

Clinical practice guidelines for the care and treatment of breast cancer: 11. Lymphedema

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Abstract

Objective: To provide information and recommendations for women and their physicians when making decisions about the management of lymphedema related to breast cancer.

Options: Compression garments, pneumatic compression pumps, massage and physical therapies, other physical therapy modalities, pharmaceutical treatments.

Outcomes: Symptom control, quality of life, cosmetic results.

Evidence: Systematic review of English-language literature retrieved primarily from MEDLINE (1966 to April 2000) and CANCELIT (1985 to April 2000). Nonsystematic review of breast cancer literature published to October 2000.

Recommendations:

- Pre- and postoperative measurements of both arms are useful in the assessment and diagnosis of lymphedema. Circumferential measurements should be taken at 4 points: the metacarpal-phalangeal joints, the wrists, 10 cm distal to the lateral epicondyles and 15 cm proximal to the lateral epicondyles.
- Clinicians should elicit symptoms of heaviness, tightness or swelling in the affected arm. A difference of more than 2.0 cm at any of the 4 measurement points may warrant treatment of the lymphedema, provided that tumour involvement of the axilla or brachial plexus, infection and axillary vein thrombosis have been ruled out.
- Practitioners may want to encourage long-term and consistent use of compression garments by women with lymphedema.
- One randomized trial has demonstrated a trend in favour of pneumatic compression pumps compared with no treatment. Further randomized trials are required to determine whether pneumatic compression provides additional benefit over compression garments alone.
- Complex physical therapy, also called complex decongestive physiotherapy, requires further evaluation in randomized trials. In one randomized trial no difference in outcomes was detected between compression garments plus manual lymph drainage versus compression garments alone.
- Clinical experience supports encouraging patients to consider some practical advice regarding skin care, exercise and body weight.

[A patient version of these guidelines appears in Appendix 2.]

Validation: An initial draft of this document was developed by a task force sponsored by the BC Cancer Agency. It was updated and revised substantially by a writing committee and then submitted for further review, revision and approval by the Steering Committee for Clinical Practice Guidelines for the Care and Treatment of Breast Cancer.

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Research

Recherche

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**The steering committee is part of Health Canada's Canadian Breast Cancer Initiative. A list of committee members appears in Appendix 1.*

A patient version of these guidelines appears in Appendix 2.

This article has been peer reviewed.

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Lymphedema in women treated for breast cancer is an accumulation of protein-rich fluid in the arm that occurs when axillary lymphatic drainage from the arm is interrupted because of axillary lymph node dissection or axillary radiation, or both. Lymphedema remains a problem even with modern treatment modalities. Affected women can experience pain, swelling of the arm, tightness and heaviness in the arm and recurrent skin infections. Three stages of lymphedema have been described.¹⁻³ Stage I presents with pitting and is considered reversible; some women with this stage have no increased arm girth or heaviness and no signs of pitting edema. As the edema progresses, it becomes brawny, fibrotic, nonpitting and irreversible (stage II). In advanced lymphedema (stage III), which rarely occurs following breast cancer treatments, cartilaginous hardening occurs, with papillomatous outgrowths and hyperkeratosis of the skin. In this guideline, we provide an evidence-based approach to the management of this difficult problem.

Method

This guideline document is based on a systematic review of English-language literature retrieved from MEDLINE (1966 to April 2000) and CANCELIT (1985 to April 2000). Medical subject headings used were "breast," "breast neoplasms," "lymph node excision," "mastectomy" and "lymphedema." Randomized controlled trials comparing different modalities would provide the strongest evidence for recommending best treatments for lymphedema. However, given the lack of data from such studies, a broader strategy without limits set by methodological search criteria was used. Review articles and textbook chapters were also consulted, primarily to provide background information and to secure additional references. A nonsystematic review of the breast cancer literature to October 2000 also took place. Rules of evidence as described by Sackett⁴ were used for grading the levels of experimental studies.

