

BREAST AND TRUNK OEDEMA AFTER TREATMENT FOR BREAST CANCER

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Breast and trunk oedema can occur with or without arm lymphoedema following breast cancer treatment and are often dismissed as common side-effects that will resolve. This paper discusses relevant epidemiology, explores the impact on patients and discusses assessment and management approaches including manual lymph drainage (MLD), compression therapy and Kinesio Taping methods. A number of issues are raised, including the lack of fully validated tools to identify and quantify breast and trunk oedema and the need for further research in this area of lymphoedema management.

Key Words

Breast oedema
Trunk oedema
Assessment
Manual lymph drainage
Kinesio taping

Arm lymphoedema is a commonly recognised complication of breast cancer treatment (Franks et al, 2006). Given that the arm, breast and adjacent trunk quadrant share lymph drainage routes via the axilla, it is not surprising that oedema also occurs in the ipsilateral trunk quadrant and breast, with or without arm swelling, after breast cancer treatment (Figures 1 and 2). Breast and trunk oedema have a significant impact on quality of life and are associated with pain, reduced function, and tissue change and distortion (Figure 3). They may, however, be ignored or minimised and assumed to be common side-effects of breast cancer treatment that will resolve in time (Jeffs, 2006).

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Figure 1. Breast oedema affecting the right breast.

Additionally, no fully validated method exists to measure oedema in these areas. Skilled assessment and management of breast and trunk oedema by specialist lymphoedema practitioners in partnership with patients will alleviate and often resolve the problem. This paper will highlight relevant epidemiology, explore the impact of breast and trunk oedema on the patient and discuss assessment and management approaches.



Figure 2. Breast oedema in the posterior axillary area.

Epidemiology

Effects of breast cancer treatment

The literature suggests that both surgery and/or radiotherapy, involving lymph drainage routes of the breast and axillary areas, are implicated in the development of trunk and/or breast oedema (Clarke et al, 1982; Fung et al, 1997; Mondry and Johnstone, 2002). Surgical management of breast cancer usually involves wide local excision of a breast lump and sampling or full clearance (dissection) of axillary lymph nodes (Scottish Intercollegiate Guideline Network, [SIGN] 2005). Lymphatic drainage pathways through the breast and axilla (*Table 1*) provide possible routes for tumour metastases. Axillary surgery is therefore an important step in the staging and management of breast cancer. Recently, sentinel node biopsy (removal of the first node/s that the tumour is draining into) has also become more widely used and appears to reduce arm morbidity following breast cancer treatment (Fleissig et al, 2006).

Women who undergo breast conservation surgery will usually have postoperative breast radiotherapy that may include the axilla. It is also advised that the supraclavicular field is irradiated in patients with four or more positive axillary nodes (SIGN, 2005). Radiotherapy may contribute to the development of an inflammatory process, lymph stasis and subsequent fibrosis in the breast. Fibrosis often occurs in the oedematous areas, for example, in the underside or dependent areas of the breast, or posterior to the axilla. However, the relationship between fibrosis associated with lymph stasis and radiation-induced fibrosis is not clear.

Other post-treatment complications, including seroma, haematoma and infection, have been associated with breast oedema (Weiner et al, 2005). The link between seroma and lymphoedema of the trunk and/or arm is of particular interest (Todd and Topping, 2005). Although rates of seroma formation appear to be reduced by sentinel node biopsy (Purushotham et al, 2005), the accumulation of lymphatic fluid under skin flaps around the surgical excision

Table 1

Lymphatic drainage routes

Level of lymph nodes	Area/route of drainage
Level I — usually 5–15 nodes up to the lateral border of the pectoralis minor	Drain the anterior chest wall and breast, ipsilateral upper quadrant of the back and the arm
Level II — nodes up to the medial border of the pectoralis minor	Drain the arm and deeper breast tissue via the fascia of pectoralis major. Receive lymph from Level I nodes, but also from lymphatics accompanying the cephalic vein border of pectoralis minor
Level III — up to the apex of the axilla, behind the clavicle	Receive lymph from Levels I and II axillary lymph nodes and drain lymphatics accompanying the cephalic vein
The medial breast may also drain along the anterior intercostal lymphatics to the internal mammary nodes, or across the midline to the other breast	



Figure 3. Distorted breast with erythema present.

site is a fairly common postoperative problem that may necessitate aspiration. The potential consequences of seroma development and drainage, in terms of local inflammation, delayed healing, difficulties in re-establishing lymph drainage and an increased risk of arm or trunk lymphoedema, warrant further study (Todd and Topping, 2005).

