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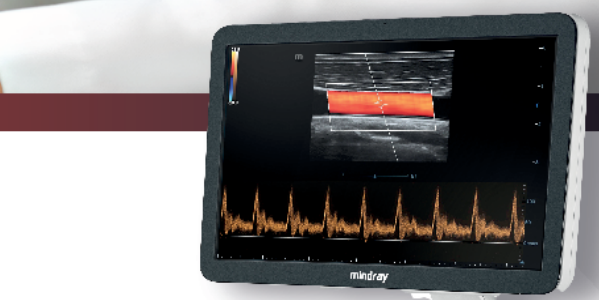

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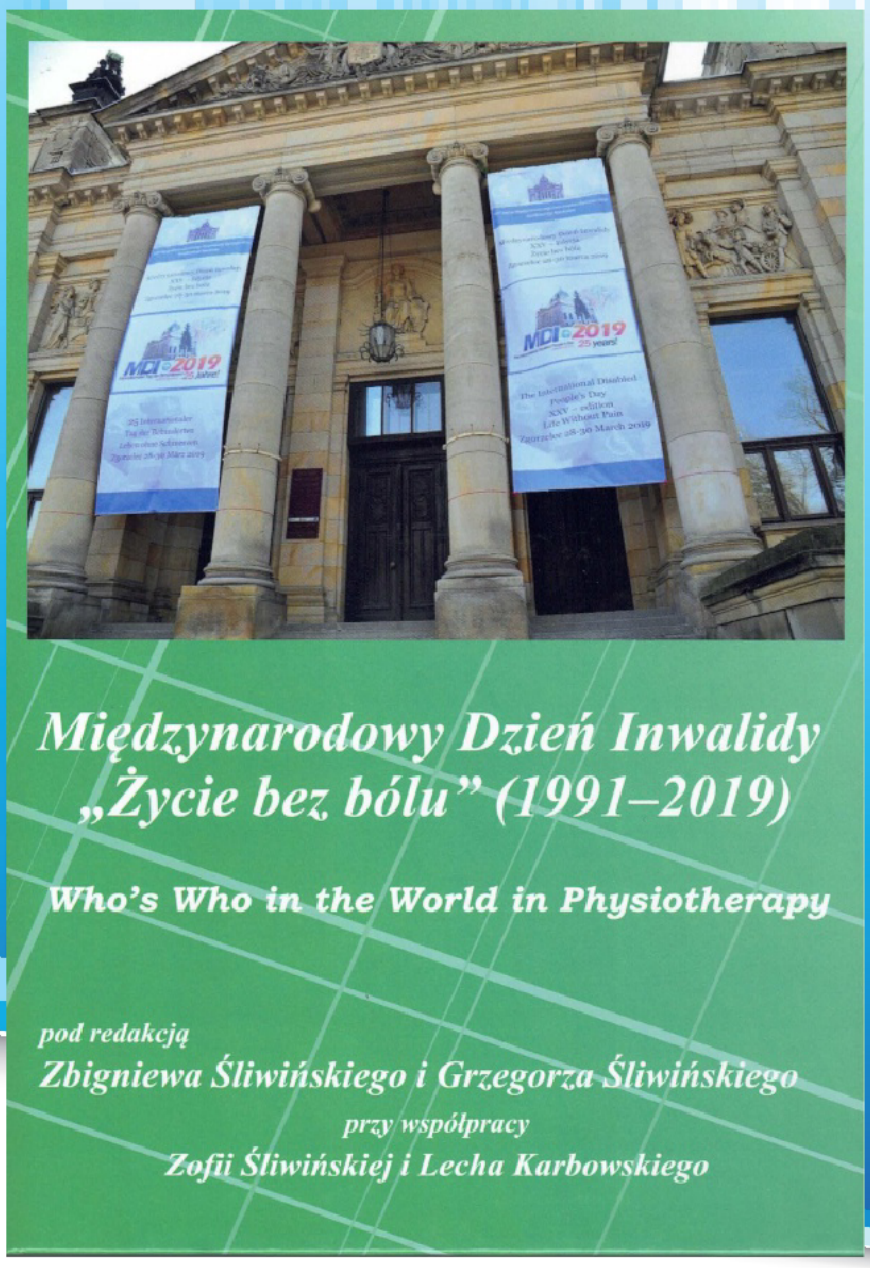

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The review of literature on the possibility of the use of Kinesiology Tape in musculoskeletal diseases. Meta-analysis

Przegląd piśmiennictwa na temat możliwości zastosowania Kinesiology Tape w chorobach narządu ruchu. Metaanaliza

