosthetics can be defined as, “referring to a prosthesis, an artificial substitute or replacement of a part of the body such as a tooth, eye, a facial bone, the palate, a hip, a knee or another joint, the leg, an arm, etc.” (MedicineNet, ¶ 1, 2012). Prosthetics can be used for many different reasons, however, the focus of this scholarly project pertained to prosthetics as they relate to the upper limb. The main reason people require a prosthetic is for a replacement of a limb due to an amputation. An amputation is “a surgical procedure that involves removal of an extremity or limb (leg or arm) or a part of a limb (such as a toe, finger, foot, or hand), usually as a result of injury, disease, infection, or surgery (to remove tumors from bones and muscles)” (Johns Hopkins, ¶ 1, 2015).

The exact number of amputations worldwide is a hard number to determine, however it is estimated that in the United States there are approximately 185,000 new amputations per year. This is a significant number of individuals who endure some form of limb loss (Amputee Coalition, 2015). “Given the increased incidence of upper limb amputations, there is a growing need for occupational therapists to be more knowledgeable in understanding the training principles of conventional and advanced electric prosthetic technology” (Mitchell, Gorelick, Anderson & Atkins, 2014, p. 5). Unfortunately Mitchell et.al found that of the 52 Occupational Therapy master programs
surveyed, only 60% devoted three to five hours or less to prosthetic training.

Occupational therapists may be only one of several allied health professionals used in the rehabilitation process, but they are an essential component. To remain essential they need the skills and education, as an entry level therapist, to successfully help individuals living with a prosthesis.

This raises several concerns regarding the preparation of occupational therapy students/new graduates to effectively meet the needs of this population. The purpose of this scholarly project was to provide evidence that prosthetic education needs to be strengthened at the academic level. As a result, a literature review was conducted on topics related to the Accreditation Council for Occupational Therapy Education (ACOTE) standards, general knowledge base, gaps in knowledge, best practice for occupational therapy students and new graduates as well as best practices for learning and teaching about prosthetics, and multidisciplinary teamwork. During the literature review, there was not a prosthetic guide found that included the entire process of rehabilitation plus basic education on prosthetic components for an occupational therapy student or new graduate. Due to this finding, the literature review resulted in the creation of a comprehensive prosthetics guide for occupational therapy students and new graduates to bridge the gap between academic knowledge and practice.
General Knowledge Base Occupational Therapy Academic Preparation

According to Mitchell et al. (2014), the number of people with amputations is expected to double by 2050, meaning the need for occupational therapists in prosthetic rehabilitation will be essential to help aid in the recovery process. To successfully serve this population, occupational therapists need to gain the basic skills within their academic courses. It is important to gain an understanding of how the requirements for teaching and learning are established for an occupational therapy program in order to fully understand the extent of academic coursework on prosthetics.

Occupational therapy programs have standards they need to follow in order to meet students' needs. Entry level skills for occupational therapy students are determined by the Accreditation Council for Occupational Therapy Education (ACOTE). ACOTE standards establish the critical requirements necessary to prepare individuals to become entry-level occupational therapists or occupational therapy assistants. The section B standards are the standards related to curriculum content requirements. The section B requirements are tied to expected student outcomes (ACOTE Standards and Interpretive Guide pg. 18). It is the responsibility of the faculty to develop learning activities and methods of evaluation to document how the students have met these outcomes. For purposes of this scholarly project, the accreditation standards for a master’s degree level educational program that could pertain to prosthetic and orthotic training were reviewed and are included in table I. Note that table is only a broad list and not all inclusive, but was provided to show the general framework occupational therapy students have, directly or indirectly related to prosthetics and training.
Table I

Relevant ACOTE Standards for Occupational Therapy and Prosthetics

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<th>Standard</th>
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<tr>
<td>B.1.1</td>
<td>Demonstrate knowledge and understanding of the structure and function of the human body to include the biological and physical sciences. Course content must include, but is not limited to, biology, anatomy, physiology, neuroscience, and kinesiology or biomechanics.</td>
</tr>
<tr>
<td>B.1.3</td>
<td>Demonstrate knowledge and understanding of the concepts of human behavior to include the behavioral sciences, social sciences, and occupational science. Course content must include, but is not limited to, introductory psychology, abnormal psychology, and introductory sociology or introductory anthropology.</td>
</tr>
<tr>
<td>B.1.8</td>
<td>Demonstrate an understanding of the use of technology to support performance, participation, health and well-being. This technology may include, but is not limited to, electronic documentation systems, distance communication, virtual environments, and telehealth technology.</td>
</tr>
<tr>
<td>B.2.6</td>
<td>Analyze the effects of heritable diseases, genetic conditions, disability, trauma, and injury to the physical and mental health and occupational performance of the individual.</td>
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<tr>
<td>B.4.1</td>
<td>Use standardized and nonstandardized screening and assessment tools to determine the need for occupational therapy intervention. These tools include, but are not limited to, specific screening tools; assessments; skilled observations; occupational histories; consultations with other professionals; and interviews with the client, family, significant others, and community.</td>
</tr>
<tr>
<td>B.5.5</td>
<td>Provide training in self-care, self-management, health management and maintenance, home management, and community and work integration.</td>
</tr>
<tr>
<td>B.5.10</td>
<td>Articulate principles of and be able to design, fabricate, apply, fit, and train in assistive technologies and devices (e.g., electronic aids to daily living, seating and positioning systems) used to enhance occupational performance and foster participation and well-being.</td>
</tr>
<tr>
<td>B.5.11</td>
<td>Provide design, fabrication, application, fitting, and train in orthotic devices used to enhance occupational performance and participation. Train in the use of prosthetic devices, based on scientific principles of kinesiology, biomechanics, and physics.</td>
</tr>
<tr>
<td>B.5.12</td>
<td>Provide recommendations and training in techniques to enhance functional mobility, including: a. Physical transfers.</td>
</tr>
<tr>
<td>B.5.15</td>
<td>Demonstrate safe and effective application of superficial thermal and mechanical modalities as a preparatory measure to manage pain and improve occupational performance, including foundational knowledge, underlying principles, indications, contraindications, and precautions.</td>
</tr>
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Throughout a master’s level occupational therapy program, students are generally prepared through various classes and experiences that can be applied to prosthetic use. For example, ACOTE standard B.1.1 states that students must demonstrate an understanding of the human body, biologically and physically (AOTA, 2011). This is often accomplished through many different courses, starting with anatomy lecture and lab. This type of course can prepare students to understand and identify muscle locations, the vascular system, nerve conduction, and brain function, in addition to several more learning objectives. This is a basic step towards understanding how a prosthesis would work in the case of an amputation. It is necessary to understand what muscles will power the prosthetic and what anatomy of the body was affected. Another course that has the potential to prepare students for working with prosthetics is a kinesiology course. Some kinesiology courses build on a foundation of physics which educates students on different muscle levers and what muscles are associated with certain functional movements. In addition to the aforementioned, there are other courses that that should be incorporated into programs to meet ACOTE standards. A course such as basic Physical Rehabilitation with Adults can provide students with education on the phases of rehabilitation, types of prosthetics, and approaches to therapy to enhance prosthetic knowledge.

Standards B.5.10 and B.1.8 were established to ensure that students have a good understanding of assistive technology to facilitate wellness and quality of life (AOTA, 2011). Assistive technology is often an introductory course that educates students on devices that are useful for individuals with disabilities. It specifically focuses on adaptations and modifications to help individuals become as independent as possible in their own environments where they engage in daily occupations.
Standard B.5.11 ensures that occupational therapy programs provide students with information that give students the opportunity and experience to fit and train clients in the use of prosthetics and orthotics (AOTA, 2011). This standard focuses on students having the opportunity to gain knowledge of kinesiology, biomechanics, and physics. It is essential for students to have a basic understanding on the use of orthotics and prosthetics to facilitate independence in occupation (AOTA, 2011). These are just a few of the ACOTE standards that can be applied to prosthetic use from a physical perspective. The psychosocial components are essential as well.

In addition to addressing the physical aspects of an amputation in the ACOTE standards, B.1.3 is a standard that requires occupational therapy programs to provide students with an understanding of psychological aspects. It is important to consider the psychosocial stressors that come with an amputation, assuming that a person used that part of his or her body for most of their life. Individuals with an amputation may or may not have a diagnosis, but is still just as important to address those symptoms to adhere to the core value of holistic practice in occupational therapy. Psychosocial coursework prepares students to deal with different types of mental health diagnoses and their associated symptoms, such as depression and post-traumatic stress disorder (PTSD), which may be associated with an amputation. Students should be trained on how to effectively meet the needs of individuals who experience mental health illnesses as it can be a complex process to consider the physical health as well as a person's mental health in treatment. Setting mental health goals alongside physical rehabilitation goals can help aid in the recovery process.
Students must receive basic training on prosthetics, according to ACOTE standard B.5.11, however, “basic” is a word people can interpret in many different ways. No matter how this knowledge is obtained, students have to apply this knowledge to the prosthetic training process once practicing in the field. In order for students to do this, they must have adequate knowledge on prosthetic rehabilitation prior to graduating. The question is whether or not the amount of time spent on educating students in school is sufficient. The current research indicates that there is a limited amount of opportunities and experience for students, impacting a standardization of skill level for entry level occupational therapists.

**Gap in OT Student Academic Preparation**

Gulick (2011) states that “Occupational therapy is a critical rehabilitation component, providing support to individuals and facilitating optimum performance of daily life activities as well as quality of life (p.1).” An AOTA fact sheet, on the role of occupational therapists with upper-limb amputations, states that, “occupational therapy practitioners play a critical part in helping people with upper-limb amputations resume meaningful activities (AOTA, 2011, p. 1).” Given this information, it is easy to see that education is a critical component for students to be competent entry level occupational therapists in this area of practice. Without education, occupational therapist would not be able to help people resume those meaningful activities.

Kanny and Anson (1998) conducted a study that surveyed entry-level occupational therapy programs regarding the level of education on assistive technology. The authors found that in 1995 the average number of hours spent on occupational therapy prosthetics lecture was one hour, while the median number of hours spent on lab
were zero (Kanny & Anson, 1998). Of the respondents to the survey, Kanny and Anson (1998) found, 34.3% reported not spending any lecture hours on the topic of prosthetics, while 60% reported spending zero hours on prosthetics lab as of 1995. The authors also found that only 4% of the time spent on assistive technology was devoted to prosthetics and orthotics. It is understood that a majority of this research is dated, but very little progress has been made even by 2014 as seen by Mitchell et al (2014).

Mitchell et al. (2014) reported that only an average of three to five hours is spent on prosthetic training in typical occupational therapy programs around the world. Of these three to five hours, the students rarely were given a hands on experience with people with amputations and/or prosthetics. O’Brien (2009) found that 80% of physical and occupational therapists received education on prosthetics, with approximately 50% having spent two to four class periods on prosthetics-related topics. Comparing Kanny and Anson (1998) to Mitchell et al. (2014) demonstrates that small gains that have been made in 21 years. Mitchell et al. (2014) states that occupational therapists need to be more “knowledgeable” on “prosthetic technology” (p. 5).

Statistics on occupational therapy academic preparation are low considering the complexity level of amputations and prosthetic training. Østlie et al. (2012) found that 35% of the participants reported that they had not received sufficient prosthetic training to meet their needs, with the participants having a variety of amputation levels at the wrist and higher. The participants were performing activities of daily living, so it was assumed they were being treated by an occupational therapist. These results could relate to the amount of education spent on prosthetic training. These results are supported by
Johnson and Mansfield (2014) who state, “this area of rehabilitation for an occupational therapist is greatly lacking in useful resources” (p. 150).

Prosthetics and orthotics is often considered more advanced and requires additional training, but many facilities or areas may not have the resources to provide the training or hire an individual who is highly trained. Based on the statistics, it is highly unlikely that entry level occupational therapists are prepared to deal with such complex cases with an average of three to five hours of class time. This supports the need for additional emphasis on prosthetics at the academic level and more resources created for those at an academic entry level (Mitchell et al., 2014). This additional emphasis will lead to increased proficiency of “best practice” once the students and new graduates are practicing, which is highlighted in the next section.

**Best Practice for Students and New Graduate Occupational Therapist’s**

The Centennial Vision highlights that the profession of occupational therapy is to provide evidenced-based practice, to ensure that practitioners are providing the highest quality and most effective interventions possible, or “best practice” (AOTA, 2007). Best practice can start with being able to apply education and evidence-based research to the rehabilitation process. DeAngelis, DiMarco, and Toth-Cohen (2013) reported great importance on students being able to apply evidence-based practice strategies when working as occupational therapy practitioners. In their survey, 96.6% to 100% of the occupational therapy programs addressed the first four out of six steps of evidence-based practice, which include formulating a clinical question, searching for the best available evidence, analyzing the evidence for its usefulness, and integrating the evidence into practice (DeAngelis, DiMarco, & Toth-Cohen, 2013).
Evidence-based practice allows students to choose effective assessment and intervention strategies and to use a variety of approaches to reinforce the principles of it (DeAngelis, DiMarco, & Toth-Cohen 2013). These approaches or strategies included research proposal development, literature reviews, levels of evidence hierarchies, analysis exercises, and database searches among others (DeAngelis, DiMarco, & Toth-Cohen, 2013). The previously provided approaches to evidence-based practice leads to “best practice”, which would enhance the education of occupational therapy in the area of prosthetics.

Essential to “best practice” is adequate preparation of students on how to successfully rehabilitate individuals with a prosthetic. Current standards only ensure a novice beginner with no experience and little clinical judgement abilities (Benner, 1984). With approximately 185,000 new amputations per year in the U.S. (Amputee Coalition, 2015), 16,000 being upper limb amputations (Gulick, 2011), an advanced beginner, which is a practitioner with acceptable performance due to previous experience and only requiring occasional support, should be the standardized best practice at entry level (AOTA, 2011; Benner, 1980). Occupational therapy programs place great emphasis on evidence-based practice, but it is important to understand what is considered “best practice” for learning and teaching occupational therapy students on the topic of prosthetics.
Best Practices for Learning and Teaching About Prosthetics

There are sparse articles regarding occupational therapy rehabilitation in the area of prosthetics, such as how to educate and train patients on prosthetic use. However, there is little research regarding best practice for learning and teaching on the topic of prosthetics in the field of occupational therapy. Due to the limited research, it is important to explore other allied healthcare research to identify the best practices for teaching prosthetic rehabilitation. In prosthetics and orthotics programs around the world, there are a variety of approaches used to inform students and professionals on preparation to become more skilled with prosthetic care.

Clinical Training

Knecht-Sabres (2013) state that “the provision of best practice in occupational therapy necessitates that clinicians use sound clinical reasoning skills” (p. 23). Clinical reasoning is something that develops overtime with proper education and hands on experience. According to Aminian, O’Toole, and Mehraban (2014), many orthotic and prosthetic programs use theoretical, clinical, and practical teaching to instruct students. It was found that overall traditional, teacher-centered approaches were used most often, but the preferences were for student-centered learning (Aminian et al., 2014). Student-centered strategies were considered to be those that facilitate problem-based learning, focus on growing critical thinking skills, and promote in-depth learning and understanding (Aminian et al., 2014). These strategies give students a more hands-on experience in the area of prosthetics. Aminian et al. (2014) also stated that instructors of prosthetics and orthotics programs around the world felt clinical training was a very important aspect of practical learning. When students are provided with clinical training
experience, they have the opportunity to build confidence in assessment and fabrication, build clinical reasoning, use evidence-based practice, and employ problem-solving practices in a real-time setting (Aminian et al., 2014). The clinical experience Aminian et al. (2014) discussed goes hand in hand with the experiential learning Knecht-Sabres (2013) presented.

Specifically in relation to occupational therapy, Swanson (2015) discussed the need for occupational therapists to learn how to prepare the patient with an upper extremity amputation before they receive the prosthetic. From this article, there are points that should be considered in the occupational therapy curriculum as they will be addressed during therapy. For example, teaching how to don and doff the prosthesis, wearing schedule, hygiene, body control motions, muscle training, and many more (Swanson, 2015). Another article by Swanson (2015) discusses, occupational therapy’s role in regards to amputee rehabilitation. Again, skills students should be taught in school, to be prepared for working with this population, include: adequate knowledge on range of motion (ROM), strength testing, measuring residual limb length and circumference, limb shape, and pain (Swanson, 2015). Due to the limited research regarding best practice for learning and teaching of prosthetics in occupational therapy, it is important to the strategies previously discussed from other healthcare professions for learning strategies that are used to educate on prosthetics.
Experiential Learning

Experiential learning is learning by “doing”. It is a “process through which a learner constructs knowledge, develop skills, and gains value from one’s experiences” (Knecht-Sabres, p. 25, 2013). This type of learning enhances students understanding of prosthetics and it also helps students develop the necessary skills to become a competent clinician (Knecht-Sabres, 2013). Knecht-Sabres (2013) state that new graduates are limited in their clinical reasoning skills, which makes it essential to provide experiential learning into school curriculum in order to help students develop those skills prior to practice. However, there are other teaching/learning methods of “doing” that can be considered.