In clinical practice, differentiating between acute and more persistent

problems in terms of seroma, lymphoedema, fibrosis and other symptoms such as cellulitis can be challenging. An erythema may be present, suggestive of acute or sub-acute inflammation (*Figure 3*) but it may not be clear if this is a result, or cause of the oedema. Additional problems may complicate the assessment of oedema, such as numbness due to intercostal brachial nerve damage, painful scar tissue and 'cording' — a

Table 2
Risk factors for chronic breast oedema in women following breast cancer treatment
Possible risk factors for chronic breast oedema in women following breast cancer treatment
● Extent of axillary surgery ● Radiotherapy to the breast and draining lymphatics ● Large and/or pendulous breast with bra cup size of > C ● Acute postoperative breast oedema ● Seroma ● Wound infection ● Obesity
Other factors to exclude in making a differential diagnosis of chronic breast oedema
● Sub-acute inflammation or cellulitis ● Seroma, haematoma, abscess ● Benign breast disease ● Infiltrating and inflammatory breast cancer ● Cutaneous angiosarcoma ● Recurrent or new primary breast cancer

tightening of tissue in the axilla which often extends down the arm and is attributed to thrombophlebitis of the lymphatics (Johansson et al, 2001).

The extent of the problem

Various studies report rates of breast oedema, although generally they rely on subjective clinical examination to identify the oedema. The studies are not easy to compare because the duration of oedema is often not reported. They do, however, give further information on possible risk factors (Table 2) and indicate that breast oedema, in particular, is a familiar problem.

In an early study, Clarke et al (1982) studied 74 patients and reported breast oedema in 41%, with the incidence of breast oedema following axillary node dissection, sampling and no axillary surgery as 79%, 25%, and 6%, respectively. In this study, the development of breast oedema was not correlated with tumour stage, radiation dose, the patient's weight or breast size, whereas another study found that patients with a bra cup size of C or larger had a greater risk of breast

oedema (P=0.03) (Pezner et al, 1985). Lijegren et al (1993) also reported breast oedema in 55% of 357 patients at three and 12 months post-treatment, reducing to 25% at 24 months.

In their retrospective review of the records of 234 women following radiotherapy treatment, Back et al (2004) identified a 21% incidence of breast oedema, suggesting an association with immediate postoperative breast oedema and infective complications. An increased risk apparently associated with a radiotherapy boost to the upper outer quadrant, especially in obese patients, was described in another study of 240 women which found a 10% breast oedema incidence (Goffman et al, 2004).

Ronka et al (2004) compared the effectiveness of clinical examination and ultrasound in the assessment of breast oedema. Using clinical examination, breast oedema was identified in 48% of patients who had axillary clearance with positive nodes, 35% of those who had axillary clearance with negative nodes, and 23% of patients following sentinel node biopsy. However, ultrasound was

stated to be a more reliable assessment method that identified an overall 70% incidence of breast oedema in the study group of 160 women.

Most studies focus on breast oedema and discussion of oedema elsewhere on the torso tends to be limited to a few publications from lymphoedema units. Bosomptra et al (2002) used telephone interviews in a retrospective study to identify self-reported problems, including trunk swelling. Results indicated that 10% had oedema affecting the back, with 22% reporting oedema of the armpit. Jeffs (2006) has also described the problem of breast and trunk oedema in a recent audit of lymphoedema treatment.