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Abstract

Background. Kinesilogy Tape (KT) is widely used in patients with muscular disorders and pain. Objectives. To present the current body of knowledge on KT as a treatment method in patients with muscular disorders and pain. Design. Systematic review. Population. Patients with musculoskeletal disorders and pain. in whom KT was used.
Methods The papers were identified on the basis of term searches in digital research databases (PubMed, Medline, Cochrane Central Register of Controlled Trials (CCTR), EMBASE Excerpta Medica, and Google Scholar). On the basis of the review of the available 152 research articles, 27 papers on muscular disorders and pain disorders were selected. Two of the authors of this review, working independently, selected the papers to be included in the analyzed sample, isolated the data, performed an assessment of the risk of bias, and assessed the quality of the evidence for the main effects using the IVS internal validity score (PEDro) approach. A simplified version of the Oxford Centre for Evidence-Based Medicine (OCEBM) system was used to evaluate the evidence. Results. There are too few prospective, controlled randomized trials on KT that include a sufficiently large cohort. Only few of the reviewed papers that discuss the principles of KT meet the criteria of scientifically rigorous research. Conclusions. There is a need for further clinical trials on the effectiveness of the use of KT method.
Clinical rehabilitation impact. We found significant quality evidence to support the use of KT in clinical practice in patients with disorders of the musculoskeletal system (and in sports therapy).

Key words:
kinesiotaping, kinesiology taping, kinesiology tape, k/active tape AND medicine, musculoskeletal disorders AND pain

Streszczenie

Wstęp. Kinesiology Tape (KT) jest szeroko stosowany u pacjentów z dysfunkcjami mięśni i z bólami. Cele. Przedstawienie aktualnej wiedzy na temat KT jako metody leczenia pacjentów z zaburzeniami mięśni i bólem. Projekt. Przegląd systematyczny. Populacja. Pacjenci z zaburzeniami mięśniowo-szkieletowymi i bólem, w którym zastosowano KT.
Metody. Prace zostały zidentyfikowane na podstawie wyszukiwań terminów w cyfrowych bazach badawczych (PubMed, Medline, Cochrane Central Register of Controlled Trials (CCTR), EMBASE (Excerpta Medica) i Google Scholar). Na podstawie przeglądu dostępnych 152 artykułów naukowych wybrano 27 prac dotyczących zaburzeń mięśniowych i dolegliwości bólowych. Dwóch autorów tego przeglądu, pracujących niezależnie, wybrało artykuły do włączenia do analizowanej próby, wyizolowało dane, przeprowadziło ocenę ryzyka błędu systematycznego i oceniło jakość dowodów za pomocą skali IVS oraz PEDro. Do oceny dowodów wykorzystano uproszczoną wersję systemu Oxford Center for Evidence-Based Medicine (OCEBM).
Wyniki. Istnieje zbyt mało prospektywnych, kontrolowanych badań z randomizacją dotyczących KT, obejmujących wystarczająco dużą kohortę. Tylko nieliczne z recenzowanych artykułów omawiających zasady KT spełniają kryteria rygorystycznych badań naukowych. Wnioski: Istnieje potrzeba dalszych badań klinicznych nad skutecznością stosowania metody KT.
Wpływ rehabilitacji klinicznej: Znaleźliśmy istotne dowody jakościowe na poparcie stosowania KT w praktyce klinicznej u pacjentów z zaburzeniami układu mięśniowo-szkieletowego (oraz w terapii sportowej).

Słowa kluczowe:
kinesiotaping, kinesiology taping, kinesiology tape, k/active tape ORAZ medicine, zaburzenia układu mięśniowo-szkieletowego ORAZ ból

Introduction

Kinesiology Tape is a method that stimulates the self-regulatory processes of the body developed by Dr. Kenzo Kase, a Japanese chiropractor. In literature and everyday practice, Kinesiology Tape is also commonly referred to as kinesiotaping, Kinesiology Tap, and K/active Tape.

The currently available materials on Kinesiology Tape (KT), especially those that are based on scientifically established facts, are scarce.

The literature on KT includes studies investigating the possibilities of using KT as a treatment method, but their results are inconclusive. Some hypotheses and theories are contradictory, many of them are not supported by experimental results, and the conclusions drawn from them are doubtful.

Purpose

The purpose of this review is to present the current body of knowledge on KT as a treatment method, based on the available literature i.e. articles published in Polish and international academic journals.

Materials and methods

The analysis, which involved a systematic review of literature, consisted of two parts. The first part of the analysis was conducted between January and February 2020. At that time, a preliminary selection of the analyzed material was conducted, which identified the research papers concerned with using KT as a treatment method. Keywords used in this part of analysis include: Kinesiotaping OR Kinesiology Taping OR Kinesiology Tape OR K/active Tape AND Medicine.

During the first part of the review, the relevant papers were identified on the basis of their titles and abstracts. The selection of the material for analysis was conducted in accordance with the following criteria: the language of the article was Polish, German or English; the methods used in the study included KT as the primary or complementary treatment in sports or medicine. 152 papers were selected in the first part of the analysis. The second part of the analysis was conducted between March and April 2020, when the selected papers on the use and efficacy of KT as a treatment method for musculoskeletal diseases were analyzed in more detail, which were assessed by means of the simplified Oxford system, selecting only the highest level of evidence recommendation – level A. The second stage included also selected tests that were qualified as being borderline of A and B levels of evidence recommendation, i.e. A/B (Table 2).

