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An investigation of self care modalities for the effective treatment of lymphedema

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**An Investigation of Self Care Modalities for the Effective Treatment of
Lymphedema**

by

Amber Major

A thesis in partial fulfillment of the requirements for the
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College of Nursing and
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Abstract

The purpose of this literature review is to investigate the most effective forms of self-care that patients can perform to reduce swelling caused by lymphedema.

Lymphedema may occur secondary to lymph node trauma, which makes it difficult for lymph fluid to leave an extremity. Even though lymphedema is more recognized as a side effect of breast cancer treatment, it can also be the result of many other ailments or treatments and can be present in any part of the body. By knowing which therapies are most effective, nurses and other health care professionals can educate patients to help ease the burden caused by this debilitating condition.

This thesis discusses the results of clinical trials that studied different methods of self-care including exercises, bandaging, compression garments, sequential compression devices, and performing manual lymphatic drainage. The conclusion derived from the review of multiple studies is that participating in a combination of multiple therapies is the most effective means of lymphedema management and should be considered the ideal standard of care.

Dedication

This thesis is dedicated to my beautiful daughter Ashleigh, for being the motivation to always do and be my very best.

Acknowledgments

I would first like to acknowledge all of my family and friends for the never ending love and support they have given me the last 5 years while I was finishing school; especially my parents. I would not have made it through without you.

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Introduction

Although cancer treatment is the most prevalent cause of secondary lymphedema, any trauma to lymph tissue can interrupt lymph flow and potentially result in swelling. Poage, Singer, Armer, Poundall, and Shellabarger (2008) state that the number of patients who will experience lymphedema after disruption of lymphatic vessels ranges anywhere from 5% to 60%. Lymphedema can occur at any time, even if the lymph node damage occurred more than 30 years previous. Injured lymph tissue will not function properly. This dysfunction allows for accumulation of lymphatic fluid in the interstitial space, subsequently resulting in swelling of the extremities or the trunk of the body (Fu, Ridner, & Armer, 2009b, Ridner, McMahon, Dietrich, & Sunday, 2008).

In a study done by Fu, Ridner, and Armer (2009), individuals who experienced lymphedema reported that it was painful and prevented them from performing daily tasks. They also disclosed that it made them self-conscious of their appearance and had an unwelcome impact on their intimate lives. Franks et al. (2006) also mention that lymphedema is responsible for financial hardships stemming from missed time from work as well as a number of hospitalizations each year. Currently there is no cure for lymphedema. Medical advances producing more cancer survivors every year and it is to be expected that the number of people having to battle this chronic health condition will rise until a solution is found (Ridner et al., 2008).

There are currently many different forms of treatment. Some are used interchangeably or in combination with other modalities. Nurses must be able to educate patients on the most effective forms of self-care activities to reduce the incidence and severity of exacerbations and thereby decrease the burden of

lymphedema. At this time however, it is unclear which interventions are the most effective.

Problem

According to Lee, Kilbreth, Sullivan, Refshauge, and Beith (2010), one problem lies with “conflicting advice” on how to prevent lymphedema and how to care for an extremity after surgery or radiation. They add that the National Lymphedema Network updated their recommendations recently, leaving many health care providers and patients unaware of the most current standards. Fu et al. (2009b) affirm that patients reported extreme frustration with clinicians who did not seem to be knowledgeable about the condition or its remedies. As a result of the rapid changes in treatment modality recommendations and the clinicians lagging awareness of those innovations, patients could easily become frustrated with clinicians who offer differing self-care instructions.

Vignes, Porcher, Arrault, and Dupuy (2006) state that standard treatment for lymphedema of upper extremities is intense decongestive therapy, which usually involves rotating between manual lymphatic drainage massage, wearing tight wraps or bandages, and using sequential compression devices on the affected limb. Langbecker, Hayes, Newman, and Janda (2008) also found that physical therapists agree that the same could be said for lymphedema that occurs in the lower extremities. The problem that needs to be addressed is finding which forms of self-care treatment are the most effective to prevent and control lymphedema. This would allow health care providers to be accurately informed and better able to educate patients. Patients would then know which modalities to incorporate into their daily lives for maximum benefit.

