2004

Client and Therapist Guidelines for Comprehensive Outpatient Upper Extremity Burn Injury Home Program and Protocol

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A Scholarly Project

Submitted to the Occupational Therapy Department

of the

University of North Dakota

in partial fulfillment of the requirements for the degree of

Masters of Occupational Therapy

Grand Forks, North Dakota

May

2004

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Chapter One

Introduction

Burn survivors are discharged from acute care and treated as outpatients with occupational therapy services earlier in their healing process than in the past. The result is that clients are having to take on the additional responsibility of a much more complicated home program treatment regimen in addition to just dealing psychologically and emotionally with their injury. Research indicated that many burn injured clients often neglect compliance with home programs for various reasons which will be presented and discussed in the literature review. There is a need for a more comprehensive approach and home program for burn clients with easy to understand treatment information that addresses issues of non-compliance.

The focus of the literature review was to research outpatient burn treatment issues as well as barriers to client compliance with traditional home programs. The research was then organized into a final product that incorporates the traditional home program topics and organizes the information to address client limitations and encourage compliance. The three main areas that challenge compliance include pain management, time management with emphasis on "normal" lifestyle, psychosocial issues. The research also indicates increased compliance with home programs when the principles of adult learning and literacy are incorporated.

The purpose of the scholarly project was to design a burn injury outpatient treatment protocol for the therapist and a comprehensive home program guideline for the client.

Currently, occupational therapists do not utilize comprehensive educational modules with burn injured clients in outpatient services. The client home program is to serve as a tool to increase the client's awareness of factors that are pertinent to their burn injury and maximize their healing process. The therapist guide is to provide the medical professional with an overview of treatment protocols that apply to burn injured clients.

Chapter Two

Review of Literature

> *Efforts to contain healthcare costs have led to increasingly shorter stays in hospitals and rehabilitation centers and a reduction in community-based and home care visits by health professionals. Clients are expected to take a more active role in their therapy programs and to supplement formal treatment with self-directed treatment (eg, home programs). Treatment outcomes need to be established with estimate of the client's capacity to follow-through with a self-directed program in mind, as this will greatly influence the success of treatment (Neistadt & Crepeau, p.332, 1998).*

As individuals pursue acute medical treatment for burn injury care, there are many healthcare professionals involved in the client's recovery from admission to scar maturation. However, there are increasing expectations that the clients will take more responsibility for their post-injury healing process as the hospital stay shortens and the client returns home. Due to the minimal hospital stay, burn clients find that the majority of the post-injury physical and emotional healing occurs at home. For this reason, the client's performance of a home-based exercise and treatment program is a critical component of the rehabilitation process, to prevent disuse and subsequent stiffness, disability and emotional distress (Kirwan, Tooth & Harkin, 2002). The best-constructed rehabilitation program can only be as effective as the degree to which the client complies with the treatment recommendations of the healthcare professionals (Kirwan et al., 2002). The literature review will show that although client compliance is a vital factor, it is not the only factor to consider when developing materials that can positively influence compliance.

Client Compliance

Client Perceptions and Expectations

A home exercise or self-treatment program for outpatients encourages responsibility, self-management and also allows the client the freedom from a rigorous or inconvenient treatment schedule at the healthcare facility. Non-compliance, or the lack of participation in the scheduled home program, not only affects the recovery and functional abilities of clients, but also wastes health care resources by increasing costs of hospitalization, professional services and medications (Kirwan et al., 2002). In the past, medical professionals and researchers have blamed non-compliance with home programs on the client. Healthcare professionals attributed non-compliance to the client's laziness, lack of motivation, ignorance, incompetent skills and forgetfulness. A study was conducted to dispel this myth and understand the *clients'* perceived factors in why they had difficulty with follow through of the assigned home program (Kirwan et al., 2002). The results of the study indicated that the clients' reasons for non-compliance with treatment were; 1) the home-program interfered with family or social life, 2) they do not have enough time for the home program and 3) pain is an issue while working on the home program (Kirwan et al., 2002). There was considerable difference between the assumptions of professionals' views of non-compliance and the clients' reasons for non-compliance. This research contributes to the clinical therapists' understanding of the real issues that clients have with working on their home program.

A second barrier related to the client's non-compliance are the expectations of the client. In 2001, research by Lund, Tamm and Brandholm was conducted to find how well clients

responded to educational feedback and rehabilitation programming. The discovery was that the client's view of the entire health care system effects how they perform self-exercise and suggested home programs (Lund et al., 2001). Literature shows that there are clients who are willing to contribute to their own therapy and treatment by spending time with their home programs and there are also clients who still believe that their efforts are unimportant in their healing process as well as unnecessary (Lund et al., 2001). Despite education, demonstration and a team approach to encourage the home program or self-exercise, these clients believe there should be a quick medical fix for their problems that can be prescribed by a doctor and requires no effort on their part (Lund et al., 2001). All of these issues are relevant for the clinical occupational therapist as he/she has the responsibility to assist, encourage and educate the client about the home program to help improve the client's healing process.

Design to Increase Compliance

The literature identifies factors that contribute to improving compliance through the appropriate design of the home program. These factors include: motivation and support, adult literacy level and the needs of an adult learner, the client's culture, and treatment specific topic areas, which are combined with the need for follow-up and support to facilitate client responsibility.

These factors are interdependent so effectiveness will decrease considerably when one or more factors is not addressed or addressed in completely. These factors are presented and discussed as follows:

Motivation and Support

Literature specific to teaching adults identifies effective methods to stimulate motivation while providing necessary support. Motivation is a large piece of the compliance factor because adult learners typically want to see reasons why their learning is beneficial. In *Helping Adults Learn and Change,* Russell Robinson (1995) reflects on the target motivation factors for the adult population. Robinson proposes that education delivery should address attitudes toward self and the experience, the specific needs of the individual, and ongoing stimulation and follow-through or interest in the topics. Once the learner is involved in learning and practicing he/she will complete the learning process by proving competence in the areas practiced and by reinforcement from investing in the practice.

Adult Literacy

All of the confidence and self-esteem will provide little advantage and opportunity for success in the educational material is not designed to meet the needs of the learner. The literature indicates that there are several factors for consideration when designing adult literature, these factors include: how to write, organize and teach the information, the client's age, the client's culture and the client's appropriate literature level (Washington Department of Health, 2003; AMC Cancer Center, 1994). Doak & Doak (p.2, 2002) presents data that suggests:

> "people with marginal literacy skills (1) make more medication or treatment errors, (2) are less able to comply with treatments, (3) fail to seek preventative care, and (4) lack the self-empowerment needed to successfully negotiate today's healthcare system. A conservative estimate places excess health care costs due to low literacy at 30 billion dollars a year."

The characteristics of individuals with low literacy include: taking words literally, reading slowly and misunderstanding the meaning, skipping over hard words, missing the context and tire quickly (Doak & Doak, 2002). Literacy not only affects how we understand text, but also how we interpret pictures and visual images. Characteristically, individuals with low literacy interpret visuals literally, have difficulty because their eyes wander without finding a central focus, skip key features on a page and get lost in details rather than main features.

The need to ensure that all written health educational material meets the needs of a variety of literacy levels is imperative. It is also imperative to ensure that all verbal communication is presented in a fashion that meets the needs of the learners at a variety of levels as well. Weiss, Williams, Davis & Parker (2003) developed, "Clear Health Communication Initiative, Tips for Practice." These tips are designed to improve communication with clients who have limited literacy skills. They pertain to written as well as direct personal contact and include the following (Weiss et al., p.1, 2003):

1. Limit the amount of information you give at each visit
2. Slow down when you are explaining the information to your clients
3. Avoid medical jargon and use words that the client can understand
4. Use pictures or models to explain the important concepts
5. Follow each learning experience with a 'show-me' technique
6. Encourage your clients to ask questions and/or use follow up questions to ensure they understand the information presented

In addition to these tips, the AMC Cancer Center (1994) has indicated that all written materials should be at the 6th grade reading level in order to accommodate all levels of learners.

Ensuring that these tips are included in the practice of health care and education will result in materials that more people can read, understand and use safely and effectively (Doak & Doak, 2002). The layout of the program is based on adult learning principles such as beginning with preliminary information, and moving in a progression that is logical and important to the learners (Robinson, 1995).

A home program needs to use researched principles for adult educational literature and writing guidelines. The program is designed in a format that allows the client to feel that his/her knowledge is important in regard to the burn injury rehabilitation and treatment process. Each topic provided in the home program begins with an explanation of why the information is necessary for a healthy, timely and successful healing process. The layout of the program itself is based on adult learning principles such as beginning with preliminary information and emergency contacts. Then, the program moves in a progression that is logical and important to the learners, such as starting with pain management and progressing to other more specific topics related to burn injury rehabilitation (Robinson, 1995). The home program targets the "three R's" of adult learning. The first is relevancy, which means that the resource must make sense to the learner. The second 'R' is relationship, meaning that those reading and using the home program materials will have related issues to the burn injury information through personal experience or experience of a loved one. The last requirement for successful adult learning is responsibility, the home program is a tool and resource that emphasizes self-treatment and ability over disability. The home program seeks to be as motivational as possible by providing the most up-to-date and relevant information for the burn injured client to initiate and maintain the responsibility in follow-through with the suggested treatments at home (Robinson, 1995).

