

ORIGINAL ARTICLE / PRACA ORYGINALNA

Natalia Ciesielska, Remigiusz Sokołowski, Karolina Klimkiewicz, Mateusz Kuriga, Wojciech Hagner

**COMPARISON OF EFFECTIVENESS IN APPLICATION  
OF MANUAL LYMPHATIC DRAINAGE AND KINESIOLOGY TAPING  
WITH PATIENTS SUFFERING POST MASTECTOMY LYMPHEDEMA**

**PORÓWNANIE SKUTECZNOŚCI METOD MANUALNEGO DRENAŻU  
LIMFATYCZNEGO I KINESIOLOGY TAPING U PACJENTEK  
Z OBRZĘKIEM LIMFATYCZNYM PO MASTEKTOMII**

Institute and University Department of Rehabilitation  
Nicolaus Copernicus University Collegium Medicum in Bydgoszcz  
Head: Prof. dr hab. Wojciech Hagner

**S u m m a r y**

**I n t r o d u c t i o n .** According to the GUS study conducted in year 2008 in Poland is high morbidity in women because of malignant breast tumor (22,2% of all female cancer). After a mastectomy procedure about 30-50% of patients suffer from lymphedema as a consequence of axillary lymph nodes removal, what impedes returning to normal activity.

**A i m .** Comparison of effectiveness of two methods suitable for elimination of mastectomy side upper limb lymphedema: Manual Lymphatic Drainage (MLD) (method A) and Kinesiology Taping (KT) (method B).

**M a t e r i a l a n d m e t h o d s .** Study was conducted in Oncology Center in Bydgoszcz on two groups of 10 women who experienced mastectomy procedure. All woman

were treated comprehensively with following differences: Group I was treated with rehabilitation method A, and group II was treated with rehabilitation method B. Measurements representing the differences between the circumference of the upper limb in a given point before and after two weeks of rehabilitation has been made in nine different points of the upper limb in each of the patients.

**R e s u l t s .** For 4 of 9 the measured points the average decrease of lymphedema when method B is applied is significantly greater than with the application of method A.

**C o n c l u s i o n s .** KT as a method of reducing the upper limb lymphedema after mastectomy could be more effective than the method MLD.

**S t r e s z c z e n i e**

**W s t ę p .** Według przeprowadzonych badań GUS w 2008 roku w Polsce występuje wysoka zachorowalność kobiet na nowotwory złośliwe piersi (22,2% zachorowalność kobiet na nowotwory). Po mastektomii u 30-50% ogółu operowanych kobiet dochodzi do obrzęku limfatycznego na skutek usunięcia węzłów chłonnych pachowych, utrudniając powrót do prawidłowej aktywności.

**C e l .** Porównanie skuteczności dwóch metod likwidacji obrzęku kończyny górnej po stronie mastektomii:

Manualnego Drenażu Limfatycznego (MDL) (metoda A) oraz Kinesiology Taping (KT) (metoda B).

**M a t e r i a ł i m e t o d y .** Badania przeprowadzono w Centrum Onkologii w Bydgoszczy na dwóch 10 osobowych grupach kobiet po mastektomii. Wszystkie kobiety były leczone kompleksowo z następującymi różnicami: I grupa przechodziła zabieg rehabilitacyjny metodą A, a II grupa – metodą B. Pomiarów dokonano w 9 różnych punktach kończyny górnej. Wartość pomiaru stanowiła różnica

pomiędzy obwodem kończyny górnej w danym punkcie przed oraz po 2 tygodniach rehabilitacji.

**W y n i k i .** Dla 4 z 9 punktów średnie zmniejszenie obrzęku przy zastosowaniu metody B jest istotnie wyższe niż dla metody A.