Purpose

The purpose of this integrated review of research is to determine which self-care activities may benefit the majority of patients on a consistent basis. With so many different treatments available, it is important for nurses to be able to educate patients on ways they can help prevent or reduce lymphedema, reduce their chances of further complications, and also improve patients overall quality of life.

There seems to be agreement among lymphedema patients that they are getting minimal or mixed advice about what to do if they experience lymphedema (Lee et al., 2010, Fu et al., 2009b). These efforts should then reflect the gaps in knowledge about what the most appropriate and effective self-care techniques are. This knowledge is crucial for patient education. It will also be beneficial to help reduce the instance and severity of lymphedema and hopefully prevent unnecessary and expensive treatments later on.

This review of literature aims to seek out the therapies that prove most responsive and can be performed by the patient themselves. This will not only empower the patient to take control of their health, but it will keep treatment costs down. Hopefully this will also prevent the need for additional, more drastic interventions later on.

Methods

An extensive review of the literature was completed. Only peer-reviewed information was considered. Publication types included academic journals, books, health reports, and periodicals. Authors of these studies were nurses, physicians, and other health care team members and entities that have a specific interest in the area of

treating lymphedema. Studies performed outside the U.S. were included as long as they were written in English and available in their entirety.

The focus of this endeavor was to gather information that could educate health care providers and patients on self-care techniques that can reduce exacerbations and keep swelling to a minimum. The exclusion criteria for this literature review revolved around study methodology. One area of concern was how extremity lymphedema was measured. Any form of measurement outside of circumference, water displacement, and infrared perometry was not considered an accurate way to record amounts of swelling or effectiveness of treatment. Any treatment that could not be self-performed such as surgical intervention, laser therapy and pharmacotherapy were also excluded from this review.

Databases such as Health Source: Nursing and Consumer Editions, MEDLINE, CINAHL, Alt-Health Watch, Academic Search Premiere and Cochrane yielded the bulk of studies used to perform the literature review. The following key words or phrases were searched alone or in combination with others: lymph*, therapy, treat*, manual, self, care, and nurs*. Key words relating directly to different forms of therapy such as compression, exercise, and massage, among others, were also included.

Background

Each of our bodies is constantly circulating lymph fluid in an attempt to rid the body of waste, bacteria, and other foreign materials. This fluid then makes its way to the lymph vessel and lastly, the lymph nodes (Mayo Clinic, 2009). When there is damage to, or obstruction of a lymph node, fluid accumulates distally causing swelling with subsequent pain and feelings of heaviness or tightness of the affected area (Mayo

Clinic, 2009). This condition also brings with it an increased risk of infection and other health problems as well as the psychological effect of having one or more extremities disproportionate to the rest of the body.

Cancer is the generally the most frequent antecedent to lymphedema (Poage et al., 2008), but many other conditions can precipitate it. Causes can be primary or secondary in nature. The Mayo Clinic states that primary causes are genetic and rare (2009). Milroy's disease is seen in infancy as a result of misshapen nodes during fetal development. Meige's disease is mostly seen in pubescence or early adulthood results in faulty valves that can't prevent backflow of fluid. Lymphedema is also seen in the chromosomal disorder, Turners Syndrome, which is when a person is born with only one X chromosome (Mayo Clinic, 2009).

Conversely, lymphedema can be induced by secondary means. Surgery, radiation, and removal of nodes can increase the risk and are often a vital part of cancer treatment. Another additional source that can bring it about is infection. Infection in the form of parasites is often seen in underdeveloped countries and is referred to as elephantitis or filariasis (Mayo Clinic, 2009).

According to Fu et al., health care providers tend to diagnose a patient with lymphedema when a limb has increased in size by at least 10%, has retained 200 ml of fluid or more, or has increased in size by 2 cm depending on the form of measurement used. They also add that the numbers can vary from practice to practice because no standardized diagnostic criteria exists (Fu et al., 2009a). The most conventional forms of measurement currently being used are circumferential measurement, water displacement, and infrared perometry.

Circumferential measurement involves the use of a tape measure to assess in centimeters the circumference at several different points along the limb. This method is simple and cost effective, but not very reliable. Water displacement is considered very accurate but hard to perform in a clinical setting. In this method, the affected limb is submerged in water while the displaced water overflows into a separate container to be weighed. Lastly, infrared perometry works similarly to a CT scan but uses infrared light instead of x-ray. It is an extremely precise way to measure lymphedema but can be costly when results are needed repeatedly to determine if treatments are working (Fu et al., 2009a).

