

# KINESIOLOGY TAPING AMONG OTHER METHODS OF OEDEMA THERAPY IN PATIENTS TREATED FOR BREAST CANCER

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## ABSTRACT

Breast cancers (BC) are a serious oncological problem in Poland and throughout the world. Patients with BC are exposed to the appearance of lymphoedema. This is excessive accumulation of high-protein fluid in the interstitial space. This leads to an increase of the upper limb circuits on the tumour side, but also pain, muscle weakness, or limited mobility in the upper limb.

They are several causes of oedema in patients with BC. It may be the removal of lymph nodes during surgery, scarring of the postoperative area, fibrosis of tissues, and damage to the lymphatic and blood vessels and lymph nodes after radiotherapy. Another cause may be the involvement of lymph nodes by the primary malignant tumour, tumour metastasis, or invasion of lymphatic vessels by the tumour.

There are many physiotherapeutic methods (manual lymphatic drainage, kinesis-therapy, compression therapy) of prophylaxis and treatment of oedema. A method of supporting oedema therapy is kinesiologic taping (KT).

KT was developed by doctor Kenzo Kase in 1963. It involves sticking tape onto the skin. The result is improved flow of blood and lymph. Good conditions can be obtained for regeneration and reduction of oedema. It has an influence on reducing pain, on the regulation of muscle and fascia tension, increased or maintained range of motion, and reduction of skin tension.

The aim of this article is to present the problems related with the occurrence of lymphoedema as a consequence of BC and propose the use of KT in oedema therapy by physiotherapists, nurses, and doctors.

**Key words:** lymphoedema, breast cancer, kinesiologic taping.

## INTRODUCTION

Breast cancers (BC) are a serious oncological problem in Poland and throughout the world. In Poland the incidence of BC in 2014 was 17,379 and it is constantly increasing [1]. According to the World Health Organisation (WHO) in the world there are approximately 1.7 million new cases of BC every year [2].

In addition to aggravating treatment and unpleasant sensations from the psychological sphere, which may occur after the diagnosis of BC, patients may be additionally exposed to the occurrence of lymphatic oedema within the upper limb on the tumour side.

## CHARACTERISTICS OF LYMPHOEDEMA

Lymphoedema is tissue oedema caused by lymph stasis, most often as a result of damage to the lymphatic vessels. This leads to excessive accumulation of high-protein fluid in the tissue spaces [3-6].

Features of oedema:

- pallor,
- skin temperature unchanged (not increased),
- positive "well" test,
- asymmetrical location,
- no ailments of pain [7].

Division of oedema due to the level of advancement:

- I degree – oedema occurs temporarily, usually during the day; it increases after physical activity, but it subsides after rest and at night.
- II degree – permanent oedema; it can be reduced by elevation of the limb.
- III degree – there is a progressive increase in the volume of the limb (in the distal side); the limb is hard and inflexible (sclerotisation).
- IV degree – elephantiasis; irreversible changes within the skin and complications [8].

The oedema division created by Prof. Waldemar Olszewski to assess the degree of advancement of oedema. This is an oedema for:

- A – hand,
- B – forearm,
- C – arm,
- D – shoulder.

It can also determine the consistency of oedema:

- pasty (a),
- hard (b),
- excessive keratosis, fibrosis, and leakage of lymph (c) [8].

## LYMPHOEDEMA IN PATIENTS WITH BREAST CANCER

The causes of lymphoedema in patients treated for BC are different. It may be the effect of lymph node dissection during surgery or scarring of the post-operative area. Also, after radiotherapy blood and lymph vessels may be damaged or scar tissue may appear [9]. Another cause may be the involvement of lymph nodes by the primary malignant tumour, tumour metastasis, or invasion of lymphatic vessels by the tumour. It is so-called cancer oedema, which is not a consequence of oncological treatment [8].

Data on the rate of oedema in patients with BC and its treatment are quite diverse.

After surgery may appear only a small oedema. Usually, enlargement of the upper limb circuits occurs in the first year after surgery, although there are cases when the oedema develops later, and it can increase up to 30 years after oncological treatment [4].

Data in the article of Mosiejczuk *et al.* show that post-operative oedema occurs in about 22-43% of patients [10]. Excessive accumulation of lymph in the interstitial space causes increased circumference of the upper limb.

This may additionally cause deformation of the upper limb, unsightly appearance, and functional limitation [11]. Untreated oedema has a tendency to gradually increase. It may additionally cause the build-up of stress and disability [6].

## METHODS OF OEDEMA REDUCTION

There are many methods of prophylaxis and treatment of lymphoedema. The early application of physiotherapeutic procedures is recommended to prevent lymphoedema in people with BC [12].

