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Evaluation of the effectiveness of therapy in degenerative-dystrophic disk diseases

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Abstract: *the dominant role during the incidence of degenerative-dystrophic changes of the spinal column in the lesion is pain syndrome of varying intensity. The purpose of this study: to evaluate the effectiveness of conservative methods of treatment of degenerative-dystrophic disk diseases. The retrospective dynamic study included 107 medical records of outpatients, the average age of patients with degenerative-dystrophic disk disease who underwent rehabilitation treatment at Evminov Center for Vertebral Health in the period 2021-2022 was 43.4 ± 4.2. Rehabilitation treatment included personalized kinesitherapy on Evminov Prophylactor (inclined board), Glisson's Loop, taking non-steroidal anti-inflammatory drugs (NSAIDs) for up to two weeks (appointment depending on the intensity of the pain syndrome) against the background of compliance with the orthopedic regimen and follow-up by a rehabilitologist in dynamics. Depending on the therapy, the examined patients were divided into 3 groups: group I – patients with kinesitherapy, II – kinesitherapy in combination with non-steroidal anti-inflammatory drugs, III – kinesitherapy with Acetaminophen (respectively: 44 (41.1%)); 33 (30.8%); 30 (28.1%) patients). The duration of taking NSAIDs is 1-2 weeks, and Acetaminophen is 5-7 days. The condition of patients was assessed at the time of the initial visit to Evminov Center and after the first course (3-6 weeks) of rehabilitation measures aimed at decompression of the intervertebral discs. A visual analogue scale was used to measure the intensity of the pain syndrome. According to the results of the study, after 3-6 weeks, there was a positive dynamics of the course in all patients with degenerative-dystrophic disk disease. After 1-2 weeks from the initial visit to the doctor, all patients observed a significant or complete disappearance of pain. Since it is necessary to perform therapeutic exercises on Evminov Prophylactor only until pain appears, and NSAIDs and Acetaminophen block the pain perception threshold, kinesitherapy in groups II and III was carried out in a gentle mode (low-amplitude movements), in contrast to group I. After the end of the course of drug therapy (NSAIDs – up to 2 weeks and Acetaminophen – up to 7 days), patients of both groups increased the range of motion on an inclined board, which is confirmed by measuring the intensity of the pain syndrome with a visual analogue scale at certain time intervals. According to the results of the study, patients who received kinesitherapy started strength exercises 1-2 weeks earlier than in groups II and III. Thus, in the rehabilitation treatment of degenerative-dystrophic disk disease with pain syndrome of varying intensity, it is necessary to include kinesitherapy on Evminov Prophylactor, which, 1-2 weeks earlier than when combined with non-steroidal anti-inflammatory drugs or Acetaminophen, allows to get a positive effect, first of all regarding pain.*

Keywords: acetaminophen, anti-inflammatory agents, back pain, patients, rehabilitation

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Introduction

According to the results of recent studies, 266 million people (3.63%) worldwide suffer from degenerative-dystrophic disk diseases (DDDD) annually, with the highest and lowest estimated incidences found in Europe (5.7%) and Africa (2.4%), respectively (Ravindra et al., 2018). A pain syndrome of varying intensity plays a dominant role in the incidence of degenerative-dystrophic changes of the vertebral column in the focus of the lesion (Casiano et al., 2022). Osteoarthritis and chronic low back pain are the single leading causes of disability with estimates ranging from 40% to 85% (Hunter et al., 2019).

Conservative treatments for pain include over-the-counter medications such as Acetaminophen or non-steroidal anti-inflammatory drugs (NSAIDs) (Peck et al., 2020). Recent guidelines from the American College of Physicians recommend NSAIDs as a first-line pharmacologic drug (Chou et al., 2017). The use of non-steroidal anti-inflammatory drugs, especially for a long time, leads to side effects. Although short-term use is considered relatively safe.

Different methods of kinesitherapy are used to eliminate movement disorders and back pain (Owen et al., 2020; Поташнюк et al., 2016).

The combination of kinesitherapy with Acetaminophen and kinesitherapy with non-steroidal anti-inflammatory drugs becomes an interesting method of comparative characterization of the quality of treatment of patients with degenerative-dystrophic changes of the spine.

