

# Zastosowanie metody fizjoterapeutycznej Kinesiology Taping w leczeniu dolegliwości bólowych odcinka szyjnego kręgosłupa wśród młodych stomatologów

*Application of the physiotherapy Kinesiology Taping method in treatment of pain of the cervical spine in young dentists*

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## Streszczenie:

**Wstęp.** Lekarze dentyści, biorąc pod uwagę warunki wykonywanej pracy, narażeni są bardzo często na wiele obciążeń zarazem fizycznych jak i psychicznych. Uwzględniając ergonomię pracy, stan zdrowia tej grupy zawodowej należy rozpatrywać głównie w aspekcie schorzeń kręgosłupa, szczególnie jego odcinka szyjnego. Odnosi się to do wszystkich pozycji podczas pracy, zarówno samodzielnej, jak i w technikach zespołowych, gdzie oprócz monotypii i monotonii, pojawia się zawsze wymuszona pozycja ciała, a więc duże obciążenie statyczne, przyczyniające się do szeregu zmian zwyrodnieniowo-zniekształcających stawów kręgosłupa szyjnego oraz zaburzeń będących czołowymi następstwami wspomnianych zwyrodnień. **Materiał i metody.** Badania przeprowadzono w Katedrze i Zakładzie Propedeutyki i Fizykodiagnostyki Stomatologicznej Pomorskiego Uniwersytetu Medycznego. Grupa badanych osób liczyła 36 studentów piątego roku kierunku lekarsko-dentystycznego Pomorskiego Uniwersytetu Medycznego w Szczecinie. Wszyscy badani zgłaszali przewlekłe dolegliwości bólowe odcinka szyjnego kręgosłupa. Grupa badanych osób została poddana leczeniu metodą Kinesiology Taping, w której zastosowano technikę mięśniową i więzadłową, zgodną z metodyką wykonania. W badaniu została użyta także metoda sondażu diagnostycznego za pomocą kwestionariusza ankiety. Do oceny stopnia odczuwania przez badanych dolegliwości bólowych użyto wizualno-analogowej skali VAS w formie poziomej skali cyfrowej w zakresie 0-10. **Wyniki.** Zakres ruchu zgięcia i wyprostu kręgosłupa szyjnego, po zastosowaniu metody Kinesiology Taping uległ poprawie. Uwzględniając zakres ruchu skłonu w bok, a także skrętów odcinka szyjnego kręgosłupa w badanej grupie odnotowano znaczącą poprawę, zarówno w ruchu w stronę prawą jak i lewą. Oceniając badanych pod względem poziomu deklarowanych wartości dolegliwości bólowych na skali VAS zauważono znaczne zmniejszenie omawianego schorzenia. **Wnioski.** Aplikacja Kinesiology Taping korzystnie wpłynęła na zakres ruchów odcinka szyjnego kręgosłupa, jednocześnie poprawiając komfort pracy i samopoczucie badanych. Metoda Kinesiology Taping przyniosła również korzystny efekt wśród młodych stomatologów w deklarowanych wartościach dolegliwości bólowych na skali VAS, co przekłada się na ich zmniejszenie. Uwzględniając płeć pacjentów, w grupie kobiet znaczącej poprawie uległ zakres ruchu wyprostu, natomiast w grupie mężczyzn zakres ruchu zgięcia.

## Słowa kluczowe:

Kinesiology Taping, ból, kręgosłup

## Abstract

**Introduction.** Dentists, due to the conditions of their work, are exposed to many loads both physical and psychological. Considering the ergonomics of work, health status of this professional group should be considered primarily in terms of diseases of the spine, especially the cervical. This applies to all items in the work, both independently, as well as in team techniques, where apart from monotony and monotony, there is always forced posture, and large static load, that contributing to a lot of degenerative arthritis changes of the cervical spine disorders, which are the result of the above-mentioned degenerations. **Material and method.** The study were conducted in the Department of Propaedeutics and Dental Physicodiagnosics of the Pomeranian Medical University. The study group consisted of 36 fifth-year students of dentistry at the Faculty of Medical-Dentistry, Pomeranian Medical University in Szczecin with chronic pain of the cervical spine. Group of examined persons was subjected to the treatment with Kinesiology Taping method, in which were used muscular and ligaments technique, accordance with the methodology. In the study has been used diagnostic survey method – a questionnaire. To assess the degree of feeling pain by the subjects were used a visual analogue scale VAS in the horizontal format in the range of 0-10.