Kultys in his article indicates that the most effective form of conservative oedema treatment is comprehensive unclogging physiotherapy. It gives good results also in the case of existing oedema (chronic) [11].

As well as physiotherapeutic treatment, pharmacological treatment is used. The aim of these two methods is reduction of oedema and other ailments, for ex-

ample limited mobility of joints and reduced muscular strength in the upper limb on the side of the tumour, disturbed circulation, pain, and limb deformity [4].

However, physiotherapy plays a prominent role in the treatment of oedema. Procedures of complete decongestive therapy (CDT), according to the International Society of Lymphology, are:

- manual lymphatic drainage,
- compression therapy,
- kinesitherapy (exercises to improve the flow of lymph),
- auto-massage and anti-oedema positions,
- skin care [5, 7].

### Manual lymphatic drainage

Manual lymphatic drainage (MLD) is a massage that uses gentle and slow circular, rotary, pumping, and drawing movements without the use of lubricants. The aim of this massage is the improvement of lymphatic system function, stimulation of lymph flow, opening, emptying, and draining lymph [7, 13].

### Compression therapy

Compression therapy involves either the use of multilayered bandaging of the swollen limb (Phase I – early period of treatment) or compressing the swollen limb with individually selected materials appropriate to the class of compression, such as compression sleeves (Phase II – supporting phase) [5, 7]. According to the European Expert Group, there is a great deal of scientific evidence that compression therapy in the treatment of oedema brings good results and should be used as an important and necessary element in CDT [14].

### Kinesitherapy (exercises)

The use of motion as an important element in the therapy of lymphoedema. Physical exercises support natural lymph drainage and penetration of fluid from the intercellular space into the lymph capillaries. However, selected forms of movement should not be too intense because the oedema will increase as a result of increased blood flow. Free active exercises or active exercises with a small load support the function of the muscle pump, while breathing exercises cause better transport of the lymph thanks to the negative pressure in the chest. Individual exercises are also important because they have an influence on the improvement of the limb function and they improve general well-being [5, 7]. According to the latest guidelines of the National Chamber of Physiotherapy, the greatest benefits are brought about by targeted exercises in reduction of oedema, mainly on the activation of the muscle pump of the biceps brachii muscle. It is recommended that the exercises be performed in a compression sleeve. This pro-

fects against the return of lymph and enlargement of oedema. New forms of movement exercises are being sought, which activate the muscle pump and help to drain the lymph, such as Pilates, yoga, aerobic cardiac rehabilitation on the stationary bike, rotor or on the treadmill, and circuit training with gradually dosed resistance (elastic bands) [14].

### Auto-massage and anti-oedema positions

Auto-massage and anti-oedema positions are another element of anti-swelling therapy, which, after learning, the patient should perform independently at home.

Auto-massage is recommended to improve venous and lymphatic circulation.

It should be performed while the limb is elevated, preferably twice a day, from 7 to 10 minutes.

Preventive measures or initial oedema treatment consists of:

- elevation of the upper limb on a wedge, at different times of the day and at night,
- breathing exercises,
- active and passive exercises of the upper limb with auto-massage,
- protection and care of the skin [5, 7].

### Skin care and protection

Skin care and protection is another element of anti-oedema therapy. Usually, the skin of the swollen limb is sensitive and susceptible to injuries and other skin abnormalities, especially after MLD and following compression sleeve treatment or bandaging. Hygiene must be observed. It is also important to regularly use emulsions and lotions. Patients with large oedema should use powders against sores, and before bandaging and after MLD moisturising preparations should be applied [5, 7].

Except for the above-mentioned CDT treatments, a pneumatic massage or KT could be suggested as a supportive procedure.

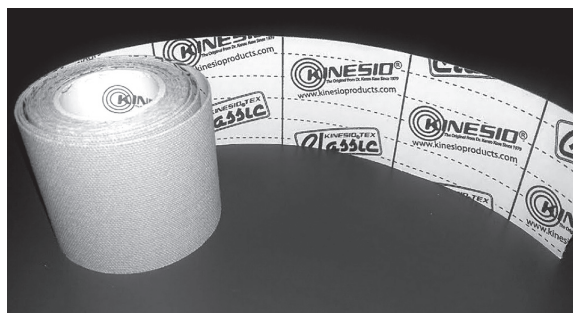


Figure 1. The tape used for kinesiology taping

### Pneumatic massage

Pneumatic massage – or pneumatic compression – is a supplementary and supportive method of prophylaxis and oedema therapy. It should be used after MLD, especially in the central quadrants bordering with the swollen area. The massage is performed using a device connected by a cord with a cuff (sleeve, which is placed on the upper limb). The pneumatic massage should last from 30 to as much as 120 minutes. During the treatment the cuff fills with air and additionally exerts pressure on the limb, which has a stimulating effect on the vascular system [5].

