

Physiotherapy following surgical treatment of breast cancer

Magdalena Pieniżek^{ABCDEF,}

Jagiellonian University Medical College, Faculty of Health Sciences

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Abstract

Breast cancer is one of the most serious issues in women's health. This is not only due to its high incidence and severe course, but also because of the fact that it has become a common cause of permanent concern amongst healthy women. The knowledge of breast cancer is continuously expanding, and so is the awareness of this disease. Much greater emphasis is placed on prevention strategies, including mammography and regular breast self-examination. The treatment of diagnosed breast cancer may involve surgical removal, radiotherapy, chemotherapy or hormonal therapy. However, whatever the method of treatment is implemented, side effects are very common and cannot be completely eliminated. Post-mastectomy physiotherapy plays an important role in oncology since it helps to counter the adverse effects of cancer treatment and boosts the patient's recovery rates. Physiotherapy encompasses, amongst others, the prevention of lymphoedema (lymphatic oedemas) or thrombosis, as well as general mobility exercises. Through rehabilitation, it is possible to considerably improve the patient's mobility as well as enhance her well-being and mental health. In order to maintain physical fitness and prevent potential health deterioration, post-operative patients should follow the recommended exercise regime for their whole life. An ideal solution is to introduce such physical activities that provide a source of pleasure for the patient, and thus encourage regular participation.

Keywords: Mastectomy, breast cancer, physiotherapy

Introduction

Breast cancer is the most common of malignant tumours amongst women in Poland and in the majority of developed countries. The progress in diagnosing and treating this type of cancer is increasing annually. Nevertheless, the mortality rates still remain high. The incidence of malignant breast tumours increases dramatically after the age of 35. Out of the total number of breast cancer cases, nearly 30% affects pre-menopausal women, while the remaining 70% – post-menopausal women. Despite greater knowledge about numerous biological, epidemiological, genetic, psychological, sociological and cultural risk factors for breast cancer, the number of new cases is observed to be continuously growing [1]. According to figures published by the Central Statistical Office of Poland (GUS), malignant breast tumours affected 10,987 female patients in our country in 2000 [2].

Depending on the stage of the disease, breast cancer patients may receive surgical treatment, radiotherapy, chemotherapy, hormonal therapy and targeted therapies. Besides striving to achieve permanent cure of the patient, the treatment of breast cancer should also take into account the physical aspect, namely to restore as much physical fitness as possible. The rehabilitation of post-mastectomy women is an extremely important area in the entire treatment process and should never be ignored.

Breast cancer is recognised as one of most serious women's diseases. This is not only due to its high incidence and severe course, but also because of the fact that it has become a common cause of permanent concern amongst healthy women. The knowledge of breast cancer is expanding and changing [3].

1. Breast cancer

Breast cancer is the most common of malignant tumours amongst women in Poland. It accounts for approximately 20% of all female malignancies, leading to around 15% of deaths. It should also be borne in mind that, although rare in men, it affects approximately 1% of the male population. The annual incidence in Poland is estimated at 11,000 cases, with mortality rates reaching 5,000 women. The incidence rate is related to the civilizational level of the society. The number of deaths is inversely proportional and depends on early detection.

Epidemiological studies demonstrated that the primary promoters of malignant neoplasia in the human population include behaviour-related factors. A large number of them play a role in the occurrence of breast cancer and are of crucial importance to its development in women [3]. Some of them are presented in Diagram 1.