Culture

In order for the home program to appeal to most clients, the program should consist of a variety of text, pictures, symbols, and language. It is important to examine all materials for potential biases of cultural exclusion because these factors will affect the clients' understanding and relevance of the materials (Doak & Doak, 2002). Cultural considerations were incorporated into the home program and the therapist guide by offering teaching tips for clients with low literacy levels, avoiding use of biased or complicated pictures, and being sensitive to additional expenses for clients.

Specific Treatment Topic Areas

This home program addresses the client's needs for pain management while performing self-treatment and normal daily activities. "Intervention for the burn client must first focus on physical comfort," (Hubick, p.13, 2003). Victims of burn injuries often have anxiety, which may cause a heightened sense of the already painful burn. If the client is given a home program that lacks information and/or resources addressing these fears and other emotions, the client will not be able to focus on completing the home program. The proposed home program provides an emphasis on these common psychological changes and emotions experienced after burn injuries. The emphasis on coping skills, support systems and suggestions for pain management at home are included in the client-literature.

Time management techniques are also included in this home program to address the obstacle of home program compliance dealing with the client's scheduling needs and

perceptions. This home program focuses on being sensitive to things that are important to the client, but also emphases the need to incorporate time each day to complete the home program. Also, this home program provides a sample schedule that the client may use to help prioritize and organize their time more effectively.

Burn Injury Home Program Protocol

The goal of this home program was to design an educational guide for burn injured clients that is stimulating and motivating for the client resulting in an interest to learn. The intent of this guide is to present an alternative approach to reach the clients who are not benefiting and complying with the current educational methods, materials and approaches. The proposed scholarly project has been based upon the principles, guidelines and suggestions found throughout the literature, which were presented earlier, and is based upon the need to accommodate all levels of learners by being written at a 6th grade level. It is the authors' belief that this home program is unique in that it has taken into consideration a wide variety of factors that other authors of educational literature have not taken into consideration. The home program guidelines protocol and recommended therapist literature are designed to maximize the client's resources, treatment recommendations and specific lifestyle information for the clients healing from a burn injury at home. The benefits of this home program are that it focuses on the main physical concerns for improving the healing process from a professional and researched standpoint, as well as addressing the motivation or compliance issues of the client by offering suggestions and tools to overcome the main reasons burn injured clients have not followed other home treatment programs in the past.

There are two separate protocols within this one scholarly project. The first protocol is designed for the client and it outlines the most relevant treatment information for his/her personal outpatient home program. The protocol includes topics and instruction for specific rehabilitative care of the burn injury as well as special topics to help the client

manage this difficult time. Each section of the protocol can be taught individually or several sections can be addressed during one treatment session.

The second protocol is designed for the occupational therapists that treat burn injured clients. This resource outlines the topics that are included in the client home program with additional information pertaining to treatment, the implications for relevance in teaching or discussion of topics and the concerns of home treatment with clients.

Protocol Contents

The following home program literature outlines the contents of the home program module/ product. The contents are designed to begin with the most common issue for burn injured clients, pain management and coping, and then progresses through treatment topics that are related and important for client's interest. Each section can stand alone or as supplemental information, so the program does not need to be read and understood all in one treatment session. It is a resourceful guide for the areas of difficulty and treatment for the burn injured client at home. The major topics addressed are:

1. A background of burn-injuries
2. Psychosocial factors and pain management
3. Physical agent modalities for understanding the inpatient and outpatient treatments and their goals
4. Dealing with scars and massage
5. Wearing and taking care of burn-pressure garments
6. Splinting
7. Therapeutic exercise

8. Cleaning the burn-wound area
9. Putting on dressings
10. Nutrition and healthy lifestyle topics

Conclusion

As treatment of burn-injuries move towards the client's natural environment at home, it is important that occupational therapists design more comprehensive treatment approaches, tools and resources. These tools and resources need to promote a higher level of access to information and higher quantity of relevant information for the client's ease and level of comfort in responsibility for home-based treatment. This home program provides relevant medical, personal, lifestyle and emotional aspects related to the healing burn injured client. With a heightened sense of sensitivity to the issues that most affect and promote compliance with the home program, this module succeeds in addressing what burn clients were missing from the other solely medical-based programs were lacking for clients with a burn injury.

References

Angelo, S. (2003). *Medical Encyclopedia: Vitamin C.* Retrieved October 15, 2003, MedLine Plus Web site: http://www.nlm.nih.gov/medlineplus/ency/article.htm

Bracciano, A.G. (2000). *Physical Agent Modalities: Theory and Application for the Occupational Therapist.* Thorofare, NJ: SLACK Incorporated.

Beyond the Brochure: Alternative Approaches to Effective Health Communication. AMC Cancer Research Center, 1994. www.cdc.gov/cancer/nbccedp/bccpdfs/pdf

Brown, C.A. (2002). The use of silicon gel for treating children's burn scars in Saudi Arabia: A case study. *Occupational Therapy International, 9*(2), 121-130.

Burns, J., Mancoll, J., Phillips, L. (2003). Impairments to wound healing. *Clinics in Plastic Surgery,* 30, 47-56.

Cartwright, A. (2002). Nutritional assessment as part of wound management. *Nutrition Plus,* 98, 44-45.

Casey, G. (2003). Nutritional support in wound healing. *Nursing Standard,* 17, 55-58.

Collins, N. (2001). Arginine and Wound Healing. *Advances in Skin and Wound Care,* 14, 16-17.

Collins, N. (2001). Estimating Caloric Needs to Promote Wound Healing. *Advances in Skin and Wound Care,* 14, 140-141.

Collins, N. (2001). Protein and wound healing. *Advances in Skin and Wound Care,* 14, 288-289.

Collins, N. (2001). Vegetarian diets and wound healing. *Advances in Skin and Wound Care,* 14, 65-66.

Doak, L.G. & Doak, C.C. (Eds.). (2002). *Pfizer Health Literacy Principles.* Retrieved September 27, 2003 from Web site: http://www.pfizer.com/improving.html

Dunford, C., Cooper, R., Molan, P., & White, R. (2000). The use of honey in wound management. *Nursing Standard, 15*(11), 63-70.

Farrell Kozera, B. (1998). **Burns.** In G.L. Clark, E.F. Shaw Wilgis, B. Aiello, D. Eckhaus, & L. Valdata Eddington (Eds.), *Hand Rehabilitation: A Practical Guide (*2nd ed., pp.29-36). New York: Churchill Livingstone.

Grandjean, A.C., Reimers, K.J, Buyckx, M.E. (2003). Hydration: Issues for the 21st Century. *Nutrition Reviews,* 61, 261-271.

Hall, P., & Schumann, L. (2001). Wound Care: Meeting the Challenge. *Journal of the American Academy of Nurse Practioners, 13*(6), 258-266.

Hubick, K.K. (2003, July 14). Psychosocial Factors in Burn Care. *Advance for Occupational Therapy Practioners, 19*(14), 13-14.

Kirwan, T., Tooth, L., Harkin, C. (2002). Compliance with hand therapy programs: Therapists' and clients' perceptions. *Journal of Hand Therapy,* 15, 31-40.

Lund, M.L., Tamm, M., Branholm, I. (2001). Client's Perceptions of their participation in rehabilitation planning and professionals' view of their strategies to encourage it. *Occupational Therapy International,* 8, 151-168.

Neistadt, M.E., & Crepeau, E.B. (Eds.). (1998). Willard & Spackman's Occupational Therapy (9th ed.). Philadelphia: Lippincott-Raven Publishers.

Reed, K.L. (2001). *Quick Reference to Occupation Therapy* (2nd ed.). Gaitherburg, MD: Aspen Publishers, Inc.

Robinson, R.D. (Ed.). (1995). Helping Adults Learn and Change. Westbend, WI: Omnibook, Co.

Scholl, D., Langkamp-Henken, B. (2001). Nutrient Recommendations for Wound Healing. *Journal of Intravenous Nursing,* 24, 124-132.

Silverstein, P. (1992). Smoking and Wound Healing. *The American Journal of Medicine,* 93, 22-24.

Sloan, R. (1996). *An easy outpatient guide to burn rehabilitation.* University of Colorado Health Sciences Center: Denver, CO. Retrieved July 17, 2003 from Web site: http://www.ncddr.org/rr/burn/burnguide.html

Sorenson, L.T., Karlsmark, T., Gottrup, F. (2003). Abstinence from smoking reduces incisional wound infection: A randomized control trial. *Annals of Surgery,* 238, 1-5.

Trombly, C.A., & Radomski, M.V. (Eds.). (2002). *Occupational Therapy for Physical Disabilities.* (5th ed.). Baltimore: Lippincott Williams & Wilkins.

Chapter Three

Activities and Methodology

An existing home program guide for burn clients was identified in the literature, but it was felt that the information was insufficient as a comprehensive outpatient treatment guide. The established program was not written to adult learning standards for health educational documents. Topics, identified as essential for burn clients such as pain management, time management and emotional wellness issues that affect compliance with a home program were not included. Further investigation was conducted to identify information pertaining to the deficient topics that have been found relevant to burn treatment. Current literatures on burn treatment topics were found in a variety of multidisciplinary information sources. Topic areas in the educational module were developed from the most pertinent information to address the needs of the clients and the multidisciplinary team.

Barriers to the access of information included a lack of public resources on splinting and pressure garments, wound cleansing and debridement. In order to supplement the lack of current information, the researchers utilized the resources of a local Certified Hand Therapist. Another area of limitation for research was in topic searches specific to upper extremity burns and not differential diagnoses. In order to find the most pertinent information, the researchers sorted and eliminated irrelevant literature in multiple times.