**Results.** Considering the range of motion of the cervical spine flexion, the Kinesiology Taping method has improved in this movement, and extension range in the cervical spine improved more than the range of flexion. Taking the scope of the movement of the bend into the side, as well as the turn of the cervical spine in the test group were significantly improved, both in motion toward the right as and left. Examined in terms of assessing the level of the declared values of pain on VAS observed a significant reduction of this disease. **Conclusion.** Kinesiology Taping application also favorably influenced the range of motion of the cervical spine, while improving comfort work. Kinesiology Taping method applied among young dentists had a positive effect on the declared value of pain on the VAS, which transfers into a reduction. Considering the sex of patients, in the group of women has significantly improved the range of extension, while in men the range of flexion.

## Key words:

Kinesiology Taping, pain, spine

## Introduction

Cervical spine consists of seven vertebrae, from which two first are adapted to head movements, seventh however is looking more like the thoracic vertebra. Cervical vertebrae III, IV, V and VI have similar structure. Their stems are low and firmly flattened, upper areas of bodies are concave transversely, lower however are concave from front to back. Spinous processes are angled slightly downwards with bifid end. Transverse processes are quite short and consist of two conjoined bone laminae ended with tubercle. The seventh vertebra, which is often called the prominent vertebra has strongly highlighted outside, placed almost horizontally long spinous process, and therefore is easily perceptible through the skin. On the bottom edge of the VII vertebra occurs facet for head of rib [1]. Dealing with the medical condition of dentists from the point of view of the ergonomics, they should be considered in the aspect of diseases as well as pain disorders of the spine, in particular his cervical segment. Profession of dental practitioner carried out independently, without the company in a sitting position with front or standing to the patient is inducing more or less forced anteverted position. It is connected with an exaggerated static load of the spine as well as related skeletal muscles and nervous structures leaving to the circumference of the body. Most often appearing at dentists are degenerative changes which are leading to distorting joints of the spine, mainly of cervical segment and diseases which are direct results of mentioned above deviations, which include: painful shoulder syndrome, headaches being an effect of changes in the cervical part of the spine, radiculalgias concerning upper limbs and cervical slipped disks. In countries, where dental treatments are performed by the dentist in a sitting position, with the help of the qualified assistance, with the patient in the rest recumbency, the frequency of appearing of mentioned above conditions is smaller, but still always current. There are in spite of numerous studies stating that musculoskeletal disorders at dentists constitute serious health problem, associated with working conditions, still no formal and technical grounds for recognizing them by decision-making factors as occupational diseases [2]. Severity of musculoskeletal disorders among dentists, peculiarly of the ones working independently without the assistance, is often very significant and can contribute to capacity limitation of the pursued profession [3]. The main factor contributing to the formation of overload diseases of the cervical spine is keeping the forced position of the body while performing everyday professional activities, as it takes place in most of the work techniques, it causes straining the entire spine to a considerable degree, in particular cervical spine, the faster the process of consuming, and consequently, faster of appearance of strain-degenerative changes. Additionally static loads with shallower cervical lordosis or carried, cause a complete change of the correct biomechanics of the spine, what next to the disadvantage the speed of the appearance of strain-degenerative changes, as well as the appearance of the first manifestations, in the today already even amongst the

society in more and more young age [4, 5, 6]. Approving Kinesiology Taping therapy effects can be achieved by applying K-Active sensory adhesive tape. The modus operandi of the tape is based on a subtle strip stimulation layers of the cuticle, influencing the withdrawal of changes in the fascia and the circulation of lymph. K-Active tapes in terms of the specific gravity, the thickness, as well as the stretchability are similar to the human skin [7, 8]. Thanks to the ability to pass air through its structure, tapes aren't disturbing processes of the thermoregulation of the body. Kinesiology Taping therapy isn't also limiting hygienic activities, so that the tape by a because the tape through the waterproof construction keeps therapeutic properties for several days after application. The occurrence of allergic reactions which are connected with the K-Active application has been reduced to a minimum by using an acrylic adhesive layer. The Kinesiology Taping therapy practice, there are six main application techniques: lymphatic, muscular, ligamentous, fascial, corrective and functional which strictly restrict the planned targets of rehabilitation treatment. Bearing in mind the proper taping technique we can obtain the analgesic effect, antioedematous, stabilizing, corrective, as well as motor effect. Appropriate analysis and diagnostics of the patient's problem, disorders of the motricity, associated with the competent, relevant application of Kinesiology Taping, is creating great opportunities for improvement of the condition of the patient with diseases, not only of musculoskeletal system [9, 10, 11].