Aim

To evaluate the effectiveness of conservative methods of treatment of degenerative-dystrophic disk diseases.

Materials and methods

The retrospective dynamic study included 107 medical records of outpatients, the average age of patients with degenerative-dystrophic disk disease who underwent rehabilitation treatment at Evminov Center for Vertebral Health in the period 2021-2022 was 43.4 ± 4.2. The established diagnosis was confirmed by clinical (anamnesis, complaints, objective examination) and instrumental (magnetic resonance imaging (MRI), dopplerography of vessels of the head and neck) examination methods. Rehabilitation treatment included personalized kinesitherapy on Evminov Prophylactor (inclined board), Glisson's Loop with pathology in the cervical region, taking non-steroidal anti-inflammatory drugs (NSAIDs) for up to two weeks (appointment depending on the intensity of the pain syndrome) against the background of compliance with the orthopedic regimen and follow-up by a rehabilitologist in dynamics. Depending on the therapy, patients are divided into 3 groups (Fig. 1).

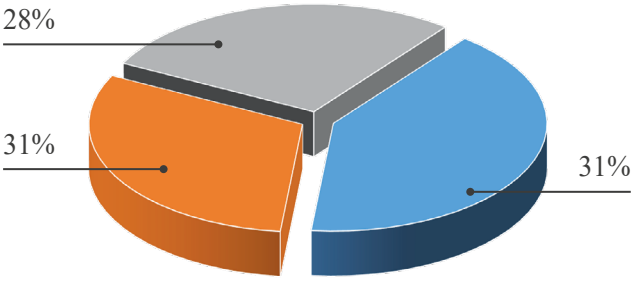

Figure 1. Characteristics of patient groups (n = 107)

The duration of taking NSAIDs is 1–2 weeks, and Acetaminophen is 5-7 days. The condition of patients (pain, muscle weakness and partial loss of sensation in the limbs) was assessed at the time of the initial visit to Evminov Center and after the first course (3-6 weeks) of rehabilitation measures aimed at decompression of the intervertebral discs (Афанасьєва et al., 2021). A visual analog scale (VAS) was used to measure the intensity of the pain syndrome (Hayes and Patterson, 1921). Pain was assessed at periodic visits and at the end of one week over the phone (after acetaminophen was completed).

All three groups were homogeneous in terms of age, sex, and degree of severity (mild and moderate) of degenerative-dystrophic diseases of the spine.

Statistical processing of the obtained data was carried out using the IBM SPSS Statistics Base version 22.0 program. Differences at $p < 0.05$ are considered statistically significant.

Results

Analysis of pathognomonic symptoms for degenerative-dystrophic disk disease during the initial visit to Evminov Center for Vertebral Health

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indicated the presence of pain syndrome of varying intensity, numbness and loss of sensitivity in the limbs, muscle weakness. However, according to the results of the study, after 3–6 weeks, there was a decrease in complaints in all patients (Table 2) and symptoms of the disease (Table 3).

The first stage of treatment of degenerative-dystrophic disk diseases is aimed at unloading (stretching) the spine.

All patients observed a significant or complete disappearance of pain after 1–2 weeks. Since it is necessary to perform therapeutic exercises on Evminov Prophylactor only until pain appears, and NSAIDs and Acetaminophen block the pain perception threshold, kinesitherapy in groups II and III was carried out in a gentle mode (low-amplitude movements), in contrast to group I. After the end of the course of drug therapy (NSAIDs – up to 2 weeks and Acetaminophen – up to 7 days), patients of both groups increased the range of motion on an inclined board. The result of VAS in patients was obtained from the study of pain intensity

Table 2. Characteristics of complaints of patients with degenerative-dystrophic diseases of the spine by patient groups before and during treatment

