
Giovanni Scibilia1, Serena V. Capobianco1,*, Adriana Bonifacino2, Valter Santilli1, Teresa Paolucci3

1Department of Anatomical, Histological, Forensic and Orthopaedic Sciences, “Sapienza” University of Rome, Rome, Italy
2Department of Medical-Surgical Sciences and Translational Medicine, “Sapienza” University of Rome, Sant’Andrea University Hospital, Rome, Italy
3Unit of Physical Medicine and Rehabilitation, Department of Medical and Oral Sciences and Biotechnologies, DSMOB, University G. d’Annunzio of Chieti-Pescara, Italy

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*Correspondence:
*Dr. Serena V. Capobianco, Department of Anatomical, Histological, Forensic and Orthopaedic Sciences, “Sapienza” University of Rome, Piazzale Aldo Moro 3/5, 00100 Roma, Italy; Telephone No: 06 49977050; Email: capobianco.serena@gmail.com.

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Guidelines
Lymphedema
Survivorship
Surgery
Complication

Abstract

Breast cancer is the most common cancer affecting women over 35 years. The primary adverse consequences after surgical treatment and often after chemotherpay or radiotherapy, are pain, upper limb impairment, postural imbalances, lymphedema, fatigue, and depression. The aim of this study is to review rehabilitative Clinical Practice Guidelines in breast cancer patients after surgical treatment and to analyze recommendations and their level of evidence.

Materials and Methods: The articles were searched for the MeSH terms “breast cancer,” “guidelines,” “rehabilitation,” “lymphedema,” “survivor,” “survivorship,” “therapy,” “exercise,” “complementary,” “cognitive,” “integrative,” “body image,” “physical therapy,” “treatment,” and “quality of life” in Cochrane Database of Systematic Reviews, PubMed, Science Direct. We restricted our search to full-text English language publications published between July 2006 and June 2017 and we considered only international practice guidelines that focus on rehabilitation after breast cancer surgery.

Results: We selected four guidelines focusing on primary care, rehabilitative approaches and integrative approaches. They recommend the early taking charge of the patient and to manage upper limb dysfunctions, lymphedema, pain, fatigue, peripheral neuropathy, body image concerns and lifestyle recommendations.

Conclusions: The current model of care for women with breast cancer focuses mostly on treatment of disease; this approach too often lacks attention to patients’ physical and functional well-being. Many criticisms emerge from this review.

We suggest that there is a need to strengthen the level of evidence for many commonly used clinical practices and to better describe innovative rehabilitative approaches.

Highlights

• Breast cancer is the most common cancer affecting women over 35 years;
• There is an increasing of survivor patients;
• The latest guidelines on breast cancer are not exhaustive about rehabilitation and complications after surgery;
• There is the need to strengthen the level of evidence of many commonly used clinical rehabilitation practices and to better describe rehabilitative approaches for breast cancer survivors.
• Only 4 breast cancer guidelines were interested in rehabilitation for survivor patients in the latest 10 years.
Introduction

Breast cancer (BC) is the most common worldwide cancer affecting women over 35 years old, representing 25% of all new cancer cases. Therapeutic management of BC includes surgery and, if necessary, radiation therapy, systemic treatments, such as chemotherapy, endocrine therapy, biologic therapy or some combination. The primary adverse consequences after surgical treatment and, often after chemotherapy or radiotherapy, are pain (post-surgical treatment, post-chemotherapy, and, often after chemotherapy or radiotherapy), upper limb impairment, postural imbalances, lymphedema, fatigue, and depression. Because of the increasing BC survivors, the rehabilitation is becoming more important: rehabilitation goals are to encourage an appropriate recovery of activities of daily living (ADL), prevent and alleviate adverse treatment outcomes and promote quality of life (QoL). In the literature, there are no univocal approaches to rehabilitation after BC surgery and there is a lack of specific rehabilitative guidelines. Then, we conducted a systematic search in the most important databases because this review aims to highlight and address an important deficit in the current rehabilitative approaches reviewing rehabilitative clinical practice guidelines in BC patients after surgical treatment and critically analyzing also recommendations and their level of evidence with respect to specific area of rehabilitative good practice points.