There are as many ways to treat lymphedema as there are ways to measure and diagnose it. Yet awareness of this debilitating health condition has only been on the American radar for about 20 years. John MacDonald, president of the Association of the Advancement of Wound Care reports that the first center devoted strictly to the treatment of lymphedema did not open until the 1980's (2006). But even then physicians had little knowledge of its etiology or treatment, prompting Saskia Thiadens, R.N. to found the National Lymphoedema Network in 1988 (MacDonald, 2006). With this national recognition, the race to find the best remedy has in turn led to the development of many alternative forms of treatment with little research on which ones are the most beneficial and cost effective.

Findings

Many randomized, controlled studies were reviewed in an attempt to determine effectiveness. Most participants were obtained through lymphedema clinics and major hospitals. A majority of the reviewed studies required the participants to report having

symptoms of lymphedema such as perceived tightness, heaviness, swelling or numbness. Another requirement was at least a 2 cm difference in circumference or 200 ml difference in volume from the other extremity in the cases of unilateral lymphedema. Clients ranged anywhere from 32-86 years old and the majority were female. This is because one of the most common causes of lymphedema is the removal of nodes as part of the treatment regime for breast cancer. Fu et al. (2009a) reports that close to half of all breast cancer survivors will experience lymphedema. This equates to a roughly 2.4 million females.

All of the studies had similar exclusion criteria. Most would not allow lymphedema that was considered severe and needed more aggressive treatment than what could be provided by the studies. Patients also had to be cancer free so that any manipulation of an extremity would not cause exacerbation of the condition or further metastasis. Those who had undergone surgery in the previous month were also not considered. They also preferred that clients were at least 3-4 months free of other lymphedema management regimes that could interfere with the outcomes of the trials.

Weight-Bearing Exercise

One frequently mentioned example of conflicting advice reported by patients is whether or not to use affected extremity. According to Lee et al. (2010), advice has been given to not use the limb as it could exacerbate the condition whereas others have advised to exercise the limb to help promote lymph circulation.

A landmark study performed by Schmitz et al. (2009) has shown that when done correctly, it is possible that exercise may reduce future exacerbations of swelling and may also relieve other lymphedema symptoms. The primary goal of this study was to

determine if a weight lifting regime would trigger or worsen swelling. Over the course of a year, the weight lifting group participated in twice weekly, 90 minute weight lifting sessions with certified personal trainers. Subjects were required to wear a compression garment and started at the minimum weight that was comfortable for each individual. The routines eventually added more weight and more repetitions of exercises as the subjects built strength. At the end of the year, both the control and study group had a comparable 5% decrease in limb swelling. The secondary focus of this study was to determine if this form of therapy could help prevent future exacerbations of lymphedema. The study reported that out of the 130 people still in the study at follow up, 19 subjects in the control group experienced an exacerbation versus 9 in the weight lifting group (Schmitz et al., 2009).

A study done by McKenzie and Kalda (2003) showed similar results with fewer subjects over an eight week period. Warm up routines, types of exercises, and levels of advancement in difficulty were almost identical and like the Schmitz et al. (2006) study, subjects were required to wear a compression garment (McKenzie & Kalda, 2003). Resistance training and aerobics were the basis of the exercise protocol for the subjects. Measurements were taken five times over the eight weeks by circumferential means and water displacement. After the eight week period no significant changes in arm circumference or volume could be reported in either the exercise or control group (McKenzie & Kalda, 2003).

Yet another trial examined the effects of exercise and weight training against lymphedema. Ahmed, Thomas, Yee, and Schmitz (2006) compared the before and after results of 45 clients who received twice weekly weight training for six months. All clients

participated in the program and none of them had an increase in limb circumference of greater than 2 cm. The outcome of study shows that an exercise regime did not cause an exacerbation of lymphedema.

One of the largest studies reviewed consisted of 134 cancer survivors who were given supervised exercise instruction for 13 weeks followed by nine months of an unsupervised exercise routine (Schmitz et al., 2010). A lymphedema exacerbation was defined as having an increase greater than 5% in limb girth at any time during the study or at its conclusion. At the end 11% of weightlifting group and 17% of the control group had instances of increased swelling; mostly in patients from which more than five lymph nodes had been removed (Schmitz et al., 2010).