Complaints	Groups of patients, n = 107					
	I, n = 44		II, n = 33		III, n = 30	
	Initial visit	Repeated visit	Initial visit	Repeated visit	Initial visit	Repeated visit
Cephalgia	14 (31,8%)	10 (22,7%)	17 (51,5%)	10 (30,3%)	9 (30,0%)	7 (23,3%)
Dizziness	10 (22,7%)	4 (9,1%*)	6 (18,2%)	2 (6,1%*)	–	–
Cervicalgia	19 (43,2%)	6 (13,6%**)	20 (60,6%)	8 (24,2%*)	17 (53,3%)	6 (20,0%*)
Thoracalgia	14 (31,8%)	6 (13,6%*)	–	–	2 (6,7%)	2 (6,7%)
Lumbargia	31 (70,5%)	7 (15,9%**)	28 (84,8%)	5(15,2%**)	23 (76,7%)	2 (6,7%**)
↑ Blood pressure	6 (13,6%)	2 (4,5%*)	11 (33,3%)	41 (2,1%)	5 (16,7%)	4 (13,3%)
Radiation of pain to limb	24 (54,5%)	10 (22,7%*)	13 (39,4%)	5 (15,2%*)	21 (70,0%)	17 (56,7%)
Numbness of limb	9 (20,5%)	1 (2,3%**)	4 (12,1%)	0 (0%**)	6 (20,0%)	1 (3,3%**)
Muscle weakness	2 (4,5%)	2 (4,5%)	–	–		–

Note: Statistical comparison was noted in I, II and III groups of patients before and after treatment: * – significant differences, $p < 0.05$; ** – significant differences, $p < 0.01$.

Table 3. Characterization of symptoms of with degenerative-dystrophic diseases of the spine by patient groups before and during treatment

Radicular symptoms	Groups of patients, n = 107					
	I, n = 44		II, n = 33		III, n = 30	
	Initial visit	Repeated visit	Initial visit	Repeated visit	Initial visit	Repeated visit
Neri's sign	39 (88,6%)	9 (20,5%**)	27 (81,8%)	10 (30,3*%)	26 (86,7%)	3 (10,0%**)
Dejerine's symptom	19 (43,2%)	6 (13,6*)	16 (48,5%)	6 (18,2%*)	21 (70,0%)	8 (26,7%*)
Spurling's sign	22 (50,0%)	3 (6,8**)	18 (54,5%)	6 (18,2%*)	17 (56,7%)	2 (6,6%**)
Pain in valleix's point	34 (77,3%)	11 (25,0%*)	31 (93,9%)	13 (39,4%*)	27 (90,0%)	12 (36,7%*)

Note: Statistical comparison was noted in I, II and III groups of patients before and after treatment: * – significant differences, $p < 0.05$; ** – significant differences, $p < 0.01$.

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during the initial visit to the rehabilitation doctor of Evminov Center for Vertebral Health, as well as after 2 and 4 weeks of rehabilitation treatment (Fig. 2).

According to the results of the study, patients who received kinesitherapy started strength exercises 1-2 weeks earlier than in groups II and III. Side effects of NSAIDs and Acetaminophen were not recorded in patients.

After 3-6 weeks of rehabilitation measures on Evminov Prophylactor using the Glisson's loop (for degenerative-dystrophic lesions of the cervical spine), all patients are assigned the II stage of rehabilitation (a course of strength exercises).

Discussion

NSAIDs and Acetaminophen (Freo et al., 2021) in degenerative-dystrophic disk disease are used for pain syndrome due to interference with the synthesis of prostaglandins, which leads to inhibition of the inflammatory cascade. Musich et al. in their work used muscle relaxants, gabapentin, local analgesics, glucocorticoids, and acetaminophen in a random sample of elderly people aged 64 years and older, which had a certain role in the treatment of back pain in each specific case (Musich et al., 2019).

(Chou та ін., 2018). Results of studies in the literature on NSAIDs and Acetaminophen for both acute and chronic pain in DDDD are highly conflicting (Chou et al., 2018).

Van der Gaag et al. found moderate-quality evidence that NSAIDs were slightly more effective than placebo in reducing short-term pain and high-quality evidence that they were slightly more effective than placebo in reducing disability in acute low back pain (van der Gaag et al., 2020). In chronic nonspecific low back pain, the effects on pain reduction and improvement in function are usually small/moderate and short-lived (Koes et al., 2018).