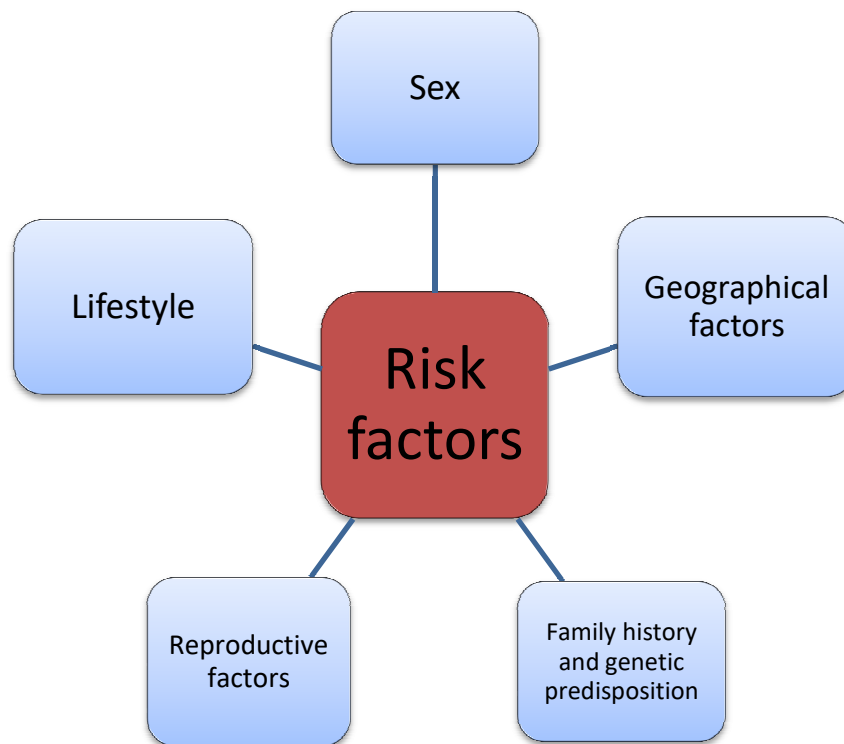


Diagram No 1. The risk factors for breast cancer
 Source: Own work on the basis of [1,4].

Ninety-nine percent of breast cancer cases affect women. Family history is one of the longest-known risk factors for this type of malignant neoplasm. Women having a history of breast cancer in mother or sister are believed to be at the highest risk – which increases 14 times compared to women without a family history of this disease. Women whose relatives developed bilateral breast cancer are reported to run the highest risk of the neoplasm. The comparison of incidence and new cases of breast cancer in different countries demonstrates surprising differences. In North America and northern European countries, the risk of breast cancer is higher than in Africa or Asia. These differences might stem from genetic factors (the founder effect) or the synergic effects of various environmental factors related to the particular lifestyle.

The majority of studies also show that early first menstruation (before 16 years of age) and late last menstruation (after 55 years of age) increase the risk of developing breast cancer. Women who have never been pregnant or gave birth after the age of 30 run a risk that is twice as high as that of women who gave birth before the age of 30. The group with the highest risk, however, includes women who had a full-term pregnancy after 35 years of age.

A significant yet controversial role in the etiology of breast cancer development is played by our lifestyle. The influence of physique differs before and after

menopause. Obesity is likely to double the risk of breast cancer after menopause and decrease it before menopause. The impact of excessive intake of fats in the diet, as a risk factor for breast cancer, is corroborated in laboratory tests and correlation analyses. A large number of epidemiological studies confirmed that alcohol consumption can increase the risk of breast cancer. Studies also indicate that regular consumption of vegetables, more than three times a week, reduces the risk of the disease. Other aspects of lifestyle that can have a beneficial influence on reducing the risk include physical activity. Sport and physical exercise decrease the risk of breast cancer probably by inhibiting the production of oestrogens. Other risk factors related to lifestyle include the effects of hair dyes, silicone breast implants, the UV radiation from the sun, electromagnetic radiation, pesticides or coffee [4]. Researchers are still studying the influence of aluminium salts present in antiperspirants on the increasing incidence of breast cancer [5].

2. Methods of treatment

Depending on the effects it exerts on the human body, the treatment of malignant neoplasms can be categorised into local and systemic (overall). In terms of the moment at which systemic treatment is administered, one can distinguish pre-operative and post-operative treatment, while based on the target of the therapy, it can be classified either as radical or symptomatic (Table 1).

Local vs systemic (overall) treatment	Local treatment is intended to remove a tumour without affecting the rest of the body. Local therapies include surgery and radiotherapy. The aim of systemic treatment is to affect all the cells in the body. Systemic therapies include: chemotherapy, hormonal therapy and targeted therapies, which may be administered orally or delivered directly into the blood stream.
Pre-operative vs post-operative treatment	Initial treatment is administered prior to local therapies (surgery, radiotherapy) in order to reduce the mass of the tumour and destroy any micrometastases. Adjuvant (complementary) treatment is used after local therapies in order to eradicate micrometastases. The pre-treatment and adjuvant treatment in breast cancer patients can include radiotherapy and chemotherapy, as well as hormonal therapies.
Radical, palliative and symptomatic treatment	Radical treatment is intended to cure the patient. Palliative treatment is aimed at prolonging survival and improving patients' quality of life (without a complete cure being expected). Symptomatic treatment is aimed at improving the quality of life (by merely alleviating the symptoms of the disease).
Surgical treatment of breast cancer	Surgical treatment is a fundamental part of breast cancer therapy. Surgical treatment is primarily used at early stages of the disease. For many years, the surgical treatment of breast cancer has become less invasive. It is becoming increasingly more common to use less invasive methods, both in terms of breasts and lymph nodes. Primary tumours are treated with breast-conserving surgery (lumpectomy), while lymph nodes are taken care of by removing the sentinel lymph node (SLN).
Breast-conserving treatment	This method of treatment is indicated in all cases where there are no contraindications. It consists of 2 stages, namely complete removal of the tumour with a margin of healthy tissue and complementary radiotherapy. If a given patient is qualified for chemotherapy, it must be completed before radiotherapy is commenced. The extent to which the tumour and its surrounding tissue can be removed safely will also depend on its size and location as well as on other factors. The post-surgical tumour bed (site) is marked with metal clips to facilitate tumour localisation before radiotherapy.
Mastectomy (excision of breast)	This procedure involves the removal of the entire affected breast, including the fascia of the pectoralis muscle and the nipple-areola complex.
Surgical procedures on axillary lymph nodes	Axillary lymphadenectomy (surgical removal of the lymph nodes in the armpit). Typically performed on patients with suspected metastases to axillary lymph nodes.
Surgical reconstructive treatment (breast reconstruction)	It may be immediate or delayed, and is performed using the patient's own tissues or a silicone implant.