The papers were identified on the basis of term searches in digital databases of research articles (PubMed, Medline, CCTR, EMBASE Excerpta Medica, and Google Scholar). The relevant literature was selected through manual searches. Two of the authors of this review, working independently, selected the papers to be included in the analyzed sample, isolated the data, performed an assessment of the risk of error, and assessed the quality of the evidence for the main effects using the IVS internal validity score (PEDro) approach. For that purpose, several types of materials on using KT as a treatment method in the disciplines relevant to this review were analyzed, including papers published in peer-reviewed journals, academic textbooks, PhD theses, and conference and

Figure 1. Procedure for selecting articles for analysis

workshop proceedings. In result, 27 items were positively reviewed, and underwent a full-text analysis (see Table 1).

Two reviewers assessed independently the quality of selected papers, using 11-point PEDro scale, prepared by The Centre of Evidence-Based Physiotherapy CEBP (Table 4). PEDro scale comprises a list of 11 questions analysing individual aspects of methodology of the carried out test, including key aspects of internal reliability.

With the use of PEDro scale in assessment of randomized control tests an appropriate reliability standard between raters is achieved (inter-rater reliability), which makes possible more comprehensive assessment of methodological quality. The scoring system with the use of PEDro scale comprises scoring for each positive answer (yes) and zero for each negative answer (no). External reliability of papers is analysed in the first point of PEDro scale and is not taken into account in the final scoring, thus the final scoring does not exceed ten points.

Table 1. Review / screening questionnaire for further analysis in disorders of the musculoskeletal system (and in sports therapy)

No.	Author	Clinical categories of the therapeutic functions	Project description	Group	Evidence assessment*	Effects **	IVS internal validity score wg skali PEDro ***
1	de-la-Torre-Domingo C., Alguacil-Diego I. M., Molina-Rueda F. et al. (2015) [3]	Immediate and prolonged (7 days) effects of KT on balance using computerized dynamic posturography (CDP)	Single-blind randomized trial	Patients with chronic ankle instability	A	1E	5/7/ ± 2
2	Aguilar Maria Bravo, Abian-Vicen, Javier, Halstead Jill et al. (2016) [4]	Efficacy of KT in amateur runners with pronated foot posture and abnormal plantar pressure distribution	Double-blind randomized trial	Amateur runners with pronated foot posture	A	1E	7/7/ ± 0
3	Luque-Suarez A., Gijon-Nogueron G., Baron-Lopez F. J. et al. (2014) [5]	The effects of KT on foot posture in participants with pronated foot posture (FPI)	Double-blind quasi-randomized trial	Amateur runners with pronated foot posture	A	1WE	7/7/ ± 0
I. KT effects on the foot 3 tests: 2E, 1WE = NE							$\bar{x}$ 6.33
4	Saracoglu I., Emuk Y., Taspinar F. (2017) [6]	Comparison of KT and conventional therapy for SIS	Systematic review	SIS patients	A	1E	3/7/ ± 0
5	Devereaux M., Velanoski K.Q., Pennings A. et al. (2016) [7]	Short-term efficacy of KT compared to NSAID (pain at rest, pain during motion, SST)	Randomized trial	SIS patients	A	1NE	7/7/ ± 0
6	Burfeind, Sean M.; Chimera, Nicole (2015) [8]	Effects of KT on shoulder proprioception in active reproduction of joint angles or measurement of joint-reposition sense (JRS)	Randomized trial	Healthy individuals	A/B	1E	3/7/ ± 0
7	Jin-Tae Han, Jung-Hoon Lee, Chul-Han Yoon (2014) [9]	Investigation of changes in PML	Single-blind randomized trial	Healthy male patients with restricted PML	A	1E	5/7/ ± 2

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No.	Author	Clinical categories of the therapeutic functions	Project description	Group	Evidence assessment*	Effects **	IVS internal validity score wg skali PEDro ***
8	Kaya D.O., Baltaci G., Toprak U. et al. (2014) [10]	Comparison of the clinical and ultrasound effects of KT combined with exercise and manual therapy combined with exercise	Randomized trial	SIS patients	A/B	1E	3/7/ ± 0
9	Luque-Suarez A., Navarro-Ledesma S., Petocz P. et al. (2013) [11]	Assessment of short-term effects of KT on AHD with ultrasound measurements	Badanie z randomizacją/ Randomized trial	Healthy individuals, asymptomatic	A	1E	3/7/ ± 0
10	Djordjevic O. C., Vukicevic D., Katunac L. et al. (2012) [12]	Comparison of the efficacy of MWM and KT techniques with a supervised exercise program in patients with SIS	Badanie z randomizacją/ Randomized trial	SIS patients (rotator cuff)	A/B	1E	3/7/ ± 0
II. KT effects on the shoulder 7 tests: 6E, 1NE = E							$\bar{x}$ 3.85
11	Woźniak-Czekierda W., Woźniak K., Hadamus A. et al. (2017) [13]	Assessment of proprioception, balance, and gait	Badanie z randomizacją/ Randomized trial	Patients after total knee replacement	A/B	1E	3/7/ ± 0
12	Demirci, S., Kinikli G. I., Callaghan M. J. et al. (2017) [14]	Assessment of pain severity, knee ROM, hamstring flexibility, physical performance	Badanie z randomizacją/ Randomized trial	Female patients with PFP	A/B	1NE	3/7/ ± 0
13	Anandkumar, Sudarshan; Sudarshan, Shobhalakshmi; Nagpal, Pratima (2014) [15]	Comparison of isokinetic quadriceps torque, SSCT, and pain severity before and after KT application with tension and with no tension	Badanie z randomizacją i podwójną ślepą próbą/ Double-blind randomized trial	Patients with knee osteoarthritis	A	1E	7/7/ ± 0
14	Boguszewski D., Tomaszewska I., Adamczyk J.G. et al. (2013) [16]	Assessment of the efficacy of KT as an adjunct therapy after ACL reconstruction (ROM, swelling, and thigh circumference)	Badanie z randomizacją/ Randomized trial	Patients after ACL reconstruction	A	1WE	3/3/ ± 0
III. KT effects on the knee 4 tests: 2E, 1WE, 1NE = E							$\bar{x}$ 4