**Key words:** lymphedema, mastectomy, lymphatic drainage, Kinesiology Taping, rehabilitation

**Słowa kluczowe:** obrzęk limfatyczny, mastektomia, drenaż limfatyczny, Kinesiology Taping, rehabilitacja

## INTRODUCTION

According to the analysis of GUS (Central Statistical Office in Poland) research made in year 2008 a mammary gland tumor is the most common tumor within female population (22,2%) and the most common tumor causing death (13,1%) [1]. Infiltrative tumors, which constitute about 85% of all breast tumors, are the greatest challenge for Polish oncology. In this form of tumor the continuity of the epithelial basement membrane is damaged. These tumors infiltrate the stroma and bring metastasis through lymphatic and blood vessels what results in numerous cases demanding a radical surgical treatment [2, 3]. Following the mastectomy, 30-50% of all operated women suffer from lymphedema.

Formation of the lymphedema depends on a complicated chain reaction, knowledge of which is essential for prevention of the lymphedema development. There are numerous causes specified, among them there are: removal of the oversized vessels and deep lymph nodes of the armpit, formation of the scarring changes at the armpit peak and infection of the postoperative wound, what intensifies the scarring. An increased risk of lymphedema development is also caused by the post radiotherapy tissue changes, where ionized energy has a damaging influence on the lymphatic vessels. This factor is particularly essential with post mastectomy patients since deep lymph vessels and lymph nodes had been removed and radiation causes the superficial vessels to close. Total lymphatic block emerges and post radiation changes lead to a destruction of lymphatic vessels along the nerves and the axillary vein [3, 4, 5]. An indirect cause of the lymph stasis can may include the pressure on the structures between the first rib and a clavicle (narrowing of the subclavian vein), obesity and also limitation of physical activity (disorder in the muscle pump functioning) [4, 5].

Clinically the pathological changes caused by an disordered lymph drainage leads in the first place to the so called soft lymphedema (1<sup>st</sup> degree), when pressure is applied it shows a visible pit which recedes after a

**W n i o s k i .** KT, jako metoda likwidacji obrzęku limfatycznego kończyny górnej po mastektomii, może być skuteczniejsza niż metoda MDL.

rest and elevation of the upper limb. Further growth of the connective tissue causes the so called hard lymphedema (2<sup>nd</sup> degree), skin becomes pale and the subcutaneous tissue becomes dense. Lymphedema of that kind can not be reversed spontaneously. The most common form is the limb elephantiasis (3<sup>rd</sup> degree) in which it comes to permanent pathological changes leading to limb deformation and severe disability [6].

As a result of the lymphedema mobility disorders emerges, overall weakness is observed and muscle strength is limited, neurological disorders occur (compression syndrome of the median nerve, ulnar nerve and the humeral plexus) and pain discomforts appear [7].

Because there is no possibility to apply the causal treatment of the lymphedema, the basic method to improve the health of the patient is a comprehensive conservative therapy or in cases resistant to conservative therapy – a surgical treatment. The basic conservative method of decreasing post mastectomy lymphedema is the manual lymphatic drainage (MLD). Recently a new method was developed, Kinesiology Taping (KT) which may be more effective and more efficient in treating and preventing lymphedema [3, 8, 9].

## AIM

A comparative analysis of effectiveness of two methods used to eliminate mastectomy side upper limb lymphedema: MLD (method A) and KT (method B). Two hypothesis were stated. Hypothesis zero stated that for each pair of considered random variables (at a given measurement point) lymphedema decrease value is a random variable of normal distribution, where standard deviation is equal for both distributions. Alternative hypothesis stated that that the expected value for patients treated with method B is greater than the expected value for patients treated with method A.



In case of four measurement points (B, C, D, G) hypothesis zero was rejected in favor of the alternative hypothesis. For the remaining five measurement points there was no basis to reject the hypothesis zero. This means that with four mentioned points we find that the average swelling decrease when method B was applied is significantly higher than with the application of method A (from a statistical point of view). In case of the remaining measurement points we conclude that the average swelling decrease is not significantly different with use of any of the two methods. It should also be noted that with eight out of nine measurement points the average value from the taken sample is higher for the method B.

