

Kinesio Taping Method in the asymmetry treatment of the shoulder girdle in women after mastectomy – a pilot study

Emilia Karczewska^{1,2}, Paula Szlachta^{1,2}, Krzysztof Pytka^{1,2},
Dorota Hałasa-Majchrzak^{1,2}, Piotr Majcher^{1,2}

¹ St Johns' Oncology Center in Lublin, Poland

² The department of Physiotherapy and Rehabilitation
Medical University of Lublin, Poland

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Corresponding address:

Paula Szlachta,
ul. Młodej Polski 26 /23,
20-863 Lublin
e-mail: paula.szllachta@
gmail.com

Abstract

Mastectomy is currently the most frequently performed life-saving surgery among women diagnosed with breast cancer. However, it involves many complications that lead over time to the pathological setting of the shoulder girdle. The aim of our study was to examine the effect of the Kinesio Taping application on the setting of shoulder girdle in women after mastectomy. The inclusion criteria for the study were as follows: the age range 40-65 years, unilateral total mastectomy, lymphoedema – lack or Grade 1, no fresh injuries, no degenerative changes in large joints, no pain and the consent in writing of the woman being tested. The research tool was the MORA 4th Generation System that bases on the photogrammetric method, which means anthropometric measurements based on images of the examined the surface. It allowed us to examine the various parameters from which were selected as follows: height of the shoulder line, height of the shoulder blades and the thoracic kyphotic angle. Kinesio Taping application was a combination of two types of applications; first

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type was supporting the lower trapezius and the second, functional application, was supporting the upper limb with the tape tension <35%. Landmarks were marked on the back of the women being tested. When the women stood at a sufficient distance from the camera (2.20 m), the image of the back was obtained - in a relaxed standing position. The image was taken one more time after the above described Kinesio Taping application. After the images were analyzed- computer calculated the selected parameters.

Statistical analysis (Student's t-Test) of the obtained results allowed us to come to the conclusion that Kinesio Taping application has a positive influence on changes in the shoulder girdle setting in frontal and sagittal plane. Asymmetry of the functional joint between scapula and upper ribs setting and the height of the shoulders decreased, the thoracic kyphosis was also reduced.

Introduction

Breast cancer is one of the most common carcinoma among women, so far the most effective treatment method is mastectomy [1]. Depending on the extent of the tumor and its grade different types of mastectomy are performed (Quadrantectomy, Madden's, Halsted's, Patey's methods of amputation). Nevertheless, the most secure method that gives the highest confidence to stop further tumor progression is radical mastectomy that comes with the removal of surrounding lymph nodes. If necessary, the pectoralis major and / or minor are removed [2]. Currently the aim is to save as much pectoral muscles tissue as possible. In functional terms and in terms of physical therapists it is more effective in reducing the risk of function reduction of the shoulder girdle movement. Therefore, it can be concluded that this operation is associated with numerous complications. The most significant of them are: lymphoedema of the upper limb on the operated side, static disorder of the body posture, asymmetrical setting of the trunk, muscle weakness of the shoulder girdle and of the trunk, limited mobility of the upper limb and spinal joints [3]. Changes in body posture are the greater, the larger the size of the patient's breast was and the longer the period of time has elapsed since the mastectomy [4]. Moreover, mastectomy also affects the aesthetics of the body and the psyche of the patient. Consequently, there is a disturbance in the biomechanics of the woman's body, what leads to pain and hinders daily function.

As shown in Hawro's et al. [5] and Rostkowska's et al. studies [4] physical activity has positive influence on maintaining good body posture in women after mastectomy [5]. The first step to compensate the body asymmetry is to balance its weight, which means complement of the removed breasts. In Poland breast reconstruction is not very widespread yet, it is advisable for women to wear the external prosthesis. Numerous studies have shown that regular prosthesis wearing, including also sleeping in it, results in smaller deviation in body posture [6].

The aim of our study was to examine the effect of the Kinesio Taping application on the setting of shoulder girdle in women after mastectomy.

Material and methods

The study included 12 women between the ages of 40 and 65 years, who at the time of the study were patients in the Oncology Center in Lublin and used the services of the Centre for Rehabilitation, COZL. Their average body weight was 70 kg. All patients were in the past subjected to the combined treatment (total unilateral mastectomy, chemotherapy and / or radiotherapy). The average time elapsed after the surgery was about 4 years.