### **Material and methods**

The study were conducted in the Department of Propedeutics and Dental Physicodiagnostics Pomeranian Medical University. The study group counted 36 students of the fifth year of the Faculty of Dentistry in the Dentistry Department of PUM in Szczecin, with chronic pain of the cervical spine. The age range of the respondents ranged from 24 to 28 years. The research was truly anonymous and voluntary. The survey with examining the mobility of the spine was conducted twice, on the first and seventh day of the study.

The aim of the study was to evaluate the effect of Kinesiology Taping applications for range of motion and the level of pain of the cervical spine in young dentists.

The group of examined people was subjected to the treatment with Kinesiology Taping method, in which the muscle and ligament technique was applied, in accordance with methodology. The application was performed in a sitting position, with possible full flexion of the cervical spine. The muscle technique was performed by sticking the tape in the shape of the letter "Y" without stretching starting with Th 4, where the base was, however tails of the application ran towards mastoid adolescents. Next an ligament application was stuck in the form of the arranged horizontally letter "I" precisely in the place of the cervical spine pain. In the ligament technique the central part of the



tape is stretched to a maximum [12]. Everyone from examined was instructed to perform all activities of the everyday without the unnecessary concern for the tapes for 7 days.

The survey method was used diagnostic survey using a questionnaire. The survey consisted of 7 closed questions in the part I and 4 closed questions in the part II with the possibility of choosing one correct answer. To the assessment of the degree of feeling the pain respondents used visual analogue VAS scale in the horizontal digital scale format in scope 0-10 (0 – lack of pain, 10 – unbearable pain), which was marked degree of perceived pain intensity. In examining the mobility of the cervical spine, measured by centimeter tape motion for flexion, extension, turning left and right and the slope, also in both sides, according to methodology determined by Walaszek, Kasperczyk and Magiera [13].

