

ПРИМЕНЕНИЕ КИНЕЗИОТЕЙПИРОВАНИЯ ПРИ РЕАБИЛИТАЦИИ СОТРУДНИКОВ  
СИЛОВЫХ СТРУКТУР, УЧАСТВУЮЩИХ В ЛИКВИДАЦИИ ПОСЛЕДСТВИЙ  
ЧРЕЗВЫЧАЙНЫХ СИТУАЦИЙ

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**Резюме.** Цель исследования – определение современной доказательной базы, свидетельствующей об эффективности кинезиотейпирования (КТ) у сотрудников МЧС России, страдающих остеоартрозом коленного сустава. Материалы и методы исследования. Проанализированы данные отечественной и зарубежной литературы об эффективности применения метода кинезиотейпирования при остеоартрозе. Поиск проводился с использованием электронных баз данных MEDLINE, Embase, Scopus, Web of Science, eLIBRARY и PEDro за период с 2007 по 2021 г. Для поиска использовались следующие ключевые слова и их сочетания: кинезиотейпирование, коленный сустав, остеоартроз, реабилитация.

Результаты исследования и их анализ. В результате поиска были найдены и проанализированы более 1 тыс. статей. Семь исследований соответствовали критериям включения.

Анализ результатов исследования позволил сделать следующие выводы:

1. Кинезиотейпирование можно считать апробированным методом уменьшения боли без каких-либо побочных эффектов.
2. Установлено положительное влияние КТ на проприорецепцию и диапазон движения в суставе.
3. В то же время доказательная база положительного воздействия кинезиотейпирования как эффективного инструмента реабилитации – неоднозначна, что говорит о необходимости проведения дальнейших исследований.
4. Отсутствие стандартизации типа используемого кинезиотейпа, его адгезионных качеств, толщины, эластичности, места наложения и продолжительности ношения затрудняют определение эффективности КТ у пациентов с остеоартрозом.
5. Так как в большинстве исследований участвовали люди в возрасте до 30 лет, остается невыясненным, влияет ли изменение текстуры и структуры кожи, связанное с возрастом, на воздействие КТ.

**Ключевые слова:** кинезиотейпирование, коленный сустав, остеоартроз, реабилитация, сотрудники силовых структур, чрезвычайные ситуации

**Конфликт интересов.** Авторы статьи подтверждают отсутствие конфликта интересов

**Для цитирования:** Самойлов А.С., Величко М.Н., Белякова А.М., Рылова Н.В., Казаков В.Ф., Большаков И.В. Применение кинезиотейпирования при реабилитации сотрудников силовых структур, участвующих в ликвидации последствий чрезвычайных ситуаций // Медицина катастроф. 2022. №3. С.47-50. <https://doi.org/10.33266/2070-1004-2022-3-47-50>

APPLICATION OF KINESIOTAPING IN THE REHABILITATION OF EMPLOYEES OF POWER  
STRUCTURES PARTICIPATED IN ELIMINATION OF EMERGENCY CONSEQUENCES

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**Summary.** The aim of the study was to determine the current evidence base for the effectiveness of kinesioteaping in Russian EMERCOM employees suffering from osteoarthritis of knee joint.

**Materials and research methods.** The data of the Russian and foreign literature on the efficacy of the kinesioteaping method in osteoarthritis were analyzed. The research was performed using electronic databases MEDLINE, Embase, Scopus, Web of Science, eLIBRARY and PEDro for the period from 2007 till 2021. The following key words and their combinations were used: kinesioteaping, knee joint, osteoarthritis, rehabilitation.

**Study results and their analysis.** More than 1,000 articles were found and analyzed as a result of the search. Seven studies met the inclusion criteria.

Analysis of the results of the study led to the following conclusions:

1. Kinesiotaping can be considered a proven method of pain reduction without any side effects.
2. A positive effect of kinesiotaping on proprioception and range of motion in the joint has been established.
3. At the same time, the evidence base for positive effects of kinesiotaping as an effective rehabilitation tool is ambiguous, which suggests the need for further research.
4. The lack of standardization of the type of kinesiotape used, its adhesive qualities, thickness, elasticity, place of application and duration of wear make it difficult to determine the effectiveness of kinesiotaping in patients with osteoarthritis.
5. Since most studies have involved people under 30 years of age, it remains unclear whether age-related changes in skin texture and structure affect the effects of kinesiotaping.