Prosthetic Simulators/Workshops

Mitchell et al. (2014) provided recommendations on how occupational therapy programs should incorporate prosthetic education in schools of higher learning. One recommendation included prosthetic simulators to enhance the experiences of students and learning materials that were created by upper limb practitioners. An additional recommendation mentioned, by Mitchell et al. (2014), was to offer a multiple day workshop on upper limb amputee rehabilitation. This can be a route that is costly for a occupational therapy program and many may not have the funding. Keep in mind, these are just options for teaching students about prosthetics if the funding is available, but there are other ways to engage in experiential learning as mentioned previously. The Prosthetics Guide for Occupational Therapy Students and New Graduates will provide additional information when simulators or workshops are not available.
Conclusion/Problem Statement

Johnson and Mansfield (2014) reported that occupational therapists should be involved from the very beginning of prosthetic fabrication to training individuals on how to use their prosthetic in ADL’s. This training requires understanding how to move from the first to the last phase, in order to achieve the best possible outcomes in rehabilitation. Also, by working closely with a certified prosthetist, an occupational therapist can help determine if modifications need to be made to increase success by communicating those needs. Increased success leads to better outcomes as far as motivation to use the prosthetic. In order to communicate such needs, an occupational therapist needs to have basic knowledge of prosthetic components.

An occupational therapist needs to understand what type of prosthesis is being used and what components are attached it (Johnson & Mansfield, 2014). It is also important to understand how the components are programmed if it is electric in order to assist and complement the work of a prosthetist (Johnson & Mansfield, 2014). This information can come from working with the certified prosthetist and from basic education in school. “The more knowledge acquired, the better they (occupational therapists) are able to train individuals to use their prosthesis and use it in their ADL” (Johnson & Mansfield, p.134, 2014). It is essential to have a basic understanding of a prosthesis and the components it is made of in order to effectively communicate with clients, families, and other professionals. Working with a prosthetist is necessary, but there are also other ways for occupational therapists to receive training through school.

Occupational therapy programs are required by ACOTE standards to incorporate “clinical experience” into the curriculum, however, clinical experience can be interpreted
to mean a variety of things. As previously stated by Diane Atkins only an average of three to five hours is spent on prosthetic training in typical occupational therapy programs and students rarely were given hands-on experience with people with amputations and/or prosthetics during these hours (Mitchell et al., 2014). If the field of occupational therapy wants to progress in regards to this area of practice, some of the learning strategies being incorporated into the prosthetics and orthotics field could be better incorporated into occupational therapy programs in the future. This will help strengthen the profession in regards to this area as the number of people with amputations worldwide is continually growing.

With the amount of people living with an amputation worldwide growing, occupational therapists will be a needed profession. Prosthetics can be used for many different reasons, however, occupational therapists mainly work with prosthetics as they relate to the upper limb. Østlie et al. (2012) reported that 35% of the participants in their study said they had not received sufficient prosthetic training to meet their needs from their therapists. If occupational therapists had a better understanding of prosthetics and the components, they would be better able to serve their clients.

Certified prosthetists are busy professionals and do not always have the time to educate entry level occupational therapists. So it is important that these skills and knowledge are gained in school or independently. When it comes to rehabilitation with a prosthetic component, it can become complicated as the user has to learn how to maneuver a device in place of their lost limb; something they have used since the beginning of their life. This can be a frustrating and long process for some individuals, which is where occupational therapists step in; to make life meaningful and easier.
There is information on occupational therapy prosthetic rehabilitation, however, the research is typically older and is scattered throughout the literature. Based on these identified needs, a guide was developed for students and entry level occupational therapists.

The *Prosthetics Guide for Occupational Therapy Students and New Graduates* was designed to bring general current literature on research related to occupational therapy, and to create one resource on prosthetics for students and novice practitioners. The *Prosthetics Guide for Occupational Therapy Students and New Graduates* is unique to occupational therapy as this is an area of practice that has limited research despite the growing number of people who endure amputations each year. Because of this, a comprehensive guide was created that includes the rehabilitation process. Occupational therapy students and new graduate occupational therapists will be able to use it to enhance their knowledge on prosthetics. It is designed as an education tool, but it can also be used as a clinical tool for practicing entry level occupational therapists as they enter the rehabilitation process with their clients.

**Theoretical Framework**

The *Prosthetics Guide for Occupational Therapy Students and New Graduates* is based on adult learning theory called Andragogy, by Malcolm Knowles. Andragogy means “the art and science of helping adults learn” (TEAL, p. 1, 2011). Andragogy is based on a set of assumptions on how the adult learner best learns and retains information. Smith (2010) explains these assumptions in the following:

- **Self-concept**
  - Adults move from a dependent to a self-directed learner
- **Experience**
  - Experiences aid in the learning process
• Readiness to Learn
  ○ Learning is oriented to social roles

• Orientation to Learning
  ○ Adults want learning to be problem-centered and the content needs to have immediate application

• Motivation to Learn
  ○ Learning comes from an internal source versus an external one

When considering Andragogy for the creation of this *Prosthetics Guide for Occupational Therapy Students and New Graduates*, the adult learner concepts were incorporated into it. The first assumption is that adult learners shift their self-concept to being a self-directed learner, which is the basis for how this guide is used. This guide is designed to add to the students knowledge base they already received in the curriculum. If the student wishes to further his or her knowledge on this topic, the guide will be available to assist with projects, assignments, and case studies, hence the “self-directed learner” assumption.

The second assumption was that experiences aid in the learning process. Smith (2010) states that “adults learn more effectively through experiential techniques of education such as discussion or problem solving” (p. 8). Knowles (1980) stated that ways to focus on experience with adult learners includes, discussions, case studies, simulation exercises, role-playing, skill-practice opportunity, and demonstration seminars. Additionally, Knowles (1980) reported that practical application is an important aspect of using experience as a learning aid. One way experience was incorporated into this guide was through case studies as they facilitate the problem-solving and discussion component of this assumption. Along with the case studies, the format of the guide emphasizes practical application of the learning into the occupational therapy practice area of
prosthetics. Experience is important in the adult learning process, but it is also pertinent to consider the learner's orientation to the learning, or his or her's readiness to learn.

The third assumption states that adults need to be ready to learn based on the developmental tasks of their social roles (Smith, 2010). According to Knecht-Sabres (2013), one purpose of college education is to prepare students for “success and leadership in a variety of social roles” (p. 24). This adult learning principle is pertinent to occupational therapy students as they will be taking on a new social role as a healthcare professional and occupational therapist following graduation. Occupational therapy students readiness to learn will be oriented to this new role as a therapist, providing motivation to learn more about this area of prosthetics as it is applicable to practice (Knowles, 1980). Also, an average of three to five hours on the topic of prosthetics can lead to a readiness to learn based on a feeling of not having enough information to adequately treat an individual with an upper extremity prosthesis (Mitchell et al., 2014). This guide can be used as a tangible tool to help therapists when they are ready to learn about the prosthetic rehabilitation process, which leads into the next assumption.

The fourth assumption states that learning needs to have immediate application and should be problem-centered (Smith, 2010). According to Knowles (1980), adult education “must be attuned to the existential concerns of the individuals and the institutions they serve” (p. 54). This guide gives new graduate therapists information regarding assessment, intervention, and evaluation of individuals with prosthetics to use in practice. Occupational therapy students or novice practitioners can use this information in the present, adhering to the immediate application aspect of the assumption. The information provided will also add to the knowledge base for the individual users and
build clinical reasoning skills in order to make informed decisions on the appropriate assessment and interventions to use with clients. The structure of the guide will help to ensure this assumption is addressed in this scholarly project. There will be case studies, quizzes and other opportunities to provide opportunity to the user’s to use the information and skills. Overall, the *Prosthetics Guide for Occupational Therapy Students and New Graduates* will provide opportunity for immediate application and problem-solving.

The last assumption is based on the fact that adults desire to learn is internal rather than external, which coincides with the assumption of self-directed learning and readiness to learn (Smith, 2010). The external motivation is related to the roles associated with adult learner’s readiness to learn. As new occupational therapy students gain new roles upon graduation, they receive responsibilities within that role. This assumption then connects with self-directed learning when an individual does not feel they have the knowledge to treat clients with best practice. This leads to the internal motivation to seek out self-directed learning.

In addition to using Andragogy to guide development, the *Prosthetics Guide for Occupational Therapy Students and New Graduates* was also organized according to Bloom's taxonomy based on a hierarchy of learning. Additionally, the andragogical assumption that adult learners seek information they can apply immediately, supporting the application and synthesis levels in Bloom’s taxonomy (Wang & Farmer, 2008).

Bloom’s taxonomy is organized into six major categories of “skills and abilities” (Armstrong, ¶ 2, 2015). These categories go in a specific order, with each one building on the preceding one. The first category is more concrete and as a person moves up the ladder, the concepts become more abstract. Bloom’s taxonomy starts with knowledge and
moves to comprehension, application, analysis, synthesis, and evaluation. Knowledge, according to Armstrong (2015), is the recall of specific topics or patterns; Comprehension is the understanding of material being communicated, without a memorization approach; Application is the transfer of learning into applicable situations; Analysis is breaking down components of an idea to better understand the bigger picture; Synthesis is taking ideas to create a whole; and evaluation is reflecting on the effectiveness of the learning.

This guide will utilize Bloom’s Taxonomy as basic knowledge will provided on prosthetics from the beginning. The basic knowledge will give students an understanding before moving to more complex ideas. Comprehension and application are utilized when the students are required to work through the case studies and choose appropriate assessment tools. Analysis and synthesis are also used with the case studies in order to break down the elements of them and create effective interventions.

The Occupational Therapy Framework is applied throughout the Prosthetics Guide for Occupational Therapy Students and New Graduates in order to maintain a consistent vocabulary that is viewed across occupational therapy settings. According to AOTA (2014), the practice framework was created to delineate or define the occupational therapy process and create a uniform system. This guide will use the framework in order to maintain the occupational therapy process and uniform terminology.

The three theories, models, and frameworks that designed the Prosthetics Guide for Occupational Therapy Students and New Graduates provide a well rounded approach to learning the material. Bloom’s taxonomy (Armstrong, 2015) will ensure that the guide is addressing all areas of cognitive knowledge, while the assumptions of Andragogy will
make sure adult learning is considered even at the lowest levels of learning (Knowles, 1980). The Occupational Therapy Framework will be incorporated in order to address each level of cognitive learning and adult learning principles from an occupational therapy perspective to ensure students and novice practitioners understand the terminology and application to the profession of occupational therapy.

The *Prosthetics Guide for Occupational Therapy Students and New Graduates* is a supplemental guide that looks at prosthetics in a holistic manner, addressing the physical and psychosocial aspects of a client with a prosthesis. This guide will help increase competence and comfort levels in this practice area for entry-level occupational therapists. The guide contains basic knowledge and can be used as a reference for:

- General knowledge on Prosthetics
- The Evaluation Process
- Interventions Ideas
- Additional Information

The Prosthetics Guide for Occupational Therapy Students & New Graduates will be a tool to make up for the limited education and hands-on/clinical experience provided during occupational therapy schooling. The design of the guide will supplement learning that new graduate students may have received in school, while incorporating learning strategies utilized in other prosthetics professions.

Chapter III goes in depth on the process taken in creating the *Prosthetics Guide for Occupational Therapy Students and New Graduates*. This will include the literature search process, theoretical application, and the ideation behind the structure of the guide.
CHAPTER III

METHODS

The authors chose the topic of prosthetics when discussing it in the physical disabilities course provided at the University of North Dakota. Both of the authors felt they were interested in the topic, but felt that the course did not cover occupational therapy prosthetic rehabilitation in enough depth to feel comfortable treating an individual with an amputation or prosthesis as a novice therapist.

An extensive literature review was conducted on the topic of prosthetics and occupational therapy to find an area of need. Specific words that were used in the search for literature included, prosthetic guides, occupational therapy, prosthetics guide for occupational therapy, orthopedic prosthesis, psychosocial, prosthetic assessment, prosthesis, best practice for occupational therapy an prosthetics, and teaching prosthetics. The search databases used included Pubmed, Google Scholar, cinahl, and psychinfo. The American Journal of Occupational therapy and the Journal of Orthotics and Prosthetics were also two publications used in the literature review process. The literature review was conducted between January to November 2015 to ensure a thorough search.

With the literature gathered, the authors found that all of the information regarding prosthetic rehabilitation in occupational therapy was scattered and very specific to each area. The literature did not include the whole process of therapy, specifically the physical and psychological aspects in one research article. It was also found in the
literature that only an average of 3-5 hours are spent on prosthetics in occupational therapy education, but 85% of respondents reported it to be “very important” (Mitchell, et al., 2014). With this information, the authors brainstormed what sort of product could be created to help occupational therapy students and new graduates better understand the topic of prosthetics and the final idea from the brainstorming process was a guide that students or new graduates can use. The literature review provided the authors with the necessary information to successfully create a guide for students or new graduate occupational therapists to aid in competently treating individuals with a prosthesis in a holistic manner. The guide includes things such as prosthetic components, assessments, interventions, and additional information that a occupational therapy students or new graduates can use for assignments or in therapy process.

Andragogy, or adult learning theory, Bloom’s taxonomy, and the Occupational Therapy Practice Framework: Domain and Process were chosen to guide the development of the Prosthetic Guide for Occupational Therapy Students and New Graduates. The authors used these theories and frameworks due to the targeted population that will use the guide. The guide is meant for use by the occupational therapy students and new graduates. The authors did not choose an occupational therapy based model so that the user can cater the information to any theory he or she wants or needs to use.

The goal is that the information provided in the Prosthetics Guide for Occupational Therapy Students and New Graduates bridges the gap found in learning to aid students and new graduate occupational therapists. It will also be a tool to help build build confidence and competence in the area of prosthetics rehabilitation.
CHAPTER IV

PRODUCT
Prosthetics Guide
for
Occupational Therapy Students & New Graduates

As one person I cannot change the world, but I can change the world of one person (Paul Shane Spear)

Chelsea de Bruto, MOTS

Kayla Oates, MOTS

Advisor: LaVonne Fox, PhD, OTR/L

University of North Dakota

2016
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Theoretical Framework

The theories chosen for the *Prosthetics Guide for Occupational Therapy Students and New Graduates* are an adult learning theory called Andragogy, by Malcolm Knowles and Blooms Taxonomy. Andragogy will be discussed first followed by Blooms Taxonomy. Visually it is then presented in a table format to show the connection.

Andragogy means “the art and science of helping adults learn” (TEAL, p. 1, 2011). Andragogy is based on a set of assumptions on how the adult learner best learns and retains information. Smith (2010) explains these assumptions in the following:

- **Self-concept (self-direction)**
  - Adults move from a dependent to a self-directed learner; enables them to choose what and how to learn. This guide is designed to add to the student’s knowledge base they already received in their academic curriculum. If the student wishes to further his or her knowledge on this topic, the guide will be available to assist with projects, assignments, and case studies, hence the “self-directed learner” assumption.

- **Experience**
  - Experiences aid in the learning process; and/or draw upon experiences in their own lives. Smith (2010) states, “adults learn more effectively through experiential techniques of education such as discussion or problem solving” (p. 8).
  - There are case studies to facilitate the problem-solving and discussion component of this assumption. Along with the case studies, the format of the guide emphasizes practical application of the learning into the occupational therapy practice area of prosthetics. Experience is important in the adult learning process, but it is also pertinent to consider the learner's orientation to the learning, or his or her’s readiness to learn.
Readiness to Learn

○ Learning is oriented to social roles; and it recognizes the power of just-in-time learning. According to Knecht-Sabres (2013), one purpose of college education is to prepare students for “success and leadership in a variety of social roles” (p. 24). This adult learning principle is pertinent to occupational therapy students as they will be taking on a new social role as a healthcare professional and occupational therapist following graduation. Occupational therapy student’s readiness to learn will be oriented to this new role as a therapist, providing motivation to learn more about this area of prosthetics as it is applicable to practice (Knowles, 1980).

Orientation to Learning

○ Adults want learning to be problem-centered and the content needs to have immediate application and should be problem centered and practical (Smith, 2010). Overall, the Prosthetics Guide for Occupational Therapy Students and New Graduates will provide opportunity for immediate application and problem-solving.

○ This guide gives new graduate therapists information regarding assessment, intervention, and evaluation of individuals with prosthetics to use in practice. Occupational therapy students or novice practitioners can use this information in the present, adhering to the immediate application aspect of the assumption. The information provided will also add to the knowledge base for the individual users and build clinical reasoning skills in order to make informed decisions on the appropriate assessment and interventions to use with clients.

Motivation to Learn

○ Learning comes from an internal source versus an external one. Builds on their personal and professional needs. This assumption connects with self-directed learning when an individual does not feel they have the knowledge to treat clients with best practice. This leads to the internal motivation to seek out self-directed learning.

In addition to using Andragogy to guide development, the Prosthetics Guide for Occupational Therapy Students and New Graduates was also organized according to Bloom's taxonomy based on a hierarchy of learning. This ensures that whatever learning
level the student/novice therapists is at there are activities incorporated to meet that level and their learning needs and preferences.

Table 1

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<td>Knowles Andragogy</td>
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The guide has been designed for those individuals who are self-directed learners. Each unit has been designed to be learner centered/directed so opportunities are provided but the learner makes the choice as to how and what they want to learn. Based on these the Units are organized according to the cognitive dimensions of Blooms Taxonomy. Need to know why, what & how.

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<th>Self-Direct</th>
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This guide will utilize Bloom’s Taxonomy as basic knowledge will provided on prosthetics from the beginning. Bloom’s taxonomy will be used as a framework to set up each unit. Bloom’s levels 1-4 will be integrated throughout the guide, whereas five and six will be carried out by each user in practice. The basic knowledge will give students an understanding before moving to more complex ideas. Comprehension and application are utilized when the students are required to work through the case studies and choose appropriate assessment tools. Analysis and synthesis are also used with the case studies in order to break down the elements of them and create effective interventions.
The Occupational Therapy Framework will be considered and applied throughout the *Prosthetics Guide for Occupational Therapy Students and New Graduates* in order to maintain a consistent vocabulary that is viewed across occupational therapy settings. According to AOTA (2014), the practice framework was created to delineate or define the occupational therapy process and create a uniform system.

