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USE OF THE KINESIO TAPING METHOD IN PAINFUL SHOULDER SYNDROME

ZASTOSOWANIE METODY KINESIO TAPING W ZESPOLE BOLESNEGO BARKU

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Summary

Introduction. The painful shoulder syndrome is becoming an increasingly frequent pathology for both sexes at different ages. Its diagnosis and treatment still cause many problems. They result from a complicated anatomical and biomechanical structure, rich innervation and diversity of symptoms of the shoulder dysfunction.

Aim. The assessment of Kinesio Taping method impact on pain reduction and improvement in muscle strength and range of the shoulder motion in patients with painful shoulder syndrome.

Material and methods. The study included 20 patients, in whom during the clinical examination carried out by a specialist of orthopedics and traumatology, a painful shoulder syndrome was recognized. Patients were evaluated by the numerical pain scale of NRS, muscle strength Lovett scale and range of motion in the shoulder joint by goniometry. The study was carried out on qualification day and in the period from 5 to 7 days after the Kinesio Taping method.

Results. 55% of the respondents were women (mean age 66 years), 45% were male (mean age 62.7 years). The level of pain perception in patients after treatment was 35% lower than before the Kinesio Taping method. The largest increase in mobility (11.72%) was found in the shoulder joint extension motion. Muscle strength after treatment increased from 15% to 20%.

Conclusions. Kinesio Taping reduces pain and improves muscle strength, but is it not a method that significantly improves the range of motion in the joint.

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Streszczenie

Wstęp. Zespół bolesnego barku jest coraz częstszą patologią dotyczącą obu płci w różnym wieku. Diagnostyka oraz leczenie zespołu bolesnego barku wciąż nastręcza wiele problemów. Wynikają one ze skomplikowanej struktury anatomicznej i biomechanicznej, bogatego unerwienia oraz różnorodności objawów dysfunkcji stawu barkowego.

Cel pracy. Ocena wpływu metody Kinesio Taping na zmniejszenie dolegliwości bólowych i poprawę siły mięśniowej i zakresu ruchomości stawu barkowego u pacjentów z zespołem bolesnego barku.

Materiał i metodyka. Do badania włączono 20 chorych, u których na podstawie badania klinicznego przeprowadzanego przez specjalistę ortopedii i traumatologii, został rozpoznany zespół bolesnego barku. Pacjentów poddano ocenie dolegliwości bólowych wg numerycznej skali NRS, siły mięśniowej wg skali Lovetta oraz zakresu ruchomości w stawie barkowym metodą goniometrii. Badanie było przeprowadzane w dniu kwalifikacji oraz w okresie od 5 do 7 dni po zastosowaniu metody Kinesio Taping.

W y n i k i . Badania przeprowadzono wśród 20 osób. 55% badanych to kobiety (średnia wieku 66 lat), 45% stanowili mężczyźni (średnia wieku 62, 7 lat). Poziom odczuwania bólu u pacjentów po terapii był o 35% mniejszy niż przed zastosowaniem metody Kinesio Taping. Największy przyrost ruchomości (11, 72%) stwierdzono w ruchu wyprostu w stawie ramiennym. Siła mięśniowa po terapii wzrosła od 15% do 20%.

W n i o s k i . Kinesio Taping zmniejsza dolegliwości bólowe oraz zwiększa siłę mięśniową, lecz nie jest metodą, która znacząco wpływa na poprawę zakresu ruchomości w stawie.

Key words: Kinesio taping, painful shoulder syndrome
Słowa kluczowe: Kinesio taping, zespół bolesnego barku

INTRODUCTION

Painful shoulder syndrome is becoming more common ailment of modern man and the cause of report to a doctor. The PHS etiology is varied and includes : sports injuries, microtraumas summing, diseases and injuries of nerves, and many others. Regardless of etiology, patients complain on shoulder pain (broadly conceived as the shoulder joint), limitation of the joint movement, and sometimes also on the decline in muscle strength. Painful shoulder syndrome occurs in 11 out of 1000 people who report to the doctor because of pain [1].