Table No 1. Methods of treatment
Source: Own work on the basis of [6].

Chemotherapy	Radiotherapy
<ul style="list-style-type: none"> • Decreased blood cell production; • Anaemia; • Neutropaenia; • Thrombocytopenia; • Hair loss (general, all over your body); • Sickness, vomiting; • Diarrhoea; • Ulceration in the oral cavity; • Taste disorders; • Fatigue; • Decreased heart and lung function; • Loss of balance, coordination problems; • Skin reactions. 	<ul style="list-style-type: none"> • Loss of appetite; • Taste disorders; • Throat irritation; • Coughing; • Dry mouth; • Skin reactions; • Nausea; • Fatigue; • Hair loss (in the irradiated area);

Table No 2. Side effects of the treatment
Source: Own work on the basis of [7].

3. *The side effects of cancer treatment*

Chemotherapy is the most effective way to eradicate cancerous cells. However, it also affects the general condition of the patient. The drugs used in chemotherapy are non-selective and also destroy healthy cells, particularly those that also divide more rapidly than others, for instance hair cells and the cells found in the oral cavity, in the gastro-intestinal tract or in the bone marrow. The side effects of chemotherapy can vary from mild to serious, depending on the type of regime used and the patient's individual response. Radiotherapy is painless and does not make the patient radioactive. However, it can produce some side effects as well. They depend on the site of the irradiated tumour and are usually limited to the irradiated field [7].

Radiotherapy and chemotherapy are often combined with surgical removal of the breast (mastectomy). As in the case of each surgery, mastectomy carries the risk of many complications. They may occur at any moment – immediately after the surgery, a few days later or even several weeks post-surgery. However, depending on the type of surgery, the general condition of the patient and the effects of accompanying therapies (chemotherapy, radiotherapy), each woman can experience such complications with different degree and intensity. The most frequent side effects include pain and tenderness at the operative site. Some women also report phantom pain in the breast that has been removed. It is experienced as itching, burning, “pins and needles” or pressure. Another negative aspect of surgery includes the risk of infections, bleeding, accumulation of fluid in the tissues or the development of haematomas. Attention should also be paid to the changes in the functions and movements of the arm. Patients may experience reduced mobility and stiffness caused by damage to the nerves and muscles. Post-operative scars, besides being an aesthetic issue, can also lead to disturbed patterns of movement.

A very dangerous complication is the development of lymphatic oedemas. Without proper therapy, they may lead to complete impairment of the upper extremity. Unilateral mastectomy is also associated with displacement of the body's centre of gravity and may affect posture symmetry and balance. In this case, it is worth considering a breast implant procedure.

As with other treatment methods, patients can experience fatigue and weakness. It should also be remembered that this type of surgery negatively impacts women's perception of their own body image, and thus their self-esteem is heavily compromised. Female patients often feel less feminine following breast removal or with the scars left behind after surgery. In the case of typically female cancers, such as cervical cancer, ovarian cancer or

breast cancer, when the affected organs are surgically removed, women wonder whether they are still women after “all the feminine attributes have been taken away”. Such symptoms must not be disregarded in order not to overlook the signs of depression, which may develop over time [7].

Where patients experience limited upper limb mobility, scars, lymphatic oedemas and disturbed body symmetry or balance, it is absolutely crucial to implement appropriate physiotherapy intervention.