The impact of breast and trunk oedema

There has been substantial research into the psychosocial effects of arm lymphoedema with little attention paid to the impact of breast or trunk oedema. Problems of psychological distress, decreased shoulder mobility (Johansson et al, 2001) and changed sensations, including numbness and pain, are often highlighted in relation to arm lymphoedema (Armer et al, 2003), but the relationship with breast or trunk oedema is not considered. This is interesting as oedema of the breast, shoulder and posterior axilla frequently cause local discomfort, and heat and pressure within the tissues, with the potential to exacerbate postoperative neuropathic symptoms and markedly reduce function.

Lymphoedema practitioners are very aware of the distress directly related to breast and trunk oedema, especially due to increased breast weight, tissue swelling in the axilla and tender erythema. Difficulties frequently arise involving clothing and underwear. Patients often describe functional changes, discomfort when wearing a bra and difficulty sleeping. Being told that the oedema and related symptoms are likely to resolve in 1–3 years is little compensation to these women as they are usually keen to get 'back to normal' once their breast cancer treatment has finished. A study by Karki et al (2005) reported axilla oedema

to be the problem that most limited activities at 12 months post-breast cancer treatment, although there had been a significant improvement from the six-month follow-up. However, at 12 months some patients had abandoned leisure activities and were also reporting a reduction in their ability to work.

The presence of breast and trunk oedema may cause fear and anxiety, as illustrated in this excerpt from an interview with a patient (Williams et al, 2004): 'I knew there was this thickening in my breast and it was heavy and full of fluid and the doctor, well, he said you know that could be another sign of... cancer, and I was really worried, I thought maybe it was the cancer coming back'. Further anxiety may ensue if treatment progress is altered, for example, if radiotherapy is delayed until severe postoperative breast oedema has subsided.

The cosmetically poor result associated with breast oedema and breast retraction has also been described (Lijegren et al, 1993) (Figure 3), and it is clear that problems with bra fitting and clothing can have a direct effect on emotional health, social well-being and body image.

Assessment of breast and trunk oedema

Patients with breast and trunk oedema require skilled and sensitive assessment of the problem. Treatment history should be established and, along with clinical examination, may indicate the cause of oedema as a direct consequence of breast cancer treatment. However, it is important to make a differential diagnosis and exclude any other factors such as cellulitis, abscess or recurrent malignancy, particularly in infiltrating or inflammatory forms of breast cancer that can cause oedema. The late onset, or apparently sudden development of oedema may be suspicious and the possibility of recurrent disease at the scar line (Figure 4), in the axilla, breast or supraclavicular area should be considered.

The use of fine needle aspiration to assess changes in an oedematous



Figure 4. Breast oedema due to recurrence on the scar line.



Figure 5. Peau d'orange effect due to breast oedema and fibrosis.

breast can be problematic and may, in itself, produce additional inflammation and oedema. A mammogram may be difficult to interpret if oedema is present and magnetic resonance imaging (MRI) is likely to be more sensitive in assessing the extent of oedema and fibrosis and excluding tumour recurrence (Dixon et al, 1993). Ultrasound may also be useful (Ronka et al, 2004), particularly in the diagnosis of particular problems such as seroma or abscess. Furthermore, patients with a long history of chronic lymphoedema in the breast after radiotherapy may be at risk of developing angiosarcoma (Sener et al, 2001), so any suspicious vascular skin lesions in the oedematous area should be investigated.

Clinical examination

Although subjective, clinical examination through observation and palpation (Jeffs, 2006) remains the most practical means

for assessing breast and trunk oedema in the clinical setting. Privacy is essential as the patient will need to remove her bra to ensure a comprehensive examination can be undertaken. Experienced therapists, particularly those who use manual lymph drainage techniques, become familiar with the assessment of tissue change and should take time to compare the ipsilateral and contralateral sides, assessing the anterior and posterior trunk quadrant to the waist and across to the midline, and including the shoulder and axilla.