Material and Methods

Search terms

We conducted a systematic search in the following databases: Cochrane Database of Systematic Reviews, PubMed, Science Direct. We restricted our search to full-text English language publications that were published between July 2006 and June 2017, and we considered only international practice guidelines that focus on rehabilitation after breast cancer surgery. We excluded guidelines that were written without a multidisciplinary (MD) or multiprofessional (MP) team. We also did not include consider guidelines that did not use a clear grading system to express recommendations. The articles were searched for the following MeSH terms: “breast cancer,” “guidelines,” “rehabilitation,” “lymphedema,” “survivor,” “survivorship,” “therapy,” “exercise,” “complementary,” “cognitive,” “integrative,” “body image,” “physical therapy,” “treatment,” and “quality of life.” We excluded guidelines without a clear level of evidence for the recommendations, guidelines without rehabilitative recommendations, and guidelines for patients under 18 years old. Unpublished guidelines (gray literature) were not included.

Two authors, who are expert clinicians and researchers in breast cancer rehabilitation, performed the literature search and data extraction independently. The discrepancies between the two authors were handled by comparing the results obtained with a third supervisor.

Results

From 61 scientific publications that were screened, we selected four guidelines (Table 1). The two guidelines on integrative therapies clearly are not only about rehabilitation but also have many sections on rehabilitation; thus, we decided to include them. However, the medical management of these patients also includes general wellness, body image, and cardiac and bone health, which are inconsistently managed by rehabilitation clinicians; consequently, these aspects were not included in this narrative review. Only two guidelines have a patient association on the team.

Every scientific society uses a different grading to express its recommendations: LOE (level of evidence) for the American Cancer Society (ACS) guidelines 2016,

In general, the role of a physiatrist is to manage problems that can occur immediately after the surgery, during chemotherapy or radiotherapy, or years after surgery. In fact, ACS guidelines 2016 recommend that the patient receives a detailed cancer-related history and physical examination every 3 to 6 months for the first three years after primary therapy, every 6-12 months for the next two 2 years, and annually thereafter (LOE = 2A) (see Table 2)10. Screening for local recurrence provides annual mammography for women who have undergone a mastectomy (LOE = 2A), whereas magnetic resonance imaging should be limited to patients who meet high-risk criteria for increased breast cancer surveillance (LOE = 2A)10. It is recommended that all women be educated and counseled about the signs and symptoms of local or regional recurrence (LOE = 2A)10. Furthermore, ACS CPG 2016 recommends that primary care clinicians should maintain communication with the oncology team (LOE = 0), as well as encourage the inclusion of caregivers in usual breast cancer survivorship care and support (LOE = 0)10. It is clear that this role cannot be managed only by the general practitioner (as occurs in many countries, including Italy) but should be taken up by the physiatrist.

The most important rehabilitative fields that we identified in the selected guidelines were the following.

**Lymphedema**

Breast cancer related lymphedema is a chronic and distressing condition that is estimated to affect between 12.5% and 49% of women who undergo surgical lymphatic vessel/node extirpation or radiation therapy, with a lower incidence in sentinel node negative patients14. It can develop directly after surgery or radiation therapy or months and even years later16.

<table>
<thead>
<tr>
<th>Level of Evidence (LOE)</th>
<th>CRITERIA</th>
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<tbody>
<tr>
<td>I Meta-analysis of randomized controlled trials (RCTs)</td>
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<tr>
<td>IA RCT of breast cancer survivors</td>
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<tr>
<td>IB RCT not based on cancer survivors, but on patients in the general population experiencing a specific long-term or late effect (eg, managing menopausal symptoms, sexual dysfunction, etc)</td>
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<tr>
<td>IC Non-RCTs not based on cancer survivors but on patients in the general population experiencing a specific long-term or late effect</td>
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<tr>
<td>II A Non-RCTs based on breast cancer survivors</td>
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<tr>
<td>II B Non-RCTs based on breast cancer survivors across multiple sites</td>
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<tr>
<td>II C Non-RCTs not based on cancer survivors but on patients in the general population experiencing a specific long-term or late effect</td>
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<tr>
<td>III Case-control study or prospective cohort study</td>
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<tr>
<td>0 Expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study</td>
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<tr>
<td>2A NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines)</td>
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**Table 2. Grading Systems adopted by Clinical Practice Guidelines**