Compression Garments and Bandaging

The concept behind wearing compression garments and wrapping the limb in a bandage are essentially the same. The goal is to push the lymph fluid out of the extremity and into the trunk of the body (Mayo Clinic, 2009). One of the first and longest running studies done on compression hosiery took place in Tokyo over a thirty-year period. Yasuhara, Shigematsu, and Muto (1996) found that of the 100 subjects able to complete the study, 92% of those wearing just a compression stocking on a regular basis either had a decrease in limb circumference or no change from baseline. The other 8% fell within the group who did not wear the garment and experienced deterioration if their condition (Yasuhara et al., 1996).

Badger, Peacock, and Mortimer (2000) compared the outcome of bandaging against a simple compression garment over a 24 week period. The experimental group received 18 consecutive days of bandaging and were then asked to wear the

compression sleeve for the remainder of the trial. The control group also received the 18 days of bandaging but did not follow up by wearing the compression sleeve. The results, according to Badger et al., were a decrease in circumference of 31% for the group who followed up with the compression sleeve versus 15.8% for the control group (Badger et al., 2000).

A study published in *Lymphology* compared exercise with the continual use of a compression sleeve. Johansson, Tibe, Weibull, and Newton (2005) conducted a simple trial over 24 hours to determine if exercise had a more immediate effect on lymph build up. Participants were required to wear a sleeve for the entire trial. Measurements were taken before exercise, immediately following the routine, and then again at 24 hours. Immediately after exertion the majority of limbs showed a slight increase in size as was determined by water displacement. When measured again after just a day, not only did the initial swelling go down but overall volume decreased from that of the baseline measurement (Johansson et al., 2005).

Swedborg (1984) had a similar idea early on to investigate the effectiveness of elastic sleeves. In his trial, patients were fitted for an elastic sleeve that was to be worn for six months. This reduced limb volume by approximately 17%. Swedborg went further and followed the therapy by adding on 10 days of intermittent pneumatic therapy, or the use of a sequential compression device (SCD). This reduced limb volume by another 18% on average. As an added measure, patients wore the sleeves for an additional six months following the study. The author reports that there was no relapse in swelling in cases where the sleeve was worn consistently, but did not disclose what constituted a relapse or consistency (Swedborg, 1984).

Manual Lymphatic Drainage

Another form of therapy that is presumed to produce the same effect as bandaging is Manual Lymphatic Drainage (MLD). Both processes attempt to manipulate the fluid up to working lymph nodes but instead of using bandages, MLD uses the hands to massage the extremity distal to proximal (Mayo Clinic, 2009). Several researchers have focused on MLD. One such study was performed by Andersen, Hojris, Erlandsen, and Andersen (2000) with 42 subjects, some of which received standard therapy and some of whom received standard therapy with MLD. Standard therapy consisted of wearing only a compression stocking. The MLD was performed four times a week for two weeks by a professional massage therapist. The MLD was taught to the experimental group who continued with the self-massage until the end of the time period. Measurements taken after three months showed a 60% reduction in the standard therapy group versus a 48% decrease in the MLD group. After following patients for an additional nine months, little difference was seen with 66% and 43% being reported (Andersen et al., 2000).

Another study conducted by Johansson, Albertsson, Ingvar, and Ekdahl (2000) presents similar findings. Each study participant received two weeks of compression therapy. This was followed by the control group receiving another week of only compression therapy while the experimental group received compression in addition to MLD. In just the two week period of all participants getting only compression the group had a median reduction in volume of 188 ml. The group that had the added week of only compression lost another 20 ml, while the group who had MLD with the compression lost another 47 ml (Johansson et al., 2000).

In a study that was performed two years later by Williams, Vadgama, Franks, and Mortimer (2002), another 31 clients were put through a slightly different trial. Here, patients either received MLD by professional lymphedema specialists or simply performed self-massage. All subjects wore compression sleeves for the entire 12 week trial. Patients in the MLD group began with a mean excess volume of 746 ml which was reduced to 674 ml by the end of the study. This gave them a mean reduction of approximately 71 ml. The self-massage group started with a mean excess volume of 753 ml and ended with approximately 724 ml. This gave them a mean reduction of 30 ml over the 12 week span (Williams et al, 2002).