4. *Physiotherapy in breast cancer*

Rehabilitation is an important aspect in the treatment of breast cancer patients. Radical mastectomy causes a number of unfavourable changes that make it necessary to implement early physical and psychological rehabilitation [8], with a view to improving the quality of life in post-mastectomy women. This is achieved by restoring their physical and psychological fitness [9]. The scope and intensity of the rehabilitation intervention will depend on the severity of the disease and type of treatment administered. Where possible, it is advisable to talk to the patient prior to surgery, informing her how the rehabilitation process will be implemented and what she can expect from it. Demonstrating the exercises which will later be introduced and performing them together with the patient prior to surgery may significantly facilitate the subsequent cooperation. After surgery, when the patient is in pain, it will be easier for her to manage the movements trained and remembered beforehand. After surgical interventions, patients should receive rehabilitation from the very first days post-surgery. When provided with systematic exercise programmes, breast amputees have been found to make a significant correction in their posture, thereby delaying its age-related degeneration. Changes in the fitness of post-mastectomy women can be reversed by physical exercise, the proper selection of which is beneficial for both the physical and psychological aspects of their health [6,10]. The intensity of the exercises will increase over time. As part of the post-treatment rehabilitation, it is also important for patients to obtain a custom-made breast prosthesis, which not only performs aesthetic functions but also helps to eliminate the asymmetry that could otherwise affect posture. An interesting study was conducted by E. Karczewska et al. who evaluated the influence of kinesiology taping on the asymmetry that occurs after unilateral mastectomy. The findings indicate that such a therapy can significantly support rehabilitation [11].

Breast cancer patients, both in the course of treatment and afterwards, are recommended to engage

into psychophysical rehabilitation activities. Their goal is to reduce the physical and psychological effects of the treatment, as well as eliminate any physical, psychological, social or professional inadequacies caused by the disease or the associated treatment.

Physiotherapy encompasses, amongst others, the prevention of lymphoedema (oedema of the upper limb on the operated side, caused by damage to lymphatic vessels) or thrombosis as well as general mobility exercises.

In the case of oedemas, it is necessary to exercise the hand, with the upper limb raised. It is also important to remember about proper positioning of the patient while she is lying (on the back, side) – the arm on the operated side should be positioned parallel to the mattress on cushions/a folded blanket. While sitting, the patient should also keep the upper limb raised above the heart. Good results are also achieved by massage and kinesiology taping.

Patients should be encouraged to perform their daily activities with both hands – as they used to do prior to their surgery. The usual daily activities such as brushing teeth, combing hair, consuming meals or getting dressed, when performed with the hand on the operated side, will stimulate quicker recovery. The activity of getting dressed can be facilitated by wearing more loose-fitting, front-buttoned blouses, putting on blouses from the operated side and taking them off from the healthy side, or fastening bras in the front before turning them round. Exercises that cause no pain can be safely done. However, it is forbidden to carry weights (of more than 5 kg) for approximately 4-6 weeks.

Each type of exercises which is not contraindicated will have a positive impact on the patient. Learning to breathe calmly and deeply or simple walks are also a form of physiotherapy. However, the primary goal is to recover full mobility in the shoulder joint within approximately 6-8 weeks post-surgery. Next, it is important to strengthen the upper limb, starting with small weights and a resistance band. Examples of exercises that can be done post-surgery are presented in Table 3.

After approximately two weeks post-surgery, when the wounds have been healed, it is important to introduce scar mobilisation techniques. They are intended to prevent the formation of scar tissue which may limit mobility in the joint. In the beginning, the scar may itch, burn or be sensitive to touch. However, these sensations should decrease over time. The mobilisation must be performed for 10 minutes, three times a day, by pressing firmly but gently along the scar in an up and down zig-zag pattern and moving in one direction and then back in a circular motion [12].

Some patients find it very helpful to participate in support groups, such as the Federation of “Amazonki” Associations. It is an organisation that offers psychological support and practical assistance to the breast cancer victims, where patients can exchange their experiences and feelings as well as unite in their fight against cancer.

Professional rehabilitation should be based on medical expertise, the knowledge of indications and contraindications for physiotherapy as well as the acquaintance with the patient's clinical condition. Of particular relevance in this regard is also the communication amongst healthcare professionals. Moreover, an important role is played by group psychotherapy and psychoeducation [13]. It is crucial to stress the decisive influence of women's gynaecological awareness concerning breast cancer. Therefore, indications also include the widely-propagated mammographic screening and breast self-examination for breast cancer. It is a good idea to introduce this issue as early as in childhood in order to inculcate the habit of breast self-control amongst young girls. The awareness of the disease-related risk increases considerably in diagnosed females and those post-mastectomy. However, the small proportion of women appearing for their follow-up examinations post-surgery points to the need for awareness-raising campaigns to be organised for this group as well [14].