An initial draft of this guideline document was developed by a task force sponsored by the BC Cancer Agency that was convened in March 1997. The task force comprised physical therapists, breast surgeons, radiation and medical oncologists, and breast cancer patients living with lymphedema. The draft was reviewed by clinical practitioners and by representatives of the British Columbia College of Physicians and Surgeons, the Registered Nurses' Association of British Columbia, the College of Physical Therapists of British Columbia and the British Columbia Council on Clinical Practice Guidelines. The Breast Tumour Group at the BC Cancer Agency then approved the guideline in October 1997. The initial draft was updated and revised substantially by a writing committee and then submitted for further review, revision and approval by the Steering Committee for Clinical Practice Guidelines for the Care and Treatment of Breast Cancer, sponsored by Health Canada.

Recommendations (including evidence and rationale)

Measurement

- **Pre- and postoperative measurements of both arms are useful in the assessment and diagnosis of**

lymphedema. Circumferential measurements should be taken at 4 points: the metacarpal-phalangeal joints, the wrists, 10 cm distal to the lateral epicondyles and 15 cm proximal to the lateral epicondyles.

There is no consistent operational definition of "clinically significant lymphedema" in the literature. The lack of a consistent definition leads to confusion regarding the incidence of lymphedema after breast cancer treatment. The following criteria have been used in the literature to measure lymphedema: absolute increase in volume or percentage increase in volume as determined by water displacement, circumferential measurements and patient symptoms.^{5,6} Results of studies comparing differences in arm circumferences with volume differences are conflicting.^{7,8} In a recent study Megens⁸ reported that both circumferential measurements and water displacement volumetry in women with breast cancer had excellent interrater and test-retest reliability, although the 2 methods had poor agreement with each other.

Circumferential measurements are widely used because tape measures are readily available and because volumetric measurement is logistically difficult. One common approach involves measuring the circumferences of both arms at points 13 to 15 cm proximal and 10 cm distal to the lateral epicondyle of the humerus.⁹ Differences greater than 2.0 cm at any point are defined by some as "clinically significant,"^{5,10} whereas others classify this degree of lymphedema as mild.^{11,12} Other methods for assessing lymphedema, including lymphoscintigraphy, MRI, CT scanning and ultrasound, are being evaluated in research settings.¹³

- **Clinicians should elicit symptoms of heaviness, tightness or swelling in the affected arm. A difference of greater than 2.0 cm at any of the 4 measurement points may warrant treatment of the lymphedema, provided that tumour involvement of the axilla or brachial plexus, infection and axillary vein thrombosis have been ruled out.**

Incidence of lymphedema

Given the variation of criteria used to define lymphedema and the variety of assessment techniques, it is not surprising to see wide variation in the reported incidence of lymphedema following breast cancer treatment. Lymphedema rates of 6% to 70% among patients with breast cancer have been reported.^{5,14-18} Petrek and Heelan¹⁹ reported on the incidence of lymphedema after breast cancer treatment in a review of 7 studies published since 1990. These studies were all retrospective, differed in patient populations, used different criteria to measure lymphedema and had varying degrees of follow-up. The incidence of lymphedema ranged from 2% to 24%.

Transient lymphedema occurs in a number of patients following axillary dissection. In a study involving 282 women who underwent breast-conserving surgery including axillary dissection, Werner and colleagues¹⁰ reported that transient edema occurred in 21 (7%) of the women and persistent edema in 24 (12%). The median time to development of persistent edema was 14 months (range 2–92 months).

Irradiation of the axilla increases the risk of lymphedema. In a randomized controlled trial conducted in British Columbia, chemotherapy alone was compared with chemotherapy plus regional radiation therapy in women with node-positive breast cancer after modified radical mastectomy.²⁰ The reported rate of lymphedema was 9.1% among the irradiated subjects and 3.2% among those who received chemotherapy alone. Although the risk of lymphedema increases with irradiation of the axilla, this risk is also influenced by the extent of axillary dissection.^{21–24} Other factors that have been implicated in the development of lymphedema are obesity,¹⁰ extensive axillary disease²² and recurrent cancer in the axillary lymph nodes.²⁵

Chronic and severe lymphedema may very rarely give rise to lymphangiosarcoma. The incidence of this complication is rarely reported among lymphedema patients; in unselected patients the risk is less than 1%.²⁵ In a population-based Swedish study involving 122 991 women treated for breast cancer between 1958 and 1992, angiosarcoma developed in only 35 women.²⁶ However, 26 (74%) of the 35 women had lymphedema.