Vignes et al. (2007) examined the relationship between the recurrences of lymphedema and compliance to wearing sleeves and bandages after manual lymphatic drainage. At the end of a year's time, 52% of the 537 patients in the study had an increase in volume of more than 10%. It was found that the patients who had an exacerbation were non-compliant when it came to wearing the bandaging and sleeves as recommended. In this study, adhering to instructions for wearing support devices was crucial to whether swelling returned over time (Vignes et al., 2007).

Sequential Compression Devices

Another set of studies examined the relationship of volume lost when sequential compression devices, or SCD's, are used. In another study conducted by Johansson, Lie, Ekdahl and Lindfelt (1998), MLD was compared to the use of SCD's in the reduction of limb volume. Clients wore a standard compression sleeve for one week. They were then divided into a group that would receive MLD for 45 minutes each day and a group that would wear a SCD for two hours a day. Both groups carried out their

respective treatments for an additional two weeks. After measuring by water displacement it was determined that during the first week an average of 7% in volume was lost with the sleeve alone. After the other therapies were performed the MLD group decreased in volume by an additional 15%, while the group wearing SCD's only decreased by another 7% (Johansson et al., 1998).

Klein, Alexander, Wright, Redmond, and LeGasse (1988) performed one of the shortest studies which lasted just 48 hours and treated 73 affected lower limbs. The patient kept the compression device on during the entire length of time with the exception of a few hour long rest periods. The result was anywhere from a 1.6 cm up to a 2.1 cm reduction in size from the baseline measurement. All of the patients who participated had not had previous success with other methods. There were no control and experimental groups (Klein et al., 1988).

A clinical trial performed by Modaghegh and Soltani (2009) also measured reduction in volume over a 48 hour interval. These patients also had previously poor results with other modalities. They were hospitalized for the two days, wearing the compression device for eight hours each day. Four different measurements were taken along the length of the limb including the foot, ankle, calf and thigh. Results from patients with both unilateral and bilateral edema had anywhere from a 66% reduction to a 94% reduction in circumference with the ankle and foot measurements seeing the largest difference (Modaghegh & Soltani, 2009).

Even shorter still was a one hour trial completed by Bordin, Godoy, and Godoy in 2009. Clients at a lymphedema clinic wore a sequential compression device with measurements taken before and after the session using water displacement. Out of 25

patients there was an average volume loss of 59.2 ml with two patients experiencing a gain in volume (Bordin et al., 2009).

The largest and longest trial reviewed involved 155 participants and lasted for six months. Ridner, McMahon, Deitrich and Hoy (2008) had their patients wear SCD's for one hour twice a day for the first month. They were then told to cut back to one hour once daily for an additional five months. Almost 50% of the subjects said they had adhered to the suggested protocol of how often to perform the procedure. The other half admitted to not doing it as often as instructed to with the least amount of use being once a week. No official measurements were taken but 95% of participants reported positively that their limb volume had dropped or at least been maintained. Of that 95%, half felt that their limb volume had decreased by at least 20% (Ridner et al., 2008).

The last study reviewed was conducted by Bunce, Mirolo, Hennessy, Ward, and Jones (1994) and addressed how a combination of therapies would work over time. During the first four weeks, patients received treatments with SCD's, had MLD, and wore compression sleeves and bandages. At this time it was determined that limbs reduced an average of 40%. Measurements were also taken six months later to reveal an approximate 50% reduction overall. After twelve months the loss in volume had remained stable. The researchers did note that the use of modalities that required assistance, which were the bandaging and MLD, declined moderately after the first four weeks (Bunce et al., 1994).

Discussion

Patients experiencing lymphedema have many forms of treatment available to them. Exercise was once thought to have promoted lymphedema exacerbations

because any injury or over use of the extremity would signal the inflammation process. This would in turn cause lymph fluid to accumulate in the area. Minimally, studies have found that little or no swelling will occur as long as a careful routine is followed. These studies defined a careful routine as one that incorporated range of motion exercises, resistance training, and light weight lifting. As part of a fitness regime, these participants were often times required to perform warm up exercises and slowly increase strength training over time. A structured regime lowered the possibility of self-injury. This is likely why there were so few complications involving exacerbation.