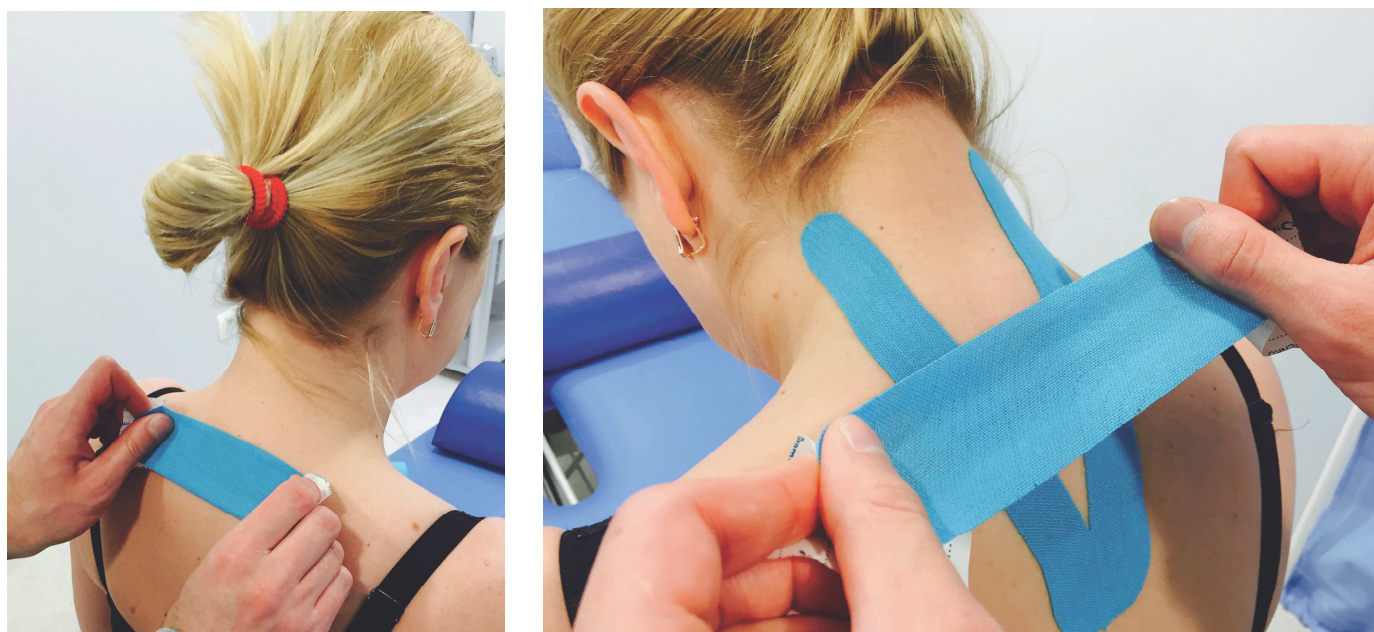


Fig. 1. Kinesiology Taping application for ligaments



Fig. 2. Kinesiology Taping application for muscles



**Fig. 3. Prepared Kinesiology Taping application**

### Results

Results of study are summarized in table 1 and figures (Fig. 4, 5). Considering the range of flexion movement of the cervical spine there was an improvement after Kinesiology Taping method in the form of muscular and ligamentous application (statistically significant,  $p \leq 0.01$ ). The range of extension movement of the cervical spine in population of the study after application of Kinesiology Taping method was highly statistically significant improved ( $p \leq 0.001$ ). The range of side slope movement, based on the results, it can be concluded that improved significantly ( $p \leq 0.001$ ) in both sides – right and left, after following treatment.

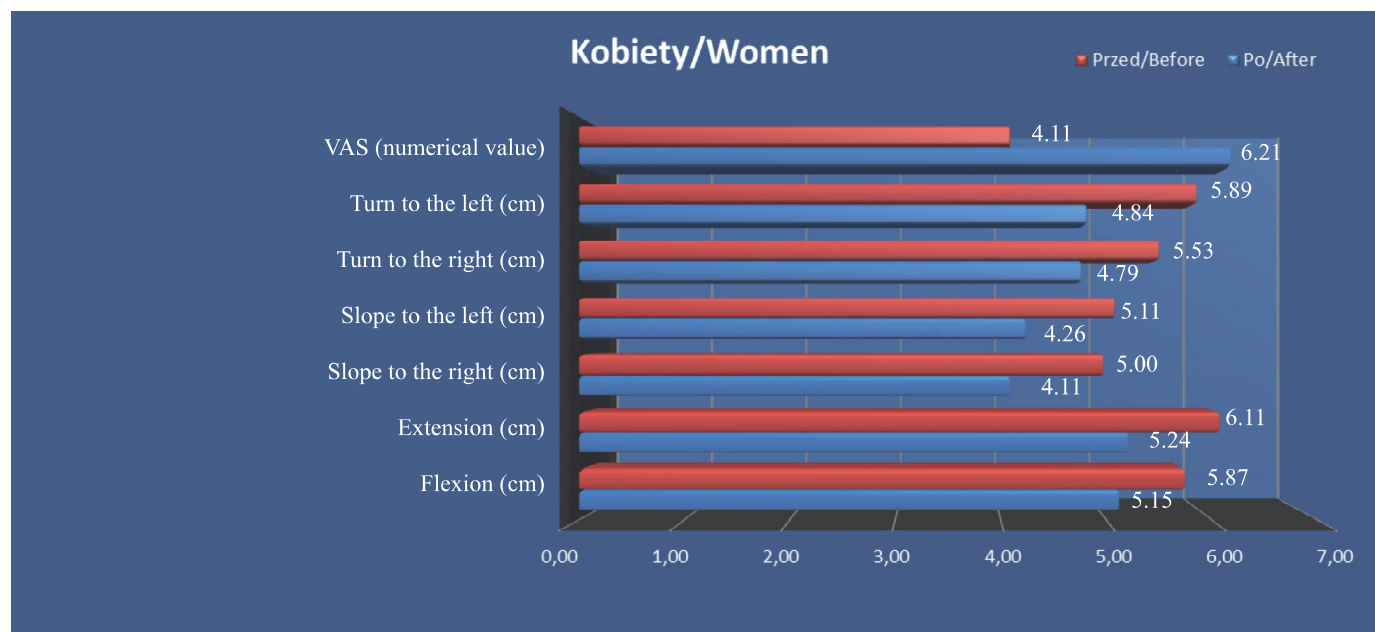
In assessing the turns movements of the cervical spine in the study group significant improvement was reported ( $p \leq 0.001$ ) in terms of turning on the right, as well as in terms of turning left. Assessing the level of the declared values of pain sensation on VAS scale significant reduction of these values was observed and the results are highly significant ( $p \leq 0.001$ ) (Table 1). There was an improvement in group of women in