Management

Before any type of lymphedema treatment is started, tumour involvement of the axilla or brachial plexus, infection and axillary vein thrombosis should be looked for and treated if present. The systematic review of literature on the management of lymphedema was limited by the lack of prospective randomized trials evaluating different treatment options.

Compression garments

- **Practitioners may want to encourage long-term and consistent use of compression garments by women with lymphedema.**

Graded compression garments that deliver pressures of 20 to 60 mm Hg are the mainstay of lymphedema therapy and can be used as primary therapy.^{1,27,28} Some clinicians recommend the use of a compression garment for up to 24 hours per day, while others recommend its use only during waking hours or exercise.^{9,12,29–32} Compression garments may also protect the extremity from injuries such as burns, lacerations and insect bites.

Collins and colleagues³³ used CT scanning to assess the effect of compression garment therapy in 27 women

with unilateral lymphedema. They found significant decreases in the cross-sectional area of subcutaneous compartments: the mean decrease was 9% in the proximal portion and 26% in the distal portion of the limb (level V evidence).

In one of the few randomized controlled trials of lymphedema, the use of a compression sleeve plus electrically stimulated lymphatic drainage was compared with the use of a compression sleeve alone.⁹ Both modalities reduced limb girth by 17%, which suggested that compression sleeve therapy alone is effective (level II evidence).

Good compression garments can be custom-made or prefabricated, and ideally they should be fitted by trained personnel.^{12,34} Some sleeves start at the wrist and end at the upper arm. Others incorporate the shoulder and fasten with a strap around the upper torso. A compression guntlet, especially one incorporating the wrist, can be used if the hand is swollen.¹ Compression garments should be replaced every 4 to 6 months, or when they begin to lose their elasticity.^{1,32}

Patients may be noncompliant with using compression garments because the garments are unsightly, uncomfortable, difficult to put on and expensive.¹ Customized, lightweight and colourful garments may be an option for comfort and wear.

Pneumatic compression pumps

- **One randomized trial has demonstrated a trend in favour of pneumatic compression pumps compared with no treatment. Further randomized trials are required to determine whether pneumatic compression provides additional benefit over compression garments alone.**

There has been only one randomized trial that has evaluated pneumatic compression pumps for the treatment of lymphedema. Dini and colleagues³⁵ assigned 80 women with postmastectomy lymphedema to either intermittent pneumatic compression or no treatment. Women in the treatment group underwent a 2-week cycle of 5 pump sessions per week, each session lasting 2 hours, followed by a 5-week break, and then another 2-week treatment cycle. Although the mean decrease in arm circumference in the treatment group was nearly 4 times that in the control group (1.9 cm v. 0.5 cm), the post-test differences between the 2 groups failed to reach statistical significance ($p = 0.084$), possibly because of the small sample and the large variability in both the initial arm measurements and the circumferential changes within each group (level II evidence).

The experience with lymphedema pumps has also been reported in a number of level V studies.^{36–42} The results have been mixed. These studies were limited by their small samples, mixed populations (arm and leg edema), lack of control groups and lack of outcome measures that assessed

symptoms such as pain and heaviness. In one study pneumatic compression produced a reduction in lymphedema volume that was 18% greater than the reduction produced by elastic compression;⁴¹ in another study no difference was detected between elastic compression and pneumatic compression.³⁶

No comparative studies have been published to determine the most effective pumping time, pressure levels or kind of pump. There is a suggestion,⁴⁴ but not unanimous agreement,⁴³ that sequential, multichambered pumps are more effective than monochambered pumps. The former produce a linear pressure wave from distal to proximal portions of the limb that reduces the tendency of fluid to collect in the hand. There are several commercially available pumps, ranging in complexity and cost. Most pumps used by therapists, clinics and consumers are complex and cost several thousand dollars. *Pump therapy is contraindicated in the presence of active infection or deep vein thrombosis in the limb.*

Massage and physical therapies

- **Complex physical therapy, also called complex decongestive physiotherapy, requires further evaluation in randomized trials. In one randomized trial no difference in outcomes was detected between compression garments plus manual lymph drainage versus compression garments alone.**

