

Structural-modifying effect of the complex of frequency-wave therapy and  
pharmacopuncture for dorsopathies S.K.

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Structurally modifying effect of a frequency-wave therapy  
and pharmacopuncture at dorsopathies

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SUMMARY

The aim of the work was to establish the structural-modifying effect of the combined use of low-intensity frequency-wave therapy and pharmacopuncture with chondroprotector Alflutop in lumbosacral dorsopathy. This phenomenon was verified using threshold echographic ultrasound videodensitometry of the intervertebral discs.

As a result of the study, the high efficiency of the proposed therapeutic approach was established. It was also revealed that ultrasound diagnostics makes it possible with a high degree of reliability to clarify the phase of the course, the stage of the degenerative-dystrophic process and detail the changes in the course of therapy.

Key words: dorsopathy, adaptive bioresonance therapy, chondroprotector Alflutop, ultrasound videodensitometry.

RESUME

The work was devoted to research of structure-modifying influence of complex treatment with low-intensity frequency-wave therapy and pharmacopuncture by chondroprotector Alflutop in cases of lumbosacral dorsopathies. This phenomenon was verified by threshold ultrasonic echography videodensitometry of intervertebral discs. The research showed high efficiency of suggested therapeutic approach. The ultrasound videodensitometry was found to have high diagnostic value for clarifying phase of diseases, stage of degenerative-dystrophic process as well as for monitoring changes during treatment.

Keywords: dorsopathy, adaptive bioresonance therapy, chondroprotector Alflutop, ultrasound videodensitometry.

Introduction

The destruction of cartilage tissue, involving both intervertebral discs (IVD) and intervertebral joints, is one of the main causes of chronic back pain [1, 2, 7, 9]. Based on this, the impact on the metabolism of the intervertebral disc is a promising direction in the treatment of patients with dorsopathy [3]. Low-intensity frequency-wave therapy [5, 6, 7] or pharmacopuncture [2] can have a similar effect. However, the prerequisites for the combined use of these methods, which increase the effectiveness of exposure in lumbosacral dorsopathy, have been noted [7]. The lack of detailed data on the therapeutic possibilities of this complex in the available literature, including the degree of influence on the metabolism of the intervertebral disc, was the basis for this study.

### Material (contingent), methods of examination and treatment

The study was of an open, controlled nature. The study included 110 patients (71 women and 39 men) with dorsopathy at the lumbosacral level. Syndromologically, compression disorders were detected in 41 cases (40.0%), reflex - in 69 (60.0%).

In addition to clinical examination methods, threshold ultrasound videodensitometry (USVD) was used as a dynamic one, which makes it possible to assess with high reliability the structures of the intervertebral disc and verify the phases of the pathological process [8, 9]. The dispersion (D), which characterizes the degree of heterogeneity of the nucleus pulposus and the annulus fibrosus, the average relative amplitude of reflections (SOA), correlated with the acoustic density of the tissue, and the echographic coefficient (ECD), equal to the ratio of the SOA of the nucleus pulposus to the SOA of the annulus fibrosus, were taken into account. The latter is an integral indicator characterizing the phase and severity of changes. On average, the D of the nucleus pulposus is 29.26; D fibrous ring - 27.03; OSA of the nucleus pulposus - 0.10; COA of the annulus fibrosus - 0.45. ECD is on average 0.22 [9].