all ranges of measured movements, particularly during the measurement of the cervical spine extension movement. The level of pain on the VAS scale among examined women had significantly decreased (Fig. 4). In assessing a group of men, on the basis of the research, can be concluded that the results are very close to results of group of women. The improvement was observed in each range of measured movements – the greatest improvement was recorded during measurement of flexion movement of the cervical spine. The declared values of the level of pain sensation on the VAS scale among male patients strongly decreased (Fig. 5).

**Table 1. Results of range of movements of cervical spine before application of Kinesiology Taping method on cervical spine area and results after application of Kinesiology Taping method to the same area.**

|                                 | Slope       |           |               |              | Turn      |           | VAS       |
|---------------------------------|-------------|-----------|---------------|--------------|-----------|-----------|-----------|
|                                 | Flexion     | Extension | On right side | On left side | Right     | Left      |           |
| Study before the application KT | 5.06 ± 1.06 | 5.13±0.93 | 4±0.72        | 4.04±0.86    | 4.78±1.20 | 4.81±1.01 | 6.53±1,70 |
| Study after the application KT  | 5.93 ± 1.04 | 5.93±0.82 | 4.83±0.88     | 4.83±0.85    | 5.53±1.03 | 5.72±0.91 | 4.5±1,66  |
|                                 | p<0.01      | p<0.001   | p<0.001       | p<0.001      | p<0.001   | p<0.001   | p<0.001   |



**Fig. 4. The average value of the range of movement and the perceived level of pain sensation among women examined before and after application of Kinesiology Taping method**