Complex physical therapy, also called complex decongestive physiotherapy, is a treatment regimen that includes meticulous skin hygiene, manual lymph drainage, bandaging, exercises and support garments. Manual lymph drainage is a massage technique that involves the skin surface only and follows the anatomic lymphatic pathways of the body. A session of manual lymph drainage starts centrally in the neck and trunk to clear out the main lymphatic pathways, thereby facilitating drainage from the arm.⁴⁵⁻⁴⁷

A recently published randomized trial involving 42 women with modest stage I or II lymphedema compared standard therapy alone with standard therapy plus manual lymph drainage and training in self-massage (level I evidence).⁴⁸ Standard therapy included use of a custom-made sleeve-and-glove compression garment worn during the day, instruction in physical exercises, education in skin care, and information and recommendations about lymphedema. Both groups obtained a significant reduction in limb volume, a decrease in discomfort and increased joint mobility over time. However, no significant differences in objective measures of change in arm volume or subjective measures of symptoms related to lymphedema were found between the 2 groups.

In a cohort study involving 35 women, compression bandaging plus manual lymph drainage was compared with compression bandaging alone (level III evidence).⁴⁹ There was a trend in mean volume reduction and a statis-

tically significant difference between the 2 groups in the percentage reduction in volume in favour of the combined treatment. Symptoms did not differ statistically significantly between the 2 groups. A number of case series have reported on the use of these modalities. Some reported alleviation of lymphedema (level V evidence).⁵⁰⁻⁵⁷ However, interpretation of the results is limited by the methodology of the studies. In another trial, manual lymph drainage plus compression garment use was compared with sequential pneumatic compression plus compression garment use; no difference was detected between the treatment groups (level II evidence).⁵⁸ In another study, involving 6 months of compression garment use by 120 women, no additional benefit was shown by adding electrically stimulated lymphatic drainage or pneumatic pump therapy (level V evidence).³⁶

Other physical therapy modalities

Other physical therapy modalities, such as laser treatment, electrical stimulation, transcutaneous electrical nerve stimulation (TENS), cryotherapy, microwave therapy and thermal therapy, have been used for lymphedema in breast cancer patients (level V evidence).^{9,59-62} However, these modalities need further, rigorous evaluation before recommendations can be made.

A 1993 Italian study compared ultrasonography and pump therapy with a monochambered pump.⁶³ There was no significant reduction in lymphedema with either therapy. In fact, therapeutic ultrasound to areas of potential metastatic disease is contraindicated. A randomized study involving 71 mice showed enhanced tumour growth when high-intensity, continuous ultrasound was applied directly over the tumour.⁶⁴ Low-intensity, continuous ultrasound and pulsed ultrasound also increased tumour weight and volume, although not as significantly as high-intensity ultrasound.⁶⁵ *Therapeutic ultrasound should not be used over areas of active or potential breast cancer metastases, such as the hips, lumbar area, ribs, chest wall or axillae.*

Pain management

Pain and discomfort associated with lymphedema are common^{66,67} and should be managed primarily by controlling the lymphedema. Refractory pain can be managed with non-narcotic and narcotic analgesics, with the use of adjuvant analgesics (e.g., tricyclic antidepressants, corticosteroids, anticonvulsants or local anesthetics) when necessary.⁶⁸ Aggravating conditions, such as infection and recurrence of cancer in the axillary lymph nodes or brachial plexus, should be looked for and treated.

Psychosocial issues

Because of the psychological morbidity associated with lymphedema, psychosocial issues should be promptly rec-

ognized and addressed. Women with lymphedema have been shown to have greater psychiatric morbidity and greater functional disability.⁶⁹⁻⁷²

Surgery, diuretics and benzopyrones

Surgery (e.g., microsurgical lymphovenous anastomoses, creation of a myocutaneous flap with latissimus dorsi muscle, omental transposition, grafting of lymphatic vessels with tubes or threads) has produced disappointing, inconsistent results and should be avoided.^{2,73-78} Diuretics, which have been recommended in the past, may temporarily mobilize water, but the increased interstitial oncotic pressure exerted by the high protein concentration of lymph fluid will cause rapid recurrence of edema.³ The diuretic effect in the rest of the body may cause adverse side effects, such as hypotension, dehydration and electrolyte imbalance.