<table>
<thead>
<tr>
<th>GRADE</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>A</td>
<td>Recommends the modality. There is high certainty that the NET BENEFIT IS SUBSTANTIAL.</td>
</tr>
<tr>
<td>B</td>
<td>Recommends the modality. There is high certainty that the net benefit is moderate, or there is moderate certainty that the NET BENEFIT IS MODERATE TO SUBSTANTIAL.</td>
</tr>
<tr>
<td>C</td>
<td>Recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the NET BENEFIT IS SMALL.</td>
</tr>
<tr>
<td>D</td>
<td>Recommends against the service. There is moderate or high certainty that the modality has NO NET BENEFIT.</td>
</tr>
<tr>
<td>H</td>
<td>Recommends against the service. There is moderate or high certainty that the HARMS OUTWEIGH THE BENEFITS.</td>
</tr>
<tr>
<td>I</td>
<td>Concludes that the CURRENT EVIDENCE IS INSUFFICIENT to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.</td>
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</tbody>
</table>

**Table 2. Grading system: LOE criteria10 and US Preventive Services Task Force18,20, adopted by ACS 2016 and SIOGWG 2014/ACS 2017, respectively.**
Only ACS guidelines 2012 give indications about how to measure arm circumferences in lymphedema. They identify four points to measure: a) the metacarpal-phalange joints; b) the wrists; c) 10 cm distal to the lateral epicondyles; and d) 12 cm proximal to the lateral epicondyles. Circumferential measurements should be taken preoperatively, postoperatively, and during monitoring treatment. To warrant treatment, it is necessary to have a difference between the two arms of more than 2.0 cm at any of the four measurement points, provided that tumor involvement in the axillaries or brachial plexus, infection, and axillaries vein thrombosis have been ruled out.

Interventions for secondary lymphedema management include a) complete decongestive therapy (CPT); b) manual lymphatic drainage (MLD); c) self-massage; d) intermittent pneumatic compression therapy; e) compression garment/sleeve; f) compression bandaging; g) low-level laser therapy (LLLT); h) oral pharmaceuticals; and i) surgical treatment.

ACS guidelines 2012 identify complete decongestive therapy as the standard. They also encourage the use of compression garments that should be worn from morning to night and removed at bedtime, even if some evidence in the literature indicates that compression garments can only keep the minimum limb volume possible and prevent additional swelling.

The CPG recommends considering manual lymphatic drainage and compression bandaging to improve lymphedema in patients without metastasis, although these treatments are only supported with a doubtful/moderate evidence level (grade C). In other studies, compression bandaging, which is useful in reducing edema volume in the intensive phase, induces more pronounced and more rapid volume reduction than compression garments.

There is a trend toward using pneumatic compression pumps. Although further randomized trials are required, a recent meta-analysis suggests that pneumatic compression pumps can reduce lymphedema volume in the intensive phase, but it is not maintained in the maintenance phase.

Regarding pharmacological therapy, ACS guidelines 2012 conclude that there is no evidence to support the use of diuretics, benzopyrones, or selenium compounds, because studies on the efficacy of coumarin, diosmin, hesperidin, Cyclo-Fort, and benzopyrones have reported conflicting results.

Weight loss in overweight/obese women is recommended for reducing lymphedema symptoms.

Table 3. Legend: R = recommended; DR = doubtful recommendation; NR = not recommended; - = not cited; 0 = expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study; I = meta-analyses of RCTs; B = RCT based on cancer survivors across multiple cancer sites; C = recommends the modality. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial; C = recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.