Chapter Four

Products

There are two separate protocols within this one scholarly project. The first protocol is designed for the client and it outlines the most relevant treatment information for his/her personal outpatient home program. The protocol includes topics and instruction for specific rehabilitative care of the burn injury as well as special topics to help the client manage this difficult time. Each section of the protocol can be taught individually or several sections can be addressed during one treatment session.

The second protocol is designed for the occupational therapists that treat burn injured clients. This resource outlines the topics that are included in the client home program with additional information pertaining to treatment, the implications for relevance in teaching or discussion of topics and the concerns of home treatment with clients.

Home Program Guidelines For Your Burn Injury

A Guide for Upper Extremity Burn Clients

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Welcome to Outpatient Occupational Therapy

There is a lot to remember about caring for your burn injury outside of therapy. A home program can seem overwhelming and time consuming. However, following these guidelines will ensure a more successful healing process. This informational booklet can help you organize important guidelines, materials and resources from your healthcare team.

In case of emergency or if you have any concerns, please contact the appropriate team member:

Doctor_____ Phone #_____

Occupational Therapist_____ Phone #_____

Dietician_____ Phone #_____

Nurse _____ Phone #_____

Physical Therapist _____ Phone #_____

Other_____ Phone #_____

Other _____ Phone #_____

Coping
With Your Burn Injury

After your burn injury, it is common to experience a variety of feelings such as fear, anger, pain, depression, withdrawal, sadness, hopelessness, frustration, guilt, and decreased self-esteem. A burn injury may cause major changes in your life. Your friends and family can also experience the same feelings you have, but by building a strong support system, sharing your feelings, and using coping strategies can lessen the added stress due to your burn injury.

Recovery from a burn not only includes physical changes, but also emotional changes within the body. Remember that it is just as important to take care of your emotional health during this stressful time. The following sections can provide you and your loved ones with information on ways to improve emotional health.

Coping Skills

Coping strategies are activities that you can do to learn more healthy ways to deal with your feelings such as stress. Being able to cope positively will help your body by relaxing your muscles and increasing your blood flow, which may increase the effectiveness of your pain medication and the healing process. The following is a list of positive coping techniques:

- Visual Imagery
- Spirituality
- Deep Breathing
- Journaling
- Support Systems

Visual Imagery

Try imagining that you are at the place where you find the most comfort, such as at home reading a book, relaxing on a tropical island, or walking in the woods. When you identify your location, focus in on the scents, sights, and feelings of your favorite place. This type of coping skill can help you relax and decrease pain levels by focusing on something other than your burn injury.

Spirituality

If spirituality is part of your routine, continue to use this form of coping to deal with the added stress of your burn injury. Spirituality includes activities or practices that motivate and inspire you such as the following:

- Religious functions (attending church, prayer groups, etc.)
- Prayer (directing your thoughts toward your higher power)
- Meditation (clearing your mind through quiet reflection)
- Yoga
- Attending a faith-based support group

Deep Breathing

Deep breathing is the process of focusing on how you breathe. You are supposed to take slow deep breaths in and then slow breaths out. This type of breathing has a consistent rhythm and focuses on the same amount of time for breathing in and out. The benefit of deep breathing is total body relaxation because the body gets more oxygen in the bloodstream, which has calming effects and decreases tension. Steps of deep breathing include:

- Sit up straight, either on a chair or cross-legged on the floor
- Let your hands rest on your lap
- Breathe in slowly and deeply for 6-8 seconds
- Hold your breathe for 1-2 seconds
- Breathe out slowly for 6-8 seconds
- Repeat

Journaling

Journaling is a good way to talk about what you're feeling by writing it down. It offers you a chance to say things that you may not be able to say to another individual. Some journaling tips include the following:

- Keep your journal entries in one place such as a folder or a special notebook
- Put a date on each entry, which helps you to reflect on past experiences and progress over time
- Write quickly and don’t erase any thoughts because these may be issues you want or need to address later
- Schedule a time during the day or week where you can focus on journaling activities in a place without distractions

Support Systems

Support systems refer to the important people in your life that you look to for encouragement and help when faced with life challenges. These individuals and groups of people offer their time, talents, and compassion as they help you to overcome obstacles related to your burn injury.

- *Self-esteem: Supporting Yourself*
  The burn injury can impact your body image as well as your emotional state. During the rehabilitation stage, which can last years, you may be at higher risks for self-esteem issues. Self-esteem is your ability to have satisfaction and competency in your daily routine. Although, seeking help from other people can be beneficial, there may be times when you need to or want to rely on yourself for encouragement.

- *Relationships with Friends and Family*
  Talking to your friends and family about your experiences, fears, and expectations during burn recovery is one of the most important aspects of healing. Your friends and family care about your physical and emotional well-being and are willing to listen to your thoughts and provide help whenever possible. Sharing your experiences with others decreases the stress involved in coping with life changes all on your own.

- *Burn Injury Support Groups*
  Another option burn survivors may explore is burn support groups, where burn survivors and families can meet other burn survivors and their families to offer encouragement and discuss issues that they are dealing with currently.

Leisure

One of the most common areas affected by your burn injury is the ability to participate in your regular leisure activities. Burn rehabilitation treatment and recovery can be a long, stressful, and painful process. Leisure is important to every individual because it provides an outlet from these obstacles.

Identifying Your Leisure Interests

For some individuals, leisure may be easy to identify and continue after a burn injury, but for some people, their past leisure interests may no longer be physically or emotionally possible. The following is a list of suggested leisure opportunities for the burn injured client with physical and/or emotional limitations:

- Playing cards, board games, video games
- Listening to music
- Taking a pottery class
- Going to a movie, play, or concert
- Sewing or cross-stitching
- Internet use (shopping)

Treatment
With Your Burn Injury

In the beginning of your burn treatment, you and your therapist will determine the right treatment for you. There are many treatment options that you and your therapist may choose to use to treat your burn. It may be confusing for you to remember what and why your therapist is using to treat your burn. This next section talks about information of treatment options your therapist may use during your treatment sessions.

Physical Agent Modalities

Physical agent modalities (PAMs) are treatments that use light, water, temperature, sound, and/or electricity to produce a response in your soft tissue such as muscle, fat, and skin.

Cryotherapy (Cold Therapy)

Cold therapy produces a numbing effect. It is used to decrease swelling, decrease muscle twitching, decrease blood flow, and lower the body's metabolism (ability to burn calories). This type of treatment is often not used until at least 2-3 weeks after your burn injury because your new skin tissue may not have enough blood flow to circulate the oxygen and nutrients or decreased awareness to touch. The following is a list of cryotherapy treatment options your therapist may choose to use in your treatment sessions.

- Ice Massage
- Cold or Ice Packs
- Cold Baths
- Cold Compression Units
- Vapocoolant Sprays

Superficial Heat Agents (Heat Therapy)
Superficial heat agents (SHAs) can help you and your burn injury heal by decreasing pain, increasing blood flow, increasing growth of new skin tissue, increasing the body's metabolism, and increasing the amount of normal skin movement at your burn site. This type of treatment is typically not used until your swelling is no longer present. The following is a list of SHAs your therapist may choose to use in your treatment sessions.

- Whirlpool Bath/Hydrotherapy
- Fluidotherapy
- Hot Packs
- Contrast Baths
- Warm Water Soaks
- Paraffin Baths

Ultrasound
Ultrasound decreases your pain, increases the body's ability produce new skin tissue, increases blood flow, and increases the amount of normal skin movement at your burn site. Your therapist will use a small tool that transforms the electrical energy into ultrasonic energy as it passes sound waves into your scar tissue. Some individuals may feel heat or warmth, whereas others may not feel anything. Typically, ultrasound is not used until your burn forms a scar and you no longer have anything draining from your burn.

Transcutaneous Electrical Nerve Stimulation
Transcutaneous Electrical Nerve Stimulation (TENS) is a treatment option that consists of placing electrodes on the skin, which are controlled by a small device that your therapist will set-up. This device is easy to use and can be clipped onto a belt or pant waistline so it is easy to wear. This type of treatment delivers controlled low voltage electrical pulses to your internal system that controls your nerves through the electrodes placed close to your burn scar to decrease your pain levels. Also, this treatment should not be used until your burn injury has scarred and is no longer producing any drainage.

Iontophoresis
Iontophoresis can be used to decrease a small area of inflammation. This type of treatment also has electrodes and is controlled by a small device that is set by your therapist. Your therapist will place the appropriate amount of medication on one or more electrodes before placing it on your skin. Then, the medication will be forced into the burn site by direct electrical current. Also, this treatment should be avoided until the burn injury has scarred and is no longer producing any drainage.

Splints & Pressure Garments

With Your Burn Injury

Splints

Splints are commonly used to help the healing process of a burn injury on the hand, arm or shoulder. The splint helps to hold the body part in a position that is in-line and supported at all times so a deformity does not occur over-time. Splints are used to lower your chance of contracture (deformity) without needing further surgeries.

The wound of a burn injury may go deeper than the skin and cause damage to the tendons and joints. Splints help to protect these damaged parts of the body while they heal. The following considerations will be made with your splint:

- Your splint is made so you can bend, twist and move as many body parts as possible
- Less friction occurs with a custom fit splint (this means the splint will not rub on your skin and cause irritation)
- Adaptations for different needs (for example, holes for I.V. tubes)
- The splint is easy to put on and take off
- You understand the need for wearing the splint

Please talk to your therapist about how to wear and care for your custom splint.

Pressure Garments

Scars develop early in the healing process. Pressure garments are important to wear while your burn injury is healing and the scar is not yet finished forming. Pressure garments help to stop the scar from becoming raised, thick, discolored and tight.