Benzopyrones were promoted for use in lymphedema because they were felt to stimulate macrophage-induced proteolysis.^{79,80} Subsequently, a large randomized, placebo-controlled trial of coumarin, a benzopyrone, in 140 women failed to show any benefit (level I evidence).⁸¹ These products are no longer recommended.

Practical tips

- **Clinical experience supports encouraging patients to consider some practical advice regarding skin care, exercise and body weight.**

The following suggestions make clinical sense to the authors of this guideline, even though the evidence that supports the suggestions is limited and primarily anecdotal.

- Scrupulous skin care should be encouraged. Women should avoid cuts, pin pricks, hangnails, insect bites, contact allergens or irritants, pet scratches and burns to the affected extremity. Whenever possible patients should avoid medical procedures such as vaccination, blood drawing, intravenous access, blood pressure monitoring, acupuncture, venography and lymphangiography in the affected arm.
- Lymphedema may be exacerbated if women use saunas, steam baths or hot tubs, spend time in hot climates or travel. Many patients report worsening of their lymphedema during flight,^{12,82} which suggests that patients who use compression sleeves should probably use them during air travel.
- Exercise involving the affected arm may be beneficial in controlling lymphedema. Although some clinicians have recommended avoidance of rowing, tennis, golf, skiing, squash, racquetball or any vigorous, repetitive movements against resistance, there is no published evidence to suggest that these activities promote or worsen lymphedema. No exacerbation of existing lymphedema or development of new cases of lymph-

edema occurred in 20 women with breast cancer who competed in the strenuous sport of dragon boat racing.³¹ Some experts have recommended that women with lymphedema wear a compression sleeve during arm exercises.³⁰

- Maintenance of ideal body weight should be encouraged. Obesity is a contributing factor for the development of lymphedema^{10,21} and may limit the effectiveness of compression pumps or sleeves.³⁶
- Skin infection, which is often streptococcal, or on rare occasions staphylococcal, should be promptly treated with antibiotics such as a penicillin, a cephalosporin or a macrolide.⁸³⁻⁸⁷ For recurrent infections, prophylaxis with oral antibiotics or monthly injections of penicillin should be considered.⁸⁷ It may be prudent to provide the patient who has recurrent infections with an emergency home supply of an antistreptococcal antibiotic, to be taken at the first sign of infection. A patient travelling to a remote area should be encouraged to take along a supply of antibiotics.

Future research

The management of lymphedema in breast cancer patients is based primarily on results from case studies, clinical experience and anecdotal information. The natural history and most effective therapies for lymphedema are poorly understood and need further study. Accurate assessment requires agreement on a standardized and reliable system of measurement.⁸⁸ Randomized controlled trials to answer these questions should be encouraged and funded whenever possible.

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Appendix 1: Members and nominating organizations of the Steering Committee on Clinical Practice Guidelines for the Care and Treatment of Breast Cancer

<p><i>Cancer Care Ontario:</i> Dr. Mark Levine (Chair) Hamilton Regional Cancer Centre and McMaster University Hamilton, Ont.</p> <p><i>Manitoba Cancer Treatment and Research Foundation:</i> Dr. David M. Bowman Manitoba Cancer Treatment and Research Foundation Winnipeg, Man.</p> <p><i>Federal/Provincial/Territorial Advisory Committee on Health Services:</i> Dr. Judy Caines Nova Scotia Cancer Centre Halifax, NS</p> <p><i>Royal College of Physicians and Surgeons of Canada:</i> Dr. Jacques Cantin Centre hospitalier de l'Université de Montréal Montreal, Que.</p> <p><i>Comité consultatif sur le cancer du Québec:</i> Dr. Jean Deschênes Jewish General Hospital Quebec, Que.</p> <p><i>Canadian Nurses Association:</i> Ms. Chris Emery BC Cancer Agency Delta, BC</p>	<p><i>Saskatchewan Cancer Foundation:</i> Dr. L. Arthur Firth Allan Blair Cancer Centre Regina, Sask.</p> <p><i>Canadian Breast Cancer Network:</i> Dr. Maria R. Hugi Providence Health Care Vancouver, BC</p> <p><i>Alberta Cancer Board:</i> Dr. Alan W. Lees Cross Cancer Institute Edmonton, Alta.</p> <p><i>Canadian Breast Cancer Network:</i> Ms. Sabina Mallard (Consumer representative) Stratford, PEI</p> <p><i>Health Canada:</i> Dr. W. Phillip Mickelson Adult Health Division Centre for Chronic Disease and Control Health Canada Ottawa, Ont.</p> <p><i>Cancer Treatment and Research Foundation of Nova Scotia:</i> Dr. Maureen C. Nolan Nova Scotia Cancer Centre Halifax, NS</p>	<p><i>British Columbia Cancer Agency:</i> Dr. Ivo A. Olivotto Vancouver Island Cancer Centre and University of British Columbia Vancouver, BC</p> <p><i>Cancer Care Ontario:</i> Dr. Carol Sawka Toronto Sunnybrook Regional Cancer Centre Toronto, Ont.</p> <p><i>Atlantic Health Sciences Corporation:</i> Dr. Hugh Scarth Saint John Regional Hospital Saint John, NB</p> <p><i>College of Family Physicians of Canada:</i> Dr. John W. Sellors McMaster University Hamilton, Ont.</p> <p><i>Newfoundland Cancer Treatment and Research Foundation:</i> Dr. S. Kishore Thain Dr. H.B. Murphy Cancer Centre St. John's, Nfld.</p>
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A patient guide to the management of lymphedema related to breast cancer appears on page 198.