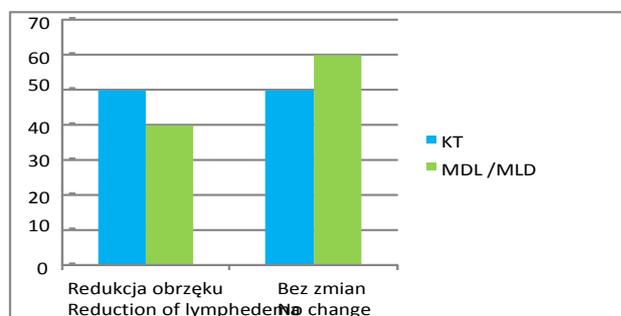


Fig. 1.

## DISCUSISON

In year 2009 in Gutowski's and partners research [10] conducted among women association "Amazonki" in Kalisz, Poznań, Toruń and Gorzów Wlkp. and among women who took part in all-Poland rehabilitation camps at Prof. W. Dega holiday rehabilitation center in Gościm and in "Gniewko" in Darłówek, on occurrence of upper limb lymphatic swelling, based on interview, clinical examination and an electronical upper limb volume measurement, lymphatic swelling was found within 100 out of 256 women (40,65%). Assessing the incidence of lymphedema among women who had a breast tumor treated surgically the attention was drawn to the factors that predispose the formation of swelling: obesity, radiotherapy and inflammation [11, 12, 13].

When analyzing the occurrence of lymphatic swelling among women who experienced mastectomy, the localization, consistency and the time when swelling appeared after surgery should also be taken into consideration. We learn from the interview that swelling showed up most commonly within two years after surgery (82%). With 80% of women the swelling

covered the arm, with 74% the forearm, with 46% the palm and only with 9% it covered the shoulder. Our observations are confirmed by Gutowski and partners research [10]: the swelling occurred generally in 2 years after surgery (72%), with 75% women swelling covered the arm, with 67% the forearm, with 40% the palm and with 13% it covered the shoulder.

The studied group more often demonstrated the soft swelling (72%) than the hard (28%). In the first stadium of the swelling progress the soft swelling shows within 68% of patients, and the hard swelling within 32% of patients, however at the third stadium the soft swelling appeared within 43% of patients and the hard within 57% of them. A clear increase in the amount of the hard swelling is noticeable with the third stadium of the swelling process. Again observations are confirmed by Gutowski and partners research [10] where in the first stadium the soft swelling constituted 78,7% and the hard constituted 21,3%, and for the third stadium accordingly the soft swelling was 42,1% and the hard was 57,9%. The lymphedema classification suggestion introduced by the International Society of Lymphology ISL was adopted in the study.

In the result of numerous scientific researches as well as one's own studies MLD can significantly reduce the lymphatic stasis, congestive and inflammatory edema and the swelling of the lymph. It can also improve the flow of the lymph. In our own study a significant decrease of the lymphatic swelling was observed with 40% of post mastectomy patients. Research conducted by Williams and partners [15] also showed a statistically significant reduction in the volume of the swollen limbs within patients with lymphedema connected with mammary gland tumor and who had undergone the treatment. The patients were treated with MLD throughout 3 weeks. In addition to reducing oedema the authors of the research also observed decrease in the feeling of heaviness, discomfort and pain within analyzed group. They also observed improvement of their quality of life.

KT is a method that can certainly be a valuable addition to the comprehensive treatment antioedematous. However, the increased efficacy against MDL should be confirmed by more studies on bigger group. Considering the intense developing of this method of treatment, it is expected that soon will be appeared more and more studies evaluating its effectiveness in the treatment of lymphoedema. [16]

## CONCLUSIONS

1. The conducted research confirmed a higher efficiency of KT against MLD with four measurement points:

- B. 10 cm below the tip of the shoulder
- C. 10 cm above the tip of the elbow
- D. Tip of the elbow and the epicondyle of the humerus
- G. 10 cm above the radial styloid process.