No.	Author	Clinical categories of the therapeutic functions	Project description	Group	Evidence assessment*	Effects **	IVS internal validity score wg skali PEDro ***
15	Kaplan S., Alpayci M., Karaman E. et al. (2016) [17]	Assessment of short-term effects of KT in female patients with pregnancy-related lower back pain (VAS), Roland-Morris Disability Questionnaire	Randomized clinical trial	Female patients with pregnancy-related lower back pain	A/B	1E	3/7/ ± 0
16	Ciosek Z., Kopacz L., Samulak L. et al. (2015) [18]	Assessment of pain and spine mobility	Randomized trial	LBP patients	A/B	1E	3/7/ ± 0
17	Parreira Patricia do Carmo Silva, Costa, Luciola da Cunha Menezes, Takahashi Ricardo et al. (2014) [19]	Comparison of the effects of KT, with and without skin convolutions (pain severity, disability)	Single-blind randomized trial	Patients with chronic LBP	A	1E	5/7 ± 2
18	Gonzales-Iglesias J. et al. (2009) [20]	Assessment of pain and spine mobility	Randomized placebo-controlled trial	NBP patients	A	1E	4/7/ ± 2
V. KT effects on the spine 4 tests: 4E = E							$\bar{x}$ 3.75
19	De Jesus, Julio, Fernandes, Franco, Yuri Rafael Dos Santos; Nannini, Stella Bispo et al. (2017) [21]	Assessment of the effects of different tensions of KT on isometric contraction of the quadriceps	Randomized placebo-controlled trial	Healthy individuals	A/B	1NE	3/7/ ± 0
20	Poon K. Y., Li S. M., Roper M. G. et al. (2015) [22]	Evaluation of the effects of KT in isokinetic conditions (two angular speeds: 60°/s and 180°/s) with an application to the quadriceps muscle	Single-blind randomized trial	Healthy individuals	A/B	1NE	5/7/ ± 0
21	Ahn Ick Keun, Kim You Lim, Bae Young-Hyeon et al. (2015) [23]	Assessment of the effects of KT on motor performance of the quadriceps muscle in conditions of induced fatigue	Randomized placebo-controlled trial	Healthy individuals	A	1E	4/7/ ± 2
22	Halski T., Dymarek R., Ptaszkowski K., et al. (2015) [24]	Assessment of the effects of KT on surface electromyographic activity (sEMG) and flexibility of muscles in the quadriceps femoris group: the rectus femoris (RF) muscle, vastus lateralis (VL), and vastus medialis (VM) in healthy female volleyball players		Healthy individuals	A	1NE	5/7/ ± 0

No.	Author	Clinical categories of the therapeutic functions	Project description	Group	Evidence assessment*	Effects **	IVS internal validity score wg skali PEDro ***
23	Vercelli S., Sartorio F., Foti C., et al. (2012) [25]	Assessment of the immediate effects of KT on quadriceps muscle strength. Isokinetic maximal test (at 60 and 180 deg/s), a single-leg triple hop, and the Global Rating of Change Scale (GRCS)	Double blind quasi-randomized trial	Healthy individuals	A	1NE	7/7/ ± 0
24	Cheung R. T. H., Yau Q. K. C., Wong K., et al. (2016) [26]	Assessment of the effects of KT applied to the quadriceps and gastrocnemius muscles the on maximum vertical jump height and peak jump power.	Randomized trial	Healthy athletes, volleyball players	A	1NE	5/7/ ± 0
VI. KT effects on muscles 6 tests: 1E, 5NE = WE							$\bar{x}$ 4.83
25	Montalvo A. M., Cara Ed Le, Myer G.D. (2014) [27]	Meta-analysis of the available literature on KT to assess its efficacy in pain management therapy in patients with musculoskeletal injuries	Systematic review	Patients with musculoskeletal injuries	A	1E	3/7/ ± 0
26	Morris D., Jones D., Ryan H. et al. (2013) [28]	Disorders of the musculoskeletal system	Systematic review	Disorders of the musculoskeletal system	A	1WE	3/7/ ± 0
27	Parreira P. do Carmo Silva, Costa Luciola da Cunha Menezes, Hespanhol L. C. Jr. et al. (2014) [29]	KT compared to placebo (assessment of pain, disability, quality of life, return to work, and global impression of recovery)	Systematic review	Twelve randomized trials with 495 patients with musculoskeletal pain	A	1WE	3/7/ ± 0
VII. KT efekts on muskuloskeletal system, 3 tests: 1E, 2WE = NE							$\bar{x}$ 3
KT Effects							$\bar{x}$ 4.29