Appendix 2

Questions and answers on the management of lymphedema related to breast cancer

A guide for women and their physicians

What is lymphedema?

Lymphedema is the swelling that occurs when a protein-rich fluid called “lymph” collects in part of the body. In lymphedema related to breast cancer, this pooling of fluid usually occurs in the upper arm, where it can lead to pain, tightness and heaviness, and recurrent skin infections.

What causes lymphedema?

Normally lymph flows through the lymphatic vessels and eventually enters the blood stream. Sometimes the flow of lymph is interrupted by damage to the vessels and the oval-shaped structures called “lymph nodes” that are located along the vessels.

In breast cancer patients, damage to the lymphatic pathways can be caused by the cancer itself, infection or certain breast cancer treatments. For instance, lymphedema can occur following removal of the lymph nodes in the armpit or “axilla” (called “axillary lymph node dissection”; see guideline 4 on the removal of lymph nodes during breast cancer surgery [www.cma.ca/cmaj/vol-158/issue-3/breastcpg/0022.htm]). Lymphedema can also occur when radiation therapy to the armpit causes scarring and blocks or slows the flow of lymph.

In many cases, lymphedema develops within the first year after surgery or radiation therapy, but it can develop at any time. It can be a temporary or a long-term problem.

How is lymphedema measured?

If you or your doctor suspect that you have developed lymphedema after surgery or radiation therapy, you will need to be assessed. Your doctor may use a tape measure to compare the distance around each of your arms at different points and around your wrists and hands. A difference of 2 cm at any of these measurement points may require treatment. Your doctor will also check for tightness and feelings of heaviness in your arms. This assessment will allow your doctor to determine whether your lymphedema is mild, moderate or severe (severe lymphedema rarely occurs following breast cancer treatments). There are other methods of measuring lymphedema, such as water displacement, but they are used less often.

My doctor says I have lymphedema. What are my treatment choices?

Before you begin treatment for lymphedema, you will want to make sure that you do not have any other problems related to your original breast cancer. Your doctor will check for infection in your arm and tumours in your armpit. Your doctor will also check for blood clots in your armpit (called “axillary vein thrombosis”). Once your doctor has ruled out these

problems, you can begin treatment for lymphedema.

Usually you will be offered treatment that involves wearing a compression garment. Other treatments, such as using a pneumatic compression pump or undergoing massage and physical therapies, are sometimes offered in addition to, or instead of, a compression garment. However, you should keep in mind that, at this time, the only treatment that can be recommended on the basis of scientific evidence — information from studies involving large numbers of women — is the use of a compression garment.

Compression garments

A compression garment (sometimes called a “compression sleeve”) is a tight-fitting piece of elastic clothing that covers all or part of the arm. It may also cover the wrist or part of the shoulder. Good compression garments are usually custom-made. They should be replaced every 4 to 6 months or when they begin to lose their elasticity. Ideally, trained personnel should fit the garment for you.