**Key words:** emergency situations, kinesiotaping, knee joint, law enforcement officers, osteoarthritis, rehabilitation

**Conflict of interest.** The authors declare no conflict of interest

**For citation:** Samoylov A.S., Velichko M.N., Belyakova A.M., Rylova N.V., Kazakov V.F., Bolshakov I.V. Application of Kinesiotaping In Rehabilitation of Employees of Power Structures Involved in Elimination of Emergencies Consequences. *Meditsina Katastrof = Disaster Medicine*. 2022;3:47-50 (In Russ.). <https://doi.org/10.33266/2070-1004-2022-3-47-50>

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## Introduction

Russian Emergencies Ministry employees in the course of their professional activities are subjected to significant physical and emotional stress. Events such as rescue operations, elimination of the consequences of emergency situations of natural and man-made character, require from the people involved in them, the maximum physical strain for a long period of time. At the same time, prolonged and unbalanced load on the joints can cause the development of inflammatory and dystrophic changes in the synovial membrane and cartilage tissues and lead to osteoarthritis (OA). Osteoarthritis is a major cause of loss of function of the lower extremities and is now considered a serious medical problem. According to various data, the prevalence in the population of this form of degenerative joint disease ranges from 15 to 40% [1]. Osteoarthritis ranks sixth among the causes of moderate to severe disability. The main symptoms of OA include pain, motor disturbances, and proprioception disorders [2]. One of the most frequent localizations of this disease is the knee joint.

Treatment methods for OA of the knee joint can be divided into three categories: drug therapy and invasive conservative methods, surgical treatment, and rehabilitation. In mild cases, drug therapy is used, the basis of which are anti-inflammatory drugs from the group of nonsteroidal anti-inflammatory drugs -[3]. The main limitations of this method include the risk of complications from the gastrointestinal tract (GIT) — bleeding, peptic ulcer, etc. [3]. Surgical treatment includes intraarticular injections, endoscopic interventions and joint endoprosthesis. The performance of these manipulations is associated with a very significant risk of postoperative complications, which limits the use of surgical methods in general practice [4]. Based on the above, the most optimal treatment option for mild forms of osteoarthritis is the use of various rehabilitation techniques. Methods of conservative non-medical therapy are relatively inexpensive and widely used to improve the quality of life, extend the range of motion, and reduce pain in patients with knee OA.

In clinical practice, chiropractic care, acupuncture, and

physical therapy are used for conservative treatment of patients with knee OA. Recently, the method of kinesiotaping (KT) has become very popular [5]. Kinesiotaping increases elasticity and strength of muscle tissue and improves proprioception in patients with various musculoskeletal disorders [6]. Kinesiotapes are made mainly of cotton with stretch fibers, which allows achieving elasticity similar to that of the skin. Since the first practical application of KT in 1970, this method has been successfully developed and improved. Currently, there are various methods of kinesiotaping. The "Lifting" method is based on the ability of KT to increase the interstitial space and thereby improve blood circulation and lymph circulation [7]. The "Pain control" method is based on the reduction of pain intensity by stimulation of skin mechanoreceptors. And finally, the method "Neurorelief" is a stimulation of mechanoreceptors of the skin, causing positive changes in the nervous system.

**The purpose of the study** is to determine the current evidence base for the effectiveness of kinesiotaping in the employees of the Ministry of Emergency Situations of Russia who suffer from osteoarthritis of the knee joint.

**Materials and methods of the study.** Electronic databases including MEDLINE, Embase, Scopus, Web of Science, and Cochrane Review were searched for articles on this topic using the following keywords: "kinesiotaping", "knee joint", "osteoarthritis", "rehabilitation", published from 2007 to 2021. [7]. The materials of the published studies were analyzed. Materials from articles were included in the review if they met the following criteria:

1. The study examined the effect of KT on osteoarthritis of the knee joint.
2. The study was original: systematic reviews and meta-analyses were excluded.
3. No history of knee surgery among emergency responders.

**Results of the study and their analysis.** A database search revealed 1062 articles. After reviewing all materials, we identified 7 articles meeting the research search criteria

and published in 2008-2021 that reported the effect of KT on the course of knee osteoarthritis [8-14]. The authors of the articles conducted randomized controlled trials. The sample size in the studies was 22-61 people; the age range was 22-70 years. In five studies, the authors reported the degree of OA; in two studies, the degree of OA was not reported [8, 9]. Visual analog scales were used to assess pain severity. Three studies reported the effect of KT in the long-term follow-up period [10-12]. The rest evaluated the short-term effect of KT [8, 9, 13, 14].

All studies evaluated the effect of KT on pain. Six studies reported that the use of KT leads to a decrease in pain in patients with OA [9-11, 13-15]. One study reported a positive effect of KT on proprioception [9]. The results of two studies showed that using KT increases the volume of active and passive movements [9, 10]. In one study, the assessment of quadriceps torque showed that, compared with placebo, the KT method significantly improved this index [13].