*Classification in accordance with therecommendations of Oxford Centre for Evidence-Based Medicine for a simplified evidence evaluation system (A-D)
**Effects: ES = WE (weak positive effect); E = E (positive effect); AE = NE (negative effect)
** * IVS internal validity score according to the PEDro scale (modification according to Maher et al., 2003) [2]

Methodological quality of test is reflected in internal validity. In PEDro scale seven out of eleven points refers to internal validity. Methodological quality of randomized control test is the most important, as in tests with low methodological quality the efficacy of treatment may be too exaggerated and may cause falsification of test result. The internal validity of each test is assessed in this study in detail by means of the internal validity score (IVS). For the needs of this study, points 2, 3, 5, 6, 7, 8 and 9 of the PEDro scale, representing the degree of internal validity, were selected for its final assessment.
For meeting each of the IVS (internal validity score) criteria, a point is awarded. Tests with a final IVS of 6-7 are considered to be high-quality methodological tests, IVS tests of 4-5 – to be moderate methodological quality, while IVS of 0-3 represent a poor methodological quality test [1, 2]. Any discrepancies in assessment between the two reviewers were resolved by discussion and re-assessment of the given criterion. If the doubts were not clarified, it was possible to consult other reviewers, but it turned out to be unnecessary, as the agreement was reached [2].
The results of the presented studies have been subjected to meta-analysis in order to determine the effects, presented collectively as an efect indicator (Effect). In the case of studies, the meta-analysis referred to the specified data resulting from the assumptions of this review (Table 4.1, 4.2, 4.3).
A simplified version of the Oxford Centre for Evidence-Based Medicine (OCEBM) system was used to evaluate the evidence (see Table 2).

Table 2. Evaluation of evidence – simplified OCEBM

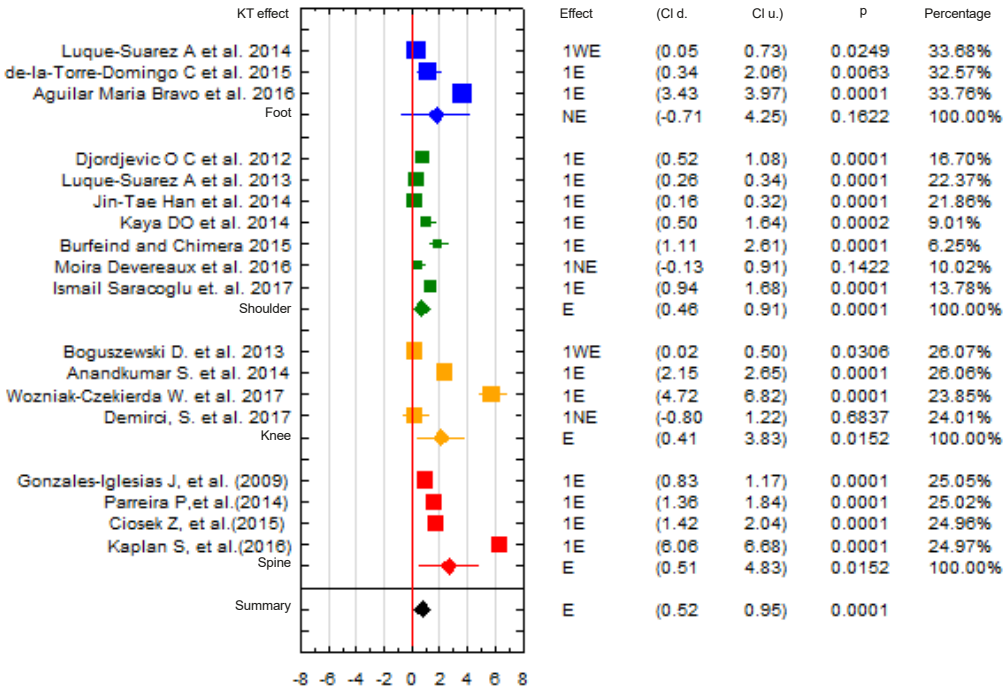
Recommendation grade	Evidence level	Classification by study type
A	1-a	Systematic review of randomized controlled trials (RCTs)
	1-b	Single RCT (well designed)
	1-c	The all-or-nothing principle
B	2-a	Systematic review of cohort studies (well designed)
	2-b	Single RCT with moderate observation (well designed)
	2-c	Results of the study
	3-a	Results of the study
	3-b	Systematic review of case studies
C	4	A series of cases, weak cohort and control studies
D	5	Expert opinion not supported by clinical assessment, physiological models, comparisons or principles.