A compression garment works by putting pressure on your swollen arm and stopping the collection of lymph in any one area. Your doctor may recommend that you wear the garment 24 hours a day or that you wear it only during waking hours. Whatever your doctor recommends, you should keep in mind that research shows that the long-term and consistent use of compression garments for lymphedema will result in improvement.

Pneumatic compression pumps

A pneumatic compression pump is a device with a sleeve that can be inflated with compressed air in order to massage the arm. The device squeezes the lymph away from the hand and arm and toward the body. There are several commercially available pumps, ranging in complexity and cost. Most pumps used by therapists, clinics and patients are complex and cost several thousand dollars.

Unfortunately, no studies have been published regarding the most effective kind of pump, the most desirable pumping time or the best pressure levels. One thing that is known, though, is that you should not use pump therapy if you have an active infection or problems with blood clots (called “deep vein thrombosis”).

Massage and physical therapies

Massage and physical therapies are used to help the fluid drain from the affected area. Manual lymph drainage is a massage technique that involves the skin surface only. The therapist tries to improve drainage from the arm by clearing out the main lymphatic pathways of the body, starting in the neck and moving to the main part of the body. Complex

physical therapy, also called complex decongestive physiotherapy, is a treatment routine that involves manual lymph drainage, skin care, bandaging, exercises and the use of compression garments.

In one study, the use of a compression garment combined with manual lymph drainage was compared with the use of a compression garment alone. Women in both groups had reduced arm volume and improvement in symptoms. However, manual lymph drainage did not provide additional benefit over the compression garment alone.

Other therapies

There are other therapies for lymphedema that you may hear about: laser treatment, electrical stimulation, transcutaneous electrical nerve stimulation (TENS), cryotherapy, microwave therapy, thermal therapy, surgery, and drug therapy with diuretics or benzopyrones. There is no research that indicates whether these therapies are useful. These therapies require further study and are not recommended at this time.

What should I do if I am having pain?

You must tell your doctor if you are having pain. Most often, the best way to control the pain is to control the lymphedema. You may need to change your treatment in some way. If changing your treatment does not help the pain, your doctor may prescribe an anti-pain medication (see guideline 10 on pain management [www.cma.ca/cmaj/vol-158/issue-3/breastcpg/0071.htm]).

What can I do to help myself?

There are several things you can do to manage your lymphedema and prevent complications:

- *Look after your skin.* Avoid cuts, pinpricks, hangnails, insect bites, pet scratches and burns to the affected arm. If your skin is injured, be sure to clean and protect the wound immediately. Stay away from substances that you are allergic to or that you find irritate your skin. Whenever possible, avoid blood pressure monitoring in the affected

arm and avoid medical procedures that require pricking the skin in the affected arm (vaccination, blood drawing, insertion of an intravenous needle, acupuncture, and venography or lymphangiography [x-ray assessments that involve injections]).

- *Treat skin infections promptly.* Usually skin infections are streptococcal — that is, they are caused by bacteria called “streptococci.” On rare occasions an infection may be staphylococcal — caused by bacteria called “staphylococci.” In either case, the infection should be treated immediately with antibiotics such as penicillin. If you have recurrent infections, you may want to take regular preventive doses of antibiotics or receive monthly injections of penicillin. Your doctor may want you to have an emergency home supply of an antibiotic, to be taken at the first sign of infection. If you are visiting a remote area, be sure to take along a supply of antibiotics.
- *Use saunas, steam baths and hot tubs with care.* Heat can make your lymphedema worse. Be cautious about exposing yourself to hot environments.
- *Travel with care.* Some patients report that their lymphedema is worse when they travel to places with a hot climate. Some also report that their lymphedema is worse during flights. If you have a compression garment, you should wear it when travelling by air.
- *Exercise your arms.* Activities that exercise your arms may help control your lymphedema. Although some doctors say you should avoid activities such as rowing, tennis, golf, skiing, squash and racquetball, there is no research to suggest that these sports promote or worsen lymphedema. In fact, in one study, 20 women with breast cancer competed in the strenuous sport of dragon boat racing and found that the activity did not promote or worsen lymphedema. Some experts recommend that you wear a compression garment during exercise.
- *Maintain an ideal body weight.* Being overweight can contribute to the development of lymphedema and may make the use of compression garments or pneumatic compression pumps less effective.



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