Another therapeutic method, which is used as a supplement to the treatment of oedema and at the same time supports the rehabilitation process is Kinesiology Taping (dynamic taping).

### APPLICATION OF THE KINESIOLOGY TAPING METHOD IN THE TREATMENT OF OEDEMA

This method was disseminated in the world in 1963 and was developed by Dr. Kenzo Kase under the name Kinesio Taping [15]. In 2007, this name was modified by the instructors from Europe on Kinesiology Taping. They found that the area to transfer knowledge about Kinesio Taping is the muscular-fascial system and theory of muscle chains [16].

Mainly, KT is used in sports medicine, but also in other clinical specialties, for example orthopaedics, traumatology and surgery of the musculoskeletal system, rheumatology, paediatrics, neurology, oncology, and even gynaecology and obstetrics [10, 15, 16].

The method involves the application of special cotton tapes directly on the skin. They are covered with acrylic medical glue (Fig. 1). The tapes are waterproof. Thanks to this, it is possible to perform daily hygienic and hydrotherapy procedures.

The tapes let also through the air. They stay on the skin for a few days, without limiting mobility in the joints, thermoregulatory processes, or hygienic activities, and they do not cause inflammatory reactions. The tapes have properties similar to human skin in terms of specific weight, thickness, and extensibility [5, 15-17].

The principle of this method is based on the fact that after applying the tape, the epidermis is raised and wrinkled, as well as the stratum papillary of the dermis. The flow of blood in the system of vessels in the stratum sub-papillary and in the deep vessels of the skin is improved. The transport of the lymph from the capillaries to the blood vessels is also changed. Thanks to these processes are created good conditions for regeneration [15, 16].

The therapeutic effects of the KT method include:

- improvement of microcirculation,

- reduction of stagnation,
- reduction of lymphoedema,
- reduction of unnatural sensations within the skin,
- regulation of muscle and fascia tension,
- reduction of pain,
- maintaining the proper range of motion in the joints,
- correction of improper joint setting [16, 18, 19].

It is recommended that before applying the tape, the patient's skin should be cleansed, preferably with a cosmetic or pharmaceutical agent, and deprived of excessive hair.

Then the therapist determines the exact location of the taping, the method and direction, and the degree of stretching the tape. First, it is recommended to remove the tape from the "tails" with one hand while the other hand holds the skin.

The treatment should be repeated often, ideally until the symptoms disappear [15, 16].

There are many techniques of applying tapes (ligament, muscle, functional, lymphatic, fascial, and corrective) [20].

In the case of upper limb oedema, the therapy used is lymphatic application. It is applied to the limb with oedema and quadrants adjacent to areas covered by lymph stasis. The tape is cut into long, narrow strips (so-called "tails"), and the base sticks near the lymph nodes. Only slight degree of stretching of the tape is used, in the range of 0 to 15%.

Techniques of cutting tapes for lymphatic applications are as follows:

- "fan" – cutting technique similar to the letter "V", but with more "tails", from four to five (Fig. 2),
- "web" – the tape is dissected so that it has two bases between which a web of narrow "tails" numbering from four to six is formed [15, 17].

### EXAMPLES OF LYMPHATIC APPLICATIONS USED PROPHYLACTICALLY OR ADJUNCTIVELY IN CASE OF UPPER LIMB OEDEMA

Activation of lymph drainage by anastomoses:

1. Base near the medial side of the scapula (on the side of the oedema), while the "tails" (transversely through the scapula) towards the axillary cavity (Fig. 3).
2. Base in the area (free from oedema) of the axillary cavity, "tails" (transversely through the chest) towards the axillary cavity (on the side of the oedema) (Fig. 4).
3. Base in the area of inguinal lymph nodes (on the side of the oedema), while the "tails" run along the torso towards the axillary lymph nodes (Fig. 5).

The degree of stretching of the tape from 0 to 15%.

Activation of lymph drainage from the upper limb:

1. Base around the teres minor and major muscle attachments, straps over the central part of the deltoid muscle towards the elbow (Fig. 6).

2. Base on the anterior edge of the axilla and "tails" along the shoulder towards the elbow (Fig. 6).
3. Base over the medial epicondylar humerus and "tails" along (the front surface) of the forearm towards the base of the thumb (Fig. 7).
4. Base near the medial epicondyle of the humerus, and straps along the back surface of the forearm towards the back of the hand (Fig. 7).