Here are some guidelines for you to follow when wearing and caring for your pressure garments. Please talk to your therapist about how to wear and care for your specific pressure garment.

Wearing Your Pressure Garment

- Pressure garments should be worn at least 23 hours a day, removing them for bathing and cleaning only
- Most clients will need to wear pressure garments for 12 to 18 months after the burn injury
- Be sure your garments fit correctly and comfortably. If irritation or pain occurs, please talk to your therapist immediately.

Cleaning Your Pressure Garment

- Hand-wash your garment daily in warm water using a mild laundry detergent such as Woolite. Rinse garment well.
- Do not twist or ring-dry by hand. To remove water, squeeze the garment and then roll garment in a dry towel to dry. Let it dry at normal room temperature.
- If you wear the pressure garment in a chlorinated swimming pool or salt water, be sure to rinse it thoroughly before wearing it again.
- If possible, have extra pressure garments to wear for when you do have to wash one or so you can do fun things like swimming.

Therapeutic Exercise
With Your Burn Injury

Therapeutic exercise is an important part of your home program because the purpose of exercises are to control swelling, prevent joint stiffness, scar tightness, muscle weakness and contracture (deformity that happens when the joints and skin become too tight and you cannot move them as easily or at all). Your therapist will provide you with your specific therapeutic exercises and it should be done 3-5 times per day. Contact your therapist immediately if your have any questions or concerns about your exercises.

Exercises can be grouped into the following goal areas:

- **Range of Motion Exercises**

  Range of motion exercises are designed to have you safely move the body parts and joints around the burn injury to prevent stiffness, scarring, contracture and muscle weakness.

There are 3 kinds of range of motion exercises:

Name of Exercise	How to…	Benefits
Passive Range of Motion	See therapist for instructions	▪ Keeps joints moving ▪ Prevents scar contracture ▪ Prevents stiffness in tendons
Active-Assisted Range of Motion	See therapist for instructions	▪ Helps to increase joint movement ▪ Begins to build strength
Active Range of Motion	See therapist for instructions	▪ Build strength ▪ Prevent muscle weakness

- **Conditioning Exercises**

  Conditioning exercises are techniques that help the muscles around the burn injury stay strong so you can use them for everything you need to do during the day. These exercises help to build your strength and endurance.

- **Functional Exercise**

  Functional exercise means including your burn injured area into everyday activities such as folding clothes or putting dishes in a cupboard. These may not be things you always think about, but remember that stretching and strengthening can occur at anytime when you are moving. With your doctor and therapist's permission, use your burn injured body part as much as possible for your normal daily activities.

Scar Massage

With Your Burn Injury

As your burn injury heals, scar tissue forms under your wound. A scar may result from the healing process in one of two ways:

- A hypertrophy (raised) scar or keloid formation (scar tissue spreads beyond the borders of the wound) may occur when body produces more new skin tissue than the body sheds dead skin tissue.
- A hypotrophic (sunken) scar may occur when the body sheds more dead skin tissue than it produces new skin tissue.

Scars can be rough to the touch, calloused, hard to stretch and move, thick or raised, and/or discolored. Scar massage is a useful technique that you can do yourself to help the healing process and prevent a raised or sunken scar from developing.

The benefits of scar massage are:

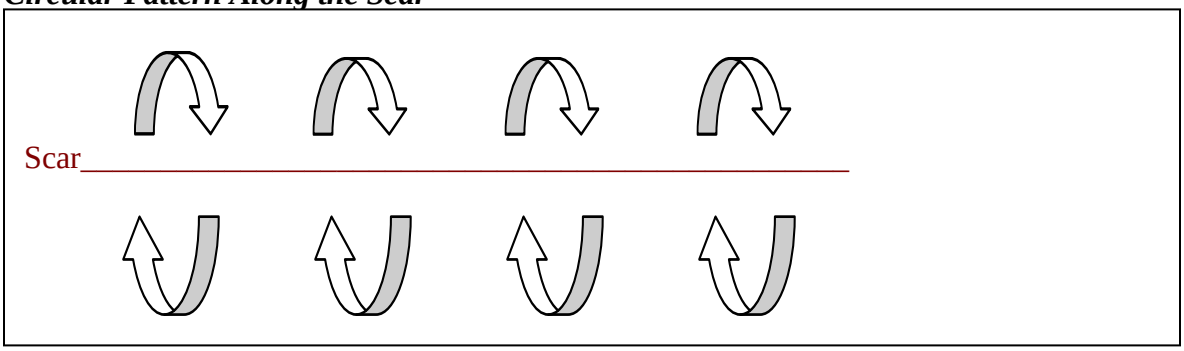
- To avoid scar contracture (hardening of the tissue that results in less motion or stretching)
- To increase blood flow and skin moisture
- Reduce pain and sensitivity of the wound
- Help the scar to heal so the skin looks more “normal”

Scar Massage Technique

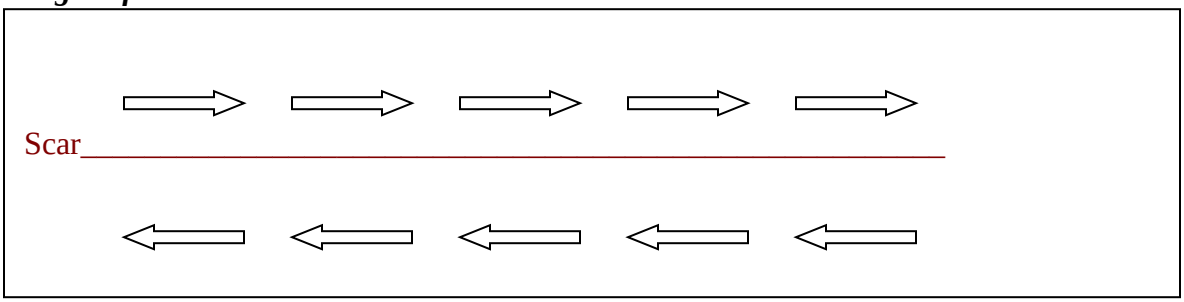
- Scar massage should be completed 3-4 times per day for 3-5 minutes as tolerated
- Use 1-3 finger(s) depending upon the scar size to apply deep pressure enough to blanch (whiten) the scar temporarily
- Use cocoa butter or a fragrance-free lotion or cream to massage the scar
- Massage movements should include a circular pattern along the scar, along the length of the scar and across the scar (see next section for pattern diagrams)

Scar Massage Patterns

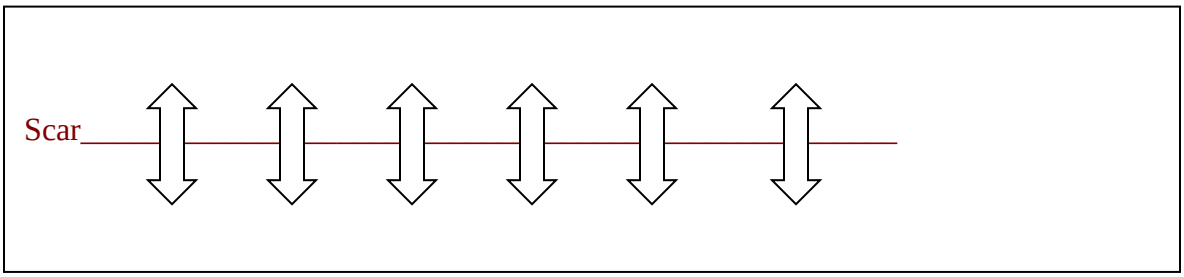
Circular Pattern Along the Scar



Length of the Scar



Across the Scar



Cleansing
Your Burn Injury

In order for your burn injury to heal correctly, it is important to keep the burn area clean. The following techniques can help you keep the burn area clean while it is healing:

- Depending upon the degree of your burn, a saline solution or a mixture with special surfactant chemicals can be used to clean your wound. If your therapist decides that special surfactant chemicals would be beneficial for you to use while cleansing your burn injury, he/she will provide you with further information.

- You can either pour the saline or saline and surfactant mixture directly onto the wound or use a gauze pad that has been soaked with the mixture and then press it onto the burn area to remove bacteria, dirt, etc…

- If your wound is red, direct contact to the wound should be avoided because the wound is in a critical stage of healing and has a high chance of becoming infected. The burn injury should only be touched with clean gauze pads.

When cleansing your wound, use the therapist recommended cleansing agents that are at body temperature because agents that are colder than the wound temperature will lower your body temperature around the burn area and it could affect the blood flow to the burn, which will slow the healing process.

Your therapist may recommend using an antiseptic cleanser depending upon the degree of your burn injury. Antiseptics cleansers are generally not useful with wounds that happened a long time ago, but are beneficial with the initial cleansing of wound. Antiseptics are used with new wounds because they reduce the risk of infection that is highest at the time of the wounding. Caution should be taken when using other wound cleansers on the market that require you to dilute the chemical mixture to avoid harming healthy new tissue.

Wound Dressings

For Your Burn Injury

Dressings are essential to the healing process because the dressing covers the wound and helps prevent infection by:

- Keeping the wound moist
- Keeping the skin that surrounds the wound dry
- Removing dead skin and drainage
- Allowing the wound to breathe
- Providing thermal (heat) insulation

Factors to be considered in choosing a dressing with your therapist include the following:

- Is the dressing easy to apply and remove?
- How often does the dressing need to be changed?
- Does the dressing brand come with detailed or understandable instructions?
- Is the dressing painful or irritating?
- Does the dressing stay in place?
- Is the dressing within my budget?
- Does the dressing protect my wound from infection?
- Is the dressing product tested and approved?