Inclusion criteria:

- Complete treatment of the breast cancer (at least one year after the surgery),
- Consent in writing,
- No fresh injuries,

- Lack of lymphoedema or lymphoedema Grade 1,
- Lack of degenerative changes in the large joints and related to it distortion,
- Lack of pain.

Exclusion criteria:

- No possibility of adopting a vertical body posture,
- Comorbidities (fresh or old injuries that caused body statics disorders),
- Neurological, rheumatic, orthopedic disorders
- General poor state of health,
- Patients after or while breast reconstruction

Study procedure

Study was performed using MORA 4th Generation System (Fig. 1). Its construction combines the advantages of spatial analysis MORA/ISIS type and movement analysis based on the markers.

The study uses the photogrammetry method, which means anthropometric measurements based on images of the examined surface. The computer allows to obtain three-dimensional coordinates of the examined surface and simultaneously calculates the parameters of the body posture in frontal, sagittal and transverse planes- with graphical representation of results. The image can be freely rotated and enlarged, the obtained image clearly shows the changes in the set of the markers.

Course of the study

Prior to measuring, the patient was asked to take off the shoes and outer clothing from waist up, including prosthesis. On the back of the tested women characteristic points were marked:

- Spinous processes C7 to S1
- Posterior superior iliac spine
- Inferior angles of scapula

Patient stood behind the line which was marked 2.2 meters from the device. Woman was told to take a relaxed position with her upper limbs hanging

along the trunk and head facing forward (Fig. 2). Device was calibrated in the way the marked dots were visible in the image. While the image was obtained the patient was instructed to take a breath in and out.

Kinesio Taping application, which is a combination of two techniques of using one kinesiology tape: muscle-technique application that supports the trapezius (ascending part) and functional application for upper limb (tape tension below 35%), was the second part of the study. Application started in relaxed position- area Th10-Th12, when inferior trapezius was stretched (flexion of the arm and horizontal extension) tape was applied on the edge of the muscle, then the patient returned to the starting position and the tape was applied when the tissue was extended (internal rotation of shoulder joint). Next step was spiral tape application on the humerus, toward the lateral epicondyle of the humerus. This application benefits from the fact that the kinesiology tape tightens itself to its starting point, which was intended to increase the external rotation of the shoulder joint. External rotation of the shoulder joint is inextricably connected to the approaching of the functional joint between scapula and upper ribs to the spinous processes line. At the same time the application supporting the function of the trapezius inferior fascia narrowed the lower angle to the chest, which also lowered the shoulder girdle. Fifteen minutes after tape application described above- second image was obtained using MORA 4th Generation System (Fig. 3).

The obtained images were analyzed in the computer using the key-code, which is a private property of the Medical University. From the obtained results the following parameters were taken to further analysis:

- Height difference of the shoulder line,
- Height difference of the shoulder blade,
- The thoracic kyphosis angle.

Statistical methods

In this study were calculated the basic descriptive statistics of the tested parameters in both groups: mean, standard deviation and median (Table 1). In order to compare the parameters of both groups a parametric



Fig. 1.
Device for computer body posture evaluation, MORA 4th Generation System



Fig. 2.
Test scheme of the body posture study using MORA 4th Generation System



Fig. 3.
Performed Kinesio Taping application

Table 1.

Comparison of body posture between group of women before and after Kinesio Taping application

Parameter	Before application			After application			Student's t-Test	
	[X]	Me	SD	[X]	Me	SD	T	p
LR	3,79	3,6	2,2	2,35	2,1	1,77	6,77*	0,001*
WS	8,58	5	7,95	8,15	8,9	6,75	3,36*	0,01*
KKP	156,95	157,8	6,59	160,84	158,7	9,13	2,29*	0,05*

* Statistically significant result

[X] – mean average

Me – median

SD – standard deviation

Student's t-Test was used. On the basis of this test significant differences between the parameters of the groups before and after Kinesio Taping application were confirmed, on the significance level of $p < 0.05$. Student's t-Test was in the end used to verify the results relevance in both groups (Table 1 and 2).

Results

Results proved statistically significant changes in the following parameters: height of the shoulder line (**LR** – shoulder line angle), height of the shoulder blade (**WS**

– height difference of the inferior angles of the shoulder blades), the thoracic kyphosis angle (**KKP**).

In Fig. 4. are shown graphic results of the study on one woman. The image on the left shows the asymmetry while a movement of elevation and protraction of the shoulders, the inferior angle of the left scapula is visible as the highest point (darkest color). The image on the right shows shoulder girdle settings after Kinesio Taping application.