Stauffer et al. investigated resting pain after KT in patients with knee OA. This type of pain does not seem to limit the function of the patient's limb, but creates significant discomfort. The use of KT significantly reduced the severity of this type of pain [16]. In contrast, a study performed by Cho et al. showed that there was no significant difference in pain in patients in the KT and placebo groups during rest. At the same time, there was shown a significant reduction in pain after walking in the KT group [9]. The results of a study performed by Aytar et al. showed that the use of KT in patients with patellofemoral pain syndrome (PFBS) is not effective in reducing pain after walking [8]. Kaya Mutlu E. et al. used KT in patients with OA 3 times within a month [10]. The results showed a decrease in pain syndrome at rest and during walking compared to the group without KT.

In a study by Cho et al., the range of active range of motion amplitude was significantly increased in the KT group [9]. Previous studies have also shown that joint mobility can improve after the use of KT [17]. In a study by Cho et al., the use of KT not only reduced pain when walking, but also effectively improved proprioception when measured at three angles. Similar results in terms of improved proprioception were obtained in a study by Shakoor et al. which used KT in combination with a set of physical exercises for 8 weeks [12].

In 2014. Anandkumar et al. determined the effectiveness of KT by isokinetic torque of the quadriceps muscle in patients with OA [13]. Their results confirmed the positive effect of KT on reducing pain and improving quadriceps muscle strength. In 2015. Kocyigit et al. proved using visual analog scale (VAS) a positive effect of KT on pain level [15]. The authors also showed a significant improvement of the Nottingham health profile in the experimental group that received KT therapy.

In 2016. Kaya Mutlu et al. divided 42 patients into 2 groups. Kinesiotape was applied in 3 stages to the quadriceps muscle and hamstring area [10]. The intervals between each KT application were 3-4 days. Compared with the control group, patients in the study group showed a significant decrease in pain according to VAS and walking task scores. The group of patients with KT after a one-month

follow-up period showed an increase in the volume of active movements in the knee joint. However, the authors found no significant differences between the two groups in the assessment of muscle strength. This study showed that, compared with the control group, the effect of KT scanning can reduce pain in walking and flexion of the knee joint in a short-term manner in patients in the observation group.

In 2018, t et al. included 61 women in the study [11]. All patients were divided into 2 groups. Patients in both groups received: myostimulation — for 30 min; heating — for 30 min; ultraphonophoresis — for 10 min a day 5 days a week for three weeks. In addition, in one group (31 patients) the KT method and physical exercises were used. In the group with KT there was a significant decrease of pain according to VAS within the first month after treatment. The KT group also had a significant reduction in pain on the Western Ontario McMaster Universities OA Index (WOMAC) and the overall WOMAC score after treatment compared to the group that did not receive KT. In both groups the peak torque measured in the quadriceps muscle increased significantly after treatment. Thus, the use of KT in women with knee OA appears to be effective in reducing the severity of pain and increasing physical capacity [11].

Castrogiovanni et al. investigated the effect of exercise and KT on the degree of physical limitation in patients with knee OA [14]. A total of 57 participants took part in the study. The patients were randomly divided into 3 groups. Group 1 patients performed a complex of exercises; Group 2 patients performed a complex of exercises with application of kinesiotape with tension; Group 3 patients performed a complex of exercises with application of KT without tension. The study showed that the patients who received KT and exercised needed less analgesics for at least four months. According to the authors of the study, knee KT in combination with moderate physical activity is an effective way to overcome pain and motor limitations in patients with knee OA [14].

A 2018 meta-analysis by Lu et al. studied the effect of kinesiotaping on pain intensity and physical activity levels in patients with knee OA. The results of the analysis showed that 308 patients who were included in the study and received the KT method showed a significant improvement in pain scores by VAS, WOMAC index and range of motion [18].

### Conclusion

1. Kinesiotaping can be considered a proven method of pain reduction without any side effects.
2. A positive effect of KT on proprioception and range of motion in the joint has been established.
3. At the same time, the evidence base for positive effects of kinesiotaping as an effective rehabilitation tool is ambiguous, which suggests the need for further research.
4. The lack of standardization of the type of the kinesiotape used, its adhesive qualities, thickness, elasticity, place of application and duration of wearing the KT makes it difficult to determine the effectiveness of KT in patients with osteoarthritis.
5. Because most of the studies involved people under 30 years of age, it is unclear whether age-related changes in skin texture and structure affect the effects of KT.

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