Summary

As one of the most common malignant tumours in women, breast cancer causes anxiety and concern. On the one hand, we know that medicine is becoming increasingly more successful in detecting, diagnosing and treating this condition. On the other hand, however, we realise that this disease is extremely dangerous.

Description of the exercises
<ul style="list-style-type: none"> • Squeezing a soft ball/sponge in the hand, • Shoulder raising, • Shoulder circles, • Head turning and bending, • External rotation of the arm, • Codman's exercises, • Lifting the elbows with the hands behind the nape of the neck, • “Walking” the upper limb up the wall (while facing the wall and standing with the operated side of the body next to the wall), • Raising the upper limbs while holding a stick in both hands.

Table No 3. Examples of exercises after mastectomy [12]

Women can control some of the risk factors, while others – such as genetic aspects or family history of cancer – remain beyond their influence. Hence the important role of prevention – including not only regular gynaecological and mammographic examinations but also breast self-examination. Raising young women's awareness concerning the importance of breast self-examination may give them an opportunity to detect neoplastic lesions at an early stage. The fight against cancer is often very long, tedious and painful. The treatment itself can have a number of devastating side effects, which are currently minimised, yet cannot be completely excluded. Despite the fact that surgery, chemotherapy and radiotherapy are used to eradicate cancerous cells, they negatively impact the entire human body.

Physiotherapy can considerably improve the patient's mobility as well as enhance her well-being and mental health. Many studies have confirmed the positive effect of exercise on patients' health. Proper rehabilitation training, based on the knowledge and experience of the physiotherapist, as well as on the current condition of the patient, can offer a chance to improve fitness and boost recovery.

In order to stay in shape and prevent potential health deterioration, post-operative patients should follow the recommended exercise regime for their whole life. In such a case, having taken into consideration all the contraindications, physiotherapists are recommended to select such physical activities that will be pleasant enough for the patient to perform eagerly. It then becomes more likely that the exercises will be systematic, and thus more effective.

References

1. Jassem J. *Rak sutka*. Warszawa: Springer PWN, 1998; 43-45; 54-56.
2. www.nfz.gov.pl
3. Kuliński W. *Postępowanie fizykalno-usprawniające po mastektomii i operacjach odtwórczych*. Nowa Klin, 1996; 3 (8): 394-396.
4. Kułakowski A., Skowrońska-Gardas A. *Onkologia*. Warszawa, Wydawnictwo Lekarskie PZWL, 2007; 106-108.
5. Ehgartnera B.: *Aluminium – o tym nie mówi się głośno...*, Purana, 2013;
6. Wojciechowska U., Didkowska J. *Zachorowania i zgony na nowotwory złośliwe w Polsce*. Krajowy Rejestr Nowotworów, Centrum Onkologii – Instytut im. Marii Skłodowskiej-Curie. Dostępne na stronie <http://onkologia.org.pl/raporty/> dostęp z dnia 17.12.2016;
7. <https://hematoonkologia.pl/chemioterapia/index/id/10-skutki-uboczne-chemioterapii-i-sposoby-ich-lagodzenia/dostep> z dnia 17.12.2016;
8. Skolimowska B.: *Wpływ ćwiczeń ruchowych na postawę ciała kobiet leczonych z powodu raka piersi*. Fizjoterapia, 2005; 13(1): 19-26
9. McNeely M.L., Campbell K., Ospina M., et al. *Exercise interventions for upper-limb dysfunction due to breast cancer treatment*. Cochrane Database Syst Rev, 2010; CD005211
10. Kyungjin Ha., Seungjun Choi. *The Effect of a PNF Technique Program after Mastectomy on Lymphedema Patients' Depression and Anxiety*. Journal of Physical Therapy Science, 2014; 7, 1065-1067.
11. Karczewska E., Szlachta P., Pytka K., Hałasa-Majchrzak D., Majcher P. *Kinesio Taping Method in the asymmetry treatment of the shoulder girdle in women after mastectomy—a pilot study*. European Journal of Medical Technologies, 2016; 1(10): 37-43.
12. Phan S. *Functional rehab after breast cancer surgery*, Princess Margaret, 2015; University Health Network.
13. Podgórska-Zdyb A., Budźko P., Janiszewski M., Hak A., et al. *Rola kinezyterapii w usprawnianiu kobiet po mastektomii*. Medycyna Manualna, 2004; 8(3/4): 51-53.
14. Lejman W., Drózdź W. *Rak piersi*. Pol Przegl Cgier, 2004; 76(11): 1209-1216

Corresponding Author:

Magdalena Pieniążek
Jagiellonian University Medical College,
Faculty of Health Sciences
Email: pieniazek.m@interia.pl

Conflict of interest:

The authors have declared no conflict of interest.