The studies varied in length from eight weeks to a year long. Each program had participants exercising at least two times per week for a minimum of 45 minutes. Short term, the trial that lasted from eight weeks to six months showed no difference in circumference between the experimental and control groups. This has been found in some cases to reduce the long term chances of having acute swelling episodes. In both year-long studies mentioned above, the experimental group that performed the exercises decreases their chance of having an exacerbation by at least half.

Even though subjective opinions from participants about how they felt the exercising enhanced their quality of life were not considered in this particular literature review, it is of note that several of the studies had very positive remarks that this particular form of lymphedema treatment improved quality of life tremendously (McKenzie & Kalda, 2003, Devoogdt et al., 2009, Fu et al., 2009b).

Compression sleeves were intended to be worn on a regular basis to help prevent lymphedema exacerbations by not allowing a space for lymph fluid to settle (Fu et al., 2009a). Repeated trials from one day to thirty years have shown the success

rates for adhering to a compression garment regime. In one study the amount of lymph reduction in the extremity was double that of the control group while another study had a 100% success rate in size reduction for the patients who complied with wearing compression garment.

The other studies involving exercise, MLD, and SCD's showed that not only does compression work as a way to reduce circumference, it is also a means of maintenance to keep swelling from reoccurring. It works by providing support and integrity to the vessels underneath the skin that will help promote lymph drainage. Sweborg's (1984) study showed that there was no relapse in swelling when a compression garment was worn after being treated by an intermittent or sequential compression device after 6 months. Another showed that even after 24 hours, decreased volume had been seen after exercise as long as a compression sleeve was worn.

All trials reviewed involving MLD used a compression sleeve as a component to therapy. Each study made it a part of either its standard or maintenance therapy, therefore it is hard to determine whether the MLD had a significant impact on limb volume reduction. The Vignes et al. (2007) trial found that the half of study subjects who had an exacerbation of lymphedema in the following year after MLD treatment did not comply with wearing a compression garment on a regular basis (2007). The Williams et al. (2002), Johansson et al. (2000), and Andersen et al. (2000) studies incorporated the compression device as part of the basic standard of care and patients were required to wear the sleeves regardless of whether they received the experimental MLD or not.

When used in conjunction with a compression device, manual lymphatic drainage had similar results to exercise as far as measured reduction in limb girth being slight to

no difference from baseline. Johansson et al. (2000) found that the majority of fluid loss was obtained by wearing the compression sleeves and that further loss gained by incorporating MLD only resulted in an approximate 11% additional reduction. Andersen et al. (2000) revealed the same thing but used MLD followed by wearing a compression garment. The result was not significant in reducing volume compared to compression alone (Andersen et al., 2000). The trial by Williams et al. (2002) did find that a slight reduction was obtained but credited the reduction to the patients wearing a compression device during the maintenance phase of the experiment.

As with exercise, clients tended to express a better sense of wellbeing after receiving manual lymphatic drainage. The subjects in Williams et al. (2002) study revealed that they had less pain and their limbs didn't feel as heavy. They also reported less sleep disturbances and better emotional functioning (Williams et al., 2002). The clients in the control group and the experimental group in Johansson's (2000) trial agreed that they experienced less pain and perceived that their limbs felt lighter. This same subjective data was also found to be true in the Andersen (2000) study.

The last component of therapy that was reviewed was the use of SCD's. Results of these trials show that it is possible to get additional volume loss with SCD's. These trials also incorporated compression sleeves as part of the maintenance phase. The studies varied with the amount of time the SCD's were worn as well as how long the treatment lasted.

In the shorter trials, volume reduction was best achieved when the SCD's were worn for a majority of the day. For example, the two studies conducted over a 48 hour period had better success because the device was being worn for a minimum of eight

hours each day. This method was able to cut down limb size by half (Klein et al., 1988, Modaghegh & Soltani, 2009). A more immediate, yet less drastic, result was seen in the Bordin (2009) study after just one hour.