The combination of the three will provide a well-rounded base to create an effective adult educational material. Bloom’s taxonomy (Armstrong, 2015) will ensure that the guide is addressing all areas of cognitive knowledge, while the assumptions of Andragogy will make sure adult learning is considered even at the lowest levels of learning (Knowles, 1980). The Occupational Therapy Framework ensures an occupational therapy perspective to ensure students and novice practitioners understand the terminology and application to the profession of occupational therapy.

**Choosing an Occupational Therapy Based Model**

This guide does not follow an occupational therapy based model, but rather two models they felt fit the user. The user of this guide will be able to cater the information to any theory he or she wishes to best fit each client they work with. The authors felt like this was the best direction as just one model cannot be tailored to every single client as they are all so different.

**Organization of Guide**

There are four main units in the guide in regards to upper extremity prosthetics: General Knowledge of Prosthetics, Evaluation, Intervention, and Other Important Aspects. Each unit is organized with these categories. Each unit builds on the other so it begins with basic knowledge that a student or new graduate should have before working
with an individual with a prosthetic. In each unit there are references to articles, YouTube videos, and comprehension-quizzes presented to address the comprehension category of Bloom’s Taxonomy. For the application, analysis, and synthesis categories there will be case studies, problem-based learning, and step-by-step pictures as appropriate to tie everything together.

**Limitations of the Guide**

This guide covers a wide variety of topics; however it is not all encompassing. There are many more possibilities in occupational therapy rehabilitation that can be done, so each user should use this guide with discretion for each client. The authors of this guide also lack clinical experience in this area, so the guide can possibly be lacking clinical judgement or interventions based on anecdotal evidence. Finally, the guide is not psychometrically sound as it has not been peer reviewed. This is a goal the authors have in the future.
These key terms are included throughout the entire guide. They are commonly used and provide the reader with a basic understanding of what they may come across in occupational therapy prosthetic rehabilitation.

**Key Terms to Remember**

- **Amputee Coalition**
  - An organization with the mission “to reach out to and empower people affected by limb loss to achieve their full potential through education, support and advocacy and to promote limb loss prevention” (Amputee Coalition, 2015).

- **Amputation**
  - “A surgical procedure that involves removal of an extremity or limb (leg or arm) or a part of a limb (such as a toe, finger, foot, or hand), usually as a result of injury, disease, infection, or surgery (to remove tumors from bones and muscles)” (Johns Hopkins, ¶ 1, 2015).

- **Assessment**
  - “The evaluation or estimation of the nature, quality, or ability of someone or something” (Dictionary.com, 2015).

- **Prosthetic**
  - “Referring to a prosthesis, an artificial substitute or replacement of a part of the body such as a tooth, eye, a facial bone, the palate, a hip, a knee or another joint, the leg, an arm, etc.” (MedicineNet, ¶ 1, 2012).

- **Prosthesis**
  - “A device, either external or implanted, that substitutes for or supplements a missing or defective part of the body” (Dictionary.com, 2015).

- **Novice Beginner**
  - "A practitioner that has no experience with individuals with specific diagnoses" (Benner, 1984).

- **Advanced Beginner**
  - "A practitioner that has acceptable performance due to experience" (Benner, 1984).

*Figure 1. Key Terms.*
Quizlet Break!
For Additional Terms...
Go to Quizlet.com
Test 1: Search Prosthetics
Complete Flashcards Created By josie_123
Test 2: Search Upper Extremity amputation and prosthetics
Complete Flashcards Created By juanriver559
General Knowledge
Unit 1 Overview

Unit one provides a basic understanding of amputations and the prosthesis itself. This unit relies heavily on the principle of self-directed learning from Knowles Andragogy, as learners will seek out this information on their own to successfully move forward. It also relies heavily on your academic preparation in anatomy, neuroscience, muscle function, and/or kinesiology courses. It is necessary to have a sound foundation before moving on into prosthetic rehabilitation to provide the best care for the recipients of therapy.

You should be able to use your higher-level cognitive skills to choose appropriate measures to treat clients. Considering the number of amputations and the complexity of upper limb prosthetics, this guide will be a useful tool for you as you decide which prosthetic and component would be useful for different areas of occupation. Unit one is only the beginning of this process.
Amputations are completed with the aim to preserve as much as possible of the limb. According to Mitsch, Smurr Walters, and Yancosek (2014), the final goal with an amputation is for it to be functional and pain free once healed. There are seven levels of amputations according to Mitsch, Smurr Walters, and Yancosek (2014). The level of amputation directly affects if a person will be able to use a prosthesis, and if so, what type. For example, the higher the amputation is the harder it is to use a prosthetic because there are fewer joints and muscles available to assist it (Mitsch, Smurr Walters, & Yancosek, 2014). They following levels of amputations go in order from the least amount of residual limb remaining to the most amount of limb remaining.

### Table 2

<table>
<thead>
<tr>
<th>Amputation Level</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forequarter</td>
<td>Amputation involving the arm, scapula, and clavicle</td>
</tr>
<tr>
<td>Shoulder Disarticulation</td>
<td>Separation of the humerus from the glenohumeral joint</td>
</tr>
<tr>
<td>Transhumeral</td>
<td>Amputation that cuts through the humerus</td>
</tr>
<tr>
<td>Elbow Disarticulation</td>
<td>Separation of the humerus from the radius and ulna</td>
</tr>
<tr>
<td>Transradial</td>
<td>Amputation that cuts through the radius and ulna</td>
</tr>
<tr>
<td>Wrist Disarticulation</td>
<td>Separation of the wrist bones from the radius and ulna</td>
</tr>
<tr>
<td>Partial Hand</td>
<td>Amputation involving part of the hand, including the metacarpals or phalanges</td>
</tr>
</tbody>
</table>

Figure 2. Levels of Amputation.
Quizlet Break!

To Test Your Comprehension...

Go to Quizlet.com

Test 1: Search UE Levels of Amputation
Complete Flashcards Created By Karen055

Test 2: Search Pros and Cons of Body Power and
External Power Upper Limb Prosthetics
Complete Flashcards Created By alex_boehme

Notes

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Administering assessments are an important component to therapy, especially at the beginning of therapy to see where each patient is sitting and what goals they have for therapy. However, this is only the first step in the therapy process. Educating individuals on the components of their prosthetic device will increase their confidence when using it.

There are several different prosthetic components that are considered when choosing the most appropriate device for each client. Each individual will have to weigh the pros and cons of choosing a body-powered, hybrid, or myoelectric prosthetic. Each individual is different so not one prosthetic may be appropriate for everyone. Also, each prosthetic with the different types of sockets, liners, and terminal devices is carefully considered when looking at each person’s goals. Some prosthetics and terminal devices are more appropriate for specific activities, whereas others are solely for cosmetic purposes. The following tables are only a few examples of the available prosthetic components and a description of what they are.
<table>
<thead>
<tr>
<th>Types of Prosthetic Devices</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Powered</strong></td>
<td>Uses motions proximal to the amputation to operate the prosthetic through a cable</td>
</tr>
<tr>
<td><strong>Hybrid</strong></td>
<td>Combination of body powered and myoelectric prosthetics. Often uses a body powered elbow device and a myoelectric terminal device</td>
</tr>
<tr>
<td><strong>Electric</strong></td>
<td>Electrical signals are produced from muscle contractions to operate the terminal device</td>
</tr>
<tr>
<td><strong>Activity Specific</strong></td>
<td>For a specific function or activity</td>
</tr>
<tr>
<td>Passive</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td><strong>No functional component. Designed to be lightweight and to resemble the physical characteristics of the arm and hand</strong></td>
<td></td>
</tr>
</tbody>
</table>


Quizlet Break!
To Test Your Understanding...
Go to Quizlet.com
Search Introduction to UE Amputations and Prosthetics
Completed Flashcards Created By love2laugh2932

Notes

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Liners and socks are an important part of the prosthetic device. They provide a barrier between the residual limb and the prosthetic device. Without a liner of some type to break the friction between the skin (residual limb) and the hard prosthetic socket, the skin would break down resulting in pain for the client and the healing process could be slowed.

Table 4
Types of Liners/Socks

<table>
<thead>
<tr>
<th>Gel Liners</th>
<th>Prosthetic Socks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral-based and silicone gel liners are used to add padding between the residual limb and the socket. Gel liners do break down as time goes by.</td>
<td>Used less frequently than gel liners. Newer versions have Silver fibers woven into the fabric in order to wick away moisture and make the sock antimicrobial.</td>
</tr>
</tbody>
</table>


Each terminal device is used for many different activities. An individual is not going to want a terminal device that is always open and closes when needed (voluntary closing) when writing on paper. Instead, they would want a device with a voluntary opening mechanism so the terminal device stays closed and holds the pencil while they write. What terminal device and individual chooses should be carefully considered based on his or her goals.

Table 5

<table>
<thead>
<tr>
<th>Terminal Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voluntary Opening Terminal Devices (Body-Powered)</strong></td>
</tr>
<tr>
<td>Device is closed and opens when needed. This mechanism is good for activity, but not heavy duty work.</td>
</tr>
<tr>
<td><strong>Voluntary Closing Terminal Devices (Body-Powered)</strong></td>
</tr>
<tr>
<td>Device is open and closes when needed. Good for active individuals who need more tension in grasp.</td>
</tr>
<tr>
<td><strong>Electrically Powered Terminal Device Prehensors</strong></td>
</tr>
<tr>
<td>Provide 20-40 pounds of pinch force. There is a digital, or constant speed control where muscle contractions control the opening and closing at a set speed. Proportional control is where the force increases in proportion to the muscle contraction intensity.</td>
</tr>
<tr>
<td><strong>Cosmetic Gloves</strong></td>
</tr>
<tr>
<td>Can cover mechanical, electric, and passive hand devices. The color is chosen to match the skin tone of each individual.</td>
</tr>
</tbody>
</table>


When choosing the socket type, the level of amputation is often considered. As you will see in the following table, many of the socket types go best with a certain amputation level. The residual limb should be in total contact with the socket of the prosthesis (Mitsch, Walters, & Yancosek, 2014). The prosthetist is trained in determining which socket type is best for each client. It is the occupational therapists job to communicate with the prosthetist if his or her client has pain of any type during activities with their residual limb.

Table 6  
Types of Sockets

<table>
<thead>
<tr>
<th>Standard Forearm</th>
<th>Supracondylar (aka modified Muenster)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Used with transradial amputations. This covers the entire residual forearm. It can be modified to allow for increased movement.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Used with short transradial limb amputations and myoelectric prosthetics. The proximal portion goes around the lateral and medial epicondyles and posterior olecranon.</strong></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Conventional</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Used with transhumeral amputations. Goes just above the acromion, depending on the length of the residual limb.</strong></td>
<td></td>
</tr>
</tbody>
</table>

Shoulder Cap Or Frame Socket

**Used with shoulder disarticulation and forequarter amputations. Can be made of plastic laminate material or carbon fiber.**


Quizlet Break!
To Test Your Understanding...
Go to Quizlet.com
Search Amputations and Prosthetics OT lx
Completed Flashcards Created By Ifrabizzio4

Notes

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55
1) What level of amputation involves the arm, scapula and clavicle?
_________________________________________

2) What level of amputation cuts through the radius and ulna?
_________________________________________
   • What type of socket goes with this level of amputation?
   _______________________________________

3) What type of terminal device provides 20-40 pounds of pinch force?
   • Voluntary Opening Terminal Devices (Body-Powered)
   • Voluntary Closing Terminal Devices (Body-Powered)
   • Electrically Powered Terminal Device Prehensors
   • Cosmetic Gloves

4) What does a hybrid prosthetic do?
   • Uses motions proximal to the amputation to operate the prosthetic through a cable
   • Electrical signals are produced from muscle contractions to operate the terminal device
   • Combination of body powered and myoelectric prosthetics. Often uses a body powered elbow device and a myoelectric terminal device
A. The evaluation or estimation of the nature, quality, or ability of someone or something.

B. An organization with the mission “to reach out to and empower people affected by limb loss to achieve their full potential through education, support and advocacy and to promote limb loss prevention”.

C. A device, either external or implanted, that substitutes for a missing part of the body.

D. A surgical procedure that involves removal of an extremity or limb, or part of a limb.

E. Referring to a prosthesis, an artificial substitute or replacement of a part of the body.

*Answers found in appendix B*

*(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)*
I. Referral
   i. Eric was referred to you by his prosthetist. The prosthetist asked that you see where Eric’s strengths and weaknesses are with ADLs prior to using a terminal device for IADLs.

II. Occupational Profile
   i. Eric is a 21-year-old male with a left transhumeral amputation that occurred 6 months ago. Eric graduated from college with a welding degree. He was working as a welder in a mine when his injury occurred. In his free time, Eric enjoys playing hockey, camping with family, and hobby metalwork. The client reports he wants to get back to work and would like advice on a terminal device.

III. Client Factors & Performance Skills
   i. Eric has experienced some residual left shoulder pain following the injury. This has inhibited his motivation to use his prosthetic device daily. The shoulder pain is resulting from lack of ROM over the course of the healing process.

1.) What is the most important thing to address first?

__________________________________________________________________

2.) What is the most appropriate type of prosthesis, liner, terminal device, and socket for Eric in regards to his daily occupations?

   Prosthesis:______________________________________________________
   Terminal Device:________________________________________________
   Socket:_______________________________________________________

Answers found in appendix B

(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
• Amputee Coalition Website
  o http://www.amputee-coalition.org/

Evaluation
Unit two includes several different assessments that would be appropriate to use during the evaluation phase with someone who has a prosthetic device. Each assessment would be chosen based on the therapist’s opinion on what suits his or her client’s the best. Unit two still focuses on the idea that you are a self-directed learner, according to Knowles Andragogy Theory. When choosing what assessment is most appropriate, the students or therapist will have to browse through the list of assessments to determine which is best. Also, Knowles assumption “readiness to learn”, comes into play here as these assessments pertain to occupational therapy so the learning is oriented toward the social role of occupational therapy (Smith, 2010). Lastly, this unit also has a component of the assumption “orientation to learning.” After an occupational profile has been developed, each therapist will have to problem-solve which assessment to use, making it a problem-centered approach with immediate application.
During the evaluation phase of occupational therapy, there are many things that should be addressed. According to the Occupational Therapy Practice Framework, the occupational therapy evaluation phase consists of building the occupational profile and analyzing occupational performance (AOTA, 2014).

**Figure 3. Occupational Therapy Evaluation.**

**Occupational Profile**

The occupational profile is the first step with new clients. The occupational profile provides an understanding into what the client likes, dislikes, goals, values, history, experiences, and daily life activities (AOTA, 2014). The occupational profile never stops growing as the therapist begins to know more and more about his or her client during each visit. There are some questions that the Occupational Therapy Practice Framework recommends to ask in order to build a sound occupational profile that can be found on pg. S13. Remember, these questions are only examples and the questions the therapist poses to each client should not be limited to what is stated in the framework. Be creative and fun!
In order to build a sound occupational profile, the following questions should be considered. Each therapist should use his or her own clinical reasoning skills to know what questions are most important to address first, and what ones they would not need to ask. This is only a small list and is not limited to the following:

- **Why is the client seeking service and what are their current concerns about ADLs?**
- **What occupations does the client feel successful in? Not successful?**
- **Is the environment hindering performance?**

*Figure 4. Building the Occupational Profile.*

After the main portion of the occupational profile has been developed, it is necessary to analyze each client’s occupational performance skills to understand what the intervention/treatment will look like.

During analysis of occupational performance, each therapist will determine which areas his or her client is having problems in (AOTA, 2014). It is ideal to have each client performing actual ADLs during this phase to get a full picture of where the client is functioning. This is where performance skills, client factors, performance patterns, and context are assessed to determine a targeted outcome (AOTA, 2014).
Client factors consist of values, beliefs, spirituality, body functions, and body structures according to AOTA (2014). Client factors influence each individual’s performance in his or her everyday occupations (AOTA, 2014). Body structures include any anatomical part of the body, from bones to organs (AOTA, 2014). Body functions can include mental, sensory, muscle, movement, cardiovascular, voice, and skin functions, among many more. One very important body function to consider under sensory functions is pain. Pain is a major factor with any occupational therapy visit, especially when it comes to new amputation sites and correct fitting of a prosthetic device. Pain should not be overlooked and should be assessed before, during, and after the therapy session.

According to Klarich and Brueckner (2014), the client factors that should be addressed are current functional abilities, including ADL function, strength in the upper extremities, range of motion (ROM), and sensation of the residual limb. Additionally, the client’s psychological state should be considered in the evaluation process. The client’s values and interests should be documented and considered in the evaluation process as these are client factors that are often overlooked (Klarich & Brueckner, 2014). In addition to client factors, performance skills should be addressed as these are what affect the way a client interacts with his or her everyday environment.
Performance skills are described as “goal-directed actions that are observable as small units of engagement in daily life occupations” (AOTA, p. S7, 2014). Performance skills are observable behaviors that have a functional purpose of some sort. Performance skills include many different functions, some of which include motor skills, process skills, and social interaction skills (AOTA, 2014). According to the Occupational Therapy Framework, if an individual’s performance patterns change, it has the potential to affect other performance skills so the assessment process is continual (AOTA, 2014).