The degree of stretching of the tape from 0 to 15%.

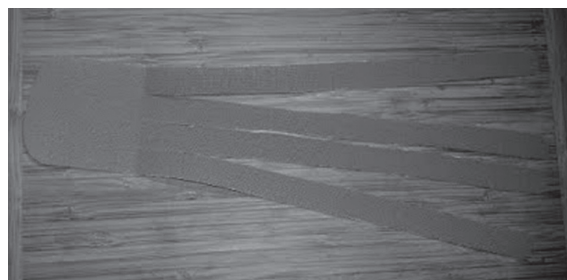


Figure 2. Example of the application – "fan" technique



Figure 3. Lymphatic application – back view

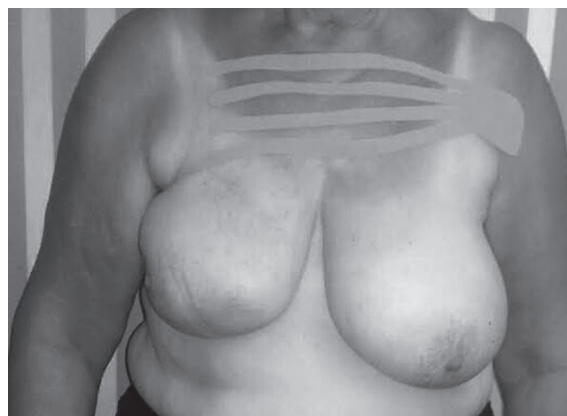


Figure 4. Lymphatic application – anastomosis – front view





Figure 5. Example of application

## CONCLUSIONS

This article presents the current state of knowledge about the possibilities of using standard treatments of CDT and KT methods as an element supporting the therapy of lymphoedema in patients treated for BC.

In effect, after analysing the literature, except for the effect of reducing oedema after applying KT, one can observe a positive effect on reducing pain, regulating muscular-fascial tension, maintaining or increasing joint mobility, and on the feelings associated with the tension of the skin's coatings.

Thanks to this non-invasive method supporting oedema treatment, patients can freely participate in everyday social life and work.

The KT method is mainly used by physiotherapists, but it can also be proposed to patients by nurses and doctors.

### Disclosure

The author declares no conflict of interest.

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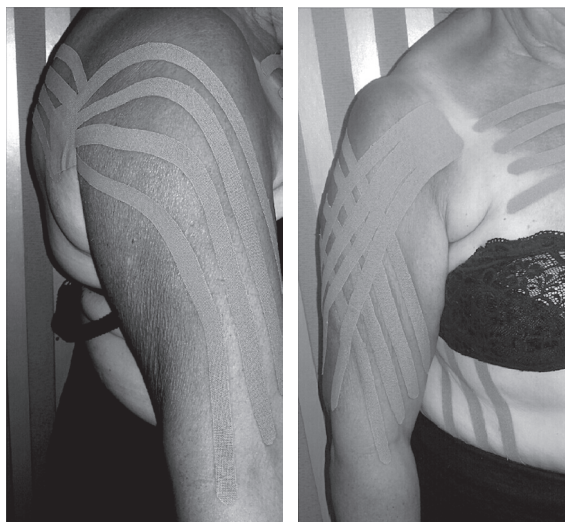


Figure 6. Example of application on the upper limb (arm)

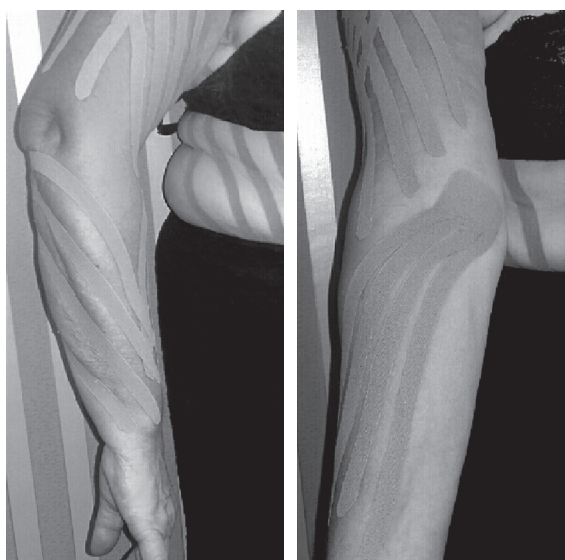


Figure 7. Example of application on the upper limb (forearm)

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