Johansson et al. (1998) found that MLD produced twice as much volume loss as that of wearing SCD's. Patients had worn the SCD's for two hours a day for two weeks but the actual reduction achieved by both methods was small over the four week period. The longest study which was done by Ridner et al. (2008) had the most consistent loss across the board with an overwhelming majority of patients reporting a minimum of a 20% decrease in volume after wearing a SCD twice a day for a month followed by once daily for five more months (Ridner et al., 2008). Therefore it can be deduced that success in the form of decreased limb size is dependent upon how often and how long the therapy is carried out.

Utilizing a combination of therapies shows the most promise in effectively preventing and treating lymphedema. Each modality may not necessarily cause a decrease in limb swelling in every patient but none of the modalities have shown to cause an exacerbation either. Even if the chosen treatments do not cause a reduction in swelling, they may still be worth incorporating into the treatment plan if the patient reports a better quality of life or less pain as reported by subjective opinion.

Limitations

When taking into consideration any type of statistical data, it is important to look at the studies limitations in determining whether the results are truly accurate. In the case of lymphedema, one of the problems behind its management stems from some of

the limitations that may keep researchers from determining which treatments work the best.

One of the limitations involves the wearing of a compression sleeve as part of standard therapy. For the studies involving exercise, MLD, and SCD's, wearing a compression garment was part of protocol. Studies on compression garments by themselves have proved repeatedly to be effective in reducing swelling and maintaining the reduction in volume. This can become a problem when trying to conclude whether or not the experimental therapy is the reason behind any reduction or exacerbation or whether the results are attributed to regular wearing of a compression garment.

Although many studies have focused on comparing different treatments for lymphedema, an overwhelming majority were only tested on lymphedema of upper extremities that had occurred secondary to treatment for breast cancer. Ideally any interventions that work for treating breast cancer related lymphedema should be effectively treat any kind of lymphedema in any extremity. Not enough studies have been conducted testing treatment for lower extremity edema to determine if this is true. If adequate lower extremity data were present, it could be compared to the results from the upper extremity treatment studies to see if similar effects were obtained. Even though breast cancer related lymphedema may account for a large share of lymphedema cases, further studies are warranted on lymphedema caused by other maladies and locations other than the arm.

Compliance presented another key limitation to many of the studies. Many of the studies, especially those that lasted for longer than a few weeks, sent the patients home with instructions on self-care for the remainder of the trial. The time left in these trials

were anywhere from weeks to years. Since it was not realistic or cost effective to follow the clients around outside of the study facility, examiners had to rely on the patient's word that they adhered to the therapy regime they were given. The results would be skewed if even a few subjects failed to fully disclose whether they completed the therapies at home as required. This is especially true in cases where it could have proved the effectiveness of a particular therapy when the results obtained were slight.

Another aspect to consider when determining the efficiency of treatment is to ascertain whether or not the treatment is feasible. Some studies did trials over shorter time frames which lasted anywhere from few weeks to just a few hours. Although they seemed to show that immediate reduction in swelling could be achieved, these treatments would also need to be tested long term. This is because patients who may experience lymphedema exacerbations will need treatment for life to prevent recurrences. Prevention of lymphedema is life-long and it should not be thought of as a side effect that will eventually go away.

Overall these studies show significant evidence as to whether they do or do not work in treating lymphedema. It is important to look at the studies individually to determine why they did or did not have success in reducing limb volume. This includes careful scrutiny of all the treatments used, whether the patients are able to carry out the recommended treatment on their own, and if the study is directed towards a short term goal of volume reduction or a long term goal of maintenance.

Nursing Implications

Lymphedema has many implications for the field of nursing. In nursing practice, nurses must be able to provide the best care possible for patients. This includes

tailoring a patient specific treatment plan with the physician. Nurses are also responsible for educating patients on the different forms of treatment and how best to prevent a lymphedema exacerbation. This can only be accomplished through research and literature reviews since nursing practice is an evidence based practice.

In the nursing process, the first step is to assess the patient. Nurses must be sure to get a thorough history. This includes whether patients may have any genetic conditions that could put them at risk for lymphedema. The nurse should also ask about a history of cancer or surgery because both could result in lymphedema. If so, it is important to note before moving on to the physical assessment since it may have an impact on how the assessment is performed. As with treating any ailment, other medical conditions that patients have must be known in order to properly treat them. For example, a patient who has a co-morbidity of congestive heart failure may need to avoid any form of manual lymphatic drainage and sequential compression devices because the sudden shift of fluid from the affected limb into circulation could overload an already weak heart. The same could be said for patients experiencing kidney dysfunction.