According to AOTA (2014), performance skills are the habits, roles, rituals, and routines that an individual engages in that support or hinder daily occupational performance. Habits are tendencies individuals engage in consistently in an automatic manner; they can be useful or controlling. Roles are “sets of behaviors expected by society and shaped by culture and context” (AOTA, p. S27, 2014). Rituals are symbolic actions with a strong emotional meaning that individuals engage in to “reinforce values and beliefs” (AOTA, p. S27, 2014). Lastly, routines are observable patterns that provide structure and organization in an individual’s life (AOTA, 2014).
Contexts and environment is one of the last components of the evaluation process that needs to be considered in occupational therapy. Every person is different from one another, so the way an individual lives his or her life may be impacting occupational performance in a huge way. If a therapist fails to assess this area, they will miss a large component of therapy and the client could potentially be set up for failure. A context includes the cultural, personal, temporal, and virtual aspects of a person’s life (AOTA, 2014). One or all of these areas may inhibit performance. The environment consists of the physical and social environment, which are just as important to consider in the occupational therapy process.
According to Gallagher (2004), there is a big responsibility for the individuals who create prosthetics as they have to think about the way the prosthetic will affect the user. Gallagher (2004) says that “it is necessary to have an accurate picture of what the individual considers a successful outcome” (p. 827). This is an important statement because it is easy to treat the injury without taking the whole person into consideration, but outcomes will increase if the person feels like they are being heard.
While there are assessments made for children with a prosthesis, measures specifically designed for adults with prosthetics are scarce so often nonspecific hand function tests are used to measure outcomes in therapy. A few of the assessments that are designed for individuals with a prosthetic include the Activities Measure for Adults with Upper Limb Amputation (AM-ULA), the University of New Brunswick (UNB) measure of prosthetic skills and spontaneity, the Upper Extremity Functional Scale (UEFS), the Patient-Specific Functional Scale (PSFS), Trinity Amputation and Prosthetics Experience Scale (TAPES), and Orthotic and Prosthetics User Survey (OPUS). Some of the non-specific hand function tests that are used are the Box and Block Test of Manual Dexterity (BB), the Jebsen-Taylor Hand Function Test (JHFT) (Resnik & Borgia, 2014), Assessment of Capacity for Myoelectric Control (ACMC) (Hermansson, Fisher, Bernspång, & Eliasson, 2005), and the Southampton Hand Assessment Procedure.

**Occupation-based Assessments**

The first assessment mentioned was the Activities Measure for Upper Limb Amputees (AM-ULA). This is a 18-item measure of functional performance with a prosthesis (Reznik et al., 2013). Resnik et al. (2013) choose the activity items from the Atkins activities of daily living checklist and were cross referenced with the UEFS and the Orthotics and Prosthetics Users’ Survey. Scoring the assessment looks at completion of all subtasks, speed of completion, movement quality, skillfulness of the user, and independence (Resnik et al., 2013). Resnick and Borgia (2014) found that individuals were responsive to the AM-ULA from their baseline levels. According to Resnik et al.
(2013), the AM-ULA has acceptable interrater reliability, test-retest reliability, internal consistency, known group validity, and convergent validity.

The UNB is an assessment that was originally created for use with children who have an amputation or limb absence, but some individuals utilize it with adults with amputation or a prosthesis (Resnik, Baxter, Borgia, & Mathewson, 2013). A study by Resnik and Borgia (2014) showed that the individuals were responsive to change at using the UNB at all amputation levels. Resnik, Baxter, Borgia, and Matthewson (2013) found that the UNB when used with adults with upper limb amputation had acceptable internal consistency, test-retest and inter-rater reliability. Resnik et al. (2013) also found that there was initial evidence of validity, so further research would be needed to find validity.

The Assessment of Capacity for Myoelectric Control (ACMC) is an assessment that was created to be an outcome measure for individuals specifically with myoelectric prostheses (Hermansson, Fisher, Bernspång, & Eliasson, 2005). The ACMC is an assessment that is based of of clinical observation during the use of a myoelectric prosthesis during everyday activities that are meaningful to the client (Hermansson et al., 2005). This assessment requires training to gain the observational skills (Hermansson et al., 2005). Hermansson, Bodin, & Eliasson, (2006) found that the ACMC has excellent intra-rater reliability with therapists that had more experience using the ACMC. Inter-rater reliability was considered to be fair between experienced and inexperienced raters (Hermansson, Bodin, & Eliasson, 2006).
Table 7  
**Occupation Based Assessments**

<table>
<thead>
<tr>
<th>Activities Measure for Upper Limb Amputees</th>
<th>Quick Description</th>
<th>Purpose</th>
<th>Population</th>
<th>Where to Find</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-item measure of functional performance with a prosthesis using an ADL checklist. Scoring is based on completion of all subtasks, speed, movement quality, skillfulness, and independence.</td>
<td>Measures activity performance in adults with an upper limb amputation.</td>
<td>Adults</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of New Brunswick Measure of Prosthetic Skills and Spontaneity</td>
<td>3 Subtests that contain activities that an individual may encounter in everyday life. The subtest for ages 11-13 suggested for adults. Scoring looks at spontaneity of use and prosthetic skill.</td>
<td>Looks at the how well the individual has naturally incorporated their prosthesis into everyday life and looks at the speed, confidence, and consistency that contribute to dexterity with the prosthesis.</td>
<td>Created for children with an amputation or limb absence, but has also been used with adults with amputation or a prosthesis.</td>
<td>Atlanta Clinic for Upper Limb Prosthetics, Institute of Biomedical Engineering, UNB. <a href="http://limbclinic.com/unb-prosthetic-test.php">http://limbclinic.com/unb-prosthetic-test.php</a></td>
</tr>
<tr>
<td>The Assessment of Capacity for Myoelectric Control</td>
<td>Outcome measure using clinical observation to rate clients with a 0-4 ordinal scale.</td>
<td>Assessment of hand function using clinical observation during daily tasks.</td>
<td>Good for ages 2-57 years</td>
<td>The assessment and information on training courses are available on <a href="http://www.acmc.se/">http://www.acmc.se/</a></td>
</tr>
</tbody>
</table>

Self-Report Assessments

The OPUS is a self-report scale that measures range of function, satisfaction with prostheses and services, and quality of life for individuals with prosthetics and orthotics (Heinemann, Bode, & O’Reilly, 2003). This measure has been shown to be a valid measure to use for individuals that use prosthetics and orthotics (Heinemann, Bode, & O’Reilly, 2003).

The UEFS is a 23 item self-report that is a module of the OPUS, which asks individuals how well they are able to perform each functional task and whether or not they usually perform the activity (Burger et al., 2008). Resnik and Borgia (2014) found that the UEFS was not responsive to participants of their study after 18 hours or more of training. It was also found that the UEFS has shown to have good reliability for the summary score when a modified version was used, but the UEFS use scale portion has shown to have questionable reliability (Resnik & Borgia, 2012). This assessment has little evidence to prove its psychometric properties and should be used with caution.

The PSFS is a scale that has its user identify five activities that are hard for them to perform in light of their personal circumstances (Stratford, Gill, Westaway, & Binkley, 1995). The assessment is rated on a scale of 0 to 10, with 10 being that the individual can perform the activity with no problems. According to Resnik and Borgia (2014), the PSFS was found to be responsive to change in individuals over 18 hours or more of training with a prosthetic arm. The PSFS has also shown that there is a significant difference in scores depending on amputation level, with more distal amputations reporting better functioning in activities (Resnik & Borgia, 2012). Overall, the PSFS is a valid and reliable measure to use with adults upper extremity injuries (Hefford, Abbott, Arnold,
Baxter, 2012), therefore it is a possible choice for use with individuals with an amputation or limb loss.

The TAPES is a 10-item survey that uses a 5-point likert scale to measure satisfaction of the reliability, comfort, fit, contentment with cosmetic look, and general satisfaction (Desmond, & MacLachlan, 2005). This assessment was found to have good reliability and there was a significant difference in the known group validity, with individuals with more distal amputations having higher satisfaction rates (Resnik & Borgia, 2012). Overall this is a reliable and valid measure to use to find the satisfaction of an individual with a prosthetic (Resnik & Borgia, 2012).
Table 8
Self-Report Assessments

<table>
<thead>
<tr>
<th>Orthotics and Prosthetics User Survey</th>
<th>Quick Description</th>
<th>Purpose</th>
<th>Population</th>
<th>Where to Find</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthotics and Prosthetics User Survey</td>
<td>Measures range of function, satisfaction with prostheses and services, and quality of life for individuals with a prosthetic through 5 different modules, or surveys.</td>
<td>This can be used to assess satisfaction with services or devices, quality of life, and lower extremity and upper extremity functional status.</td>
<td>Mixed populations of children and adults.</td>
<td>Available for free online. Can be found at: <a href="http://www.ric.org/research/centers/cror/publications/opus/">http://www.ric.org/research/centers/cror/publications/opus/</a></td>
</tr>
<tr>
<td>Upper Extremity Functional Scale</td>
<td>23 item self-report module of the OPUS. Asks individuals how well they are able to perform functional tasks and whether or not they usually perform the activity, specific to the upper extremity using a likert scale.</td>
<td>This assessment is used as an outcome measure. Measuring ease of performing the included activities.</td>
<td>This assessment has been tested for use with adults.</td>
<td></td>
</tr>
<tr>
<td>Patient-Specific Functional Scale</td>
<td>The user identifies 5 activities that are hard for them to perform. Patient rates themselves on their ability to complete an activity on a scale of 0 to 10. They do this for their ability prior to injury and current status. Takes 5 minutes or less to administer.</td>
<td>Assesses functional ability to complete certain activities.</td>
<td>Adults between the ages of 18-64 years.</td>
<td>Free to use. Measure can be found on the Transport Accident Commission's website. <a href="http://www.tac.vic.gov.au/__data/assets/pdf_file/0020/27317/Patient-specific.pdf">http://www.tac.vic.gov.au/__data/assets/pdf_file/0020/27317/Patient-specific.pdf</a></td>
</tr>
<tr>
<td>Trinity Amputation and Prosthetics Experience Scale</td>
<td>10-item survey that uses a 5-point likert scale to measure satisfaction of the reliability, comfort, fit, contentment with cosmetic look, and general satisfaction. Includes psychosocil aspects such as adjustment.</td>
<td>Used to measure satisfaction in a variety of areas that pertain to prosthesis function</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Functional Assessments

The BB is a test of dexterity that can be used for injury or disability. Resnik and Borgia (2012) found that this assessment has excellent reliability and significant differences in known group validity from level to level, with more distal amputations having better dexterity. It was also found that the individuals with who completed the BB test were responsive to change and made the largest gains in the earlier stages of training (Resnik & Borgia, 2014).

The JHFT is a seven-part assessment that contains functional activities and is traditionally is scored on the speed of completion of each task (Rider & Linden, 1988). Resnik and Borgia (2012) changed how they used the assessment with individuals with upper limb amputation and capped each item time at two minutes and calculated the score as number of items completed per second. The results of the study conducted by Resnik and Borgia (2012) indicate that when using their method for measurement the reliability was acceptable to good depending on the subtest, with the exception of the checker subtest. Resnik and Borgia (2014) also found that overall individuals using the JHFT were responsive to change when using the light and heavy can subtests.

The Southampton Hand Assessment Procedure (SHAP) is an assessment that is designed to objectively look at hand function in individuals with prostheses or hand pathologies (Light, Chappell, & Kyberd, 2002). The purpose of the SHAP is to find how effective an individual's terminal device and the controller are by looking at unilateral performance activity (Light, Chappell, & Kyberd, 2002). The tasks included in the SHAP contain abstract elements and activities of daily living tasks, such as turning a key, lifting a tray, and turning a doorknob (Light, Chappell, & Kyberd, 2002).
<table>
<thead>
<tr>
<th>Table 9</th>
<th>Functional Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quick Description</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td><strong>Box and Blocks Test of Manual Dexterity</strong></td>
<td>Small blocks are placed on one side of the box; patients are asked to transfer blocks from one side of a wall to the other using their affected hand; # of blocks moved in 60 seconds is counted. Takes 5 minutes or less to administer.</td>
</tr>
<tr>
<td><strong>Jebsen Hand Function Test</strong></td>
<td>7 part assessment that is scored on the speed of completion of each task. 120 seconds is allowed for each subtest. Takes 6-30 minutes to administer. The time needed to complete printing a letter, turning over a card, picking up small objects, stacking checkers, simulated feeding, moving large empty cans, and moving weighted cans is evaluated.</td>
</tr>
<tr>
<td>Southampton Hand Assessment Procedure</td>
<td>Outcome measure used to objectively look at hand function for individuals with a prosthesis or hand pathology. SHAP includes tasks such as the opening a jar, picking up coins, rotating a key, and lifting objects.</td>
</tr>
</tbody>
</table>

There are several different psychosocial assessments that can be administered to assess individual’s mental health during the occupational therapy rehabilitation process. These are important as often times mental health is overlooked during physical rehabilitation. The individual with the prosthetic is going through many changes and needs to take care of themselves mentally as well as physically. In the following paragraphs a few mental health occupational therapy assessments will be described.

The Canadian Occupational Performance Measure (COPM) is used as an outcome measure, and is unique as it has been translated into 21 different languages making it appropriate for many populations (Baptiste, 2008). It uses a semi-structured interview format, assessing three different areas that include self-care, productivity, and leisure (Baptiste, 2008). Two scores are provided following completion of the assessment. These scores are based on performance and satisfaction, and are both self-rated by the client (Baptiste, 2008).

The Role Change Assessment (RCA) also uses a semi-structured interview format to “describe the perceived role participation of older adults” (Rogers & Holm, p. 49, 2008). The RCA examines role participation of the past and the present, changes in roles, and the level of importance of roles in individuals lives (Rogers & Holm, 2008). There are 43 specific roles in the RCA, all of which are divided amongst six different categories: relationship, self-care/home maintainer, productive, leisure, organizational, and health and wellness (Rogers & Holm, 2008).
The Performance Assessment of Self-Care Skills (PASS) is an assessment that helps document change in functional status (Holm & Rogers, 2008). PASS is performance based and consists of 26 tasks categorized into four different domains including: functional mobility, self-care, and instrumental activities of daily living with a cognitive and a physical component (Holm & Rogers, 2008). The performance level at which each patient engages in is rated independent, safe, or adequate. This specific assessment looks at each individual's ability to return to the community and/or his or her ability to remain in the community on their own (Holm & Rogers, 2008).

The Worker Role Interview (WRI) uses a semi-structured interview format to look at different psychosocial components that have the ability to interfere with work performance (Fenger, Braveman, & Kielhofner, 2008). The WRI has 16 different items on it that are assessed. There is a four point therapist administered rating scale, the ratings being: strongly supports, supports, interferes, and strongly interferes (Fenger, Braveman, & Kielhofner, 2008). There are three different formats of questions that the therapist must choose from before the interview, looking at each patient specifically to make the right decision.

The Occupational Self-Assessment is a two-part self-report assessment that was designed for adults 18 and older (Kramer, Kielhofner, & Forsyth, 2008). There are 21 “everyday” activities that each patient reports on using a four point scale based on how well they do they activity and how important it is (Kramer, Kielhofner, & Forsyth, 2008). The patient and therapist then go through the ratings together to develop priorities for treatment.
These are only a few of the mental health assessments available for occupational therapists to use when assessing their patients with amputations and prosthetics. Keep in mind, these are only suggestions and the therapist should choose what is best for each client individually to keep therapy client-centered. Mental health assessments are often completed through interview, so many of the questions from the assessments can be posed throughout the therapy session to save on time. Mental health should always be in the back of a therapist's mind so it is not overlooked. Occupational therapists can be the first people to determine that their patient may need further treatment and assessment by more specialized professionals.
Table 10
Psychosocial Assessments

<table>
<thead>
<tr>
<th>Quick Description</th>
<th>Purpose</th>
<th>Population</th>
<th>Where to Find</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canadian Occupational Performance Measure</strong></td>
<td>Assesses performance and satisfaction with ADL’s, IADL’s, education, work, play, leisure, and social participation.</td>
<td>All ages and populations capable of understanding the questions posed.</td>
<td>Can be purchased for $52.45 from the listed website</td>
</tr>
<tr>
<td>Semi-structured interview that looks at self-care, productivity, and leisure. The client scores themselves on satisfaction and performance and develops goals based on their scores.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Role Change Assessment</strong></td>
<td>Assesses role participation in older adults from the past and present to see what has changed in their lives.</td>
<td>Older adults who participate in the described roles.</td>
<td>Can be purchased for roughly $56.49 through the publisher.</td>
</tr>
<tr>
<td>Semi-structured interview format that takes roughly 1 hour to administer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient rates themselves using a 5-point ordinal scale based on frequency of role participation, the same way based on past participation, and then past and present participation is compared.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Performance Assessment of Self-Care Skills</strong></td>
<td>Assesses functional status and change in four different domains. The PASS helps determine whether or not an individual is safe enough</td>
<td>Adolescents through adults.</td>
<td>The cost comes from copying fees and purchasing the items (if not on hand) to complete all the tasks.</td>
</tr>
<tr>
<td>This is a performance based assessment that consists of 26 tasks categorized into functional mobility, self-care, and instrumental activities of daily living with a cognitive and a physical component.</td>
<td></td>
<td></td>
<td>Can be located through the authors: Joan C.</td>
</tr>
<tr>
<td>Occupational Self-Assessment</td>
<td>Patient engages in is rated independent, safe, or adequate. Can take roughly 1.5 to 3 hours to administer.</td>
<td>to return to community living or to remain in the community.</td>
<td>Rogers and Margo B. Holm.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>21 different everyday activities are self-rated based on how well each client perceives they can do the activity and how important it is to them. The client and therapist then go through the responses to develop goals based on ratings.</td>
<td>Client centered evaluation tool that assesses occupational competence and value of occupation through self-report.</td>
<td>Adults 18 and older. Can be purchased for $40 off of the Model of Human Occupation website:</td>
<td></td>
</tr>
<tr>
<td>Worker Role Interview</td>
<td>Semi-structured interview format. The therapist chooses from three different questions formats to match the patient’s needs. Can take roughly 30-60 minutes to administer.</td>
<td>Assesses psychosocial and environmental components that may impact a person's ability to return to work.</td>
<td>Working adults. Can be purchased for $40 from the following website:</td>
</tr>
</tbody>
</table>

**Match** the assessment with the description

- Box and Blocks Test of Manual Dexterity
- Worker Role Interview
- Activities Measure for Upper Limb Amputees
- Trinity Amputation and Prosthetics Experience Scale

A. An observational assessment in which an OT scores a client on the speed, movement quality, skillfulness, and independence using a prosthesis during ADLs.