Diagnosis and treatment of painful shoulder syndrome still provide many therapeutic and diagnostic problems that arise from the complicated anatomical and biomechanical structure, and a variety of shoulder joint abnormalities. The search for new therapeutic approaches that reduce the pain, thereby improving and / or restoring the functionality of the shoulder girdle, seems to be very required. Shoulder treatments are often ineffective, mainly based on symptomatic treatment, including analgesic, anti-inflammatory and saving action [2-5].

Saving treatment consists of setting a limb in positions that do not provoke pain or in the use of sling. Such solutions are short term, because they do not solve the cause of pain and immobility develops further limitation of movement in the joint and muscle atrophy [6].

Kinesio Taping (KT) is a method of dynamic tapinging, developed by Kenzo Kase. This method affects the muscles, fascia, lymphatic and nervous system, which during the treatment are to be relieved, while joints remain active at all times [7-9].

It is known that the body forms integrity, therefore, when discussing the effect of Kinesio Taping we should focus on the systemic action of tapes. The cause of many problems within the musculoskeletal system is reduced flow of blood and lymph circulation and increased density of fluids in the subcutaneous layer. Stick of the tape lifts the layers of the epidermis and papillary dermis. This creates favorable conditions to increase blood flow and vascular network in deep vessels of the skin. The flow of lymph is also multiplied. Thanks to it the myofascial system is better nourished and oxygenized, which creates favorable conditions for the regeneration of the affected areas. It is worth mentioning that the free nerve endings that are found in tissues subjected to overloads are continuously irritated mechanically and chemically. Reducing tensions in painful structures, or protecting them from excessive stretching reduces the stimulation of pain receptors. The result is a normalization of muscle and fascial tone, pain reduction and motility improvement [7, 9].

The aim of this study was to verify whether and to what extent the Kinesio Taping affects the range of motion in the shoulder joint, muscle strength and pain reduction in patients with painful shoulder syndrome.

MATERIAL AND METHODS

The studies were conducted in REH-MED Rheumatology & Rehabilitation Center in Bydgoszcz between February and May 2009. The study included 20 patients who gave written consent to participate in the study, in which the painful shoulder syndrome was diagnosed by clinical examination carried out by a specialist of orthopedics and traumatology. Patients enrolled in the study were assessed by the numerical pain scale of NRS, muscle strength Lovett scale and range of motion in the shoulder joint by goniometry. The study was carried out on a qualification day and in the period from 5 to 7 days after the Kinesio Taping method.

Patients underwent a two-stage study. The first stage of the study consisted of assessing pain by the numeric scale NRS (Numerical Rating Scale) of 0 to 10, where "0" indicates "no pain" and "10" is "the greatest pain imaginable". Assessment of the shoulder girdle range of motion was performed by Zembaty [10], for: the Flexion, extension, abduction, adduction, horizontal adduction, lateral rotation and medial

rotation. Assessment of muscle strength were made by the Lovett' method.

At the end of the first stage each patient was subjected to taping of the side in which he felt the pain. The second stage began a week after the first application and for comparison consisted of the same parameters of evaluation as in the first stage.

Prior to the tape application the skin should be cleaned and degreased by using cosmetic or pharmaceutical products (eg. salicylic alcohol). In case of hypertrichosis it is necessary to shave the application site.

In the study, a local technique was used. It is used in the areas of ongoing inflammation and local painful points. Application technique was called 'Web' (network), which consists in cutting the tape in such a way that between the two bases a grid consisting of about 4 bars is formed. First base was applied around acromion, the other in the middle of the arm. Bases were applied without tension. Strips between the bases were applied with the tension of approximately 30%.

RESULTS

The study was conducted among 20 people. 55% of the respondents were women (mean age 66 years), 45% were male (mean age 62.7 years). Of the 20 patients studied, 11 of them are women, 9 men. Women suffer from a painful shoulder syndrome about 3 years later than men.

