

The Effectiveness of Shock Wave and Chiropractic on The Spinal Column in Degenerative Diseases, Inflammatory Changes and Correction of Scoliotic Changes in Humans

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Abstract

Modern lifestyle, as well as numerous negative factors, including sedentary work, lack of sufficient physical activity and improper posture negatively affect the condition and health of the spine. Degenerative diseases, inflammatory changes and scoliotic abnormalities are becoming increasingly common phenomena faced by people of different ages, significantly reducing the level and quality of life of those suffering from these abnormalities. This is due to the increased interest in the topic of the effectiveness of non-surgical treatment methods, among which quite a lot of attention is paid to focused shock wave therapy and chiropractic (massage).

The effectiveness and expediency of using these techniques for the treatment of diseases and deformities of the spinal column, as well as the potential for their study and viability are the subject of this article.

Keywords: deformity, pathology, spinal column, shock wave therapy, chiropractic, noninvasive methods of treatment, efficacy, potential for study.

Relevance Research into the effectiveness of therapy through the use of shock wave therapy and chiropractic in the treatment of the spinal column is determined by several factors. First of all, this is due to the rapid spread of spinal problems in modern society. By causing pain and limiting movement, they significantly reduce the quality of life of patients. As they progress, spinal deformities can lead to serious pathologies and cause disability. In this regard, the development of effective methods for treating and correcting the pathologies under study is a critically important task in medicine.

In addition, shock wave therapy and chiropractic are non-invasive treatments that have the potential to achieve high results without the need for long-term medication or surgery. This has caused high interest in them from both patients and medical specialists.

Another reason for the actualization of the problem under consideration is the positive results, which are practically confirmed by numerous studies and experiments. Thus, it has been practically proven that non-surgical methods of treating spinal deformities can improve motor functions, reduce pain and inflammation, and help improve the quality of life of patients with these problems. Further study of the stated topic will reduce the use of invasive procedures and medications, generally stimulating a new round in the development of the healthcare system and optimizing methods for treating pathologies of the spinal column.

Goals and objectives

The key purpose of the study is to analyze the effectiveness of shock wave therapy and chiropractic adjustments to the spinal column for degenerative diseases, inflammatory changes and

scoliotic disorders. The study examines the mechanism of action of these techniques, reviews existing research and clinical trials, and then discusses the effectiveness of treatment and the potential for further study and development of non-surgical methods for treating spinal deformities and diseases.

Job objectives:

- conduct a review of scientific articles and publications that analyze the experience of using shock wave therapy and chiropractic in the treatment of the spinal column, find out the current level of knowledge on this topic;
- study the mechanisms of action of the presented methods on the structure and function of the spine, as well as adjacent tissues and systems;
- evaluate the effectiveness of shock wave therapy and chiropractic by analyzing the results of studies and clinical trials;
- analyze the side effects and safety of using the stated methods;
- summarize the knowledge gained about efficiency and identify the potential for further research and development in this industry.

Review of experience in using existing techniques

Focused shock wave therapy (SWT) is a non-invasive alternative to surgery in the treatment of spinal pathologies and deformities. Its main advantage is the simultaneous impact on the cause and symptoms of chronic pain. The essence of the technique is the use of shock waves through which damaged tissues are stimulated, leading to their cellular activation, regeneration and healing. Shock waves are acoustic waves that

travel longitudinally and transmit high energy to painful points of the musculoskeletal system [6].

This therapeutic method can be a solution for patients:

- those suffering from pain in ligaments and joints, with pathologies and diseases of the spine;
- those who prefer non-invasive therapy to surgical intervention;
- seeking an alternative to drug treatment and therapy using local anesthetics.

For the first time, shock wave treatment was used to destroy kidney stones, but over the past decade this technique has become widespread in the treatment of chronic diseases of the musculoskeletal system. The effectiveness of such therapy is confirmed by the results of numerous studies demonstrating the healing and restorative effects on tissue [9].

Thus, since 2019, the Shinnik sanatorium of Belshina OJSC has been using the Zimmer Enpuls version 2.0 shock wave therapy device to treat patients with diseases of the musculoskeletal system. Generating electromagnetic energy of 60-185 mJ with a frequency from 0 to 22 Hz, which has a therapeutic effect on 20 human energy levels, the device successfully demonstrates its effectiveness, proven in practice. Depending on the source of therapy, the penetration depth of shock waves varies from 5 to 35 mm.

The therapeutic effects of shockwave therapy were tested on 940 sanatorium patients (323 men and 612 women aged 32-60 years). It should be noted that the method has contraindications, which include: pregnancy, the presence of tumors, and an installed pacemaker).

For each patient, an individual treatment plan was drawn up, developed in accordance with the medical history, the results of a preliminary medical examination and additional diagnostics.