In case of five remaining measurement points the effectiveness of both methods is comparable, whereas a possible extension of the sample could yield in a more definite conclusion on the effectiveness of both methods also for these five measurement points. However this would require an additional study.

2. Both rehabilitation methods, MLD and KT are clearly an effective way to decrease the post mastectomy swelling.

3. The ways to treat a long preserved arm swelling are not efficient enough, thus it would be proper to undertake any measures to prevent the swelling development. Efforts should be made to eliminate the causes and mechanisms creating the postoperative swelling.

## BIBLIOGRAPHY

1. Szymborski J.: Zdrowie publiczne i polityka ludnościowa. Rządowa Rada Ludnościowa. Warszawa: 2012; 78-85.
2. Kordka R.: Onkologia. Podręcznik dla studentów i lekarzy. Wydawnictwo Via Medica. Gdańsk; 2007;
3. Madetko R., Ćwiertnia B.: Rehabilitacja po mastektomii. Problemy pielęgniarstwa. 2008; 16(4): 397-400.
4. Chachaj A., Szuba A.: Obrzęk limfatyczny kończyny górnej po leczeniu raka piersi. Prz. Flebol. 2007; 15(4): 129-136.
5. Chęciński P.: Obrzęk chłonny. Wydawnictwo Medyczne. Poznań: 2010;
6. Szuba A., Shin W.S., Strauss H.W., i wsp.: The Third Circulation: Radionuclide Lymphoscintigraphy in Evaluation of Lymphedema. The Journal of Nuclear Medicine. 2003; 44(1): 43-52.
7. Chachaj A., Małyszczak K., Lukas J., i wsp.: Jakość życia kobiet z obrzękiem limfatycznym kończyny górnej po leczeniu raka piersi. Współczesna Onkologia. 2007; 11(9): 444-448.
8. Lipińska A., Sliwinski Z., Kiebzak W., i wsp.: Wpływ aplikacji Kinesiotapingu na obrzęk limfatyczny kończyny górnej u kobiet po mastektomii. Fizjoterapia Polska. 2007; 3(4): 258-269.
9. Zejt-Kwiatkowska J., Rajkowska-Labon E., Skobot W., i wsp.: Kinesio Taping metoda wspomagająca proces usprawniania fizjoterapeutycznego - wybrane aplikacje kliniczne. Nowiny Lekarskie. 2005; 74(2): 190-194.13
10. Doś J., Gutowski P., Górski-Doś M.: Występowanie oraz czynniki ryzyka obrzęku chłonnego u kobiet po operacji raka piersi. Rocznik Pomorskiej Akademii Medycznej w Szczecinie 2009; 55(2): 30-34.
11. Ruciński A., Rybak Z., Pupka A., i wsp.: Obrzęk chłonny po mastektomii. Prz. Flebol. 2005; 13(5): 223-226.
12. Weissleder H., Schuchhardt Ch.: Erkrankungen des Lymphgefäßsystems. Viavital Verlag GmbH. Köln 2000.
13. Olszewski W.L.: Obrzęki limfatyczne kończyn – klasyfikacja, diagnostyka i leczenie. Prz. Flebol. 2005; 13 (2): 1-8.
14. Consensus Document of the International Society of Lymphology. The diagnosis and treatment of peripheral lymphoedema. Lymphology. 2003; 36: 84-91.
15. Williams A.F., Vadgama A., Franks P.J. i wsp.: Arandomized controlled crossover study of manual lymphatic drainage therapy in women with breast cancer related lymphoedema. Eur.J.Cancer Care. 2002; 4: 254-261.
16. Pyszora A.: Kompleksowa fizjoterapia pacjentów z obrzękiem limfatycznym. Medycyna Paliatywna w Praktyce. 2010; 4(1); 23-29.

Address for correspondence:

mgr Natalia Ciesielska  
ul. Jagiellońska 13-15/216  
85-067 Bydgoszcz  
e-mail: nataliaciesielska1986@gmail.com  
tel.: 503 801 601

Received: 25.07.2012

Accepted for publication: 6.11.2012