B. A timed test that assesses hand dexterity

C. A self-report that measures prosthetic satisfaction, based on reliability, comfort, fit, looks of the prosthesis, and general satisfaction

D. An assessment used to look at a client’s psychosocial and environmental aspects to enable that individual to get back to his or her job

1) What occupation-based physical assessment would be appropriate to use with a client who has received a myoelectric prosthesis?

- University of New Brunswick Measure of Prosthetic Skills and Spontaneity
- Orthotics and Prosthetics User Survey
- The Assessment of Capacity for Myoelectric Control
- Box and Blocks Test
2) Which assessment was initially made for use with children with prosthetics, but has been used and tested in adult populations?
- New Brunswick Measure of Prosthetic Skills and Spontaneity
- Jebsen Hand Test
- Role Change Assessment
- Performance Assessment of Self-Care Skills

3) What assessment would be appropriate for an adult who recently had an amputation and is having trouble adjusting to the activities they used to do?
- Box and Block Test
- Role Change Assessment
- Performance Assessment of Self-Care Skills
- Southampton Hand Assessment Procedure

4) Which self-report, physical assessment includes both physical and psychosocial satisfaction scales?
- Upper Extremity Functional Scale
- Patient-Specific Functional Scale
- Orthotics and Prosthetics User Survey
- Trinity Amputation and Prosthetics Experience Scale

Answers in Appendix B
(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
The case study will be built off of the previous Unit’s Case Study.

I. Referral
   i. Eric was referred to you by his prosthetist. The prosthetist asked that you see where Eric’s strengths and weaknesses are with ADLs prior to using a terminal device for IADLs.

II. Occupational Profile
   i. Eric is a 21-year-old male with a left transhumeral amputation that occurred 6 months ago. Eric graduated from college with a welding degree. He was working as a welder in a mine when his injury occurred. In his free time, Eric enjoys playing hockey, camping with family, and hobby metalwork. The client reports he wants to get back to work and would like advice on a terminal device.

III. Client Factors & Performance Skills
   i. Eric has experienced residual left shoulder pain following the injury. This has inhibited his motivation to use his prosthetic device daily. The shoulder pain is resulting from lack of ROM over the course of the healing process.

1.) What physical evaluations would you use with the information provided?
   __________________________________________________________

2.) What psychosocial evaluations would you use with the information provided?
   __________________________________________________________

3.) What occupations would you focus on with this client?
   __________________________________________________________

   Answers found in Appendix B
   (It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
• This article provided additional information regarding what client factors and performance skills should be assessed in the evaluation process.
  
Intervention Strategies
Unit 3 Overview

Unit three is all about the rehabilitation process and the potential interventions that can be incorporated into therapy. This unit is only a small portion of what can be done. Each occupational therapist is encouraged to use this as a guide, however, each therapist should brainstorm fun and new ways to make therapy client centered. At this point the guide makes the assumption that you are “motivated to learn”, “oriented to learning”, and should be using “experience” to guide your decision making according to Knowles Andragogy. If you took the time to gain knowledge in units one and two, then interventions should be motivating to both your clients and you.

Your academic preparation should have provided you with sufficient information to make informed decisions on what interventions are appropriate. Sufficient information could include; activity analysis, client centeredness, therapeutic use of self, intervention ideas, and more. Also, at this point the learning is problem-centered because each client is different and will require a different approach. Anyone using this guide, specifically anyone who has worked with this population, can draw from experiences on what has worked and what hasn’t worked. If you haven’t had experience with this population, then trust your clinical reasoning skills gained through your education and this guide to help guide you in the right direction.
Knowledge of 4 Phases

Prosthetic rehabilitation has four therapeutic phases and occupational therapy (OT) has a role in each one (Gulick, 2011). The client moves through each stage as he or she progresses and the therapist is responsible for determining when each move is necessary. For example, if a therapist moves into phase two before phase one is completed, there may be damage to the healing site. The following is what is occurring with the client during each phase:

- **Phase 1** the client’s wound is healing following his or her amputation. This is a very important phase as further damage can be done if the therapist continues with an open wound. There are several different interventions that should be implemented during this phase which will be discussed in the following sections.

- **Phase 2** is considered the pre-prosthetic training phase. In this phase of therapy, the client will begin to work with an occupational therapist to build the necessary skills he or she will need when using his or her prosthesis (Gulick, 2011).

- **Phase 3** is considered the basic prosthetic training phase according to Gulick (2011). During this phase, the client will have received his or her prosthetic and will now being training. He or she will learn how to use the basic controls of the prosthetic and they will also learn how to care for it.

- **Phase 4** is considered the community integration phase (Gulick, 2011). This is the time when the client is ready to get back to work or his or her everyday activities that are done out in public.
Quizlet Break!
To Test Your Comprehension And Get You Ready for The Next Sections...
Go to Quizlet.com
Test 1: Search Prosthetics
Complete Flashcards Created By jhuy117
Test 2: Search Prosthetics Again
Complete Flashcards Created By sfriedm

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1 2 3 4
Physical Issues in Prosthetics

Physical issues with amputations and prosthetics can range from discomfort at the healing site all the way to incorrect fitting of the prosthetic itself. The Amputee Coalition (2015) shares top priorities that need to be addressed from the very beginning of rehabilitation. Some of these priorities include:

- Exercising and strengthening the muscles needed for balance as an individual will be thrown off due to a missing limb. This will also help maintain muscle tone and prevent any contractures from forming.

- Mitsch, Walters, and Yancosek (2014) state that core strengthening will promote balance, as well as postural control and endurance. If an individual has core strength and is able to hold themselves upright, they will also experience symmetry (Mitsch, Walters, & Yancosek, 2014).

- The Amputee Coalition (2015) states to take care of the residual limb to maintain the shape of the residual limb and to learn body positioning to maintain tone and prevent contractures. When dealing with such complex issues, everything works together so it is important to address all these potential issues.

It is necessary to stress the importance of exercise, strengthening, and appropriate care of the residual limb as one thing leads to another. For example, if the side of the amputation is weak, has low endurance, and is poorly taken care of, the individual won’t be able to use it. On the other hand, if the residual limb is strong and is constantly...
moving, circulation will be improved and edema reduced (Mitsch, Walters, & Yancosek, 2014).

The individual with the limb loss should be encouraged to constantly incorporate their limb into everyday bilateral tasks in their own environment. This will increase or maintain their range of motion at all joints proximal to the amputation, and this will also help prevent possible contractures from forming (Mitsch, Walters, & Yancosek, 2014).

Hypersensitivity at the end of the residual limb is normal. The nerve endings are learning to fire again in a different way. Without desensitization, the client may not be able to tolerate the touch and pressure of their prosthesis (Mitsch, Walters, & Yancosek, 2014). The therapist should communicate with their client about sensation and the therapist should take caution if their client has limited sensation.

The individual may be dealing with a change in hand dominance if their dominant limb was amputated. Everyday occupations and tasks should be addressed if this is the issue as this poses a great deal of difficulty. There is a program that runs six weeks long called, *Handwriting For Heroes*, that shows “promising results for handwriting skill development” for people who have lost a limb (Mitsch, Walters, & Yancosek, p. 1272, 2014).
Video To Watch!
Go to YouTube.com
Search AmputeeOT: Difficult Parts of Being an Amputee

Notes

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Phase One Interventions

The focus of phase one in occupational therapy prosthetic rehabilitation is to begin with preparatory interventions. According to Smurr, Gulick, Yancosek, and Ganz, (2008), phase one will continue until all infection and open wounds are gone. Preparatory interventions are begun in phase one in order to prepare the individual for engagement in occupational performance (AOTA, 2014). Some of the goals of phase one include:

- Promote healing of the clients wounds
- Limb Hygiene
- Limb shaping
- Start to increase independence in basic ADLs (BADLs)
- Provide education of the rehabilitation process to the client and family (Smurr, Gulick, Yancosek, & Ganz, 2008).

Preparatory Interventions

Preparatory interventions are used as a part of the treatment session to support performance (AOTA, 2014). Preparatory interventions are started in phase one in order to prepare the individual for phase two (Gulick, 2011). These preparatory interventions should and can include range of motion (ROM) exercises, wound care, desensitization, and pain control. Preparatory interventions are meant to prepare the residual limb and surrounding joints ready for a prosthesis.
<table>
<thead>
<tr>
<th>Preparatory Goal</th>
<th>Intervention Idea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Edema Control</strong></td>
<td>✓ Icing&lt;br&gt;✓ Education on elevating the residual Limb&lt;br&gt;✓ Wrapping</td>
</tr>
<tr>
<td><strong>Wound Care</strong></td>
<td>✓ Dressing Changes&lt;br&gt;✓ Scar Massage</td>
</tr>
<tr>
<td><strong>Desensitization</strong></td>
<td>✓ Wear a limb shrinker&lt;br&gt;✓ Educate to touch residual limb when possible (Either light massage or Tapping)&lt;br&gt;✓ Rubbing textured fabric or other items on the residual limb&lt;br&gt;✓ Massage scar adhesions&lt;br&gt;✓ Tapping, rubbing, and vibration over the limb&lt;br&gt;✓ Weight bearing on the residual limb on different textured surfaces if there are NO contraindications</td>
</tr>
<tr>
<td>(Should be done 3 times a day for 20-30 minutes)</td>
<td></td>
</tr>
<tr>
<td><strong>Range of Motion</strong></td>
<td>✓ AROM and PROM at all joints proximal to the amputation site</td>
</tr>
<tr>
<td><strong>Pain Control</strong></td>
<td>✓ Electrical Stimulation&lt;br&gt;✓ Mirror Therapy (Consistent Program)&lt;br&gt;✓ Ice&lt;br&gt;✓ Heat&lt;br&gt;✓ Transcutaneous electrical nerve stimulation</td>
</tr>
</tbody>
</table>

Video To Watch!
Go to YouTube.com
Search AmputeeOT: Massage, Scar Mobilization, Desensitization, and End-Bearing Exercises for New Amputees
Limb Hygiene

During phase one it is important to instruct on correct limb hygiene to expedite wound healing. Incorrect or lack of limb hygiene can lead to infection and slowing of the healing process, which can limit the ability of the client to use his or her prosthetic successfully. Mitsch, Walters, and Yancosek (2014) recommend instructing each patient to wash his or her limb daily. This should be done with mild soap and should be dried thoroughly afterwards. These authors also suggest to provide basic care duties such as debridement and scar massage (either done by the therapist or the patient) to prevent, and/or decrease, adhesions.

Wash limb daily
Mild soap and water
Dry thoroughly
Debride if necessary
Scar massage

Figure 5. Limb Hygiene
**Limb Shaping**

In addition to wound healing, the therapist will also want to maximize limb shrinkage and limb shaping. Limb shaping is done so “the residual limb is tapered at the distal end, allowing for optimal prosthetic fit” (Mitsch, Walters, & Yancosek, p. 1271, 2014). Some intervention ideas to achieve this optimal prosthetic fit include:

**Table 12**  
*Limb Shaping*

<table>
<thead>
<tr>
<th>Optimal Prosthetic Fit</th>
<th>What to do?</th>
<th>Remember to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastic Bandaging</td>
<td>Wrap the residual limb in a figure-eight pattern of diagonal configuration. Most of the pressure should be applied at the end of the limb, wrapping distal to proximal. DO NOT wrap the limb in a circular motion as that can act as a tourniquet and restrict circulation.</td>
<td>Should be worn continuously. Reapply if loose. Remove bandaging 2-3 times daily &amp; check skin integrity. Clean bandage every 2 days with mild soap. Lay flat to air dry.</td>
</tr>
<tr>
<td>Elastic Shrinker</td>
<td>Worn when sleeping &amp; when individual is not wearing prosthetic. When the shrinker becomes too large, a smaller shrinker should be worn.</td>
<td>Wear as directed. The point in this system is to maintain the residual limb shape and size.</td>
</tr>
<tr>
<td>Early Postoperative Prosthesis</td>
<td>A temporary prosthesis to reduce dependency with self-care activities. Also, by using this route individuals may be more accepting of their permanent prosthetic.</td>
<td>Have daily communication with team members to assure proper use of the prosthetic, proper fit, and to provide adjustments.</td>
</tr>
</tbody>
</table>

Phase Two Interventions

During phase two, occupational therapy rehabilitation will most likely occur in an outpatient setting or out of an inpatient status (Smurr, Gulick, Yancosek, & Ganz, 2008). This does not mean that phase one solely occurred in an inpatient setting, however, inpatient status during phase one is more likely. In some cases, the client may still be admitted in the hospital, depending on many different medical and functional factors (Smurr, Gulick, Yancosek, & Ganz, 2008). During phase two, preparatory interventions from phase one are continued as the therapist deems necessary. In addition, the following are also carried out during phase two:

- Scar management
- Conditioning/postural training & strengthening
- Body awareness
- Adaptive Equipment
- Biofeedback

These are only a few examples of what can be done in phase two. Making sure the wound has healed is a very important step before moving into phase two, and also incorporating preparatory interventions if needed to prepare the individual for occupational performance.

Preparatory Interventions

The preparatory interventions from phase one should be continued into phase two from table 11, but are slightly altered due to wounds now being closed (Gulick, 2011; Smurr, et al., 2008). The interventions are altered as the therapist can be more aggressive with the residual limb as the wound has healed. There will be fewer precautions in
regards to this. These preparatory interventions should or can include range of motion (ROM) exercises to prevent contractures and shortening of soft tissue, scar management, desensitization, and pain control (Gulick, 2011).

**Body Awareness**

An important intervention is to use a mirror to increase body awareness (Klarich, & Brueckner, 2014; Smurr, et al, 2008). The occupational therapist should have the client start in static postures in front of the mirror, then move on to dynamic movements in order to ensure the client is aware of where his or her body is in space (Smurr, et al., 2008). Body awareness can occur during strengthening if done in front of a mirror to make sure the individual is using proper form (Smurr et al., 2008). Strengthening should also work on scapular mobilization to ensure the shoulder integrity once a prosthetic is introduced (Smurr, et al., 2008).
Scar Management

Scar Management is implemented once a wound is no longer open and does not have any infection at the site (Smurr, et al., 2008). If there is too much scar tissue it can create hypertrophic scarring or it can adhere to the underlying muscle (Klarich, & Brueckner, 2014). This adherence can cause unnecessary rubbing under a prosthesis and in turn lead to blistering on the residual limb (Klarich, & Brueckner, 2014). Scar massage is one technique that is used to decrease the amount of scar tissue and the wound site on a residual limb (Klarich, & Brueckner, 2014). Figure 6 shows the direction that scar massage can be done on a closed wound, moving from more conservative with the parallel motions to most aggressive with the perpendicular motions. Silicone pads or liners can also be added to compression garments in order to minimize or reduce scar tissue (Klarich, & Brueckner, 2014; Smurr, et al., 2008).

Parallel Motions  Circular Motions  Perpendicular Motions

Figure 7. Scar Management Techniques
Conditioning/Postural Training

The Amputee Coalition (2015) indicates that exercise and strengthening the muscles needed for balance is essential to someone who has experienced limb loss. Mitsch, Walters, and Yancosek (2014) agree stating that core strengthening will also promote balance, as well as postural control and endurance. If an individual with an amputation learns proper body positioning, he or she will be able to maintain tone and prevent contractures (Amputee Coalition, 2015). Often individuals with an amputation compensate by elevating the shoulder on the affected side, causing awkward posturing and deformity (Smurr, et al., 2008).

The residual limb should also be kept moving to increase circulation and reduce edema (Mitsch, Walters, & Yancosek, 2014). The individual with limb loss should be encouraged by the occupational therapist to incorporate their limb into bilateral tasks to prevent overuse of the contralateral limb. The contralateral limb is the limb opposite of the affected side. This will increase or maintain their range of motion at all joints proximal to the amputation, and this will also help prevent possible contractures from forming (Mitsch, Walters, & Yancosek, 2014).

Table 13

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Focus on...</th>
</tr>
</thead>
</table>
| **Strengthening** (Use A Mirror for Good Form) | ✓ Scapular stabilization  
✓ Equalizing upper arm strength  
✓ Core strength |
| **Interventions With a Full Length Mirror** | ✓ Start in Static Postures  
✓ Move onto Dynamic Postures |

Strengthening Exercise Examples

Exercise is an important aspect to any type of therapy, however, it is very important in the world of prosthetic rehabilitation. The affected limb most likely experienced some level of non-use, which can cause atrophy and weakening. Some form of exercise program will more than likely be necessary. When reviewing the exercise examples from the link below, it is up to the individual using the guide to determine the best routine for each client as far as repetitions and times per day. These exercises are only a few possible examples that do not require both hands to complete. Each therapist will determine which exercises will benefit his or her client.