Burn dressings typically have three layers:

- The layer directly on the wound is dry, adherent (sticky), or non-adherent (non-sticky)
- The middle layer on the wound is absorptive, protective, and supportive
- The outer layer on the wound holds the dressing in place

The Four Most Common Types of Dressings

The most common types of dressings include transparent films, foams, hydrogels, hydrocolloids, and alginates.

- Adherent dressings are most commonly used when the amount of dead tissue exceeds the amount of viable tissue and debridement is required.
- Nonadherent dressings are used with tidy wounds or with wounds that contain mostly of viable tissue.
- Permeable dressings are used with wounds that have drainage.
- Occlusive dressings are used to provide a moist environment for tissue re-growth, but may cause maceration (over-hydration) and/or infection.

Nutrition & Lifestyle

For Your Burn Injury

It is important to follow the guidelines for good nutrition while your burn is healing. By remembering to do these steps for a healthy body, you will be helping your burn injury to heal faster and better! With good nutrition, your burn injury will look better, scar less and be less painful.

Drink Water

When the body is burned, it acts like it is dehydrated, or has less water than usual.

- Drink at least 8-10 eight ounce glasses of water each day to keep your body moisturized so your burn will not be as sensitive and painful when healing.

Eating for Healing

When you have a burn injury, you need more calories in your diet because your metabolism burns more calories during the healing process to make sure your burn injury is getting the nutrition it needs.

Counting Calories

If you do not increase the calories in your diet while you are healing, you may lose weight and the healing process may be damaged or slowed. Calories can be thought of as fuel for your body to burn energy. Calories need to be measured, especially when the body is healing because it uses calories much faster.

Eat Your Protein

Protein is very important part of your normal, balanced diet, but it is even more important for your healing burn injury. Protein helps in *all* the stages of wound repair and the re-growth of new body tissue, blood vessels and skin. Your burn injury *will not* heal without protein. Please talk to your physician or dietician about your specific diet-protein needs.

The average burn-wound client needs a Dietary Allowance (RDA) amount of 60-100 grams of protein daily.

	Food Groups	**Protein-Enriched Food Options**	**Supplements**
Where to get **Protein**	<u>Protein</u> • Meat, Poultry, eggs Cheese, fish (1 oz) 7 g • Milk (1 cup) 8 g • Breads (1 slice) 3 g • Vegetables (1/2 cup) 0-2 g *Beans have highest protein • Fruits (1/2 cup) trace • Fats 0 g	• High-protein cookies • High-protein gelatins • Nutrition bars	• Liquid Supplements *Product Examples*_____ **Boost** ***10 g*** *NuBasics* 9 g *Oral Impact* 16.8 g *Ensure* 8.8 g *Ensure Plus* 13 g *Resource 2.0* 21.3 g

Vegetarian Proteins

High Protein Vegetarian Foods	Protein (grams)
• Soybeans (1/2 cup cooked) • Tofu (1/2 cup) • Soy milk (1 cup) • Tempeh (1/2 cup) • Soynuts (1/4 cup) • Soy flour (1/4 cup de-fatted) • Seitan (wheat meat), 4 ounces • Mixed nuts, 1 ounce • Gardenburger, 1 patty • Almonds, 1 ounce	**14.3** g **10** g **6.6** g **15.7** g **1** g **12.8** g **31** g **4.8** g **11.2** g **5.9** g

Vitamins & Nutrients

A burn injury heals best when the body has essential vitamins and nutrients to help. Please note that taking more supplements than suggested is not beneficial and may be harmful to your body and health.

- **Vitamin A** Destroys harmful bacteria and germs that may cause infection. It is also an important vitamin that helps the body get rid of dead skin and grow new, healthy skin tissue.
- **Vitamin C** This is the most important vitamin needed in wound healing because it forms a strong barrier against infection of a wound. Vitamin C also makes sure the wound is getting as much blood and nutrients as possible.
- **Vitamin E** Helps to stop scars from forming in the wound area.
- **Arginine** Helps the body with wound healing by stimulating the immune system and metabolism to fight infection.
- **Zinc** Boosts your immune system and fights infection. It is a necessary nutrient for burn injury healing

- **Daily Vitamin Recommendations for Women:**

Vitamins & Nutrients	***Vitamin A***	***Vitamin C***	***Vitamin E***	***Arginine***	***Zinc***
Recommended Dietary Allowance (RDA) **Dosage**	750 ug* **Pregnancy** 800 ug	15 mg	15 mg **Pregnancy** 15 mg	8 mg	8 mg **Pregnancy** 11 mg
Where to Get it	• Eggs • Milk • Fortified breakfast cereal • Tomato • Eggplant • Spinach • Multi-vitamin	• Green peppers • Citrus fruits & juices • Tomato • Sweet & white potatoes • Strawberry • Broccoli • Cantaloupe	• Vegetable Oils • Nuts • Green, leafy vegetable *example*: spinach, celery • Multi-vitamin	• Whole-Wheat • Nuts • Seeds • Peanuts • Brown Rice • Popcorn • Soy • Raisins • Chocolate • Carob	• Red meat • Poultry • Beans • Whole grains • Yogurt • Milk • Nuts • Some seafood • Multi-vitamin

*ug = micrograms

- **Daily Vitamin Recommendations for Men:**

Vitamins & Nutrients	***Vitamin A***	***Vitamin C***	***Vitamin E***	***Arginine***	***Zinc***
Recommended Dietary Allowance (RDA) **Dosage**	900 ug*	16mg	15 mg	10mg	11 mg
Where to Get it	• Eggs • Milk • Fortified breakfast cereal • Tomato • Eggplant • Spinach • Multi-vitamin	• Green peppers • Citrus fruits & juices • Tomato • Sweet & white potatoes • Strawberry • Broccoli • Cantaloupe	• Vegetable Oils • Nuts • Green, leafy vegetable *example*: spinach, celery • Multi-vitamin	• Whole-Wheat • Nuts • Seeds • Peanuts • Brown Rice • Popcorn • Soy • Raisins • Chocolate • Carob	• Red meat • Poultry • Beans • Whole grains • Yogurt • Milk • Nuts • Some seafood • Multi-vitamin

***ug = micrograms

NO Smoking!
The chemicals in cigarettes and cigars *slow* and *change* the normal way your burn injury is supposed to heal.

- Do not smoke for at least 4 weeks after your burn injury.
- If you *must* smoke, cut back as much as possible. This is very risky and may change the way your burn scars, looks and feels.

Prescription and Non-Prescription Drugs and Steroids

Some drugs and steroids can be harmful to the burn injury healing process. Please talk to your doctor if you use any of the following types of drugs listed:

- Anticoagulants
- Antihistamines
- Antimicrobials
- Aspirin
- Azathioprine
- B-aminoproprionitrile (BAPN)
- Chemotherapeutic agents
- Chlorhexidine
- Cholchicine
- Cyclosporine
- Dakin's Solution (sodium hypochlorite)
- Glucocorticoids
- Immunosuppressive agents
- Papaverine
- Penicillamine
- Phenylbutazone
- Providone-iodine
- Quyinoline sulfate
- Retinoids
- Thiphenamil hydrochloride

Making the Time to

Take Care of Your Burn Injury

Finding the time to care for your burn injury and take care of yourself after the burn injury can be difficult. On one hand it is important to spend time doing the things you normally do and the activities that are most important to you. On the other hand, it is important to spend time each day working on the home program activities to help your burn injury heal.

This section of the home program gives you some suggestions to help you organize your time so that you can better prioritize all of the important people, habits, work, fun and self-care that you are used to, as well as make the home program part of your daily routine.

No matter what schedule you choose to use for organizing your personalized burn care home program, remember to include these areas of importance:

- Therapeutic exercises
- Scar massage
- Wearing schedule for splints or pressure garments
- Wound cleaning and changing dressings
- Eating balanced meals and taking supplements
- Wearing schedule for therapy treatment devices
- Coping, pain management and leisure activities
- Other daily activities

On the following pages, there is a schedule that you can use to plan your day with your home program and regular activities and another schedule that you can use as an example.

Daily Home Program Schedule

Date _____

6-7 a.m. _____

7-8 a.m. _____

8-9 a.m. _____

9-10 a.m. _____

10-11 a.m. _____

11-noon _____

noon-1 p.m. _____

1-2 p.m. _____

2-3 p.m. _____

3-4 p.m. _____

4-5 p.m. _____

5-6 p.m. _____

6-7 p.m. _____

7-8 p.m. _____

8-9 p.m. _____

9-10 p.m. _____

Daily Checklist

☐☐ Therapeutic Exercise: ☐ Times A Day

☐ Scar Massage ☐ Times A Day

☐ Splint Use

☐ Pressure Garment Use

☐ Wound Cleansing

☐ Wound Dressing Changes

☐ Nutrition & Supplements

☐ Therapy Treatment Device Use

☐ Coping & Leisure Activities

☐ _____

☐ _____

Daily Home Program Schedule

Date Monday, December 8th

6-7 a.m. Shower & Dress , Put on splint

7-8 a.m. 7:15 Scar Massage & hand exercises

8-9 a.m. Kids to school, Work

9-10 a.m.

10-11 a.m.

11-noon

noon-1 p.m. Lunch with Thomas + Gina; Take Vitamins

1-2 p.m. Department Meeting

2-3 p.m.