**Pain and peripheral neuropathy**

Pain is common during and after breast cancer.
treatment, with a prevalence between 40% and 89%27. A multidisciplinary approach is fundamental to managing patient pain26. The selected guidelines converge on the need to use pain scales both in identifying the intensity of early-onset pain and for regular monitoring of treatment results. ACS guidelines 2016 recommend the use of acetaminophen and NSAIDs (LOE = I); for patients with neuropathic pain, they suggest the use of duloxetine (LOE = IB)18. Pain treatment and goals should be tailored to the needs, desires, and circumstances of individual patients12.

In addition to drugs, it is necessary to consider non-pharmacological interventions. The ACS guidelines 2012 recommend physical interventions, such as the transcutaneous electrical nerve stimulation (TENS), the bed, bath and walking supports, the positioning instruction, the energy conservation strategies, the pacing of activities, the acupuncture or acupressure and the occupational therapy consultation12.

For the treatment of postsurgical and post chemotherapy pain, ACS guidelines 2017 and SIO Guidelines Working Group 2014 report (grade C) some alternative therapies, such as acupuncture, music therapy, hypnosis, and healing touch11,13,28-30.

The occurrence of peripheral neuropathy in breast cancer survivors requires a differential diagnosis to identify its etiology (surgery, radiotherapy, chemotherapy). The identified guidelines refer only to chemotherapy-induced peripheral neuropathy (CIPN)18. The ACS CPG 2016 suggests that primary care clinicians should investigate for peripheral neuropathy symptoms—specifically, numbness and tingling in the patient’s hands and/or feet—and assess contributing factors for pain (LOE = 0)10. The ACS 2017 and SIO 2014 guidelines do not recommend the use of acetyl-L-carnitine or guarana, due to the lack of clinical trials in neoplastic patients (grade D)9,11. ACS guidelines 2012 reports acupuncture as an adjunctive, non-invasive, and relatively inexpensive option in medication-resistant patients and recommends TENS in those patients for whom pain medication is contraindicated or ineffective; it also recommends referral to an occupational therapist12.

Fatigue

Fatigue is a commonly observed symptom, particularly among radio- and chemotherapy patients. ACS guidelines 2016 recommend assessing and treating any causative factors of fatigue (such as anemia, thyroid dysfunction, cardiac dysfunction) (LOE = 0) and factors that may impact fatigue (such as mood disorders, sleep disturbance, pain) (LOE = I)10. The ACS CPG 2012 recommends encouraging patients to engage in moderate-intensity physical activity during and after treatment, including walking, cycling, resistance exercise, or a combination of aerobic and resistance exercise for 30 minutes most days of the week12. The ACS CPG 2016 recommends that primary care clinicians counsel patients to engage in regular physical activity, as well as refer them for cognitive-behavioral therapy (LEO = I)10.