Exercise Examples!
Use exercise code “UXD4DCB” to view the examples.

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Introduce Adaptive Equipment

Adaptive equipment is a big topic when someone goes through the trauma of an amputation. He or she will need to learn how to complete their activities of daily living (ADLs) in a completely different way. Before someone receives a prosthetic device there will be a period of time when their amputation site is healing, so they will need extra assistance because they will only have use of one arm and hand (Gulick, 2011). This is a good time to introduce any adaptive equipment that would help with ADLs initially and then instrumental activities of daily living (IADLs) (Smurr et al., 2008).

The following table provides some ideas for adaptive equipment. It is important to remember that each client is different so not all of these options are appropriate for everyone. The occupational therapist should discuss the options with his or her client and decide which is best based on the client’s personal goals. Ultimately it is the clients choice on how to complete each ADL and IADL (Smur et al., 2008). The following table is only a small amount of possible adaptive equipment available.
**Table 14**

*Adaptive Equipment Ideas*

<table>
<thead>
<tr>
<th>Electric can opener</th>
<th>Universal cuff, button &amp; zipper hooks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocker knife</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reacher, hygiene sponge, dressing stick</th>
<th>Suction nail-brush</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pump dispensers for soaps, shampoo, and conditioner</td>
</tr>
<tr>
<td></td>
<td>Shower chair</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Velcro or slip on shoes</th>
<th>Adapted cutting board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper weights to hold paper in place when writing</td>
<td></td>
</tr>
</tbody>
</table>

Biofeedback/ Myoelectric Site Testing

Biofeedback is when an occupational therapist helps to find muscle activity that is adequate enough to illicit prosthetic movements in a myoelectric prosthetic (Klarich & Brueckner, 2014). According to Klarich and Brueckner (2014), two sites are ideal for prosthetic function. Common muscles that are used and can be tested first are the biceps for closing a terminal device and triceps for opening a terminal device in a transhumeral amputation (Klarich & Brueckner, 2014). Similar to posturing exercises, the therapist should start myoelectric testing in static positions or simple motions and then moving into training with more complex movements in order to train the muscles under different circumstances (Smurr et al., 2008).
One-Handed Technique

According to Klarich and Brueckner (2014), it is pertinent that an individual with an amputation mastery completing basic ADLs without the use of assistive devices. Smurr et al. (2008) emphasized that this is important because the client may not always have a prosthesis that is appropriate for every ADL. Once the client has mastered BADLs, then they can explore more difficult ADLs and instrumental ADLs (Smurr et al., 2008). Examples of one-handed techniques include one-handed shoe tying or using a residual limb to stabilize objects during completion of ADLs (SMur et al., 2008).

Another task related to one-handed technique to work on in this phase of treatment includes teaching individuals how to use the opposite hand, especially if there is going to be a change in dominance. If an individual experiences an amputation of their dominant hand, many tasks will need to be addressed. Mitsch, Walters, and Yancek (2014) state that an individual will instinctively use their opposite hand for tasks, however it is beneficial to instruct these individuals on one-handed techniques and adaptive equipment as needed.
Video To Watch!
One Handed Shoe Tying Technique
Go to YouTube.com
Search One Handed Shoe Tying Technique: Video by Justin Strafuss

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Phase Three Interventions

Activities of Daily Living

Once the initial components from phase one and two are completed and the individual is ready to move forward, basic activities of daily living (ADLs, such as dressing, toileting, bathing, and eating can be targeted (Gulick, 2011). During phase three, the client begins to learn the more complex controls of his or her prosthetic device and they also learn how to care for it. Table 14 gives basic examples of how to complete ADLs. Remember, these are only a few ideas and the therapist is encouraged to brainstorm with his or her clients to find the best fit.

Table 15
Activities of Daily Living

<table>
<thead>
<tr>
<th>Activity of Daily Living</th>
<th>Intervention Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dressing</td>
<td>✓ Occupation-based- Practice putting on clothing with prosthetic on. Could use a dressing tree and reacher. ✓ Activity- Practicing grasping clothing with prosthetic.</td>
</tr>
<tr>
<td>Grooming</td>
<td>✓ Occupation-based- Brushing teeth, putting on make-up, applying deodorant. ✓ Activity- Squeezing toothpaste out of tube using prosthesis as main UE used or as a stabilizer.</td>
</tr>
<tr>
<td>Toileting</td>
<td>✓ Occupation-based- Practice toilet hygiene using a toilet paper holder with either limb, whichever the client prefers. ✓ Activity- Practice putting toilet paper on the toilet paper holder and practice toilet transfer if needed.</td>
</tr>
<tr>
<td>Bathing</td>
<td>✓ Occupation-based- Practice standing in the shower without prosthetic on. Make sure to have a shower chair they can sit on if they lose balance. ✓ Activity- Practice shower transfer in and out of tub prior to completing first full shower.</td>
</tr>
<tr>
<td>Eating</td>
<td>✓ Occupation-based- Practice eating using prosthetic and adaptive equipment if necessary, or while using non-affected hand. ✓ Activity- Practice dishing up plate with food using one hand as a stabilizer and the other to dish the food. Client can choose which way works best.</td>
</tr>
</tbody>
</table>
Advanced Occupation Training

The final phase of prosthetic rehab is considered advanced prosthetic training (Gulick, 2011). Occupational therapy’s role in this phase is to help the individual incorporate their prosthesis into the activities that are more complex than his or her everyday ADLs (Gulick, 2011). Gulick (2011) gave examples being recreational activities, work, taking care of a child, driving, and maintaining a home. According to Smur et al. (2008), there are characteristics that make an occupation advanced. These characteristics include that the occupation is individualized, it may require the use of tools or additional equipment, the occupation will have many steps and require use of both hands, the client has a choice of prosthetic type, and the occupation has a meaningful outcome (Smur et al., 2008).
<table>
<thead>
<tr>
<th>Instrumental Activities of Daily Living</th>
<th>Intervention Ideas</th>
</tr>
</thead>
</table>
| **Meal Preparation**                   | ✓ Occupation-based- Eat a meal that was prepared by client using adaptive equipment and the prosthetic device.  
   ✓ Activity- Go grocery shopping for the ingredients needed to make the meal while wearing/using prosthetic device. |
| **Driving**                            | ✓ Occupation-based- Drive around an empty parking lot for practice and then go out into the city using prosthetic device.  
   ✓ Activity- Practice driving on a simulator prior to practicing in the vehicle on the road while using the prosthetic. |
| **Home Maintenance and Repair**        | ✓ Occupation-based- Have the patient clean a room at his or her home and report back in therapy how it went using the prosthetic device.  
   ✓ Activity- Clean a room in the therapy department simulating cleaning the clients home. ie/ vacuuming. |
| **Vocational Training**                | ✓ Occupation-based- Do a job site visit and have the patient show the therapist what he or she would do on the job while using prosthetic device.  
   ✓ Activity- Do a simulation in the clinic on possible work activities. |
| **Leisure Activities**                 | ✓ Occupation-based- Engage in leisure activity of clients choice  
   ✓ Activity- Plan a day to engage in a leisure activity and go through all the steps. |
Comprehension Quiz Unit 3
Physical Interventions

Match the intervention activity with each phase of prosthetic rehabilitation.

___ Phase 1
___ Phase 2
___ Phase 3
___ Phase 4

A. Scar massage and wound dressing
B. A work assessment and community outing
C. Practicing using a prosthetic to put on deodorant
D. One-handed dressing techniques and adaptive equipment training

1) What direction and tightness is elastic wrapping done in?
   • Starting Proximal and moving to distal, Starting tight and moving to loose
   • Starting Proximal and moving to distal, Starting loose and moving to tight
   • Starting Distal and moving to proximal, Starting tight and moving to loose
   • Starting Distal and moving to proximal, Starting loose and moving to tight

2) Which one is not an example of a desensitization technique?
   • Rubbing the residual limb
   • Mirror therapy
   • Putting residual limb in a rice bin
   • Putting weight on the residual limb
3) What is an intervention in phase 4 of prosthetic rehab?
   - Scar massage
   - Activities of daily living training
   - Practicing using the components of the prosthesis
   - Leisure activity training

4) How often does a client wear an elastic shrinker?
   - When sleeping and when not wearing prosthesis
   - All the time
   - Only half of the day
   - All of the time except when showering

5) What is the focus of phase 3 of prosthetic rehab?
   - Wound healing
   - Basic training with the prosthesis
   - Getting the arm ready for the prosthesis
   - Community integration

6) What is biofeedback and when is it used?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

Answers Found in Appendix B

(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
Application Case Study Unit 3
Physical Interventions

I. Referral
   i. Jamie was referred to you by her doctor for strengthening and instruction in ADLs.

II. Occupational Profile
   i. Jamie is a 40-year-old woman who had an amputation due to an infection in her left arm. Her final surgery was exactly 3 months ago at the transradial level. Jamie has been seeing a therapist since her surgery and is just transferring to you for outpatient therapy. She got her prosthetic 2 weeks ago and is still learning to use it. Jamie is married and has two daughters, ages 5 and 10 years old. Jamie is a nurse in the local hospital and has been off of work since her the infection started. She is very involved in her family’s life and her daughters have many activities they are in. Her 10 year old is in basketball, volleyball, and soccer, while her 5-year-old daughter is in gymnastics, Girl Scouts, and t-ball. Jamie was a Girl Scout leader, volleyball coach, PTA member at the girl’s school, and volunteers at the animal shelter before the infection cause her amputation. In addition to her other roles, Jamie enjoyed knitting, being a member of a quilting club, reading, and playing games with her family.

III. Client Factors & Performance Skills
   i. Jamie is experiencing decreased strength on the side of her amputation. She also has some acute pain in her elbow along with a lack of ROM from nonuse.

IV. Interventions
   i. What stage of prosthetic rehab is she in?

   ii. What are examples of interventions to do with Jamie at her current stage?
iii. After seeing you for two months, Jamie is complaining of phantom limb pain. What interventions could be used to alleviate some of this pain?

iv. What occupation-based interventions would be appropriate for Jamie once she has mastered using her prosthetic in her basic ADLs?

Answers found in Appendix B

(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
Supplemental Articles/Book References


When looking at an individual with a prosthetic, it is easy to see all of the physical issues that may arise, but those psychological effects are often put on the backburner or overlooked. According to Dillingham, Pezzin, and Mackenzie (2002), the main cause of upper limb amputations are due to some sort of trauma, which bring about many different feelings from person to person. The Amputee Coalition (2015) states one of the top priorities when dealing with psychological issues is to “work through the feelings and emotions you are experiencing and decide how to rebuild your life after amputation. Remember that everyone responds differently to the loss of a limb” (p. 4). It
is important for a therapist to also provide emotional support to the patient and his or her family (Gulick, 2011; Mitsch, Walters, & Yancek, 2014).

**Self-Image**

Self-image is a psychological concept that is greatly affected by an amputation or limb loss in today’s society (Ellis, 2012). According to Ellis (2012), “A positive self-image is the foundation of a comfortable sense of well-being and that, in turn, adds to our enjoyment of life (p. 26).” When an individual has a negative view of themselves, it can lead to decreased motivation, which will then slow the rehabilitation process (Ellis, 2012). This corresponds to what Gallagher (2004) reports about the necessity of knowing what each individual considers to be a successful outcome when using a prosthetic. If an individual feels unsuccessful, they will have poorer self-image in relation to that. It will help to plan interventions that reduce avoidant coping mechanisms, to facilitate the use of problem-solving approaches, provide extensive education, and to conduct comprehensive psychological screenings with follow-up services that are appropriate (Desmond, 2007; Gallagher, & Maclachlan, 2001).

**Mood Disorder Symptoms**

Desmond (2007) conducted a study with individuals who have a prosthesis to see the prevalence of mood disorder symptoms. Desmond (2007) wanted to see how coping strategies affected the following rates. It was found that 28.3% of the participants had symptoms that would be indicative of depression (Desmond, 2007). This number being three times the national average. Another statistics Desmond (2007) found included 35.5% of the individuals involved in the study met the criteria for clinical anxiety, which
is close to the national average. These high rates are indicators of how an individual with an amputation or limb loss will deal with a prosthesis.

**Coping**

It was found that the participants that used problem-solving as a coping mechanism adjusted to the change better and displayed fewer depressive symptoms (Desmond, 2007). Additionally, Desmond (2007) looked into how coping affects psychosocial issues. It was discovered that the use of the coping mechanism of avoidance was significantly associated with poor adjustment to the prosthesis and was linked to higher levels of reported anxiety. This author suggests the benefits of looking at the psychosocial issues an individual with a prosthesis may have (Desmond, 2007).

**Adjustment Process**

Gallagher and Maclachlan (2001) also looked into the adjustment process of individuals with for individuals with lower limb amputation. This amputation is seen less with occupational therapy, but the occurrence will have a similar effect on an individual with an upper limb amputation. Themes that were emerged from the study that were important to the rehabilitation process included self-image, social discomfort, encouragement, and assurance (Gallagher, & Maclachlan, 2001). Individual and family acceptance and support were also highlighted as something that was very important for individuals with limb loss and have a huge effect on the outcome of recovery (Gallagher, & Maclachlan, 2001).
Instruction on Approaching Everyday Problems

Training on everyday issues was another theme that many of the participants discussed as an important aspect of adjusting to having a prosthesis (Gallagher, & Maclachlan, 2001). According to the study Gallagher and Maclachlan (2001), participants felt less anxiety and depression, along with an overall more successful adjustment to the prosthesis, when they were instructed on how to approach everyday obstacles. This is an important aspect to consider in both psychosocial and physical rehabilitation settings. It is important to prepare each individual for everyday tasks and what to expect before they engage in those activities with his or her prosthetic device. If an individual believes they will succeed with the first try, they will most likely end up disappointed. Talking through each step before the activity is conducted will help the client better understand the prosthetic process.

This is an intervention that can be conducted throughout the entire therapy process. Each client will be tackling new obstacles the more efficient he or she gets with their prosthetic, so they will need to continually be trained on new tasks. The following is only a small list of examples that can be used during one on one rehabilitation or in a group setting.
Table 17

Important Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Activity Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive Muscle Relaxation</td>
<td>See Appendix D for a progressive muscle relaxation script</td>
</tr>
<tr>
<td>Positive Self-Talk</td>
<td>Each time the client becomes frustrated and feels unable to complete a task, have them say something positive about their experience. Also have them say something more constructive, such as &quot;I can do this&quot;.</td>
</tr>
<tr>
<td>Coping Techniques</td>
<td>The client can practice deep breathing throughout tasks in order to calm him or herself down.</td>
</tr>
</tbody>
</table>

Groups

Gulick (2011) emphasized the importance of looking at the individual's psychosocial well-being during this phase, recommending peer groups as an option for his or her mental health. A suggestion made by Smurr, Gulick, Yancosek, & Ganz (2008) was to find an amputee peer visitor. This is an individual who has been trained by the Amputee Coalition of America who can provide support and be a sounding board for and individual with a recent amputation (Amputee Coalition of America, Knoxville, TN).

Other possibilities for psychosocial well-being could include psychological interventions provided by an occupational therapist or peer participation in rehab could be suggested. The following table describes some possible interventions that could be implemented into therapy. Keep in mind, most of these interventions would be conducted in a psychosocial setting, but it is possible to incorporate small portions of these interventions into a physical rehabilitation setting.
<table>
<thead>
<tr>
<th>Group Topics</th>
<th>Activities in Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coping</td>
<td>✓ Occupation-based- Practice using learned coping strategies during everyday activities and have the client report back on how they worked.</td>
</tr>
<tr>
<td></td>
<td>✓ Activity- Coping worksheet to determine which coping tools are most commonly used and which ones the client wants to use more of.</td>
</tr>
<tr>
<td>Self-Image</td>
<td>✓ Occupation-based- Create a self-esteem collage on what makes the client feel good about them.</td>
</tr>
<tr>
<td></td>
<td>✓ Activity- Positive self-esteem worksheet that requires each person to determine their personal strengths.</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>✓ Occupation-based- Role play situations that would require assertive behavior.</td>
</tr>
<tr>
<td></td>
<td>✓ Activity- Watch a role play video before the role play. The client could also read social scripts where people are assertive and passive (have them determine which was which).</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>✓ Occupation-based- Act out social situations with peers. For example, people will be asking questions about why they have a prosthetic and they can practice responding.</td>
</tr>
<tr>
<td></td>
<td>✓ Activity- Journal about social interactions they have had and what they could have done to make the interaction better if it went poorly.</td>
</tr>
</tbody>
</table>
1. What is one of the most important things to have when receiving a new prosthetic device?
   a. Family support
   b. Coping skills
   c. High self-esteem

2. Individuals who experience a limb loss have the highest chance of what disorder?
   a. Depression
   b. Seasonal Affective Disorder
   c. Anxiety
   d. Bipolar Disorder

3. Individuals who use problem solving experience fewer depressive symptoms.
   a. True
   b. False

4. What helped individuals experience less depression and anxiety?
   a. Instruction on approaching everyday problems
   b. Knowledge
   c. Self-image exercises

Answers found in Appendix B
(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
I. Referral
   i. Billy has been referred to you by his psychologist.

II. Occupational Profile
   i. Billy is a 16-year-old boy who was in a farming accident 4 months ago. This resulted in a wrist disarticulation. Billy has been big into drama at school, but since his accident he has not been on stage. His drama class has their first show coming up in 6 weeks and he has one of the main roles. He has been fitted with a temporary cosmetic glove, but he hopes to be fitted with something more useful soon.