The patient will often become an expert and will be able to report changes in sensation that may be indicative of trunk oedema. Careful observation should be made of the skin, looking for signs such as indentations from the bra (Figure 1) and other skin signs suggestive of oedema such as a *peau d'orange* effect (Figure 5). Areas of

Table 3
Advice for patients with breast and trunk oedema (adapted from Lymphoedema Support Network) factsheet on breast oedema
• Wash the area using warm water and soap-free wash, or water alone and gently pat dry • Moisturise using a suitable bland emollient • Inspect the area for skin breaks under breast and in armpit • Treat any skin breaks with antiseptic • Get a well-fitting, comfortable bra, maybe seamless • Wear comfortable, non-restrictive, but supportive clothing • Get MLD or learn self-massage methods

fibrosis should be noted and skin folds should be checked for skin damage or fungal infection. A body chart may be used to identify the specific sites of oedema, skin changes and fibrosis. Mondry and Johnstone (2002) suggest grading the severity of oedema as mild, moderate or severe. Although this is subjective, it may be useful to the individual practitioner in evaluating outcome. Particular attention should be made to the extent of the oedema and whether it is localised, extends to the midline of the back, for example, or includes the shoulder, root of the limb or neck, as this may influence the plan of treatment with manual lymph drainage (MLD).

Several methods have been identified to assess breast and trunk oedema, including breast weight, tissue tonometry (Bagheri et al, 2005), bioelectrical impedance (Hayes et al, 2005) and skinfold calipers (Williams et al, 2002). Tissue tonometry has been used to differentiate between soft and hard oedema in the arm, but its use in breast oedema has not been evaluated

(Bagheri et al, 2005). One study used modified Harpenden skinfold calipers to evaluate the effects of MLD on the posterior trunk of women with breast cancer-related lymphoedema (Williams et al, 2002). With the calipers positioned on a skinfold at the posterior axillary area, caliper readings were taken at 10 and 60 seconds to assess caliper creep (the degree of change in skinfold thickness over time). A higher degree of creep was attributed to a greater displacement of interstitial fluid and, as such, a greater degree of trunk oedema. Although the study was limited by small numbers, the findings indicated that the calipers were sensitive to detecting oedema on the affected side, as compared with the unaffected side. However, there are problems with the use of calipers on irradiated skin and in obese patients, so further work is required to validate this and other methods of quantifying trunk and breast oedema.

Treatment approaches
Management of breast and trunk oedema usually requires a combined treatment approach. Giving information and support is crucial in enabling patients to understand the problem and become involved in self-care measures that will help the condition (Table 3).

Skin care
Oedematous areas should be kept clean, dry and moisturised with a suitable bland emollient. Maceration and/or fungal infection can occur in skin creases and the underside of the breast, particularly in patients who have large, pendulous breasts, obese patients, and those who perspire due to hot flushes. General advice should be given to patients on observing their skin, washing and patting the areas dry and seeking advice if problems occur. Appropriate care should be taken of any skin reactions to radiotherapy or ulcerated areas, following local guidelines on wound care.

Acute or sub-acute inflammation, characterised by tenderness, pain, heat and/or erythema may be present but will not always respond to antibiotics (Stevenson et al, 2005). The suggestion

that this 'delayed breast cellulitis' is a manifestation of lymphoedema, highlights the importance of early and appropriate intervention by a lymphoedema practitioner to minimise anxiety and discomfort and reduce the risk of further complications. Appropriate treatment with a 14-day course of antibiotic therapy and, for some, a longer course of prophylactic antibiotics should be considered. Treatment to decongest the area will be required and practitioners need to be aware that treatment with MLD may initially cause a brief flare-up of systemic symptoms as lymph stasis begins to clear.

Manual lymph drainage
MLD has been identified as central to the management of breast and trunk oedema, particularly when used in conjunction with a self-care programme that includes self-massage and skin care (Jeffs, 2006). The literature base is limited, however, and most studies of MLD have evaluated the effect in terms of reducing arm swelling alone (Johansson et al, 1999; McNeely et al, 2004).

Within the network of initial lymphatics in the dermis, lymph normally moves in various directions across the skin and down through pre-collector and collector vessels towards lymph nodes. MLD can be used to redirect lymph across the plexus of initial lymphatics towards healthy lymph nodes, often across the watershed areas between lymphatic territories of the skin (Figure 6) and via the intercostal and parasternal lymphatics of the trunk. The initial lymphatics respond to the rhythmic movement of the skin under the therapist's hands, opening to allow fluid to enter the system. MLD also influences the contractile function of larger collector lymphatics, enhancing lymph flow and creating a suction effect that pulls lymph from distal areas toward the lymph nodes.