### Table 4. Therapeutic and Rehabilitation Recommendations for Pain Management

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<tr>
<td>Acetaminophen</td>
<td>-</td>
<td>R (I)</td>
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<td>NSAIDs</td>
<td>-</td>
<td>R (I)</td>
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<tr>
<td>Duloxetine</td>
<td>-</td>
<td>R (I B)</td>
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<tr>
<td>TENS</td>
<td>-</td>
<td>-</td>
<td>- R</td>
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<tr>
<td>Physical activity</td>
<td>-</td>
<td>R (I)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Physiotherapy or therapeutic exercise</td>
<td>-</td>
<td>-</td>
<td>- R</td>
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<tr>
<td>Physical training program that includes a mind-body modality</td>
<td>-</td>
<td>-</td>
<td>R (C)</td>
<td>-</td>
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<tr>
<td>Balance reeducation</td>
<td>-</td>
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<td>- R</td>
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<tr>
<td>Massage</td>
<td>-</td>
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<td>R (C)</td>
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<tr>
<td>Acupuncture</td>
<td>R (C)</td>
<td>R (I)</td>
<td>R (C)</td>
<td>R (C)</td>
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<tr>
<td>Electro-acupuncture</td>
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<td>R (C)</td>
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<td>Music therapy</td>
<td>R (C)</td>
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<tr>
<td>Healing touch</td>
<td>R (C)</td>
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<td>R (C)</td>
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<tr>
<td>Hypnosis</td>
<td>R (C)</td>
<td>-</td>
<td>R (C)</td>
<td>-</td>
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<tr>
<td>Energy conservation strategies</td>
<td>-</td>
<td>-</td>
<td>R (C)</td>
<td>-</td>
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<tr>
<td>Occupational therapy consultation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>R</td>
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Table 4. Legend: R = recommended; DR = doubtful recommendation; NR = not recommended; - = not cited; 0 = expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study; I = meta-analyses of RCTs; IB = RCT based on cancer survivors across multiple cancer sites; B = recommends the modality. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial; C = recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.
The SIO Guidelines Working Group recommends energy conservation (grade B)\(^9\),\(^{32}\). The ACS guidelines 2017 and SIOWG 2014 suggest hypnosis and ginseng as alternative methods for reducing fatigue during treatment (grade C)\(^9\),\(^{11}\). The use of acetyl L-carnitine and guaranà is not recommended due to the lack of efficacy tests and studies on possible long-term side effects (grade D). Acupuncture, as well as qigong, can be considered (grade C)\(^9\),\(^{11}\).

**Upper limb limitations and/or postural dysfunction**

The ACS guidelines 2016 recommend that primary care clinicians assess musculoskeletal symptoms, including pain (LOE = 0), and offer acupuncture, physical activity, physical therapy, or rehabilitation (LOE = III)\(^10\).

The only guideline that specifically considers upper limb limitations is the American Cancer Society Breast Cancer Rehabilitation Guideline 2012, which specifies that bilateral upper extremity function should be assessed preoperatively\(^12\). Physical therapy should begin on the first post-surgical day, with gentle range of motion exercises encouraged the first week after surgery. Active stretching exercises can begin in the first postoperative week or at drainage removal and should be continued for 6 to 8 weeks\(^12\) or until full range of motion is achieved and it is also useful to instruct patients in scar tissue massage. Between the 4th and 6th postoperative week, progressive resistance exercises can begin with light weights (1-2 pounds). It is important to minimize the risk of infections and secondary lymphedema by properly caring for limb skin, minimizing the extent of axillary dissection; avoiding trauma to the arm, body weight gains, vaccinations, venous bites, and intravenous access to the axillary-dissected upper limb; and promptly initiating antibiotic therapy if an infection is suspected\(^12\).

Among non-pharmacological interventions, laser therapy, electrical stimulation, endogenous microwave thermotherapy, and thermal therapy are not recommended due to insufficient evidence to support their use\(^12\). Therapeutic ultrasound, however, is absolutely contraindicated, even in non-metastatic patients, due to the possible risk of metastatic dissemination\(^12\).

**Lifestyle recommendations and psychological support**

Even if this part of breast cancer patient care is typically addressed by a general practitioner, the physiatrist also needs to highlight some important advice for early and better recovery after surgery. All guidelines emphasize the importance of a healthy lifestyle. There is evidence that a body mass index (BMI) of greater than 30 represents a risk factor for the onset of secondary lymphedema\(^12\),\(^{32}\). Weight gain also has a negative effect on functional prognosis\(^12\).

It is important to discourage weight gain, encourage the maintenance of a healthy BMI, and offer a nutritional consultation if needed\(^12\). According to the ACS guidelines 2016, an adequate dietary model should include a high content of vegetables, fruits, whole grains, and legumes; a low content of saturated fat; and limited alcohol consumption (LOE = IA, III)\(^12\).