III. Client Factors & Performance Skills
   i. Billy is experiencing anxiety about this and is not sure he can do it. He has also been having increased troubles in school with failing grades because he has been missing days due to “feeling sick” as he tells his mother.

IV. Interventions
   i. What assessment is most appropriate to assess Billy’s current state of mind?
   ii. What interventions would be appropriate and why?
   iii. What are some reasons Billy may be feeling so much anxiety and how can you help ease his fears?

Answers found in Appendix B
(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
Supplemental Articles/Book References

- Amputee Coalition Website
  - [http://www.amputee-coalition.org](http://www.amputee-coalition.org)

Quizlet Break!
To Test Your Comprehension...
Go to Quizlet.com
Search Phases Prosthetic Rehab
Complete Flashcards Created By Kelly_lynn79

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Other Important Aspects of Therapy
Educating individuals on how to use and care for their prosthetic is a large component in success, motivation, and correct use of the device. The Amputee Coalition (2015) breaks down commonly asked questions by prosthetic users, and gives answers to help them better understand if, when, and how to use their prosthetic device. These questions are not limited to, but can include:

- Why would I use a prosthesis?
- How does a prosthesis work and what does it look like?
- When will I get a prosthesis?
- How soon can I get back to what I used to do before the surgery once I get my Prosthesis?
- Is it difficult to learn to use a prosthesis?
- What can I do to prepare myself for a prosthesis?
- Would it be helpful to speak with others who use a prosthetic device?

When answering these questions, it is important to first look at the individual's personal goals on what they want to accomplish with a prosthetic device (Amputee Coalition, 2015). When considering each person's personal goals, the device will be picked to match the individual’s need and custom fit to each person to increase success and motivation. Once an individual receives his or her prosthetic, a common question that will arise will be how long until they can get back to doing normal everyday tasks. This can be a tricky question as every person is different. This question should be approached with caution, reminding the individual that a few months is average, however, it depends
on the overall health and well-being of each person (Amputee Coalition, 2015). The Amputee Coalition (2015) also states that, “the first year is tough. It is common to spend about six months to a year working with a rehabilitation team” (p. 3). It is important to remind individuals that learning to use a prosthetic device in place of a lost limb is a journey, and not something they will learn overnight. “Learning to use a prosthesis is a tough job. It takes time, effort, strength, patience, and determination” (Amputee Coalition, p. 4, 2015).

According to the Amputee Coalition (2015), some important knowledge/techniques prosthetic users should be taught by their prosthetist, physical therapist, or occupational therapist include:

- How to care for the prosthetic
- How to don and doff the prosthetic device
- How to walk on different surfaces
- How to handle emergencies safely
- How to perform ADL’s at home, work, and in the car
- How to walk more efficiently
- How to try new recreational activities

These are all activities that any individual, with or without a prosthetic, needs to know how to do. These are all essential activities that would help someone live independently. In addition to teaching each client how to use the device for everyday activities, it is also important to educate the individual on the specifics of his or her device.
Knowledge on Prosthetic Device

In addition to educating the individual on everyday problems, knowledge on the prosthetic device eases a lot of the fear each client experiences. Gallagher and Maclachlan (2001) found that knowledge was an important factor in reducing anxiety fear, anxiety, and depression. The unknown is scary for a lot of people and the prosthetic will be something completely new and exciting at the same time. If the person with the prosthetic device is afraid of failure they may be less likely to use it. This is something that will be included within the interventions through conversation. Make sure to answer the client’s questions and encourage them to ask all the questions they have.

Wearing Schedules/ Amount of Time Worn

Education should be the first thing implemented on wearing schedules and prostheses. The individual and his or her family should be informed that wear time is gradual after the first fitting (Mitsch, Walters, and Yancosek, 2014). Wear time should be limited from about 15-20 minutes followed by a skin check to assess integrity (Smurr et al., 2008). As skin tolerance improves, the daily wear time can be increased and as time progresses, a more specific wearing schedule will be set by the occupational therapist and prosthetist (Mitsch, Walters, and Yancosek, 2014). Smurr et al. (2008) reported that the client can increase the amount of time wearing a prosthetic in 30 minute intervals once skin integrity is shown to be sufficient and the client should be able to tolerate wearing the prosthetic for a approximately 8 hours.

When an individual with a prosthetic wears their device, it can be variable and will affect how certain occupations are completed. Each individual will use their prosthetic for different reasons and activities. Østlie et al. (2012) conducted a study to
look at when people wore their prostheses, its use in performance of ADL tasks, how useful those they feel their prosthesis is, and how the prosthetic skills influences the use of a prosthesis in ADL performance. It was found that the participants wore their prosthesis more than four hours a day (Østlie et al., 2012). The individuals would wear the prosthesis only when they needed it functionally. These results highlighted the importance of individualizing treatment with clients. A therapist should give input on a prosthetic that will be conducive to the ADLs that are pertinent to a client and those should be the subject of intervention (Østlie et al., 2012).

**Cleaning & Repair**

Cleaning and repair questions should be directed towards the prosthetist. Each prosthetic is so different that there may be different procedures for each one. For example, a myoelectric prosthetic would be cleaned differently than a purely cosmetic one, due to the electrical component. The following videos give a good example of how to keep the prosthetic and limb clean.
Videos To Watch!!
Go to YouTube.com

Video 1- Search AmputeeOT: How to clean your stump and liner so you don’t stink!
Video 2- Search AmputeeOT: How to Reduce Sweating in Your Prosthetic

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The Amputee Coalition Support Network is a great resource for individuals who have experienced an amputation. This group provides a place for individuals and their families to connect with other people experiencing the same thing (Amputee Coalition, 2015). There are over 260 connected groups already and there is always room to grow! More information can be located at the following website:

- http://www.amputee-coalition.org/support-groups-peer-support/support-group-network/
1. Name 3 techniques that an occupational therapist (or any therapist) should teach someone who has a prosthetic device. refer to page... 74 under education

2. When first wearing a prosthetic, what is the average amount of time it should be worn at any given time?
   a. 15-20 minutes
   b. 5 minutes
   c. 7-10 minutes
   d. 30 minutes

3. Once the client develops tolerance, how long should he or she be able to wear the prosthetic a day?
   a. 5 hours
   b. 15 hours
   c. 8 hours
   d. 16 hours

4. Does knowledge on the prosthetic device ease the users fear or make it more intense?
   a. More intense
   b. Fear decreases

Answers found in Appendix B

(It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
I. Referral
   a. Janie was referred to you by her psychologist for increased anxiety about using her prosthetic device.

II. Occupational Profile
   b. Janie is a 25 year old who experienced a wrist disarticulation 6 months ago after being in a car accident. Although this was the greatest extent of her injuries, she has had a lot of difficulty adjusting to everyday life. You find out that Janie was given her prosthetic device followed by 1 week of therapy and no education at all. She enjoys knitting, riding horse, and playing basketball.

III. Client Factors & Performance Skills
   c. Janie has increased anxiety completing everyday tasks as she is unsure of how to do it. She also is afraid of failing so she has been letting her mother help her with everything. Janie does not experience anymore pain, besides some occasional phantom pain that she reports as not being bothersome.

IV. Interventions
   d. What assessment(s) would be appropriate for Janie and why?

   e. What is the most important thing, in your opinion, to address first?

   f. What did the previous therapist miss?

   Answers found in Appendix B

   (It is recommended you try to find the answers without looking at the answers. It will help reinforce your learning)
Supplemental Articles/Book References

- Amputee Coalition Website
  - http://www.amputee-coalition.org
Quizlet Break!
Test Your Overall Understanding, Comprehension, and Ability to Apply The Material...
Go to Quizlet.com
Test 1: Search Prosthetics
Complete Flashcards Created By sarah_klug
Test 2: Search Prosthetics
Complete Flashcards Created By o0giselle0o
Test 3: Search Amputations and Prosthetics
Complete Flashcards Created By rae1353
References


Appendix A

Assessments
### OPUS UPPER EXTREMITY FUNCTIONAL STATUS

#### I. Please indicate your affected limb(s).
- [ ] Left arm
- [ ] Right arm
- [ ] Both arms

#### II. How many hours per day do you currently wear your prosthesis or orthosis? ______

#### III. Using the scale to the right, please indicate how easily you perform the following activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Very easy</th>
<th>Easy</th>
<th>Slightly difficult</th>
<th>Very difficult</th>
<th>Cannot perform activity</th>
<th>Not applicable</th>
<th>Using</th>
<th>Not using</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wash face</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. Put toothpaste on brush and brush teeth</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3. Brush/comb hair</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4. Put on and remove t-shirt</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5. Button shirt with front buttons</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6. Attach end of zipper and zip jacket</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7. Put on socks</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8. Tie shoe laces</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9. Drink from a paper cup</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10. Use fork or spoon</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11. Cut meat with knife and fork</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>12. Pour from a 12 oz can</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>13. Write name legibly</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14. Use scissors</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### OPUS UPPER EXTREMITY FUNCTIONAL STATUS

#### III. Using the scale to the right, please indicate how easily you perform the following activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Very easy</th>
<th>Easy</th>
<th>Slightly difficult</th>
<th>Very difficult</th>
<th>Cannot perform activity</th>
<th>Not applicable</th>
<th>Using</th>
<th>Not using</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Open door with knob</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Use a key in a lock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Carry laundry basket</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Dial a touch tone phone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Use a hammer and nail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Fold bath towel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Open an envelope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Stir in a bowl</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Put on and take of prosthesis or orthosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Open a bag of chips using both hands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Twist a lid off a small bottle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Sharpen a pencil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Peel potatoes (or fruit) with a knife/peeler</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Take bank note out of the wallet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### IV. Do you usually perform this activity using or not using your prosthesis or orthosis?
The Patient-Specific Functional Scale

This useful questionnaire can be used to quantify activity limitation and measure functional outcome for patients with any orthopaedic condition.

Clinic to read and fill in below: Complete at the end of the history and prior to physical examination.

Initial Assessment:

I am going to ask you to identify up to three important activities that you are unable to do or are having difficulty with as a result of your ___________ problem. Today, are there any activities that you are unable to do or having difficulty with because of your __________ problem? (Clinician: show scale to patient and have the patient rate each activity).

Follow-up Assessments:

When I assessed you on (state previous assessment date), you told me that you had difficulty with (read all activities from list at a time). Today, do you still have difficulty with: (read and have patient score each item in the list)?

Patient-specific activity scoring scheme (Point to one number):

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unable to perform activity

Able to perform activity at the same level as before injury or problem

(Date and Score)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>Additional</td>
<td></td>
</tr>
<tr>
<td>Additional</td>
<td></td>
</tr>
</tbody>
</table>

Total score = sum of the activity scores/number of activities
Minimum detectable change (90%CI) for average score = 2 points
Minimum detectable change (90%CI) for single activity score = 3 points


Reproduced with the permission of the authors.
What is this survey about?
This questionnaire looks at different aspects of having a prosthesis. The information gathered will be used to improve our understanding of aspects of prosthesis use and to assist in the development of better services for prosthesis users.

Who should complete the questionnaire?
The questionnaire should be completed by the person with a prosthesis. However, if the person needs help to complete the questionnaire, the answers should be given from his/her point of view – not the point of view of the person who is helping.

How to complete the questionnaire?
Please answer every item as honestly as you can. For each question, please tick clearly inside one box using a black or blue pen. Don’t worry if you make a mistake; simply cross out the mistake and put a tick in the correct box. There are no right or wrong answers.

Your answers will be treated in strictest confidence


Preliminary information on using the TAPES with people with acquired upper limb amputation is available in ‘A guide to the TAPES’ (p7) and in: Desmond, D. M., & MacLachlan, M. (2005). Factor structure of the trinity amputation and prosthesis experience scales (TAPES) with individuals with acquired upper limb amputations. American Journal of Physical Medicine & Rehabilitation, 84(7), 506-513.

This is a questionnaire designed to investigate different aspects of having a prosthesis. Please answer every item as honestly as you can. There are no right or wrong answers. Your responses will remain confidential.

1. Client Name: ______________________________

2. Client date of birth: ______________________

3. Are you male... [ ]
   female... [ ]

4. How long ago did you have your amputation?
   __________________ years ____________ months
   (If you have had more than one amputation surgery
   please refer to your first amputation surgery).

5. How long have you had a prosthesis?
   __________________ years ____________ months

6. How long have you had the prosthesis that you wear at the moment?
   __________________ years ____________ months

7. What type of prosthesis do you have? (Please tick the appropriate box)
   Below-Knee [ ]           Below-elbow [ ]
   Through-Knee [ ]         Through-elbow [ ]
   Above-Knee [ ]           Above-elbow [ ]
   Other (please specify) _____________________________

8. What was your amputation a result of? (Please tick the appropriate box)
   Peripheral Vascular Disorder [ ]
   Diabetes [ ]             Cancer [ ]
   Accident [ ]             Other (please specify) _____________________________
Part I

Below are written a series of statements concerning the wearing of a prosthesis. Please read through each statement carefully. Then **tick the box** beside each statement, which shows how strongly you agree or disagree with it.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I have adjusted to having a prosthesis</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>2.</td>
<td>As time goes by, I accept my prosthesis more</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>3.</td>
<td>I feel that I have dealt successfully with this trauma in my life</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>4.</td>
<td>Although I have a prosthesis, my life is full</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>5.</td>
<td>I have gotten used to wearing a prosthesis</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>6.</td>
<td>I don't care if somebody looks at my prosthesis</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>7.</td>
<td>I find it easy to talk about my prosthesis</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>8.</td>
<td>I don't mind people asking about my prosthesis</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>9.</td>
<td>I find it easy to talk about my limb loss in conversation</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>10.</td>
<td>I don't care if somebody notices that I am limping</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>11.</td>
<td>A prosthesis interferes with the ability to do my work</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>12.</td>
<td>Having a prosthesis makes me more dependent on others than I would like to be</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>13.</td>
<td>Having a prosthesis limits the kind of work that I can do</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>14.</td>
<td>Being an amputee means that I can't do what I want to do</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>15.</td>
<td>Having a prosthesis limits the amount of work that I can do</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>
The following questions are about activities you might do during a typical day. Does having a prosthesis limit you in these activities? If so, how much? Please tick the appropriate box.

<table>
<thead>
<tr>
<th></th>
<th>Yes, limited a lot</th>
<th>Limited a little</th>
<th>No, not limited at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(b)</td>
<td>climbing several flights of stairs</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(c)</td>
<td>running for a bus</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(d)</td>
<td>sport and recreation</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(e)</td>
<td>climbing one flight of stairs</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(f)</td>
<td>walking more than a mile</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(g)</td>
<td>walking half a mile</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(h)</td>
<td>walking 100 metres</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(i)</td>
<td>working on hobbies</td>
<td>[2]</td>
<td>[1]</td>
</tr>
<tr>
<td>(j)</td>
<td>going to work</td>
<td>[2]</td>
<td>[1]</td>
</tr>
</tbody>
</table>
Please tick the box that represents the extent to which you are satisfied or dissatisfied with each of the different aspects of your prosthesis mentioned below:

<table>
<thead>
<tr>
<th></th>
<th>Colour</th>
<th>Not satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>Shape</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv)</td>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v)</td>
<td>Usefulness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi)</td>
<td>Reliability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii)</td>
<td>Fit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(viii)</td>
<td>Comfort</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please circle the number (0-10) that best describes how satisfied you are with your prosthesis?

0  1  2  3  4  5  6  7  8  9  10

Not at all  Very Satisfied
Satisfied

Part II

(For the following questions, please tick the appropriate boxes)

1. On average, how many hours a day do you wear your prosthesis? __________ hours

2. In general, would you say your health is:
   Very Poor [ ]  Poor [ ]  Fair [ ]  Good [ ]  Very Good [ ]

3. In general, would you say your physical capabilities are:
   Very Poor [ ]  Poor [ ]  Fair [ ]  Good [ ]  Very Good [ ]

4(a) Do you experience **residual limb (stump) pain** (pain in the remaining part of your amputated limb)?
   No [ ] .... (If no, go to question 5)
   Yes [ ] .... (If yes, answer part (b), (c), (d) and (e))

   (b) **During the last week**, how many times have you experienced stump pain? __________

   (c) How long, on average, did each episode of pain last? __________

   (d) Please indicate, the average level of stump pain experienced **during the last week** on the scale below by ticking the appropriate box:

   Excruiciating [ ]  Horrible [ ]  Distressing [ ]  Discomforting [ ]  Mild [ ]

   (e) How much did stump pain interfere with your normal lifestyle (eg. work, social and family activities) **during the last week**?

   A Lot [ ]  Quite a Bit [ ]  Moderately [ ]  A Little Bit [ ]  Not at All [ ]
5. (a) Do you experience **phantom limb pain** (pain in the part of the limb which was amputated)?
   No [ _ ] .... (if no, go to question 6)
   Yes [ _ ] .... (If yes, answer part (b), (c), (d), and (e))

   (b) During the last week, how many times have you experienced phanom limb pain? ______

   (c) How long, on average, did each episode of pain last? ______

   (d) Please indicate the average level of phantom limb pain experienced during the last week on the scale below by ticking the appropriate box:

   (e) How much did phantom limb pain interfere with your normal lifestyle (e.g. work, social and family activities) during the last week?