Table 3. PEDro scale (modification acc. to Maher et al. 2003) [2]

Criteria	Scoring YES(1)/ NO (0)
1. Eligibility criteria were specified	
2. Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received)	
3. Allocation was concealed	
4. The groups were similar at baseline regarding the most important prognostic indicators	
5. There was blinding of all subjects	
6. There was blinding of all therapists who administered the therapy	
7. There was blinding of all assessors who measured at least one key outcome	
8. Measurements of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups	
9. All subjects for whom outcome measurements were available received the treatment or control condition as allocated, or where this was not the case, data for at least one key outcome were analyzed by "intention to treat"	
10. The results of between-group statistical comparisons are reported for at least one key outcome	
11. The study provides both point measurements and measurements of variability for at least one key outcome	

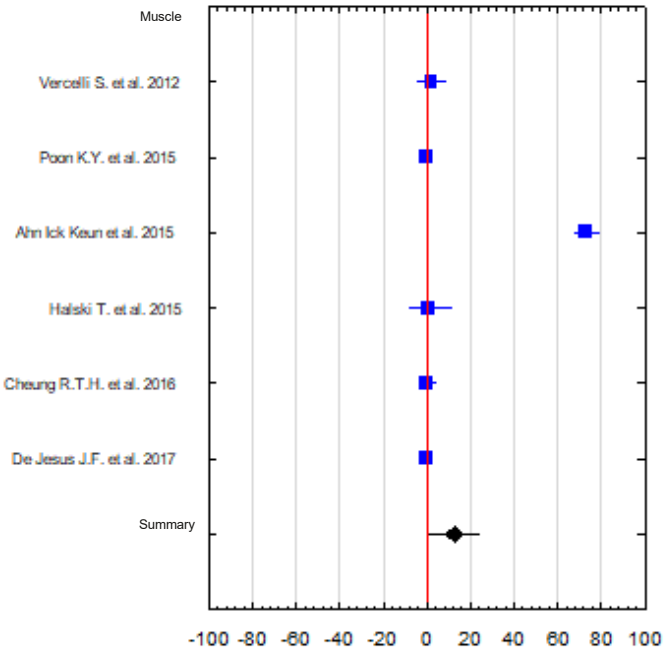
The collected database has been subjected to matrix processing. Variables vectors for individual analyzed categories have been designated and used in the meta-analysis. Analysis defined effects on the scale: effect (E), weak effect (WE); negative effect (NE). The whole meta-analysis has been carried out using the Statistica package – Plus module.
The effects of the study were subjected to a detailed meta-analysis with the D indicator – raw mean difference (Tables 4.1, 4.2, 4.3).

Table 4.1. Detailed meatanalysis with the Effect indicator – raw mean difference. Table for KT effect



	Effect	(CI d.	CI u.)	p	Percentage
Luque-Suarez A et al. 2014	1WE	(0.05	0.73)	0.0249	33.68%
de-la-Torre-Domingo C et al. 2015	1E	(0.34	2.06)	0.0063	32.57%
Aguilar Maria Bravo et al. 2016	1E	(3.43	3.97)	0.0001	33.76%
Foot	NE	(-0.71	4.25)	0.1622	100.00%
Djordjevic O C et al. 2012	1E	(0.52	1.08)	0.0001	16.70%
Luque-Suarez A et al. 2013	1E	(0.26	0.34)	0.0001	22.37%
Jin-Tae Han et al. 2014	1E	(0.16	0.32)	0.0001	21.86%
Kaya DO et al. 2014	1E	(0.50	1.64)	0.0002	9.01%
Burfeind and Chimera 2015	1E	(1.11	2.61)	0.0001	6.25%
Moira Devereaux et al. 2016	1NE	(-0.13	0.91)	0.1422	10.02%
Ismail Saracoglu et. al. 2017	1E	(0.94	1.68)	0.0001	13.78%
Shoulder	E	(0.46	0.91)	0.0001	100.00%
Boguszewski D. et al. 2013	1WE	(0.02	0.50)	0.0306	26.07%
Anandkumar S. et al. 2014	1E	(2.15	2.65)	0.0001	26.06%
Wozniak-Czekierda W. et al. 2017	1E	(4.72	6.82)	0.0001	23.85%
Demirci, S. et al. 2017	1NE	(-0.80	1.22)	0.6837	24.01%
Knee	E	(0.41	3.83)	0.0152	100.00%
Gonzales-Iglesias J, et al. (2009)	1E	(0.83	1.17)	0.0001	25.05%
Parreira P,et al.(2014)	1E	(1.36	1.84)	0.0001	25.02%
Ciosek Z, et al.(2015)	1E	(1.42	2.04)	0.0001	24.96%
Kaplan S, et al.(2016)	1E	(6.06	6.68)	0.0001	24.97%
Spine	E	(0.51	4.83)	0.0152	100.00%
Summary	E	(0.52	0.95)	0.0001	