In a 2015 Cochrane review, Moore et al. evaluated the effectiveness of NSAIDs in chronic back pain, especially with a neuropathic component. 251 patients with chronic low back pain participated. The authors concluded that there was insufficient information to make a decision about the efficacy or safety of new NSAIDs in the treatment of chronic low back pain with a neuropathic component (Moore et al., 2015).

NSAIDs are associated with gastrointestinal, cardiovascular (Varrassi et al., 2020), skin, renal, hematological, respiratory, and central nervous system side effects (Lanas et al., 2010).

Chou et al. showed that Acetaminophen was ineffective in acute low back pain, NSAIDs had less benefit in chronic low back pain (Chou et al., 2017).

In the literature of Saragiotto et al. was not found study evaluating patients with subacute low back pain (Saragiotto et al., 2016).

Most current international clinical practice guidelines continue to recommend Acetaminophen

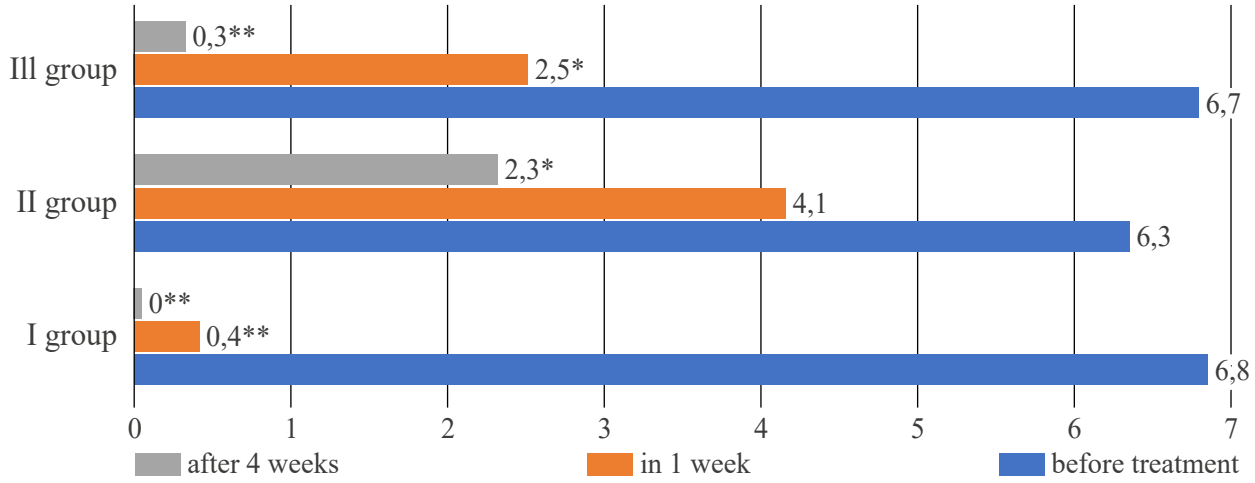

Figure 2. Intensity of pain according to VAS groups in the course of treatment after one week (in telephone mode) and at re-admission.

Note: Statistical comparison is noted in I, II and III groups of patients: * – probable differences, $p < 0.05$; ** – significant differences, $p < 0.01$.

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as first-line therapy for chronic back pain. Multimodal therapy including this drug appears to be more effective (Price et al., 2022) when NSAIDs are used for acute back pain (Qaseem et al., 2017).

Hepatotoxicity is a worrisome side effect, but it is rare in adults who take Acetaminophen (Paracetamol) as prescribed, including people with cirrhosis (Alchin et al., 2022), which is reflected in our research.

The latest clinical guidelines emphasize the importance of providing non-pharmacological care to patients with back pain: magnetotherapy, electrotherapy, massage (Grushina et al., 2021), therapeutic gymnastics (Özyemişci Taşkıran, 2020), mechanotherapy2, ero2 and ers2, mechanotherapy and er. (Wang et al., 2018; Koes et al., 2018).

Conclusions

1. In the case of degenerative-dystrophic disk disease, the scheme of the complex conservative method of treatment primarily includes kinesitherapy on Evminov Prophylactor as needed with the inclusion of Glisson's loop.
2. To include in the therapy NSAIDs or acetaminophen depending on the severity of the pain syndrome in the pharmacological treatment to facilitate individual care as a symptomatic treatment at the discretion of the doctor and according to the patient's condition.
3. Kinesitherapy on an inclined board allows you to get a positive effect 1-2 weeks earlier than with its combined use with NSAIDs and Acetaminophen.