6. (a) Do you experience any other **medical problems** apart from stump pain or phantom limb pain? No [ _ ]
   Yes [ _ ] (If yes, answer part (b), (c), (d), (e), (f) and (g))

   (b) Please specify what problems you experience ________________________________

   (c) During the last week, how many times have you suffered from these medical problems? ______

   (d) How long, on average, did each problem last? ______

   (e) Please indicate the level of pain experienced as a result of these problems during the last week on the scale below by ticking the appropriate box:
(f) How much did these medical problems interfere with your normal lifestyle (e.g. work, social and family activities) during the last week?

A Lot [ ] Quite a Bit [ ] Moderately [ ] A Little Bit [ ] Not at All [ ]

(g) Do you experience any other pain that you have not previously mentioned?

No [ ]
Yes [ ]
If yes, please specify _____________________________

7. Did you complete this questionnaire: (please tick the appropriate box)

on your own? [ ]
with assistance? [ ]

8. Date of Completion: ________________________

Please check that you have answered all the questions. Thank you for all your help.
Appendix B
Comprehension Quiz and Application Case Study Answers
Comprehension Quiz Unit 1

1) What level of amputation involves the arm, scapula and clavicle?
   __ Forequarter __________________________

2) What level of amputation cuts through the radius and ulna?
   __ Transradial __________________________

3) What type of socket goes with this level of amputation?
   __ Standard Forearm ______________________

4) What type of terminal device provides 20-40 pounds of pinch force?

   *Electrically Powered Terminal Device Prehensors*

5) What does a hybrid prosthesis do?
   - Uses motions proximal to the amputation to operate the prosthetic through a cable
   - Electrical signals are produced from muscle contractions to operate the terminal device
   - Combination of body powered and myoelectric prosthetics. Often uses a body powered elbow device and a myoelectric terminal device

Matching:

   B  Amputee Coalition
   D  Amputation
   A  Assessment
   E  Prosthetic
   C  Prosthesis

Application Case Study Unit 1

Prosthesis: Myoelectric (Due to the shoulder pain. Body powered requires use of repetitive shoulder movements and we do not want to further injure his shoulder.)

Terminal Device: Voluntary Closing (Allows for strong, sustained grip force for welding, and holding a hockey stick.)

Socket: Conventional Socket (Due to his Transhumeral level)
Comprehension Quiz Unit 2

Match the assessment with the description

__B__  Box and Blocks Test of Manual Dexterity
__D__  Worker Role Interview
__A__  Activities Measure for Upper Limb Amputees
__C__  Trinity Amputation and Prosthetics Experience Scale

A. An observational assessment in which an OT scores a client on the speed, movement quality, skillfulness, and independence using a prosthetic during ADLs.
B. A timed test that assesses hand dexterity
C. A self-report that measures prosthetic satisfaction, based on reliability, comfort, fit, looks of the prosthesis, and general satisfaction
D. An assessment used to look at a client’s psychosocial and environmental aspects to enable that individual to get back to his or her job

1. What occupation-based physical assessment would be appropriate to use with a client who has received a myoelectric prosthesis?
   • The Assessment of Capacity for Myoelectric Control

2. Which assessment was initially made for use with children with prosthetics, but has been used and tested in adult populations?
   • New Brunswick Measure of Prosthetic Skills and Spontaneity

3. What assessment would be appropriate for an adult who recently had an amputation and is having trouble adjusting to the activities they used to do?
   • Role Change Assessment

4. Which self-report, physical assessment includes both physical and psychosocial satisfaction scales?
   • Trinity Amputation and Prosthetics Experience Scale

Application Case Study Unit 2

Physical Evaluation(s): ROM assessment in addition to the Activities Measure for Upper Limb Amputees to assess performance in ADLs.

Psychosocial Evaluation(s): Worker Role Interview to assess psychosocial and environmental components that may impact his ability to return to work.

Occupations to focus on: ADL’s that include hygiene tasks and dressing. Once he is competent in these areas you can move forward to addressing his work goals.
Comprehension Quiz Unit 3 Physical Intervention

**Match** the intervention activity with each phase of prosthetic rehabilitation.

A. **Phase 1**
   - Scar massage and wound dressing

B. **Phase 2**
   - A work assessment and community outing

C. **Phase 3**
   - Practicing using a prosthetic to put on deodorant

D. **Phase 4**
   - One-handed dressing techniques and adaptive equipment training

1) What direction and tightness is elastic wrapping done in?
   - Starting Distal and moving to proximal, Starting tight and moving to loose

2) Which one is not an example of a desensitization technique?
   - Mirror therapy

3) What is an intervention in phase 4 of prosthetic rehab?
   - Leisure activity training

4) How often does a client wear an elastic shrinker?
   - When sleeping and when not wearing prosthetic

5) What is the focus of phase 3 of prosthetic rehab?
   - Basic training with the prosthetic

6) What is biofeedback and when is it used?
   - Biofeedback is the system a therapist uses to find viable muscles that will be used to control a myoelectric prosthesis.

**Application Case Study Unit 3 Physical Interventions**

1) Phase 3- Prosthetic Phase
2) Anything related to learning to use the prosthetic or learning to do basic ADLs. Example- using the prosthetic to complete grooming, dressing, or eating.
3) Mirror therapy, Electric stimulation
4) Working on getting back to knitting, her quilting group, or volunteering at the animal shelter. Whether building skills or adapting the activities.

Work on the skills she would need to get back to work as a nurse or the accommodations that should be made at work.
Comprehension Quiz Unit 3 Psychosocial Interventions

1. What is one of the most important things to have when receiving a new prosthetic device?
   - Family support
2. Individuals who experience a limb loss have the highest chance of what disorder?
   - Anxiety
3. Individuals who use problem solving experience fewer depressive symptoms.
   - True
4. What helped individuals experience less depression and anxiety?
   - Instruction on approaching everyday problems

Case Study Unit 3 Psychosocial Interventions

What assessment is most appropriate to assess Billy’s current state of mind: Role Change assessment would be appropriate as Billy has experienced a change in his roles. This will compare his past and present participation in his everyday life roles and he can make goals based on what is found.

What interventions would be appropriate and why: Roleplay would be a useful intervention to help Billy prepare for his play coming up. This will help him build confidence in himself which can also decrease his anxiety.

What are some reasons Billy may be feeling so much anxiety and how can you help ease his fears: Addressing Billy’s anxiety first is important. Acknowledge his fears, but help him develop confidence in his own abilities and characteristics. Billy is unsure of what other people are going to think of his prosthetic, and he has not been able to functionally use his hand for 4 months. This leaves him fearful of messing up once he begins trying new things.
Comprehension Quiz Unit 4

1. Name 3 techniques that an occupational therapist (or any therapist) should teach someone who has a prosthetic device. refer to page... 74 under education

2. When first wearing a prosthetic, what is the average amount of time it should be worn at any given time?
   • 15-20 minutes

3. Once the client develops tolerance, how long should he or she be able to wear the prosthetic a day?
   • 8 hours

4. Does knowledge on the prosthetic device ease the users fear or make it more intense?
   • Fear decreases

Case Study Unit 4

What assessment(s) would be appropriate for Janie and why: The Canadian Occupational Performance Measure (COPM) would be an appropriate assessment to begin with. The COPM will help Janie develop personal goals and to start small before tackling her leisure interests. However, this is not the only assessment appropriate.

What is the most important thing, in your opinion, to address first: Education should be addressed first. Janie needs to be educated on her prosthetic (what it does, how it works, what the pieces are). This gives her a foundation and an understanding of her prosthetic she will most likely have for life. It also helps her develop confidence and decrease her anxiety.

What did the previous therapist miss:
Educating Janie on her prosthetic device.
Appendix C
Picture Use Permission
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Thanks!

Chelsea de Bruto
James Goff Jr, CP

Certified Prosthetist/Owner

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www.prosindiana.com
Julie Jordan Brown <medart@earthlink.net>

To:
de Bruto, Chelsea;

Sun 11/8/2015 6:00 PM
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Thank you for your interest,

Julie

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---

de Bruto, Chelsea

Reply all

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info@medicalartresources.com;

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here ist the picture you asked for.

Please write a "copyright by ottobock" under the picture.

Thank you!

Yours sincerely

Antje Grammel

Ottobock Germany

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Email: kayla_oates@hotmail.com

COMPANY INFORMATION
add notes to your receipt (optional)

ORDER DETAILS
Order Number: 5608156
Date: October 28, 2015
Payment Method: Credit Card
Card Ending In: 5691

ORDER SUMMARY

<table>
<thead>
<tr>
<th>Subscription Plan</th>
<th>Price</th>
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<tbody>
<tr>
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<td>$0.00</td>
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Starts: October 28, 2015 4:12:42 PM EDT
Ends: November 4, 2015 3:12:41 PM EST

Total: $0.00

[Email] [Print]
Appendix D
Psychosocial Worksheets
## Self-Esteem Weekly Journal

<table>
<thead>
<tr>
<th>Mon.</th>
<th>Something that went well today...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A fun part of my day was...</td>
</tr>
<tr>
<td></td>
<td>Something I did for someone else...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tues.</th>
<th>Something interesting about today was...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Today I felt proud when...</td>
</tr>
<tr>
<td></td>
<td>Today I had a positive experience with...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wed.</th>
<th>Something positive that I saw today was...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Today I had fun when...</td>
</tr>
<tr>
<td></td>
<td>Someone else that I was proud of today was...</td>
</tr>
</tbody>
</table>

Adapted from TherapistAid.com (2014)
<table>
<thead>
<tr>
<th>Day</th>
<th>Activity</th>
<th>Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurs</td>
<td>Today I accomplished...</td>
<td>I felt proud of myself when...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Today I was successful doing...</td>
</tr>
<tr>
<td>Fri.</td>
<td>Something interesting about today is...</td>
<td>Something I was good at today...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Something positive I experienced today...</td>
</tr>
<tr>
<td>Sat.</td>
<td>Something good that I saw today was...</td>
<td>Someone I was proud of today was...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>It felt good when I...</td>
</tr>
</tbody>
</table>

Adapted from TherapistAid.com (2014)
<table>
<thead>
<tr>
<th>Sun.</th>
<th>Today I helped someone...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I was proud of myself when...</td>
</tr>
<tr>
<td></td>
<td>I had fun today...</td>
</tr>
</tbody>
</table>

Adapted from TherapistAid.com (2014)
Positive Experience Journal

Write about a time in the last week that you displayed the following characteristics.

<table>
<thead>
<tr>
<th>Kindness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td></td>
</tr>
<tr>
<td>Trustworthy</td>
<td></td>
</tr>
<tr>
<td>Sacrifice</td>
<td></td>
</tr>
<tr>
<td>Selflessness</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from TherapistAide.com (2015)
<table>
<thead>
<tr>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisdom</td>
</tr>
<tr>
<td>Honest</td>
</tr>
<tr>
<td>Courage</td>
</tr>
<tr>
<td>Love</td>
</tr>
<tr>
<td>Loyal</td>
</tr>
</tbody>
</table>

Adapted from TherapistAide.com (2015)
Progressive Muscle Relaxation Script
(When reading the script, speak a comforting tone, and slow speaking rate.)

Progressive muscle relaxation is a way to reduce your anxiety and stress. During this relaxation strategy you will slowly tense and relax the muscle group read in the following interaction. Do not tense your muscle to the point of discomfort or pain. You may stop at any time. Now we will begin...
Start sitting or lying down in a comfortable position allowing all of the tension to fall away from your body...

You can close your eyes if you would like when you are comfortable...

Take a deep, slow breath focusing on lungs filling with air...

Now let that breath out slowly... You can feel the tension leaving your body...

Take in another breath... and let it out... Remember to keep breathing...

Focus on your feet, flex your toes by curling your toes in for 5 seconds... Now release your muscles and pay attention to how those relaxed muscles feel...

(Pause for 7 sec)

Now we will move on to your legs...Tense your calves by pointing your toes (5 sec)...Then release your calves focusing on the tension melting away...

(Pause for 7 sec)

Next, flex your thighs and buttocks by squeezing your knees together and tensing the muscles in your buttocks...(5 sec)... and release the tension...

(Pause for 7 sec)

Start to tense your stomach and chest by sucking in your stomach while taking in a deep breath and holding that for 5 sec... and release and let the relaxation wash over your body...

(Pause for 7 sec)

Remember to keep taking deep breaths as we continue...

Adapted from TherapyAide.com (2015); Adapted from The Anxiety & Phobia Workbook, by Edmund J. Bourne
We are moving on to the back now...slowly tense the muscles in your back by pulling your shoulder blades together, arching your back...(5 sec)... And now relax and feel the muscles relaxing in your body...

(Pause for 7 sec)

Now flex your triceps by locking your elbows visualizing your muscles contracting... and hold that for 5 sec...and relax the muscles...

(Pause for 7 sec)

Next flex you are going to flex your biceps... bending your elbow as tight as it will go...(5 sec)... and release feeling the limpness in your arms...

(Pause for 7 sec)

Begin clenching your fists tight...(5 sec)... and then let go...

(Pause for 7 sec)

Now we will move on to the head...you will tense the muscles in your neck by looking up at the ceiling...(5 sec)... and release the muscles, letting the tension fall away...

(Pause for 7 sec)

Next tense your eye muscles by squinting with your eyes tightly shut...(5 sec)... and release...

(Pause for 7 sec)

Start to flex the muscles in your forehead by raising your eyebrows as high as you can...(5 sec)... and release...paying attention to how your relaxed muscles feel...

(Pause for 7 sec) Finally... tense your whole body... from the top of your head to the tip of your toes...hold that tension...(5 sec)... and relax feeling your whole body go limp...

Feel the all of the tension leave your body and notice how heavy you feel... breathing in and out slowly...allow yourself to slowly wake up...

And once you feel you are ready, go ahead and open your eyes.

Adapted from TherapyAide.com (2015); Adapted from The Anxiety & Phobia Workbook, by Edmund J. Bourne
CHAPTER V

SUMMARY

Purpose

The purpose of this scholarly project was to bridge the gap in education for occupational therapy students on the topic of prosthetic rehabilitation. In a study by Mitchell et al. (2014) it was found that an average of only three to five hours are spent on prosthetics education, but 85% of the participants categorizing the topic as very important in occupational therapy education. It is evident that the amount of time spent in class is insufficient according to this statistic, which is what led to the development of the product.

The product of this scholarly project is the *Prosthetics Guide for Occupational Students and New Graduates* is meant to enhance prosthetic training knowledge in future or present occupational therapy practitioners so they can feel comfortable and competent treating an individual with an amputation or prosthetic. The guide includes information regarding general information and prosthetic components, information on evaluation and assessments to use, physical and psychological intervention ideas, and additional information that is important to know for the occupational therapy prosthetic rehabilitation process.

One of the strengths of the *Prosthetics Guide for Occupational Therapy Students and New Graduates* is that it is a good supplement to a occupational therapists base knowledge of prosthetics rehabilitation. The guide covers a wide variety of topics related occupational therapy prosthetic rehabilitation. It also contains additional resources that can be taken out of the guide and used in the therapy process, such as intervention materials and assessments. The final
strength of this scholarly project is that the guide was created with many different learning styles. The authors included various media including figures, tables, added Quizlets, video links, quizzes, case studies, additional readings, and worksheets and assessments. This will allow for a larger variety of individuals who are able to use and benefit from the information provided.

Limitations

While the guide does cover a wide variety of topics, a weakness is that it is not a comprehensive, or all encompassing, tool that contains all of the possibilities in occupational therapy rehabilitation. The user should use the information in this guide with discretion for each individual client. An additional weakness is that the authors do not have clinical experience in the area of prosthetics. This means that the guide could be lacking clinical judgement or interventions based on anecdotal evidence. The final weakness is that the guide is not peer reviewed by a review board. This decreased the validity or psychometric properties of the project. Due to these two factors the Prosthetics Guide for New Graduate Occupational Therapy Students and New Graduates is not as psychometrically sound.

Implementation

It is the hope that this guide is implemented on at an academic level for students and at personal level for new graduates. Occupational therapy departments or individuals can purchase the guide and use as necessary, whether it be to further knowledge, for homework assignments, or to plan prosthetic. There are not many roadblocks or barriers to implementing the use of this guide other than the therapist's willingness to change or be an independent learner.

Conclusion

Overall, the Prosthetics Guide for Occupational Therapy Students and New Graduates is meant to provide additional knowledge for occupational therapy students and new graduates who
may be lacking in this area of practice. Usefulness and outcomes of the guide will be measured with the use of a voluntary survey added to the end of the guide that will contain likert scales related to satisfaction, usefulness, and an additional comments section. The authors have included an address the user can mail the survey to for continuous quality management.

**Recommendations**

First, it is the authors hope to get the Prosthetics Guide for Occupational Therapy Students and New Graduates peer reviewed, make changes as needed, and get it published. Some ideas for this would be to have the guides effectiveness evaluated and to expand the areas more comprehensively. Second, it is also a hope of the authors to get the guide widely marketed to reach as many occupational therapy students or novice practitioners possible. In the future there is potential for scholarly collaboration. Lastly, future students or practitioners could carry out the interventions or assessments included in the guide to further test their efficacy. The authors could also collaborate with other practitioners or students to address the lack of clinical experience or judgment.
REFERENCES


10.1177/0309364614554032:


http://dx.doi.org/10.1016/j.apmr.2012.10.004


doi:10.1016/j.apmr.2007.08.148


doi:10.1016/S0894-1130(88)80036-X


Appendix
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Best wishes with your project and please let me know if I can be of further assistance.

Andrea

Andrea Spridgen, Editor in Chief
The O&P EDGE
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Fax: 303.255.0844
E-mail: andrea@opedge.com
Http://www.oandp.com/edge

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