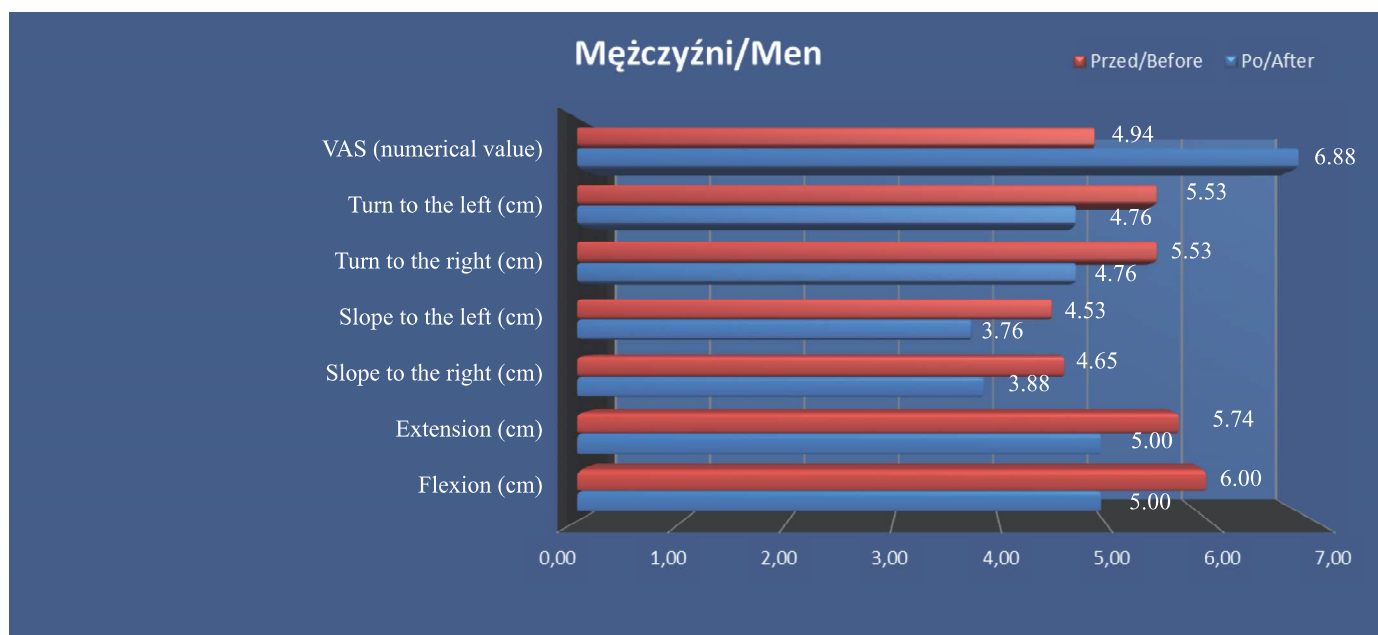


Fig. 5. The average value of the range of movement and the perceived level of pain sensation among men examined before and after application of Kinesiology Taping method

### Discussion

Overload and destructive action of clinical work in dental practice on cervical spine, even after two years, has been proved by Diaz-Caballero et al. at the University of Cartagena in Colombia, conducting research on a group of 83 students of dentistry (last year). Up to 11% of students had permanent pain in area of neck, back, shoulders and arms after such a short period of work as clinicians [14]. Own study also included a group of students of dentistry (final year of study). Diaz-Caballero conclusions confirm the conclusions based on observations of the author. This means that there is no position or teat working technique in dental practice, which would be free from overloads, cervical spine diseases and their consequences, regardless of the number of years of work.

Wilczyńska and Szeszenia-Dąbrowska conducted extensive research on the prevalence of occupational diseases among the population of health care workers and social assistance in Poland and stated that the highest risk for occupational diseases, including originating from the musculoskeletal and nervous systems, occurs in dentists compared to other medical professions [15].

Kierklo and others conducted study, in a group of 220 Polish dentists, on the occurrence of musculoskeletal diseases that are associated with the practice of dentistry. The results are clear – permanent symptoms of degeneration of musculoskeletal system in various degrees are present in up to 92.0% of the respondents, including 47.0% related to the cervical spine. According to these authors, the causes of this condition are bad habits and

inadequate position during work and repetitive movements. According Kierklo and others most of overloads and disorders of the musculoskeletal system exists among dentists practicing in a standing position [16].

Morse and others' research from 2010, which was conducted on the basis of multi-annual analysis of risk indicators of degeneration of cervical spine and shoulder joints among dentists, has shown that early symptoms of disease are already at the beginning of career and obviously deepen over the years of work. The authors suggest the use of principles of ergonomics to minimize the risk of overload of the cervical spine and shoulders [17].

Dylewski et al. in own researches received significant improvement in symmetry of pelvic in motion in the sagittal plane after the application of Kinesiology Taping on abdominal oblique muscles [18]. This method may result in the improvement of posture profile and spine mobility.

Śliwiński et al. have proved beneficial combination of Kinesiology Taping and PNF method (Proprioceptive Neuromuscular Facilitation), which contributed to improve the function of the upper limb in patients after stroke [19]. A combination of both methods in treatment resulted in significant improvement. This type of therapy can be used in many other conditions, including those related to the cervical section of spine.

The method of Kinesiology Taping is also preferred to use in the central nervous system injuries. This research was also conducted by Śliwiński et al. The study was focused on determining the impact of Kinesiology Taping functional application in children with disorder of central nerve coordination. Evaluation was based on selected responses in neurophysiological diagnosis by Vojta method. Kinesiology Taping functional applications resulted in a correction of the axis of the body in children with asymmetry of its position [20].

The reports, as well as own research, shows how serious is the problem of occurrence of overload, degeneration and damage of musculoskeletal and nervous systems. The consequences of these dysfunctions are associated pain and a number of other effects. The current static overload, resulting from technical conditions of practicing dentistry, is the most important factor in damaging the musculoskeletal system regardless of the technique of work. And this is also a major cause of occupational diseases of musculoskeletal system, as well as health result of working. All proposals, opinions or recommendations that relate to the ergonomics are designed to greater or a lesser extent minimize the consequences of musculoskeletal disease in this occupational group. Total elimination of these consequences is possible only at the moment of the end of working in the profession.

### **Conclusions**

1. Application of Kinesiology Taping method among young dentists have a positive effects on declared values of pain sensation on VAS scale, which means reduction in symptoms.



2. Improvement in all measured movements of the cervical spine has been reported in both sexes. Extension movement range has significantly improved in the group of women, while in men the range of flexion movement.

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