3-4 p.m. Pick up kids from School / Grocery Store

4-5 p.m. Hand exercises, Scar Massage

5-6 p.m. Wear TENS unit(45 minutes), Make dinner

6-7 p.m. Dinner 6:30 take Joey to hockey practice

7-8 p.m. Relax & deep breathing/ Help Molly with math

8-9 p.m. Pick up Joey, Scar massage/ Read to kids

9-10 p.m. Remove splint, exercises Kids to bed

10-11 p.m. Watch news/ pay bills

Daily Checklist

- ☐☐ Therapeutic Exercise: 3 Times A Day
- ☐ Scar Massage 3 Times A Day
- ☐ Splint Use
- ☐ Pressure Garment Use
- ☐ Wound Cleansing
- ☐ Wound Dressing Changes
- ☐ Nutrition & Supplements
- ☐ Therapy Treatment Device Use
- ☐ Coping & Leisure Activities
- ☐ _____
- ☐ _____

References

Angelo, S. (2003). Medical Encyclopedia: Vitamin C. Retrieved October 15, 2003, MedLine Plus Web site: http://www.nlm.nih.gov/medlineplus/ency/article.htm

Bracciano, A.G. (2000). *Physical Agent Modalities: Theory and Application for the Occupational Therapist.* Thorofare, NJ: SLACK Incorporated.

Brown, C.A. (2002). The use of silicon gel for treating children's burn scars in Saudi Arabia: A case study. *Occupational Therapy International, 9*(2), 121-130.

Burns, J., Mancoll, J., Phillips, L. (2003). Impairments to wound healing. *Clinics in Plastic Surgery*, 30, 47-56.

Cartwright, A. (2002). Nutritional assessment as part of wound management. *Nutrition Plus*, 98, 44-45.

Casey, G. (2003). Nutritional support in wound healing. *Nursing Standard*, 17, 55-58.

Collins, N. (2001). Arginine and Wound Healing. *Advances in Skin and Wound Care*, 14, 16-17.

Collins, N. (2001). Estimating Caloric Needs to Promote Wound Healing. *Advances in Skin and Wound Care*, 14, 140-141.

Collins, N. (2001). Protein and wound healing. *Advances in Skin and Wound Care*, 14, 288-289.

Collins, N. (2001). Vegetarian diets and wound healing. *Advances in Skin and Wound Care*, 14, 65-66.

Doak, L.G. & Doak, C.C. (Eds.). (2002). *Pfizer Health Literacy Principles.* Retrieved September 27, 2003 from Web site: http://www.pfizer.com/improving.html

Farrell Kozera, B. (1998). **Burns.** In G.L. Clark, E.F. Shaw Wilgis, B. Aiello, D. Eckhaus, & L. Valdata Eddington (Eds.), *Hand Rehabilitation: A Practical Guide (*2nd ed., pp.29-36). New York: Churchill Livingstone.

Grandjean, A.C., Reimers, K.J, Buyckx, M.E. (2003). Hydration: Issues for the 21st Century. *Nutrition Reviews*, 61, 261-271.

Hall, P., & Schumann, L. (2001). Wound Care: Meeting the Challenge. *Journal of the American Academy of Nurse Practioners, 13*(6), 258-266.

Hubick, K.K. (2003, July 14). Psychosocial Factors in Burn Care. *Advance for Occupational Therapy Practitioners, 19*(14), 13-14.

Neistadt, M.E., & Crepeau, E.B. (Eds.). (1998). Willard & Spackman's Occupational Therapy (9th ed.). Philadelphia: Lippincott-Raven Publishers.

Reed, K.L. (2001). *Quick Reference to Occupation Therapy* (2nd ed.). Gaitherburg, MD: Aspen Publishers, Inc.

Scholl, D., Langkamp-Henken, B. (2001). Nutrient Recommendations for Wound Healing. *Journal of Intravenous Nursing*, 24, 124-132.

Silverstein, P. (1992). Smoking and Wound Healing. *The American Journal of Medicine,* 93, 22-24.

Sorenson, L.T., Karlsmark, T., Gottrup, F. (2003). Abstinence from smoking reduces incisional wound infection: A randomized control trial. *Annals of Surgery,* 238, 1-5.

Trombly, C.A., & Radomski, M.V. (Eds.). (2002). *Occupational Therapy for Physical Disabilities.* (5th ed.). Baltimore: Lippincott Williams & Wilkins.

Overview of Outpatient Upper Extremity Burn Injury Treatment & Protocols

A Guide for Occupational Therapists

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Introduction and Orientation

There is a lot of information for the burn injured client to remember about self-treatment outside of therapy. A home program can seem overwhelming and time consuming to many clients. This information parallels the information presented in the client's home program to outline the relevance of each topic area.

The following tips are designed to improve communication with clients who have limited literacy skills. They pertain to written as well as direct personal instruction and include the following:

1. Limit the amount of information you give at each visit
2. Slow down when you are explaining the information to your clients
3. Avoid medical jargon and use words that the client can understand
4. Use pictures or models to explain the important concepts
5. Follow each learning experience with a 'show-me' technique
6. Encourage your clients to ask questions and/or use follow up questions to ensure they understand the information presented

Basic Integumentary System, Anatomy and Physiology

To provide educational information in the home program for the burn injured client, it is important to understand the mechanism of injury and the physiology of the acute and healing burn.

The integumentary system also known as the skin serves many functions that are vital to life. Acting as the body's main defense from the external environment, skin makes up 15% to 20% of total body weight. According to Farrell Kozera (1998), normal skin guards against bacteria, regulates body temperature, prevents excess loss of body fluids, protects deeper structures from injury, protects against ultraviolet rays of the sun, and protects nerve endings responsible for sensation.

Three layers of skin make-up the integumentary system. The epidermis is the outermost layer that is avascular and varies from 0.04 mm on the eyelids to 1.6 mm on the palms and soles. Four cell types are found in the epidermis include keratinocytes, melanocytes, Merkel cells, and Langerhans cells. Dead keratinocytes serve as a cover to the body's surface. Melanocytes, which contain melanin, determine the individual's skin color and provide the greatest barrier from the ultraviolet radiation. Merkel cells are related to the touch receptors whereas Langerhans cells aid in cell-mediated immune responses (Hall & Schumann, 2001).

Deep to the epidermis is the dermis, which ranges from 1 to 4 mm in thickness and is vascular. Lymphatic glands, which remove microbes and extra interstitial fluids, blood vessels that aid in the body's ability to regulate its temperature and supply metabolic skin

requirement, and nerve fibers, which detect heat, cold, pain, and itch sensations can be identified in the dermis. The dermis contains three types of connective tissue that include collagen, reticulum, and elastin which enables the skin to move, elongate, and contract with the body's movements. Three cell types are located in the dermis and include fibroblasts, macrophages, and mast cells. Fibroblasts are responsible for collagen formation that is necessary for skin structure, strength, and wound healing. Macrophages, also known as phagocytes are cells that destroy foreign substances, which is the beginning of inflammation and repair. Mast cells supply histamine, which initiates blood vessel dilation and chemotactic factors in response to the inflammation (Hall & Schumann, 2001).

The deepest layer of skin is called the hypodermis, also known as the adipose (fat) layer. It is compromised of a layer of connective tissue that insulates, provides cushioning, supplies energy, and hormone metabolism. Also, the hypodermis includes dermal appendages such as hair, nails, sebaceous glands, and sweat glands (Hall & Schumann, 2001).

Burn Wound Classification

There are several classification systems used to determine the severity of a burn wound. "The most common classifications used by therapists are based on the tissues layers and depth of tissue destruction, the National Pressure Ulcer Advisory Panel (NPUAP), and on wound color, such as the Marion Laboratories red/yellow/black color system," (Bracciano, 2000). For our purposes, we will discuss the tissue layers and depth of tissue destruction and the color system, which is more pertinent to burns.

Red wounds indicate that no infection is present, it is healing appropriately, and granulation is occurring. Yellow wounds often indicate infection and a possibility of necrotic tissue. Dying tissue or fibrous drainage contributes to the bacterial growth and infection. Black wounds indicate the presence of necrotic or dead tissue. Furthermore, black wounds provide an excellent location for bacterial growth. "Rarely are wounds exclusively one color, and most manifest all three colors depending on the amount of necrotic tissue as well as systemic and local influences on the healing process," (Bracciano, 2000). Therefore, a system that is more concrete may be more useful when monitoring the burn's healing process.

Another classification for wounds can be based upon amount and depth of tissue damage either partial or full thickness. This classification system is most often used for skin tears, donor sites, surgical wounds, and burns, (Bracciano, 2000). Partial thickness burns can be derived into superficial and deep partial thickness burns depending upon the severity of the burn. Superficial partial thickness burns can indicate either a first or

second-degree burn with damage to the epidermis and possible destruction to the upper layers of the dermis. Burn site characteristics of superficial partial thickness burns can include red or bright pink, blistered, wet, soft, and painful. Deep partial thickness burns indicates a deep second-degree burn with damage to the epidermis and most of the dermis. Burn site characteristics of deep partial thickness burns may include red or white, wet, soft, elastic, and decreased sensation. This type of burn may also evolve into a full thickness burn if not treated appropriately. Full thickness burns indicate a third-degree burn that includes damage to the epidermis and dermis. Burn site characteristics include white or tan, waxy, dry, leathery, and non-elastic (Bracciano, 2000).