If the patient has a positive history for either a primary or secondary trigger that can exacerbate lymphedema, care must be taken when doing the physical exam. Patients who have undergone surgery with lymph node trauma, dissection, or removal should avoid having blood pressure taken or blood drawn on the effected extremity because it can potentiate a lymphedema exacerbation (Breastcancer.org, 2008). It is also important to determine if the patient is having any current issues by inspecting the extremity for any signs indicative of swelling. Signs can include weeping or skin that has a pig-skinned or orange peel look. Measurements can be taken by several effective

methods such as circumferential measurement or water displacement. Results obtained should be compared to those of a known baseline measurement or compared against the measurements taken from the unaffected side. Some other signs may be subjective data reported by the patient as experiencing feeling of heaviness, tightness, or pain in the limb (Breastcancer.org, 2008). All of the subjective and objective data will help the nurse determine if the patient is experiencing increased a lymphedema exacerbation.

After the assessment is done, the nurse can then formulate a nursing diagnosis, determine the outcomes, and begin a care plan. Diagnoses such as pain, fluid volume excess, impaired skin integrity, and disturbed body image are just a few that patients may exhibit. Once the diagnosis has been identified, the nurse and patient can list realistic goals that the patients will try to meet. The biggest goal will be to either prevent lymphedema from occurring or to reduce the swelling caused by a lymphedema episode. This planning process should also be patient specific. The nurse should take into consideration factors like whether the patient is able to perform daily exercises or if his or her insurance will cover the cost of a compression garment or SCD's if it is a planned intervention. The nurse should also consider if the patient is able to carry out the treatments at home on their own.

One of nursing's primary responsibilities is to educate their patients on their specific health issues. When implementing interventions, part of the nurses role is demonstrating to the patient how to perform interventions correctly for optimum results. In cases where patients are experiencing a lymphedema exacerbation, nurses will educate them on the safest way a decrease in volume can be obtained. Nurses may work with many other health care professionals that can be an essential part of the

patients care such as counselors, specialists, physical therapists, and home health among many others. All of them will have a collective goal to help the patient meet his or her individual goal. For example, a certified lymphedema therapist could teach the patient how to perform MLD at home. Home health may be able to assist with showing the patient how to properly wear SCD's or compression garments. In this part of the nursing process, interventions will be implemented in the hopes of meeting the patient's specific goals.

Lastly, a nurse must be able to determine if the interventions were appropriate and effective. Subjective data can tell the nurse whether patients feel the treatments can be carried out on their own. If the treatments are appropriate, a reduction in swelling should be seen. Measurements should be compared to a baseline reading or an unaffected limb to determine effectiveness. Nurses must also to continue to educate their patients, making sure that patients understand the importance of adhering to a regime in order to prevent recurrence of lymphedema in the future.

Summary

Lymphedema occurs as the result of trauma or deformation of lymph nodes that help remove fluid from the interstitial space. Many primary and secondary factors can cause an increase in limb swelling. Lymphedema is most recognized as a side effect of lymph node removal as part of the treatment for breast cancer.

Patients have expressed frustration with health care professionals about how to treat lymphedema. Patients state that they encounter clinicians who do not know much about it or they get opposing advice about how best to treat it. With so many forms of treatment available, it is easy to see how patients may feel confused and overwhelmed.

A review of the literature involving self-care modalities that prevent and treat lymphedema has yielded positive results. Most forms of treatment that can be performed by the patient will prevent exacerbations as well as promote a reduction in volume. It is important to determine which modalities will best fit each patient individually based on factors such as his or her current health status and whether the recommended treatment can be performed without help.

It is essential that nurses continue to review current studies and literature so that they may advocate for appropriate and effective treatments. Current practice dictates that basic lymphedema care should include preventing injury to the skin, wearing a compression garment, and seeking out medical care for any exacerbation (Mayoclinic.com, 2009). After performing a thorough review of the studies available, it has been determined that a combination of therapies is the best approach to preventing an onset of swelling and treating active swelling as long as they are not contraindicated by other health issues the patient may have.

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