Over the course of one year, patients underwent about 4980 sessions of shock wave therapy - from 3 to 10 procedures for one patient, 1-2 times a week (no additional therapy or anesthesia was used). During one UTV session, the patient received from 2000 to 6000 shock pulses from one of the used sources (6, 15 and 22 mm). The choice of source depended on the clinical effect to be achieved. Patients with pronounced changes in the tissues surrounding the spine required the greatest number of impulses, since the device had to simultaneously influence several painful points.

The results obtained confirmed the high effectiveness of shock wave treatment. Thus, after the second session, 93.1% of treated patients noted improvements. Thanks to innovative treatment techniques, the pain was relieved and joint mobility improved. In the long-term period (1-2 procedures before the end of therapy), improvements were noted in 94.2% of patients.

No complications were identified as a result of the use of the UVT device, however, in 25 people (2.66% of those who took part in the study), after the first procedure, an increase in pain was detected, which subsequently resolved on its own. Since shock wave therapy causes a rapid and significant increase in blood pressure (BP) during the procedure, special attention was paid to monitoring this indicator. Observations showed that in patients with arterial hypertension after the session, an increase

in blood pressure of 10-20 mmHg was detected. Art., which is the reason for a more careful assessment of the condition of this category of patients suffering from spinal diseases [6].

Another experimental study aimed at identifying the effectiveness of shock wave therapy was organized in 2020 in the physiotherapy department of the Orenburg Medical Center. It involved 37 patients with spinal osteochondrosis at the L1-S1 level and clinical and instrumental criteria for sacroiliitis (with a disease duration of 3-6 years) eleven, aged 35-72 years.

SWT sessions were carried out using the BLT-6000 SWTEASY device (Great Britain-Czech Republic) paravertebrally on the lumbosacral spine (frequency 7 Hz, pressure 2 bar, 2000 shocks per procedure) 2 times a week (for all patients), the course consisted of 5 procedures.

A preliminary assessment of the pain syndrome and disability of the experiment participants was carried out using the Oswestry questionnaire. The sum of the patients' disability scores before the start of the experiment averaged 34.4 ± 2.1 points (58% of subjects). It has been reliably proven that by the end of the experiment the total score decreased to 26.8 ± 2.0 points ($p < 0.01$). 34 of 37 patients who received UTV treatment noted normalization of their condition. Thus, the effectiveness of therapy using shock wave pulses has been proven to be 91.8%. Two clinical trial participants did not experience any benefit from treatment, and another experienced increased pain. Analysis of the level of vital activity using the Oswestry questionnaire made it possible to determine a clearly expressed analgesic effect from the use of HTS. At the same time, 27 patients noted an effect expressed in improved self-care, increased walking distance and length of stay in a sitting position [4].

Thus, it was possible to identify a significant effect from the use of shock wave therapy in the complex treatment of patients with degenerative diseases of the spine.

Another effective method of non-surgical treatment of diseases and deformities of the spine is chiropractic, which is a type of manual therapy, the purpose of which is to examine and restore optimal function of the spine. Chiropractic allows you to cope with spinal problems, its deformities, as well as lowering of the vertebrae using massage and finger/whole hand pressure [2].

Chiropractors (an officially listed specialty intended for physiotherapists and doctors) work not only with the patient's muscular and skeletal system, but also with the nervous system: according to chiropractors, spinal diseases that affect the nerves coming from the spinal cord are the cause of other diseases of the body person. In their work, chiropractors use a variety of treatment methods, including:

- manipulation of the spine;
- short strong shocks;
- gradual movement of joints from side to side;
- pulling/stretching muscles in different directions [5].

The main advantage of chiropractic from the point of view of patients is the painlessness of the procedures (they experience maximum discomfort). The disadvantage of this method, in turn, is that most chiropractors today are unqualified people who do not have proper education; this justifies the negative attitude and

distrust of many patients towards a fairly effective non-surgical method of treating serious diseases of the spinal column [4].

In 2017, Dr. Yu.I. Kolyagin received a patent for the invention of a new method of structural diagnostics of the spine and surrounding muscle and ligamentous tissues [10]. Diagnostics, which is carried out using a special computer program, provides much more information than all existing diagnostic techniques (including computed tomography and MRI), through which it is impossible to determine what is happening around the osteochondral tissue. The essence of Dr. Kolyagin's method is to determine the exact cause of pain, the location and degree of pinching of various structures around the spine, including blood vessels and nerves, using a special highly sensitive sensor that records the passage of a special wave through the vertebrae, discs, intervertebral joints, ligaments, muscles and tendons patient. The result of such an examination is a complete picture of the disease state, which determines the degree of pathological morphological changes in the segment/section of the spine and paravertebral environment [1].

The specificity of the stated diagnostics determines the advantage of the Kolyagin method, which is superior in accuracy to computed tomography, which records the condition of exclusively osteochondral tissue. Structural diagnostics, in turn, allows you to monitor the patient's condition over time, promptly responding to deviations in the treatment program and making adequate adjustments to the rehabilitation process.