All schools of MLD follow the same principles, usually commencing proximally on the trunk. Approaches for arm lymphoedema treatment should be modified to focus on the trunk, and breathing techniques should also be incorporated. Following assessment,

treatment is planned to address specific needs according to the extent, severity and site of oedema and may include:

- » Neck
- » Unaffected axilla and trunk quadrant (this may include the upper quadrant with drainage to contralateral axilla and also the lower trunk quadrant on the affected side with drainage to the ipsilateral inguinal lymph nodes)
- » Midline
- » Affected trunk quadrant and/or breast with drainage to contralateral axilla or ipsilateral inguinal nodes
- » Techniques to encourage drainage into intercostal or parasternal lymphatics
- » Treatment to areas of fibrosis, such as gentle stationery circles.

MLD is always gentle and should not cause hyperaemia (Földi and Strössenreuther, 2005), particularly over vulnerable areas such as the chest wall. The therapist should always work with relaxed hands. Treatment should avoid broken or tender areas and sufficient time should be spent on treating the proximal unaffected areas. MLD should not be used in acute cellulitis, but once antibiotic therapy has commenced and acute symptoms have subsided, MLD will play an important role in decongesting the tissues and encouraging any inflammation to resolve. MLD is not used in untreated

active disease but may be indicated as a component of palliative care.

A treatment course of 10–15 days over three weeks is often required, although this may be modified according to need and if patients are able to undertake self-treatment with modified MLD. Time should be taken to teach patients how to self-massage (Williams, 2006) and review their technique. In the first few weeks of treatment, patients should be encouraged to do self-massage for at least 20–30 minutes each day. Breast oedema can be readily self-treated, provided the patient is comfortable in doing so and able to learn the necessary skills. Oedema of the axilla or back may require assistance from a willing and able helper, although the patient can be taught to massage down the flank and abdomen from the axilla towards the inguinal lymph nodes.

Compression

Patients with trunk and breast oedema are often reluctant to wear a compressive garment or bra as the area may be tender, particularly following surgery or if they have a radiotherapy skin reaction. However, if breast oedema is present, it is preferable for patients to be fitted with an appropriate garment or bra as the problem is likely to worsen if the breast remains unsupported in a dependent position. Measuring for

Key Points

- » Skilled assessment and management of breast and trunk oedema by specialist lymphoedema practitioners in partnership with patients can do much to alleviate and often resolve breast and trunk oedema.
- » Epidemiological studies provide information on possible risk factors and indicate that breast oedema is a significant problem.
- » There has been substantial research into the psychosocial effects of arm lymphoedema with little attention placed on the impact of breast or trunk oedema.
- » Patients with breast oedema should be fitted with an appropriate garment or bra as the problem may worsen if the breast remains unsupported in a dependent position.
- » Manual lymph drainage is central to the management of breast and trunk oedema, particularly when used in conjunction with a self-care programme that includes self-massage and skin care.



Figure 6. Manual lymph drainage.

bras or compression garments requires specialist expertise and, if not correctly fitted, they can cause further problems.

A well-fitting bra (Figure 7) should correctly fit the chest width and come comfortably around the back to gently compress the oedematous tissue near the axilla without causing a tourniquet effect, or restricting the tissues. Straps should be sufficiently wide to avoid cutting into the shoulders. Importantly, the cup size should ensure that all the breast tissue is fully supported, with minimal seams. The area between the bra cups should fit comfortably against the sternum. If the bra is the wrong size, breast tissue will be



Figure 7. Sports bra. Picture supplied by Haddenham Healthcare Ltd.

squeezed and fibrotic bands may develop, particularly in the medial aspect of the breast. Other options may be considered, such as a specialist compression vest or bra (Figure 8), and these are available as off-the-shelf standard garments that can also be custom made. A pocket can also be provided within the compression garments to fit a prosthesis if necessary.