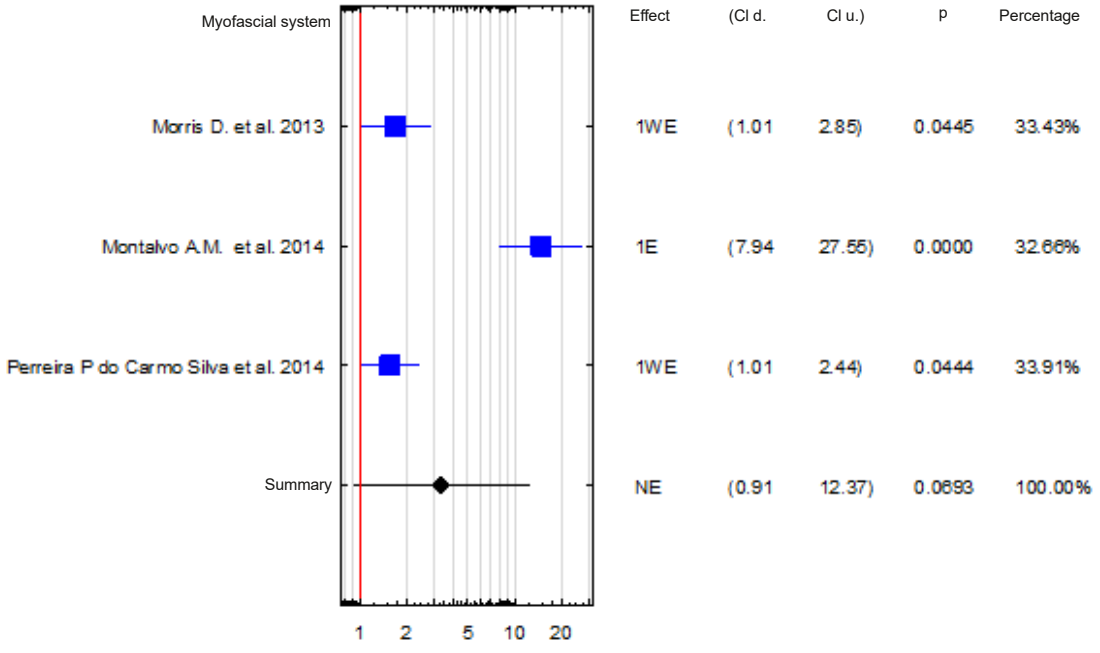
Table 4.2. Detailed meta-analysis with the Effect indicator – raw mean difference. Table for muscle



	Effect	(CI d.	CI u.)	p	Percentage
Vercelli S. et al. 2012	1NE	(-4.85	8.85)	0.5689	16.42%
Poon K.Y. et al. 2015	1NE	(-0.47	0.49)	0.9675	17.35%
Ahn Ick Keun et al. 2015	1E	(68.89	79.15)	0.0000	16.57%
Halski T. et al. 2015	1NE	(-9.09	11.15)	0.8419	15.42%
Cheung R.T.H. et al. 2016	1NE	(-4.43	4.15)	0.9490	16.98%
De Jesus J.F. et al. 2017	1NE	(-2.01	2.21)	0.9261	17.26%
Summary	WE	(0.68	24.47)	0.0386	100.00%

The data from the analysis of KT effects on muscles and KT effects on the myofascial system can not be combined with aggregate data, as it is analysis from analyzes. They must be separately applied (Tables 4.2, 4.3). However, it should be remembered that, in summary, the meta-analysis showed no effect from the assessment of KT effects on the myofascial system ($p = 0.0693$).

Table 4.3. Detailed meta-analysis with the Effect indicator – raw mean difference. Table for myofacial system



Results

Among twenty seven articles investigating the efficacy of KT in treating disorders of the locomotor system and in sports physiotherapy, three articles on the effects of KT on foot disorders were selected. The remaining articles were concerned with the effects of KT on: the shoulder (7), knee joints (4), the spinal cord (4), muscle performance (6), the musculoskeletal system (3).

The methodological quality of all tests assessed with the internal validity score (IVS), according to the PEDro scale, was assessed: IVS $\bar{x}$ 4.29 / for 7 points, which means moderate grade. The highest quality was assessed for foot dysfunction tests: IVS $\bar{x}$ 6,33 / for 7, which means high methodological quality. IVS of muscular system tests was assessed at $\bar{x}$ 4,83 / 7, which means a moderate grade. Tests of shoulder dysfunction; knee joint; spinal cord, muscles system, musculoskeletal system were assessed correspondingly: $\bar{x}$ 3.85 / 7; $\bar{x}$ 4/7, $\bar{x}$ 3,75 / 7; $\bar{x}$ 4,83/7, $\bar{x}$ 3/7 which exceeds the low and, in two cases, moderate grade threshold methodological quality.