Clinicians should advise patients to achieve and maintain a healthy weight, especially for overweight or obese patients (LOE = III)\(^10\),\(^{12}\); to limit the consumption of high-calorie foods and beverages (LOE = IA); to increase physical activity (LOE = III) and to undertake regular physical activity and return to normal daily activity as soon as possible (LOE = III)\(^10\).

In relation to exercise, ACS guidelines 2012 suggest that long-term, regular (moderate- to high-aerobic) physical activity is associated with a favorable prognosis and that aerobic exercise and weight lifting do not contribute to the development of secondary lymphedema\(^12\). The ACS guidelines 2016 recommend: a) to aim for at least 150 minutes of moderate exercise or 75 minutes of vigorous aerobic exercise each week (LOE = I, IA) and b) to include muscle strengthening exercises at least 2 days a week and stimulate reinforcement in women who have been treated with adjuvant chemotherapy or hormone therapy (LOE = IA)\(^10\).

It is advisable to encourage patients to avoid cigarette smoking by inviting them to contact a smoking counselor, if necessary (LOE = I)\(^10\).

To improve the patient’s quality of life, the ACS guidelines 2017 and SIOWG 2014 recommend—with varying levels of evidence—meditation (grade A), yoga (grade B), acupuncture (grade C), qigong (grade C), plantar reflexology (grade C), stress management (grade C), mistletoe therapy (grade C)\(^9\),\(^{11}\),\(^{33}\),\(^{34}\), and yoga practice for sleep disturbance management (grade C)\(^11\),\(^{33}\).

Most women experience at least some psychosocial distress during the course of their BC diagnosis and treatment and the level of distress varies from woman to woman and, within an individual, over the course of diagnosis and treatment. Then, during the rehabilitation process, psychological support is very important to help patients overcome the trauma of the disease and manage more adequate coping strategies (as fear of recurrence and marital/partner communication)\(^35\). At the moment there are no specific guidelines on the psychological treatment of women after breast cancer, although interest on this topic is increasing and starts to show the importance, for example, of choosing a correct setting or single treatment rather than group treatment. Since treatment often requires breast surgery, a combination of chemotherapy and radiation, and antiestrogen treatment that hastens menopause, the psychological effects are different for premenopausal women married with children, women concerned about their physical attractiveness or who want...
to preserve fertility, and women concerned about the effect on their partners.

Also, support from breast care nurses can significantly reduce psychological morbidity. Specific interventions after BC can effectively target biopsychosocial impacts of stress and promote adaptive coping, focusing on problem-solving, social support utilization, assertive communication, sexual health and intimacy, adherence to medical and supportive care recommendations, health behavior change, and emotional processing and expression.

Body image

The ACS 2016 is the only guideline that includes assessing concerns that breast cancer patients may develop in relation to their physical appearance and self-image (Level 0). Primary care clinicians should propose the option of adaptive devices (including breast prostheses, wigs) and reconstructive surgery when appropriate (level 0) and provide psycho-social assistance (Level IA).

Discussion

Women’s experiences with breast cancer affect many aspects of their lives, from the cancer diagnosis until many years later. A thorough discussion of the psychological needs of survivor breast cancer women is beyond the scope of this paper because we focused on activity limitations and problems of strictly physiatrist relevance.

Immediately after surgery, during the “early phase,” it is necessary to inform and guide patients on the recovery of daily life activities and to limit and treat impairments after surgery. Rehabilitative intervention must begin soon after surgery, regardless of the type of surgery (quadrantectomy or mastectomy) and should aim to recover the range of motion (ROM) of the upper limb on the operated side, recover strength, and control pain. At a later stage, it is also important to consider the recovery of a correct postural assessment. Evidence suggests that rehabilitation is effective in preventing and managing many physical side effects of breast cancer treatment. Multifactorial physical therapy and active exercises are effective in treating postoperative pain and impaired ROM after treatment for BC. The steadily increasing survival rate after BC results in a growing need for rehabilitative treatments for short- and long-term sequelae, especially in the upper limb that which emphasize the need for standardized rehabilitation protocols. In the literature, a wide variation in the prevalence of these sequelae has been reported for shoulder pain (from 12% to 51%), the reduction in the range of shoulder motion (from 2% to 51%), and muscle strength (from 17% to 33%).