Sometimes, the garment or bra may be worn at night to prevent oedema accumulating in dependent areas. If areas of fibrosis are present, pads of dense or ridged foam may be inserted within the bra to provide gentle friction over the areas, although care must be taken to ensure skin damage does not occur. Patients should be regularly reviewed to ensure bras or garments are comfortable and a good fit, particularly if the patient gains or loses weight.

Exercise and movement

Currently, many questions are being raised regarding the role of exercise in preventing and managing lymphoedema after breast cancer treatment (Todd and Topping, 2005). It has been shown that exercise can influence lymph (and venous) flow in the arm (Lane et al, 2005), but its effect on the lymphatics of the trunk and breast is likely to be equally important and requires further study.



Figure 8. ETO 601 compression vest. Picture supplied by Haddenham Healthcare Ltd.

Assessment of patients with breast and trunk oedema will often highlight restriction of the underlying connective tissue and musculature and this is likely to affect lymph drainage in the local area. Fourie (2004) described changes such as fascia restriction that occur after surgery and radiotherapy and may influence the lymphatic and vascular systems. Patients may also develop poor posture, particularly as they seek to protect the tender, oedematous areas. The range of shoulder movements should be assessed and specific areas of restriction of the shoulder joint and across the anterior and posterior chest should be identified. Problems such as tendonitis may occur and specialist physiotherapy referral may be required. Individualised exercises to mobilise and stretch the areas should be given and specific techniques to encourage fascia release may be indicated. As the effects of radiotherapy may continue long term, the importance of establishing an enjoyable but effective exercise such as swimming into their general routine should be stressed to patients, where appropriate.

Kinesio Taping

Kinesio Taping techniques have their origins in sports science where this specialised tape is used to support weakened or damaged muscle and correct joint problems (Kase et al, 2003). The use of Kinesio Taping in the management of lymphoedema is gaining popularity, and there is significant clinical



Figure 9. Kinesio Taping for breast oedema. Picture supplied by Haddenham Healthcare Ltd.

experience in this approach but little published research.

The tape is similar in weight to the epidermis and appears to exert its effect on lymphatic drainage by lifting the skin, providing space around the initial lymphatics, and thereby encouraging fluid to move from areas of higher pressure towards the areas of lower pressure under the tape (Kase et al, 2003). The tape may also influence deeper lymphatics and encourage myofascial release, enhancing drainage in the intrafascial lymphatics.

Various methods of cutting and applying Kinesio Tape are currently being taught. Commonly, the tape is cut into a fan shape with several strips cut, leaving a shorter length of tape to act as an anchor. This anchor may be placed near the lymph nodes in a non-oedematous area and the strips fanned out across the skin, for example, over the oedematous breast or trunk (Figure 9), and sometimes over the watershed between skin territories. The patient is usually positioned so the skin is at a slight stretch before application of the tape, so once the skin returns to its normal position, it is drawn up to create an underlying negative pressure.

A patch test should be done to ensure the patient is not allergic to the material or adhesive, and care should be taken if applying to sensitive and irradiated areas as there is a risk of further damaging the skin. Once applied to the skin, the tape responds to the body heat and becomes secure so it can often stay on for several days. Patients should be advised to avoid using warm air to dry the tape as this will further activate the adhesive. The tape can be removed

by rolling it off using the flat of the hand. Application of soap or petroleum jelly will help to release the adhesive.

Kinesio Tape is generally used over a 4–6-week period and patients can be taught the taping techniques so it can be used over the longer term where necessary. It may be particularly useful during and following a course of MLD, and appears to provide good results for some patients in terms of oedema reduction and comfort.

Conclusion

Oedema of the breast and trunk is a common and often distressing problem for patients who have undergone breast cancer treatment. Following comprehensive assessment, a partnership approach using a variety of treatments including MLD, appropriate compression garments and Kinesio Tape can be very effective in managing these problems and, in some cases, resolving the oedema completely (Jeffs, 2006). Specialist lymphoedema practitioners have an important role in the treatment and support of these patients. However, further work is required to develop the evidence base to inform practice in this area. JL

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