In this context, it should be noted that the signs of unchanged intervertebral discs are relatively low echogenicity of the nucleus pulposus and high echogenicity of the annulus fibrosus, with practically the same dispersion indices, confirming the homogeneity of anatomical structures [9]. Quantitative echographic signs of pathological changes are statistically significant increases in D, OSA of the nucleus pulposus and ECD, with practically unchanged indicators of the annulus fibrosus. A reliable sign of a degenerative process in the disc is the alignment of the values of the OSA of the nucleus pulposus and the OSA of the annulus fibrosus, with a significant increase in the value of D of the nucleus pulposus. It is important that according to the dynamics of these indicators, it is possible to identify the structural-modifying effect of one or another type of impact. Based on this, patients were divided into four groups - three main, each of 30 people, and one comparison - of 20 people. In all groups, basic therapy was used, including drug exposure (analgesics, non-steroidal anti-inflammatory drugs and other drugs), individual manual therapy techniques and exercise therapy. In addition to this, in the 1st group, bioresonance therapy was used (apparatus for adaptive bioresonance therapy "IMEDIS-EXPERT") [5, 6], and in the 2nd - injections of chondroprotector Alflutop (Biotechnos, Romania) into trigger points, those. by pharmacopuncture. In the 3rd group, a complex of bioresonance therapy [6] and pharmacopuncture by Alflutop was used. In the comparison group, this drug was administered intramuscularly [4], including medication (analgesics, non-steroidal anti-inflammatory and other drugs), certain methods of manual therapy and exercise therapy. In addition to this, in the 1st group, bioresonance therapy was used (apparatus for adaptive bioresonance therapy "IMEDIS-EXPERT") [5, 6], and in the 2nd - injections of chondroprotector Alflutop (Biotechnos, Romania) into trigger points, those. by pharmacopuncture. In the 3rd group, a complex of bioresonance therapy [6] and pharmacopuncture by Alflutop was used. In the comparison group, this drug was administered intramuscularly [4], including medication (analgesics, non-steroidal anti-inflammatory and other drugs), certain methods of manual therapy and exercise therapy. In addition to this, in the 1st group, bioresonance therapy was used (apparatus for adaptive bioresonance therapy "IMEDIS-EXPERT") [5, 6], and in the 2nd - injections of chondroprotector Alflutop (Biotechnos, Romania) into trigger points, those. by pharmacopuncture. In the 3rd group, a complex of bioresonance therapy [6] and pharmacopuncture by Alflutop was used. In the comparison group, this drug was administered intramuscularly [4], in the 1st group bioresonance therapy was used (apparatus for adaptive bioresonance therapy "IMEDIS-EXPERT") [5, 6], and in the 2nd - injections of chondroprotector Alflutop (Biotechnos, Romania) into trigger points, i.e. by pharmacopuncture. In the 3rd group, a complex of bioresonance therapy [6] and pharmacopuncture by Alflutop was used. In the comparison group, this drug was administered intramuscularly [4], in the 1st group bioresonance therapy was used (apparatus for adaptive bioresonance therapy "IMEDIS-EXPERT") [5, 6], and in the 2nd - injections of chondroprotector Alflutop (Biotechnos, Romania) into trigger points, i.e. by pharmacopuncture. In the 3rd group, a complex of bioresonance therapy [6] and pharmacopuncture by Alflutop was used. In the comparison group, this drug was administered intramuscularly [4].

The treatment cycle in all groups consisted of 10 procedures, carried out 3 times a week. The effectiveness of the treatment was assessed on the basis of the dynamics of clinical and instrumental parameters, using computer-statistical analysis.

### results

The initial data of the ultrasound scan indicated degenerative-dystrophic changes in the tissues of the intervertebral discs at the lumbosacral level in all subjects (Table 1).

Table 1

Sonographic characteristics of lumbar intervertebral discs ( $M \pm m$ )

Уровень	Толщина (в мм), норма	Толщина (в мм), патология
L1-L2	$8,40 \pm 0,12$	$6,41 \pm 0,19^*$
L2-L3	$8,78 \pm 0,13$	$6,57 \pm 0,23$
L3-L4	$9,12 \pm 0,17$	$6,74 \pm 0,10$
L4-L5	$11,33 \pm 0,21$	$8,32 \pm 0,12^*$
L5-S1	$9,28 \pm 0,44$	$6,45 \pm 0,11^*$

\* – достоверность изменений ( $p < 0,05$ )

Thus, the average thickness of the affected IVD was  $6.86 \pm 0.15$  mm, which is significantly ( $p < 0.05$ ) below the norm. Distinct deviations of this indicator were detected at the levels L4L5 (in 29 observations) and L5-S1 (in 13). The thickness of the annulus fibrosus with thinning averaged  $7.32 \pm 0.12$  mm, mostly in the postero-lateral parts of the right - in 49 cases. Were identified 44 hernias and 39 protrusions of the discs, and also confirmed the multi-level nature of the lesion: 2 patients had disc lesions at 4 levels, 2 patients - in 3, 10 patients - in 2 and 14 patients - in the 1st ... When pathological changes were detected at several levels, a disc with signs of the third period of the disease was considered causal, and in the presence of several such discs, a disc with the largest hernia size ( $p < 0.05$ ) was considered causal. The initial indicators of quantitative ultrasound videodensitometry are given in table. 2.

In 49 cases, the OSA of the nucleus pulposus was lower than the OSA of the annulus fibrosus, with an ECD equal to  $0.95 \pm 0.04$ . Morphologically, the process was manifested by the fragmentation of the nucleus pulposus, the formation of microcracks and thinning of the annulus fibrosus, which corresponded to the 1st stage. degenerative-dystrophic process. Reflex-pain syndromes were observed clinically.

table 2

Average indices of ultrasound videodensitometry ( $M \pm m$ ) Structure

Структура	Дисперсность		COA		ЭКД	
	норма	патология	норма	патология	норма	патология
Пульпозное ядро	$29,26 \pm 0,75$	$41,07 \pm 1,12^*$	$0,10 \pm 0,01$	$0,48 \pm 0,03^*$	0,22	$1,04 \pm 0,04^*$
Фиброзное кольцо	$27,03 \pm 0,88$	$28,11 \pm 0,89$	$0,45 \pm 0,03$	$0,46 \pm 0,03$		

\* – достоверность различий ( $p < 0,05$ )

In 45 cases, an alignment of the values of the OSA of the nucleus pulposus and the OSA of the annulus fibrosus was revealed, with an ECD fluctuation from 0.95 to 1.0. The initial stages of fibrosis and sclerosis were morphologically detected in the absence of rupture of the fibrous rings and pathological changes in the epidural tissue (stage II of the process). Reflex-pain and compression radicular syndromes have been clinically established.