PAIN ASSESSMENT

The level of pain perception in patients after treatment was 35% lower than before the Kinesio Taping method. The arithmetic mean of pain before Kinesio Taping was 5.65 (SD 1.5) while after Kinesio Taping 3.65 (SD 1, 3). (Figure 1)

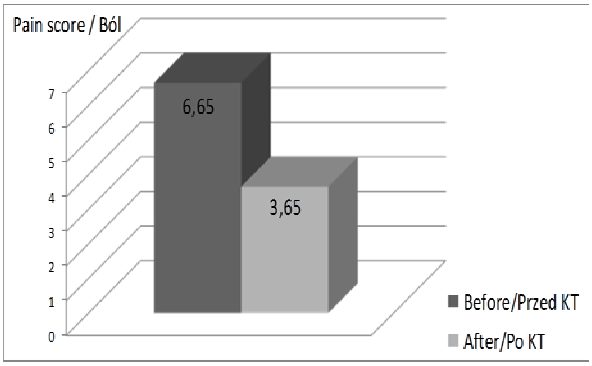

Fig. 1. *Comparison of average pain values in Kinesio taping group*

Ryc. 1. *Średnia bólu przed i po Kiensio Tapingu*

The mean of pre-treatment pain perception in women was 6.36, while in men it was about 1.59 lower and amounts to 4.78. (Figure 2)

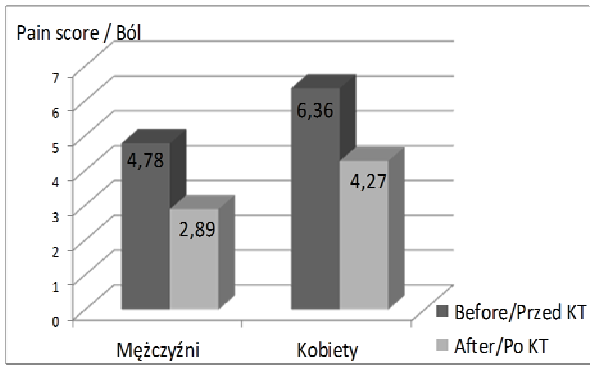

Fig. 2. *Comparison of average pain values between men and women in Kinesio taping group*

Ryc. 2. *Średnia ocena bólu przed terapią i po terapii w grupie kobiet i mężczyzn (zależność między subiektywnym odczuciem bólu, a płcią pacjentów)*

RANGE OF MOTION EVALUATION

The largest increase in mobility (11.72%) was in the shoulder joint extension. In external rotation motion the improvement was 3.64%. The smallest improvement in range of motion was 0.85%, in flexion and adduction. In all patients there was no difference in the shoulder joint abduction neither before nor after Kinesio taping. (Figure 3)

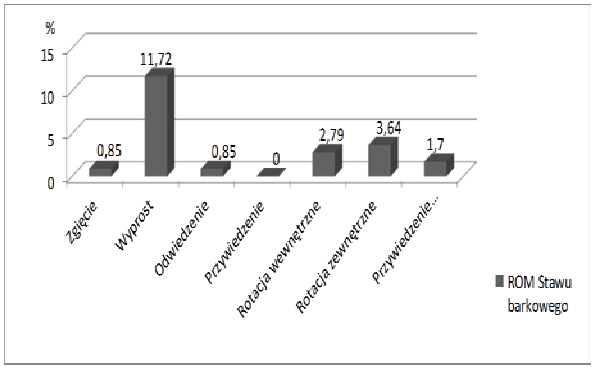

Fig. 3. *Comparison of average shoulder movements values in Kinesio taping group*

Ryc. 3. *Zestawienie średnich procentowych przyrostów ruchomości*

MUSCLE STRENGTH EVALUATION

After the therapy muscle strength increased from 15% to 20%.

Before the treatment 35% of patients rated the muscle strength to 5, 45% to 4 and 20% to 3. In none of patients the strength of muscles was rated 2 and

below. After Kinesio Taping treatment muscle strength during movement in 43% of patients was 5, in 47% - 4, and 10% - for 3. In none of patients the strength of muscles was rated 2 and below. It can be concluded that in 20% of patients improvement in muscle strength in the shoulder girdle rising test, measured by Lovett' scale was achieved.