Rehabilitation methods and their effectiveness vary not only because of the differences between patients but because guidelines are few and incomplete: too often, a physiatrist is called to manage problems well after they have developed and without clear support guidelines.

Lymphedema appears to worsen asymmetries and modifications in posture after mastectomy. Moreover, the literature is lacking in studies on posture balance after breast cancer surgery. In lymphedema management, three guidelines agree with different levels of recommendation with the use of manual lymphatic drainage and the use of acupuncture; two of the guidelines agree with the use of compression bandages and laser therapy. None of the guidelines provides specific treatment selection criteria regarding secondary upper limb lymphedema or provides precise indications about lymphatic drainage practices (method, precaution, duration) or modalities (contraindications, parameter intensity, duration, number of sessions).

With respect to pain management, ACS guidelines recommend the use of NSAIDs, and all of the guidelines agree with the use of acupuncture but do not provide an unequivocal view of pain management.

Scientific evidence for the use of TENS to address antalgic gait is currently insufficient in neoplastic patients and breast cancer survivors, although a randomized clinical trial has reported parietal region electrocortical modifications that could explain the efficacy of TENS in patients with intercostobrachial nerve pain after breast cancer surgery.

With respect to fatigue, guidelines emphasize the importance of assessing and treating any causative factors of fatigue and factors that may impact fatigue. They also promote regular physical activity and cognitive-behavioral therapy.

Only one guideline stresses the importance of therapeutic exercise and physiotherapy, giving some indications about the type and quality of exercise that is recommended. In the literature, we must note that there are many specific reviews on rehabilitation exercises to follow, but these reviews do not provide sufficient evidence to support their guidelines satisfactorily.

There are other important rehabilitative issues that lack clear guidelines from the literature search. Emerging therapeutic options, such as Kinesio-taping are not reported in the guidelines. There are few recommendations on the management of complications, such as lymphangitis and axillary web syndrome (AWS). There is a lack of recommendations on body image concerns, which are overwhelmingly covered by rehabilitation guidelines. All selected guidelines exclude metastatic patients; thus, there are no recommendations about metastatic bone pain or vertebral collapse.

There are no recommendations about rehabilitation in...
patients with a breast expander or definitive prosthesis, despite the importance of these devices in improving body shape, self-confidence, balance, and posture. With respect to a surgical approach during the follow-up phase, the aforementioned guidelines do not give any selection criteria for patients with breast cancer-related lymphedema who can benefit from microsurgical techniques or indications to prevent postural alterations. Existing guidelines do not provide indications for different approaches after radical surgery compared with conservative surgery and do not discuss gender differences in the rehabilitative approach.

The survival rate of women after breast cancer has improved significantly worldwide, for this reason cancer rehabilitation is very important to help breast cancer survivors maintain the highest possible physical, social, psychological, and vocational function in the limits that are imposed by the cancer treatments. Rehabilitation should be considered as a way to a global and complete return to "life after cancer". For this reason it should include also psychosocial support recommendations, that are not considered in the principals guidelines.

**Conclusion**

In conclusion, the current model of care for women with breast cancer focuses mostly on treatment of disease; this approach too often lacks attention to patients' physical and functional well-being. Many criticisms emerge from this review. The figure of the physiatrist has been involved in only one of the guidelines, despite clear evidence of the importance of a multidisciplinary and multiprofessional team in promoting an early and complete rehabilitative approach.

We suggest that there is a need to strengthen the level of evidence for many commonly used clinical practices and to describe innovative rehabilitative approaches better. Based on these assumptions, there is a clear need for a new best practice formulation and new multidisciplinary, multiprofessional guidelines that use a standardized system of evaluating evidence in the rehabilitation of breast cancer treated patients.

**Conflict of interest statement**

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**References**