In the process of evaluating the effects of KT application, the reviewed papers were categorized into ones that show a weak positive effect (WE), ones that show a positive effect (E), and ones that show a negative effect (NE), when the results of the study do not support the use of therapeutic KT. The evaluation of the evidence for efficacy of KT in foot disorders yielded the following results: 1WE, 2E. With regard to the remaining studies, the results of the review were, accordingly: KT / shoulder / 6E, 1NE /; KT/ knee / 1WE, 2 E, 1 NE /; KT / spinal cord / 4E /; KT / muscles / 1 E, 5NE /; KT/ musculoskeletal system / 2WE, 1E/. In total, the results of the review were as follows: four weak effects / 4 WE (14,81%)/, sixteen effects /16E (59,26%)/, seven negative effects / 7NE (25,93%)/ (see Table 5, Figure 2).

Table 5. Summary of the results

KT effects	IVS *PEDro	WE Weak effects	E Effects	NE Negative Effects
KT/foot	$\bar{x}$ 6,33	1	2	
KT/shoulder	$\bar{x}$ 3,85		6	1
KT/knee	$\bar{x}$ 4	1	2	1
KT/spinal cord	$\bar{x}$ 3,75		4	
KT/muscles	$\bar{x}$ 4,83		1	5
KT/myofascial system	$\bar{x}$ 3	2	1	
Total	$\bar{x}$ 4,29	4	16	7
%		14.81	59.26	25.93

**IVS internal validity score (PEDro)*

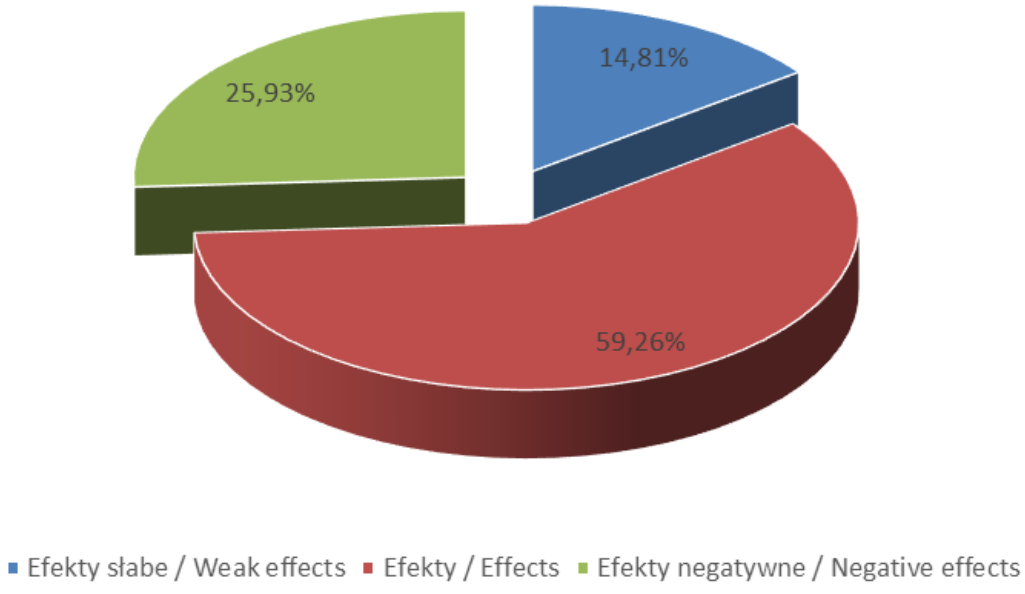


Figure 2. Graphical representation of the results

Discussion

The papers were identified through term searches in digital databases of research articles (PubMed, Medline, CCTR, EMBASE ExcerptaMedica, and Google Scholar). On the basis of the review of the available 152 publications, 27 articles on disorders of the locomotor system were chosen.

The research on using KT in physical therapy has made considerable progress in recent years, including papers investigating its effects on disorders of the locomotor system. However, there are few prospective, randomized controlled studies on KT that were conducted on a sufficiently large cohort. In the group that meets these criteria, there are few papers on using KT in the treatment of disorders of the locomotor system published by Polish and foreign authors in journals with an impact factor.

We found significant quality evidence to support the use of KT in clinical practice in patients with disorders of the musculoskeletal system (and in sports therapy). The methodological quality of all tests assessed with the internal validity score (IVS), according to PEDro, was assessed as moderate.
More prospective randomized controlled trials that have a sufficiently large cohort and are based on rigorous scientific evidence and principles of Evidence Based Medicine (EBM) need to be conducted to explain the mechanism behind KT and to investigate the possibility of using it as therapy method in musculoskeletal disorders and sports therapy.

Conclusions

The analysis of the source material shows that:
1. The research on using KT in physical therapy has made considerable progress in recent years, including papers on musculoskeletal disorders.
2. There are too few prospective, randomized controlled studies on KT that are conducted on a sufficiently large sample.
3. Few of the reviewed papers that discuss the principles of KT meet the criteria of scientifically rigorous studies.

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