The mean before treatment is 4.15 (SD 0.75). The mean after the treatment is 4.35 (SD 0.67). The difference between them is 0.2, which means that muscle strength was improved by 20% (Figure 4)

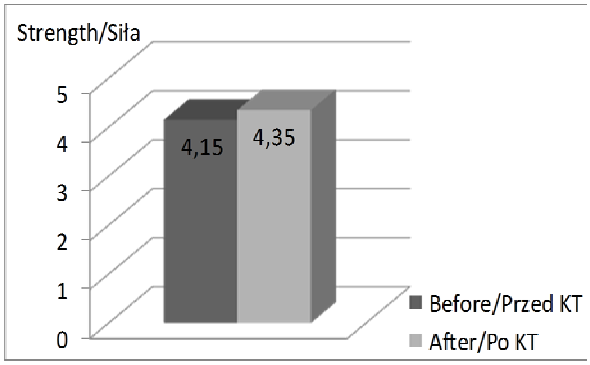

Fig. 4. *Comparison of average shoulder elevation strength values in Kinesio taping group*

Ryc. 4. *Średnia testu ruchu wznosu obręczy barkowej przed i po Kinesio Tapingu*

Before Kinesio Taping, 40% of patients were rated 5 and 4, while the remaining 20% were rated 3. None of the patients was rated 2 and below. After Kinesio Taping 40% of patients were rated at 5 and 4. At the same time, a number of patients in whom muscle strength was rated 3, decreased. Muscle strength equal to 3 was obtained by 18% of patients, so 15% of patients achieved a better result at the time of the shoulder girdle front ejection evaluation. The mean before the therapy is 4.2 (SD 0, 77), and after therapy 4.35 (SD 0.67). The mean increase is 0.15 that is 15%. (Figure 5)

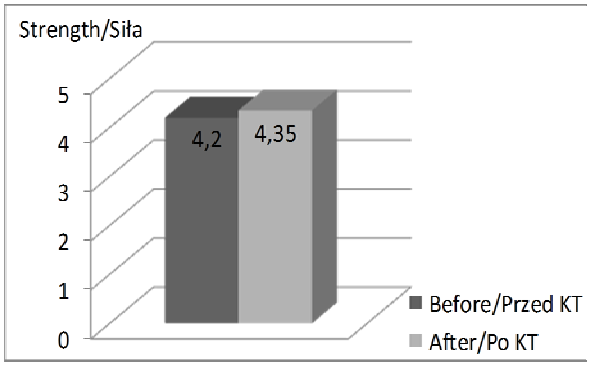

Fig. 5. *Comparison of average shoulder protraction strength values in Kinesio taping group*

Ryc. 5. *Średnia przyrostu siły mięśniowej uzyskaną w czasie wysuwania obręczy barkowej w przód przed i po Kinesio Tapingu*

In an examination conducted before the treatment in 40% of patients muscle strength was rated 5. 35% of patients gained muscle strength equal to 4, and 25% equal to 3. None of patients was rated 2 and below. In an examination after the treatment, 40% of patients gained muscle strength rated 5 and 4. A number of patients in which muscle strength was rated 3, decreased to 10%. None of patients was rated 2 and below. In summary, 20% of patients received a better outcome after the therapy.

The mean before the therapy was 4.15 (SD 0.81), and after the therapy it increased to 4, 35 (SD 0.67). It may be noted that muscle strength in described movement increased by 20%. (Figure 6)

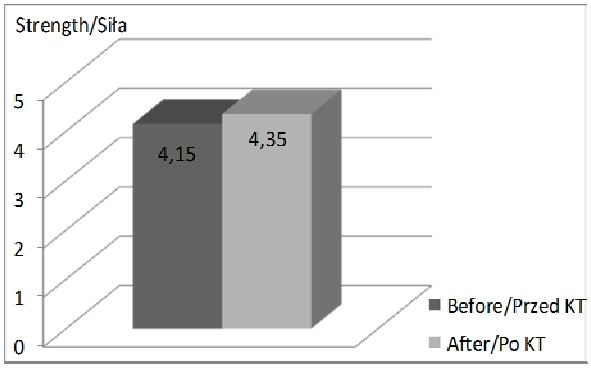

Fig. 6. *Comparison of average shoulder retraction strength values in Kinesio taping group*

Ryc. 6 *Średnia testu ruchu cofania obręczy barkowej przed i po Kinesio Tapingu*

Discussion

A fair comparison of results obtained during this study with the results presented by other authors was not possible to make, because there were no sources found in the literature, evaluating the effectiveness of the treatment of painful shoulder Kinesio Taping by 'Web' technique. It is difficult to compare previous studies on the effectiveness of different methods in the treatment of painful shoulder syndrome with each other due to not always heterogeneous groups of research and lack of details in diagnosis.