Defining parameter of the shoulder line height indicated a reduction of its asymmetry in the group of women after the Kinesio Taping application (Table 1). Asymmetry of the shoulder line was reduced in nine

Table 2.

Comparison of body posture between group of women before and after Kinesio Taping application in regard to the improvement and deterioration of symmetry

Parameter	Student's t-Test					
	Improvement of the symmetry			Deterioration of the symmetry		
	Number of examined	T	p	Number of examined	T	p
LR	9	6,19*	0,005*	3	2,19	0,1
WS	6	2,6*	0,05*	4	2,16	0,1
KKP	7	1,9	0,1	5	2,37*	0,05*

* Statistically significant result

LR – shoulder line angle,

WS - height difference of the inferior angles of the shoulder blades,

KKP - the thoracic kyphosis angle

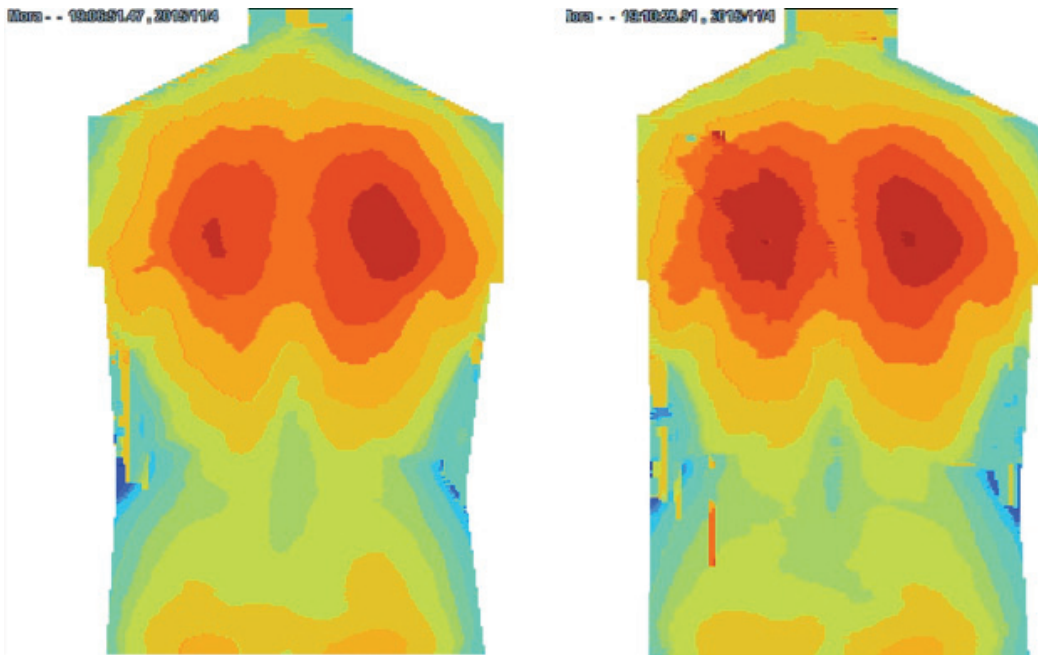


Fig. 4.

Graphical result of the study obtained with MORA 4th Generation: on the left - before Kinesio Taping application, on the right - after Kinesio Taping application

women. Three women showed increase of the asymmetry, but this result was statistically non-significant (Table 2).

Another parameter that has undergone a major change was the thoracic kyphosis angle (Table 1). In seven out of twelve tested women kyphosis angle increased, result is reduction of the thoracic kyphosis. The value slightly deteriorated in five women (Table 2). Although this parameter was statistically non-significant, from the physiotherapists point of view (and perception of the changes, which are the result of a mastectomy), even a small reduction in thoracic kyphosis has a significant impact on preventing further compensation, which may occur in the future as a complication after mastectomy.

The last parameter taken into consideration by the authors was the difference in the scapula height (Table 1). Six women showed decrease in this parameter what indicates improvement of the scapula symmetry. In four women this parameter slightly deteriorated (Table 2). In case of two women the difference in the scapula height did not change after the Kinesio Taping application.