In 16 cases, further alignment of the OSA of the nucleus pulposus and the OSA of the annulus fibrosus was observed with a simultaneous increase in the dispersion of the nucleus pulposus and ECD, amounting to 1.0–1.04. There was a significant decrease in the transparency of the nucleus pulposus and an increase in epidural changes, the development of a herniated disc, "hernial orifice", which corresponded to the III stage. process. Compression radicular syndromes were clinically observed in several adjacent segments.

The study did not include patients with stage IV. degenerative-dystrophic process, with ECD from 1.05 to 1.16, against the background of a high dispersion of the nucleus pulposus, which characterizes a more significant predominance of connective tissue structures in the disc, up to its gross fibrous degeneration and the development of disc opacity.

Thus, the complex application of the methods of USG and USVD IVD makes it possible to differentiate various clinical and morphological periods of the development of pathology and to clarify the cause of its development. In a previous article [7], it was shown that in the clinical plan for dorsopathies, the most effective combination was frequency-wave therapy and pharmacopuncture. In this work, in order to detail the observed effects, the shifts of quantitative echographic indicators were additionally evaluated (Table 3).

Table 3

Comparative dynamics of indicators of ultrasound videodensitometry ( $M \pm m$ )

Группы	СОА пульпозного ядра			Дисперсность пульпозного ядра		
	Исходно	21 день	6 месяцев	до лечения	21 день	6 месяцев
1-я (30)	0,47 ± 0,07	0,38 ± 0,02	0,31 ± 0,02	40,09 ± 1,08	36,6 ± 1,12	33,1 ± 1,12
2-я (30)	0,46 ± 0,06	0,36 ± 0,03	0,30 ± 0,03	41,01 ± 1,09	36,3 ± 1,11	32,8 ± 1,12*
3-я (30)	0,48 ± 0,04	0,28 ± 0,02*	0,26 ± 0,02*	41,03 ± 1,10	32,2 ± 1,07*	30,0 ± 1,12*
Сравнения (20)	0,46 ± 0,02	0,40 ± 0,02	0,42 ± 0,02	40,07 ± 1,07	36,5 ± 1,09	39,2 ± 1,12
норма	0,10 ± 0,01			29,26 ± 0,75		

\* – достоверность различий ( $p < 0,05$ )

The most pronounced decrease in the quantitative parameters of USP was observed in patients of the 3rd group, who received combined pharmacopuncture and bioresonance therapy. Here, the OSA indicator of the nucleus pulposus by the 21st day of treatment significantly ( $p < 0.05$ ) decreased 1.7 times, and the dispersion indicator - 1.2 times ( $<0.05$ ). 6 months after the end of therapy, the trend towards a decrease in the OSA of the nucleus pulposus was reliably preserved in the 3rd group - 1.8 times less than the initial level, and its dispersion was 1.4 times less than the initial level ( $<0.05$ ). In the remaining groups, especially the comparison, changes in similar indicators were less pronounced.

The integral indicator, EKD, also had the most pronounced positive changes in patients of the 3rd group (Table 4). As in the previous case, in other groups, especially in the comparison group, changes in the ECD index were less pronounced.

Table 4

## Comparative dynamics of EKD indicators (M + m)

Группы	ЭКД		
	Исходно	21 день	6 месяцев
1-я	1,02 ± 0,03	0,83 ± 0,03	0,67 ± 0,03*
2-я	1,03 ± 0,02	0,78 ± 0,03	0,65 ± 0,04*
3-я	1,04 ± 0,04	0,60 ± 0,04*	0,56 ± 0,02*
Сравнения	1,01 ± 0,04	0,87 ± 0,04	0,91 ± 0,04
Норма	0,22 ± 0,02		

\* – достоверность различий ( $p < 0,05$ )

## Discussion and conclusions

The revealed changes in quantitative echographic parameters confirmed the distinct modifying effect of the complex of bioresonance therapy and pharmacopuncture on the structure of the nucleus pulposus, the degree of its hydrophilicity. It can be assumed that the combination of these methods provides an increase in the resonant response to the entire amount of influences, leading, in turn, to the potentiation of therapeutic effects, including structural-modifying effects.

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