Prospects for further researches consist in the study of patients with degenerative-dystrophic disk diseases while performing strength exercises on Evminov Prophylactor.

Financing

This study did not receive external funding.

Conflict of interests

The authors declare that they have no conflict of interest that could be perceived as prejudicing the impartiality of the article.

Consent to publication

The authors took consent from patients and guardians related to this manuscript, all of whom gave their consent for publication. All authors read and approved the final version of the manuscript. All authors agreed to publish this manuscript.

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of article.

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Оцінка ефективності терапії при дегенеративно-дистрофічних захворювань хребта

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Анотація: *домінуючу роль в картині захворюваності дегенеративно-дистрофічними змінами хребетного стовпа у місці враження має місце больовий синдром різної інтенсивності. Метою цього дослідження є оцінка ефективності консервативних методів лікування дегенеративно-дистрофічних захворювань хребта. До ретроспективного динамічного дослідження включено 107 медичних карток амбулаторних пацієнтів, середній вік пацієнтів з дегенеративно-дистрофічним захворюванням хребта, які проходили реабілітаційне лікування у вертебрально-оздоровчому центрі Євмінова у період 2021-2022 років. становив 43,4 ± 4,2. У реабілітаційне лікування входило персоналізована кінезітерапія на профілакторі Євмінова (похилій площині), петля Глісона, прийом нестероїдних протизапальних засобів (НПЗЗ) до двох тижнів (призначення від інтенсивності больового синдрому) на тлі дотримання ортопедичного режиму та спостереження реабілітологом у динаміці. Залежно від терапії, обстежені розбиті на 3 групи: I група – пацієнти з кінезітерапією, II – кінезітерапія у поєднанні з прийомом нестероїдних протизапальних препаратів, III – кінезітерапія з ацетамінофеном (відповідно: 44 (41,1%); 33 (30,8%); 30 (28,1%) пацієнтів). Тривалість прийому НПЗЗ 1-2 тижні, а ацетамінофену 5-7 днів. Оцінювали стан пацієнтів на момент первинного звернення до центру Євмінова та після закінчення I курсу (3-6 тижнів) реабілітаційних заходів, спрямованих на декомпресію міжхребцевих дисків. Для вимірювання інтенсивності больового синдрому застосовано візуальну аналогову шкалу. За результатами дослідження через 3-6 тижнів відзначалася позитивна динаміка перебігу у всіх пацієнтів із дегенеративно-дистрофічним захворюванням хребта. Через 1-2 тижні від первинного відвідування лікаря усі пацієнти спостерігали значне чи повне зникнення болю. Оскільки виконувати лікувальні вправи на профілакторі Євмінова потрібно тільки до появи больових відчуттів, а НПЗЗ і ацетомінофен блокують поріг сприйняття болю, то кінезітерапія у II та III групах здійснювалася в щадному режимі (малоамплітудні рухи), на відміну від I-ої групи. Після закінчення курсового прийому медикаментозної терапії (НПЗЗ – до 2 тижнів та ацетомінофену – до 7 днів) пацієнти обох груп збільшили обсяг рухів на похилій площині, що підтверджується вимірюванням інтенсивності больового синдрому візуальною аналоговою шкалою через певні часові проміжки. За отриманими результатами дослідження пацієнти, які отримували кінезітерапію, на 1–2 тижні раніше приступали до силових вправ, ніж у II та III групах. Таким чином, в реабілітаційне лікування дегенеративно-дистрофічних захворювань хребта з больовим синдромом різної інтенсивності необхідно включати кінезітерапію на профілакторі Євмінова, яка на 1–2 тижні раніше, ніж при її поєднанні з прийомом нестероїдних протизапальних препаратів або з ацетамінофеном, дозволяє отримати позитивний ефект щодо болю.*

Ключові слова: ацетамінофен, біль у спині, нестероїдні, протизапальні засоби, реабілітація.