Psychosocial Aspects

Comfort is the main issue to initially address when working with a burn victim. According to Hubick (2003), if the client is experiencing anxiety or fear, he/she may actually increase his/her pain perception. In order to decrease the client's anxiety and fear, it may be beneficial to incorporate a family member into the treatment session to increase the client's comfort with a familiar and supportive individual. Also, occupational therapists can teach relaxation techniques including imagery, deep or rhythmic breathing, and music to decrease the client's pain level. Imagery helps to distract the client whereas rhythmic breathing and soft soothing music aids to relax the client.

When treating clients who have experienced a burn, it is important to remember that burns often include psychosocial factors in addition to a physical impairment. "During the healing process, burn clients go through many stages of disfigurement that can have a profound effect on body image," (Hubick, p.14, 2003). Occupational therapists can play a key role in helping the client overcome their identity changes because the client's family may be affected by their loved one's appearance. By encouraging the client to return to previous activities, the occupational therapist can hopefully avoid client maladjustment. "Anger, depression, denial, withdrawal, and regression usually diminish quickly as the client makes a physical recovery and can assume increased independence," (Hubick, p.14, 2003). Although over time most burn clients will learn to cope with their injury. "Only about 30 percent of burn clients have long-term psychological problems, which are commonly anxiety and depression, while 70 percent manage to cope,"

(Hubick, p.14, 2003). Therefore, occupational therapists have an important part in treating every client individually and holistically as he/she heals physically and mentally.

Physical Agent Modalities

Many types of physical agent modalities (PAMs) can be utilized when treating burning clients such as cryotherapy "cold therapy", superficial heat agents (SHAs), therapeutic ultrasound, transcutaneous electrical nerve stimulation (TENS), and iontophoresis. These PAMs are known to be beneficial when used appropriately with burn clients, but the occupational therapist must demonstrate competency prior to utilizing PAMs in treatment. "Occupational therapists' strong background in psychosocial issues, activity analysis, and depth of understanding occupation provide the therapist with a unique and valuable perspective on the use and application of physical agents," (Bracciano, p.4, 2000). Furthermore, the use of PAMs is not considered entry-level practice and additional education is encouraged to understand the basics and connection of occupation and function.

Scar Tissue Formation

Scar tissue formation is an ongoing process that occurs as the wound heals. "Scar tissue consists of disorganized collagen fibers laid down by the fibroblasts, is randomly arranged, and different from the surrounding tissue," (Bracciano, p.23, 2000). The wound begins the final phase of wound healing called remodeling two weeks post injury, which can last up to 2 years. Collagen lysis (break-down) and collagen synthesis (formation) occurs throughout the remodeling stage. When collagen synthesis surpasses collagen lysis, a hypertrophic or keloid scar may form. Hypertrophic scars are described as a red, raised, and inelastic scar. They form in the wound area, whereas keloid scars are raised and spread beyond the wound (Bracciano, 2000).

Scar Massage

Scar massage with fragrance-free lotion can be used to avoid scar contracture, increase circulation and surface moisture, and desensitize the healing tissue. In order for scar massage to be beneficial, it should be completed approximately 3-4 times a day for 3-5 minutes as tolerated. Scar massage is described as using 1-3 fingers depending upon the scar size to provide deep pressure on the scar (enough to whiten it temporarily) in a circular pattern along the scar, the length of the scar, and across the scar, (Trombly & Radomski, 2002).

Pressure Garments

Pressure garments are designed to conform to the body as they aid in scar control and reducing edema. According to Reed (2001), inserts or overlays are needed to protect for body contours, bony prominences, and postural adjustments made by the burn victim. Such inserts include orthopedic felt, Plastazote, Aliplast, Aquaplast, silicone gel, silastic elastomer, prosthetic foam, or adhesive-based closed cell foam. "The standard practice is for a burn pressure garment to be worn 23 hours a day for an average of 8-12 months," (Brown, p.122, 2002). Due to the lengthy wear time requirements of the pressure garment it is important for the therapist to discuss the implications of compliance with pressure garment wearing times.

Therapeutic Exercise

Exercise is an important part of caring for burn injuries because exercise techniques are designed to benefit and control edema (swelling), prevent muscle atrophy, tendon and joint stiffness and contracture (Trombly & Radomski, 2002). With training and recommendation in the home program, burn clients may be able to do exercises at home to help prevent these problem areas. Exercise programs may be performed up to five times daily (Trombly & Radomski, 2002). The over all goal of the exercise program is to get the client back to normal daily activities as soon as possible.

Burn Wound Cleansing and Debridement

Before applying a dressing, the wound must be cleansed. "Removal of exudates and metabolic waste products will optimize wound healing and decrease the potential for infection," (Hall & Schumann, p.264, 2001). Saline is most often used to cleanse wounds because it does not further damage the tissue. Saline is applied either directly to the skin or soaked in a gauze pad and then gently pressed onto the burn to remove foreign particles. Also, there are other wound cleansers on the market that require dilution to maintain white blood cell viability and phagocyte function, but these are advised to be used with caution because their chemicals can be harmful to the healthy tissue.

Wound Dressings and Topical Treatment

When treating a burn client, dressings are essential to the healing process. According to Hall & Schumann (2001), an ideal dressing should keep the wound moist and the surrounding intact skin dry. Dressings will remove exudate, allow gaseous exchange, provide thermal insulation, be easy to apply and remove, require minimal dressing changes with detailed explanation, be non-traumatic to the wound, have placement stability, be cost effective, resist microorganisms, and have documented research validating the product. The most common types of topical treatments include transparent film, foams, hydrogels, hydrocolloids, and alginates. All of the previously stated topical treatment dressing types vary in absorptive ability, hydrating ability, and adhesiveness, therefore occupational therapists can be client centered when selecting the most appropriate dressings for his/her clients.

Burn dressings typically have three layers: the contact layer, the intermediate layer, and the outer layer. The contact layer is dry, adherent (sticky), or non-adherent (non-sticky), while the middle layer is absorptive, protective, and supportive, whereas the outer layer holds the dressing in place. Adherent dressings are most commonly used when the amount of dead tissue exceeds the amount of viable tissue and debridement is required. Non-adherent dressing are used with tidy wounds or with wounds consisting mostly of viable tissue. Permeable dressings are used with wounds that exhibit drainage. Finally, occlusive dressing are used to provide a moist environment for tissue re-growth, but may cause maceration (over-hydration) and/or infection (Hall & Schumann, 2001).

Splinting

Splinting regimens vary from facility to facility, but most burn centers agree that splints are to be worn at all times except during bathing, dressing changes, and possibly exercises. According to Reed (2001), the primary splint for burns is designed to permit the claw hand (forward flexion of the wrist, hyperextension of the metacarpophalangeal joints, and flexion of the interphalangeal joints). The wrist is in 30 degrees to 35 degrees extension, the metacarpophalangeal joints are flexed between 50 to 70 degrees, and the interphalangeal joints are extended, with the thumb in abduction. Gauge or elastic wrap maintains the splint in appropriate position. When applying the splint, it is important to apply it distal to proximal to ensure appropriate body fluid movement.

Nutrition

Assessing, planning and monitoring the nutrition of a burn injured client is important because he/she is in a diagnostic category of nutritional risk. When a burn injury occurs, the body reacts by increasing metabolism by up to 50% more because the body senses neuroendocrine disturbances and severe tissue and organ damage (Cartwright, 2002).

Calories and Metabolism

Clients with burn wounds have higher caloric needs. If these needs are not met, the client may suffer a hypermetabolic response with negative effects such as losing valuable weight and healing may be impaired (Collins, 2002). A typical client with a wound needs to increase his/her calorie intake to make up for the hypermetabolic response (Collins, 2002). Calories need to be measured for each client because physical attributes, energy expenditure and wound severity play a role in calculating the caloric needs of a burn injury client (Cartwright, 2002). The most widely used calorie calculating equation is the Harris-Benedict Equation which includes gender, weight, age, height and activity and injury levels in its formula (Collins, 2002). Monitoring caloric intake is important in the healing process to evaluate if the client's nutritional habits are sufficient for the body's needs at this time (Collins, 2002).

Healing with Protein

Protein is one of the most important nutrients for health, and even more important for wound healing. The body cannot heal without protein (Collins, 2001). Protein helps to balance the body's fluids, as well as acid-base composition, it provides energy, boosts the immune system and directly benefits wound repair and tissue re-growth (Collins, 2001). After nutritional assessment of the burn client, it can be determined and recommended amounts of protein needed for a protein-rich diet. For the best wound healing results, use protein of high-biologic value that is digested easily and absorbed quickly in the body such as protein found in eggs, meat, poultry and fish (Collins, 2001).

Vegetarian Diet Considerations

When any food group is removed from the diet, such as meat, fish and poultry in the vegetarian diet, there is a risk that the client may not be getting and benefiting from needed animal proteins (Collins, 2003). Especially in times of wound healing and elevated need for protein calories in the body, vegetarians can supplement animal proteins for plant and natural proteins found in whole grains, nuts, seeds and legumes (Collins, 2003). Other valuable sources of protein in the vegetarian diet are soy protein and whey protein which are both easily digested and absorbed in the body (Collins, 2003).

Vitamins and Nutrients

Vitamins and nutrients are an important part of the wound healing process. Deficiency in the following vitamins and nutrients results in malnutrition for the healing wound (Burns, Mancoll & Phillips, 2003).

- *Vitamin A*: helps to regulate the immune system to fight infection in the burn as well as killing harmful bacteria that may compromise the sterility of the wound area (Burns et al., 2003).