According to Kaya, the purpose of the study was to determine and compare the efficiency of Kinesio Taping and physical therapy modalities in patients with shoulder impingement syndrome. Patients (n = 55) were treated with kinesio tape (n = 30) three times by intervals of 3 days or a daily program of local modalities (n = 25) for 2 weeks. Response to the treatment was evaluated with the disability of arm, shoulder, and hand scale. Patients were questioned for the night pain, daily pain, and pain with motion.

Outcome measures except for the disability of arm, shoulder, and hand scale were assessed at baseline, first, and second weeks of the treatment. Disability of arm, shoulder, and hand scale was evaluated only before and after the treatment. Disability of arm, shoulder, and hand scale and visual analog scale scores decreased significantly in both treatment groups as compared with the baseline levels. The rest, night, and movement median pain scores of the kinesio taping (20, 40, and 50, respectively) group were statistically significantly lower (p values were 0.001, 0.01, and 0.001, respectively) at the first week examination as compared with the physical therapy group (50, 70, and 70, respectively). However, there was no significant difference in the same parameters between two groups at the second week (0.109, 0.07, and 0.218 for rest, night, and movement median pain scores, respectively). Disability of arm, shoulder, and hand scale scores of the kinesio taping groups were significantly lower at the second week as compared with the physical therapy group. No side effects were observed. Kinesio tape was found to be more effective than the local modalities at the first week and was similarly effective at the second week of the treatment. Kinesio taping may be an alternative treatment option in the treatment of shoulder impingement syndrome especially when an immediate effect is needed [12].

According to Garcia-Muro, F. data on pain, joint motion and shoulder function obtained from this study may suggest that treatment with Kinesio Taping contributed to the resolution of the patient's pathology, producing an immediate improvement and resolving the problem in the following days. The results therefore suggest that Kinesio Taping might well be a technique highly appropriate in the treatment of MTPs. However, more research is necessary, both clinical and neurophysiological, to clarify the specific mechanisms and effects of the Kinesio Taping technique [13].

In studies conducted in the Department of Physical Medicine and Division of Rehabilitation CSK WAM in Warsaw over the therapy in patients with painful shoulder syndrome out of 40 people there were 25 of were women and 15 men. Studies were conducted on patients aged 14 - 65 years [14].

Bergenudd et al. conducting researches on the prevalence of painful shoulder syndrome found that it occurs in 13% of women and 15% of men, while Van der Windt said that 55% of people complaining of shoulder pain are women, and 45% are male [1].

When consider the age of people complaining about the shoulder pain, Allender believes that the peak incidence is between 42 and 46 years of age, and Pope et al. believe that 63% of the patients are aged 18 to 39 years, and 28% are aged 40 – 59 [15,16]. You can go so far as to say that the distribution of painful shoulder syndrome, both in terms of gender distribution and age of respondents, is difficult to clearly identify and objectivise.

Comparing this to the average pain perception with no division by sex, we see that women are above average and men are slightly below. It can be assumed that women have a lower pain threshold, or that they report to the doctor later than men, when their subjective feeling of pain was within the limits of 6. The difference between the arithmetic mean of pain perception before and after treatment in both sexes is similar. In the group of women it is 2.09, and 1.89 among men. In summary, the subjective sensation of pain in women was decreased by 33% and among men by 40%.

One of the main aims of physiotherapy in painful shoulder syndrome is pain reduction and normalization of neuromuscular function. For this purpose ultrasound is often used. However, randomly conducted studies comparing active and sham ultrasound application to the evaluation of pain perception, did not confirm the influence of ultrasound to reduce pain [15].

Chard et al. studied 137 patients with rotator cuff inflammation, in which pain lasted 6 months and more. In all patients a local injection of corticosteroids, physiotherapy were used. In 39% of patients, pain disappeared completely, 29% felt little pain and in 26% a severe pain still remained. The remaining patients had additional symptoms after repeated examination. It is difficult to assess objectively the results of these studies because the use of physiotherapy in the research group was not standardized, so you cannot tell what really determined the resolution of pain or its reduction [15].