In summary, the conducted studies of the static posture in women after unilateral radical mastectomy (our study) have shown that the tested group has the asymmetry of shoulder line and the difference in shoulder blades height. In the available literature

there are no studies about the effects of Kinesio Taping application on a group of women after mastectomy. So far the most important information in the literature, taking into consideration the same parameters, is that the shoulder girdle in women after mastectomy is asymmetrical in the shoulder line, namely the shoulder on the operated side is elevated. There are no studies about the effects of the kinesiology tape application, because it was created by one of the authors of this study. The author, while creating this method, took into consideration the direction of the tape tension, as well as the biomechanical aspect of the shoulder girdle in order to reduce its asymmetry.

Discussion

Previous studies about changes in the posture symmetry in women after mastectomy have shown that those women tend to have shoulder girdle elevated in the coronal plane on the operated side [7], which is probably result of protection of the surgical wound and pain during stretching of the scars while movement. Furthermore, changes were noted in the sagittal plane exposed as significant winging of the inferior angle of the shoulder blade and the rotation of the pelvis (twisted pelvis). In addition, center of gravity was moved to the front - tendency to forward leaning

of the trunk. Furthermore, in the studies conducted up to now there was no relationship between the operated side and the direction of the posture asymmetry [4].

Kinesio Taping Method is known for over 30 years. This form of adjuvant therapy in rehabilitation process was invented by a Japanese chiropractor Dr. Kenzo Kase. Its effectiveness was scientifically proven. Numerous articles and research studies have confirmed its therapeutic value, as well as have the patients themselves. Kinesio Taping Method is a non-invasive, safe and easy to use therapy, which requires from the therapist knowledge of the anatomy, physiology and of the principles of this method. Additionally, the kinesiology tape can remain on the skin for 5 days, 24h/day. As long as the therapist has knowledge of the basics of myofascial chains, as well as of combining movements in different joints in anatomical, functional and planes of motion [8], free combinations of the techniques are allowed.

Kinesio Taping Application used in this study was developed for the needs of women who experience complications after mastectomy in form of restriction in movement in the shoulder girdle joints. Mentioned dysfunction is associated with complication in the form of changes in center of gravity, which deteriorates the symmetry of the female body. There are no reports in the literature of similar application performed in order improve the setting of the shoulder girdle in women after mastectomy.

Our study showed that This method can be successfully used as an adjunct therapy in asymmetry treatment of the shoulder girdle. However, it is to be noted that this is not the only application that can be used in a particular dysfunction. Since each patient has a different body structure, each application should be individualized, depending on the pain the patient is reporting.

Conclusion

1. Kinesio Taping is an effective method of treating the asymmetry of the shoulder girdle.
2. Kinesio Taping Application has a positive influence on symmetrical setting of the shoulder girdle in the frontal plane. The following parameters were changed: shoulder line height – asymmetry deterioration, shoulder blade height (symmetrical positions) and thoracic kyphosis – excessive thoracic kyphosis deterioration.

References

1. Haddad CA, Marcelo S, Janeiro Perez M, [et al.]. Assesment of psture and joint movements of the upper limbs of patients after mastectomy and lymphadenectomy. *Einstein* 2013; Oct; (4): 426-34.
2. Woźniewski M: *Fizjoterapia w Onkologii*. PZWL; Warszawa 2012
3. Śliwiński Z. Ocena dysfunkcji ruchowych kręgosłupa u kobiet po amputacji piersi. *Assesment motor dysfunction of spine in women with mastectomy*. *Fizjoterapia*, 2996; Apr; (3): 29-33
4. Rostkowska E, Bąk M, Samborski W. Body posture in women after mastectomy and its changes as a result of rehabilitation. *Adv Med Sci* 2006; March; (51): 287-97
5. Hawro R, Będenek M, Pudeko M. Wczesna poop-eracyjna fizjoterapia po doszczętnym leczeniu raka gruczołu piersiowego. *An early postoperative physiotherapy following mastectomy*. *Fizjoterapia*, 1999; July; (1): 12-7
6. Bąk M, Rostkowska E. Wpływ stosowania protezy piersi podczas snu na postawę ciała u kobiet po mastektomii. *Fizjoterapia*, 2000; Aug; (4): 11-5
7. Drzał-Grabiec J, Rachwał M, Walicka-Cupryś K. Postawa ciała kobiet po mastektomii. *Body posture in women after mastectomy*. *Onkol. Pol.*, 2013; 16; (1): 11-15
8. Kase K, Wallis J, Tsuyoshi K. *Clinical Therapeutic Applications of the Kinesio Taping Method 3rd Edition*, USA 2013