- *Vitamin C:* is a vital nutrient in the body that promotes wound healing, second only to protein. Vitamin C is also active in promoting the immune system and helps maintain healthy connective tissue (Angelo, 2003).
- *Vitamin E:* is a strong antioxidant in the body. When a burn injury occurs, Vitamin E is a more active antioxidant, fighting against free-radicals, which are harmful chemical results of the body's increased metabolism. These harmful free-radicals target the wound and reverse the healing process (Burns et al., 2003).
- *Arginine:* is an Amino Acid that promotes wound healing and tissue re-growth by increasing collagen synthesis as well as killing harmful bacteria (Scholl & Henken, 2001).
- *Zinc:* is needed for development and activation of white blood cells needed to fight infection and assists wound healing by promoting normal growth of tissue matrix (Burns et al., 2003).

Water

Water is essential to wound healing because it makes up a high portion of blood to improve circulation and keeps the skin and dry burn injured area hydrated (Scholl & Henken, 2001). When the body has adequate hydration, blood circulation is at it best. This is most important for the healing wound because blood carries healing oxygen and nutrients directly to the wound (Scholl & Henken, 2001). When considering necessary higher water intake for the burn injured client, take into account the client's water output in urine, fecal loss, sweat, and severity of the burn injury (Grandjean, Reimers & Buyckx, 2003). Dehydration directly slows wound healing by blocking the nutrients from the wound area with less blood-circulation. A conscious effort to keep the body hydrated through water, food and other beverages is the best way to ensure the necessary healing nutrients reach their target (Grandjean et al., 2003).

Smoking

Smoking cigarettes delays the healing of a burn wound by putting nicotine and other harmful toxic chemicals in the body that reverse the body's natural healing process (Silverstein, 1992). In the body, the production of red blood cells, fibroblasts and macrophages is decreased with tobacco use. These cells are responsible for moving healing substances to the wound area and helping the wound scar. Nicotine has influenced and increased blood-platelet stickiness and thickness that creates clots in the blood stream so necessary nutrients and oxygen do not reach the healing wound (Silverstein, 1992). Smokers who have general and orthopedic surgery have a higher incidence of wound infections than non-smokers (Sorenson, Karlsmark & Gottrup, 2003),

Research shows that 4 weeks after the burn injury, of not smoking for habitual heavy smokers reduced wound infections to a similar level as never smokers. This finding suggests that 1 month preoperative abstinence from smoking may be sufficient to reduce post-operative wound infections (Sorenson et al., 2003). At a minimum, the client should be instructed to stop smoking prior to the surgical procedure.

Drugs and Steroids

Steroids are harmful to wound healing because they stop the body from forming granulation tissue and extracellular matrix needed for re-growth of new, healthy tissue. Other drugs known to impair and delay wound healing are listed (Burns et al., 2003).

- Anticoagulants
- Antihistamines
- Antimicrobials
- Aspirin
- Azathioprine
- B-aminoproprionitrile (BAPN)
- Providone-iodine
- Chemotherapeutic agents
- Chlorhexidine
- Cholchicine
- Cyclosporine
- Dakin's Solution (sodium hypochlorite)
- Glucocorticoids
- Immunosuppressive agents
- Nonsteroidal anti-inflammatory agents
- Papaverine
- Penicillamine
- Phenylbutazone
- Quinoline sulfate
- Retinoids
- Thiphenamil hydrochloride

Potential or Future Burn Treatment Options

Honey

During the last 2000 years, honey has been used as a topical treatment for wounds. "The emergence of microbial strains with multiple patterns of antimicrobial resistance has reduced the efficacy of conventional therapies and forced the re-evaluation of traditional remedies in the search for appropriate antimicrobial agents," (Dunford, C., Cooper, R., Molan, P., & White, R., p.64, 2000). Honey is understood to have an antibacterial agent due to its low pH and ability to form a barrier on the wound surface to avoid bacteria invasion and growth. By avoiding the entrance of bacteria into the wound, odorous smelling wounds are avoided. According to Dunford et al. (2000), evidence is accumulating on the positive effect of honey on key wound healing stages: angiogenesis (the ability to evoke blood vessel formation), granulation, and re-epithelialization. Although, honey has been determined to be a healing agent, most honey sold to consumers is edible honey that is not sterilized, which can be hazardous to a burn wound. According to the Subrahmanyam research (as cited in Dunford et al., 2000), honey is better to use with partial thickness burns, whereas excision and grafting demonstrated better results in regards to sepsis, contractures, and healing rates. When applying a dressing consisting of honey, it is recommended to apply approximately 25-35g of active honey on an absorbent pad and the secured with a secondary dressing. Honey draws fluid out of the skin, which will reduce the likelihood of over hydration under the dressing (Dunford et al., 2000). If too much fluid remains in the wound, it will become depressed and uneven with the healthy tissue surrounding the wound.

References

Angelo, S. (2003). Medical Encyclopedia: Vitamin C. Retrieved October 15, 2003, MedLine Plus Web site: http://www.nlm.nih.gov/medlineplus/ency/article.htm

Bracciano, A.G. (2000). *Physical Agent Modalities: Theory and Application for the Occupational Therapist.* Thorofare, NJ: SLACK Incorporated.

Brown, C.A. (2002). The use of silicon gel for treating children's burn scars in Saudi Arabia: A case study. *Occupational Therapy International, 9*(2), 121-130.

Burns, J., Mancoll, J., Phillips, L. (2003). Impairments to wound healing. *Clinics in Plastic Surgery*, 30, 47-56.

Cartwright, A. (2002). Nutritional assessment as part of wound management. *Nutrition Plus*, 98, 44-45.

Casey, G. (2003). Nutritional support in wound healing. *Nursing Standard*, 17, 55-58.

Collins, N. (2001). Arginine and Wound Healing. *Advances in Skin and Wound Care*, 14, 16-17.

Collins, N. (2001). Estimating Caloric Needs to Promote Wound Healing. *Advances in Skin and Wound Care*, 14, 140-141.

Collins, N. (2001). Protein and wound healing. *Advances in Skin and Wound Care*, 14, 288-289.

Collins, N. (2001). Vegetarian diets and wound healing. *Advances in Skin and Wound Care*, 14, 65-66.

Doak, L.G. & Doak, C.C. (Eds.). (2002). *Pfizer Health Literacy Principles.* Retrieved September 27, 2003 from Web site: http://www.pfizer.com/improving.html

Farrell Kozera, B. (1998). **Burns.** In G.L. Clark, E.F. Shaw Wilgis, B. Aiello, D. Eckhaus, & L. Valdata Eddington (Eds.), *Hand Rehabilitation: A Practical Guide (*2nd ed., pp.29-36). New York: Churchill Livingstone.

Grandjean, A.C., Reimers, K.J, Buyckx, M.E. (2003). Hydration: Issues for the 21st Century. *Nutrition Reviews*, 61, 261-271.

Hall, P., & Schumann, L. (2001). Wound Care: Meeting the Challenge. *Journal of the American Academy of Nurse Practioners, 13*(6), 258-266.

Hubick, K.K. (2003, July 14). Psychosocial Factors in Burn Care. *Advance for Occupational Therapy Practitioners, 19*(14), 13-14.

Neistadt, M.E., & Crepeau, E.B. (Eds.). (1998). Willard & Spackman's Occupational Therapy (9th ed.). Philadelphia: Lippincott-Raven Publishers.

Reed, K.L. (2001). *Quick Reference to Occupation Therapy* (2nd ed.). Gaitherburg, MD: Aspen Publishers, Inc.

Scholl, D., Langkamp-Henken, B. (2001). Nutrient Recommendations for Wound Healing. *Journal of Intravenous Nursing*, 24, 124-132.

Silverstein, P. (1992). Smoking and Wound Healing. *The American Journal of Medicine*, 93, 22-24.

Sloan, R. (1996). *An easy outpatient guide to burn rehabilitation.* University of Colorado Health Sciences Center: Denver, CO. Retrieved July 17, 2003 from Web site: http://www.ncddr.org/rr/burn/burnguide.html

Sorenson, L.T., Karlsmark, T., Gottrup, F. (2003). Abstinence from smoking reduces incisional wound infection: A randomized control trial. *Annals of Surgery*, 238, 1-5.

Trombly, C.A., & Radomski, M.V. (Eds.). (2002). *Occupational Therapy for Physical Disabilities.* (5th ed.). Baltimore: Lippincott Williams & Wilkins.

Chapter Five

Summary and Conclusions

A comprehensive home program and treatment guide was developed to eliminate or minimize the issues that contribute to client non-compliance and to provide relevant information that was non-existent in other home programs. Another issue addressed in the development of this guide was the issue of ensuring the information was written and organized to address the needs of those adults with literacy challenges. Occupational therapists can use this educational module to better serve their clients that have experienced burn injuries by trying a new, client-centered outpatient treatment protocol. A home program that is strong in emphasizing the main issues of compliance is more effective to validate the clients' concerns and guide participation in treatment.

A limitation of this scholarly project is that it does not include the anatomical location of the burn injury for guidelines in individualized and specific treatment options. Also, lower extremity burn injury was not addressed in this proposed program.

Recommendations

1. Further research focus on identifying specific treatment options pertaining to location of the burn injury.
2. A companion module be developed to address the anatomical location of the burn injury for guidelines in individualized and specific treatment options.
3. The educational module be modified/ adapted to accommodate adults with varied learning levels.

4. The proposed home program should be included in a research study to determine user satisfaction and relevance of the information. Further limitations and recommendations may be identified upon implementation of the proposed program.