It cannot be forgotten that pain is a subjective sensation and therefore pain assessment is always subjective, regardless of the methods used to assess it and a kind of the assessed damage. In practice this means that what one person assesses pain on a scale as significant pain, it can be judged by another person as a mild pain and be expressed by a lower score. Harmis-Ringdahl et al. in their study demonstrated that there was no significant difference between evaluating pain scales [15].

In the painful shoulder syndrome it is difficult to objectively assess muscle strength, because the patient experiencing pain during the exercise movement automatically reduces muscle activity. Maleba et al. believe that pain and fatigue have a negative impact on the effort implementation by the patient. A study done by Ben-Yishay et al. and Brox et al. confirmed Maleba's thesis. From the presented results the relationship between the reduction in pain perception, and increase muscle strength can be noticed.

In the medical world there is a saying that it is better to prevent disease than to treat it. This saying also applies to the painful shoulder syndrome, which is why prevention is very important, that each physician is obligated to refer it to the patient.

The need for clinical and experimental trials seems to be obvious in order to seek the most appropriate methods for the treatment of painful shoulder. Our studies were conducted to provide a basis for future clinical trials using Kinesio Taping in painful shoulder syndrome.

RESULTS

1. Kinesio Taping decrease pain in the shoulder joint,
2. Kinesio Taping improves muscle strength,
3. Kinesio Taping does not significantly improve range of motion in the shoulder joint.

REFERENCES

1. Lesiak A. Zespół bolesnego barku. *Rehabilitacja Medyczna.* 2002;6.
2. Hepp WR, Hans, U., Debrunner. *Diagnostyka w ortopedii*. Warszawa: PZWL; 2008.
3. Dziak A, Tayara, S. *Bolesny Bark*. Kraków: Firma Handlowo- Usługowa „ KASPER" s. c.; 1998.
4. Tayara S, Łapińska, I. Kinezyterapia i fizykoterapia w zespole bolesnego barku. *Medicina Sportiva.* 1998;2(3):253-256.
5. Łyp M. Zespół bolesnego barku. *Postępy Rehabilitacji.* Vol 11. Warszawa PWN; 1997:119-122.
6. Wytyczne Holenderskiego Kolegium Lekarzy Rodzinnych- Dolegliwości Barku. *Przewodnik Lekarza.* 2001;11(35).
7. Put M. Taping jako metoda postępowania terapeutycznego. *Fizjoterapia.* 2007;15(2):27-34.
8. Słoniak R, Tittinger, T. *Taping sportowy w rehabilitacji*. Rzeszów2008.
9. Zajt-Kwiatkowska J, Rajkowska-Labon, E., Skrobot, W., Bakuła, S. Kinesio Taping metoda wspomagająca proces usprawniania fizjoterapeutycznego- wybrane aplikacje kliniczne. *Nowiny Lekarskie.* 2005 74(2):190- 194.
10. Zembaty A. *Kinezyterapia.* Vol 2. Kraków: Wydawnictwo „Kasper" sp. z o. o.; 2002.
11. Philadelphia Panel evidence-based clinical practice guidelines on selected rehabilitation interventions for shoulder pain. *Physical therapy.* Oct 2001;81(10):1719-1730.
12. Kaya E, Zinnuroglu M, Tugcu I. Kinesio taping compared to physical therapy modalities for the treatment of shoulder impingement syndrome. *Clinical rheumatology.* Feb 2011;30(2):201-207.
13. Garcia-Muro F, Rodriguez-Fernandez AL, Herrero-de-Lucas A. Treatment of myofascial pain in the shoulder with Kinesio taping. A case report. *Manual therapy.* Jun 2010;15(3):292-295.
14. Mróz J, Kuliński, W., Misztela, A., Orłowski, J., Rybak, T. Postępowanie fizykalno- usprawniające w zespole bolesnego barku. *Balneologia Polska.* 1999;XLI(3-4):37-43.
15. Bertoft ES. Zespół bolesnego barku z punktu widzenia fizjoterapeutycznego- przegląd literatury. *Rehabilitacja Medyczna.* 2002;6:52-79.
16. Lauterbach G. Rehabilitacja Barku Sportowca. *Medicina Sportiva.* 1998;2(3):245-252.

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