The success of treating spinal deformities and pathologies has been proven in clinical studies conducted at Dr. Kolyagin's sanatorium located in Sochi.

Description of the claimed method.

In November 2022, a method for eliminating spinal deformity by I.R. was patented. Kasimova [2], including examination of the patient and impact on the spine, which takes place in seven successive stages:

Stage 1 – muscle preparation by stretching from the crown to the heels in a passive mode;

Stage 2 – visual examination to determine the degree of scoliosis by palpating each vertebra, palpation of trigger points;

Stage 3 – pressing on the vertebrae, sequential traction of the neck, legs, thoracic and lumbar regions;

Stage 4 – tapping the patient's vertebrae with strikers and a rubber hammer on the spasming muscles as they exhale;

Stage 5 – repeated palpation of the vertebrae;

Stage 6 – additional tapping of the vertebrae with a rubber hammer in a sitting position;

Stage 7 – drawing up an individual plan of physical exercises aimed at building a muscle corset [6].

I. Kasimov's invention echoes the method of positive reduction with a fixed-point hammer in the treatment of patients with cervical spondylosis, which was discovered by Dr. Wang Jianfei in 2006. This mechanism is a kind of transformation of one of the techniques of traditional Chinese medicine, which differs from traditional massage in the use of special correction equipment.

Clinical trials and research on spinal correction with a fixed hammer were initiated by the doctor back in 1998, and after 2000, numerous experiments were carried out that made it possible to develop complex spinal correction with a hammer -

a stereotypical invention that subsequently became widespread [7]. The invention of I. Kasimov can be considered one of the modifications of Dr. Wang's technique.

Data analysis and effective proof of method.

To determine the effectiveness of Kasimov's technique, a clinical experiment was conducted, the participants of which were 12 people - 6 men and 6 women, aged from 31 to 54 years, suffering from lumbar osteochondrosis, lumbar osteochondrosis with severe compression syndrome of the L5 and (or) S1 roots due to disc herniation, remaining relevant for over 2 months. 7 patients were examined by computed tomography, 5 patients underwent a complete examination in the neurosurgical department. The duration of the disease at the start of the experiment was 3-4 months, all patients underwent a course of medication and physiotherapy, after which the severity of clinical manifestations was determined as grade 3 severity of the disease.

Examination of experiment participants using Kasimov's technique: S or C-shaped reactive scoliosis of the thoracolumbar region with hypolordosis in the lumbar spine with the apex of curvature at the level of the actual spinal motion segment was identified in 5 patients; in the remaining 7 patients, cervical spondylosis was identified, the manifestation of which is:

- numbness and pain in the head, neck, shoulders and arms;
- related diseases of internal organs [2].

In severe cases, the disease leads to urinary incontinence and even paralysis. The development of this dangerous disease is influenced by the urbanization of society, as well as the growing popularity of sedentary work, which reduces the efficiency and quality of human life over time. All patients complained of limited active movement, mainly in the direction of the presumed destruction of the disc. Traditional therapeutic techniques for the spine have not proven effective.

During the treatment process, it was decided to use the acupressure method for the experimental group (7 people), and manual massage for the control group of patients (5 people). To avoid the formation of a pathological balance, it was decided to use a three-stage combination:

- correction with a fixed-point hammer to correct the displacement of the vertebral bone;
- acupuncture to relax mechanical soft tissues;
- traditional Chinese medicine to enhance the healing effect [7].

Duration of therapy is 2 weeks. Clinical symptoms, which measure patients' ability to participate in normal life and work, improved by more than 90%. It should be noted that the reset method using a fixed-point hammer correction is easy to learn, accessible, and easy to use. The patient is not tied to the place where the correction is performed, which allows immediate relief of painful symptoms.

Analysis of results. Patients in the control group noted a decrease in tension and stiffness, which persisted for 2-3 hours after completion of the manual massage session. In turn, 6 out of 7 patients in the experimental group recorded a decrease in stiffness and radiating pain, which had a long-term effect. Objectively, the disappearance of zones of hyperalgesia, a decrease in muscle tension, and an increase in the volume of

active and passive movements in all directions were noted. One patient in the experimental group did not feel any improvement, so his treatment was continued for another week.

Thus, the results of the study confirm the feasibility of using complex therapy through the use of manual practices, acupuncture and traditional Chinese medicine to alleviate the condition and improve the quality of life of patients with degenerative diseases, inflammatory changes and for the purpose of correcting scoliotic changes in humans.

Conclusion

Research into the effectiveness of chiropractic and shock wave therapy in spinal treatment confirms their potential for non-surgical treatment of spinal deformities and diseases. These techniques have demonstrated significant improvements in spinal symptoms and function in clinical studies. However, continued larger and controlled studies are needed to confirm and determine optimal protocols and duration of treatment for patients. Thus, chiropractic and shock wave therapy represent promising approaches in the non-surgical treatment of spinal problems, and can be included in a comprehensive rehabilitation program for patients avoiding surgery.

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