



# Therapeutic Physical Culture: The Historical Experience of Using Physical Therapy for the Treatment of the Wounded During the Second World War

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## Abstract

**Background:** Therapeutic physical culture as a component of physical rehabilitation is used in the treatment of various diseases in neurology, cardiology, pulmonology, traumatology, orthopedics, dentistry, nephrology and pediatrics. In the study, we provide comparative data on the treatment of the wounded results and patients with advanced use of therapeutic physical culture during the Second World War.

**Methods:** In a retrospective study, the reports of hospitals and evacuation centers received by the Main Military Medical Administration of the Red Army from 1942 to 1945 from medical institutions of the Military Districts were analyzed.

**Results:** It has been established that with an improvement in the setting of medical physical culture in medical institutions, the number of those returned to the duty has increased and the duration of their treatment is reduced.

**Conclusion:** Historical and literary data, as well as practical experience in the use of physical exercises for medical and rehabilitation purposes, indicate the high effectiveness of this area of treatment and rehabilitation. The further development of the use of therapeutic physical culture should be in accordance with the development of clinical and preventive medicine.

**Keywords:** Therapeutic physical culture; Physical exercises; Physical rehabilitation; Treatment and prevention of diseases (traumas); The second world war

## Introduction

Therapeutic physical culture is a medical industry, primarily related to the restoration of disorders, functional abilities, quality of life and movement potential, as well as the prevention of exacerbations and complications of the disease [1, 2]. A distinctive feature of therapeutic physical culture in comparison with other methods of healing, treatment and rehabilitation is that it uses physical exercises as the main therapeutic agent applied in accordance with the objectives of treatment, taking into account the etiology, pathogenesis, clinical features, functional state of the body, the degree of general physical performance [3]. This method uses a kind of natural innate quality of a person - physical activity, which is the main stimulator of the growth, development

and formation of the body processes [4]. In the past, medical and surgical care was directed only to the treatment of diseases. It is now universally recognized that sufficient attention must be paid to the consequences of diseases.

So, with the help of physiotherapeutic treatment, the healing processes of patients can be accelerated, and in some cases it is possible to minimize the consequences of disability, and even completely prevent its development. The progress and rapid development of therapeutic physical culture have made it the main component of regenerative medicine, which, in turn, plays an important role in sports medicine and physical education. In Russia, the concepts of "physical culture" and "therapeutic physical culture"

appeared after the victory of the October Socialist Revolution and are closely related to issues of communist education and the construction of Soviet health care. Particularly great importance was attached to therapeutic physical culture during the Second World War. Doctors worked in numerous hospitals to restore impaired functions and improve the combat and physical training of soldiers. Obligatory were the classes aimed at restoration of general fitness (strength, endurance, dexterity), the development of military-applied skills (throwing a grenade, climbing, skiing, etc.), carrying out sports activities in certain sports, games, and organization of competitions. All this contributed to the return of fighters back to the duty, reducing treatment time and cases of disability [5].

**Purpose of the research**

To analyze the effectiveness of treatment and rehabilitation of the wounded with the expanded use of therapeutic physical culture during the Second World War.

**Materials and Methods**

The study used materials in the form of hospitals and evacuation points reports received by the Main Military Medical Administration of the Red Army for the period from 1942 to 1945 from medical institutions of the Military Districts. The results of treatment were estimated in various medical institutions depending on the quality of work on physical therapy statement, the degree of its use intensity and the change in the timing and outcome of treatment - disability or return to duty.

**Results**

The report of the central military medical commission for the first quarter of 1942 on the results of the examination of the wounded in military medical commissions indicates that the percentage of those dismissed from military service is 33.3. Of

these, according to the consequences of wounds in the upper limbs - 18.3%, by the consequences of wounds in the lower limbs - 10.6% and by the consequences of injuries of other organs - 4.4%. The main reason for the dismissal from the ranks of the Red Army was hand wounds (48.5%). Of the specific reasons for the dismissal due to the consequences of injuries are noted:

- a. damage to the peripheral nerves – 25.0%
- b. amputation – 16.5%
- c. ankyloses – 7.6%
- d. organic mobility – 9.6%
- e. the effects of finger injuries – 10.4%

The same report indicates that a high percentage of layoffs due to the effects of finger injuries, limited mobility in joints and ankylosis depend on poorly delivered functional therapy. So, for example, evacuation hospital No. 3640 (EH-3640), where functional therapy is well delivered, gives 14% of those who were laid off due to the consequences of injuries, and EH-1311 with the worst setting of functional therapy gives 29.6% of those who were laid off for the same reasons. Although these two hospitals are identical in all other respects.

At the same time, with an improvement in the setting of functional treatment, the number of those returned to service increases. So, over the three months of 1942 in EH-2801, the duration of treatment of a wounded men decreased from 47 to 40 bed days. At the same time, the percentage of those returned to service increased: in January it was – 89.3%, in February – 95.8% and in March – 92.1%. Data on the effect of therapeutic physical education on the duration of treatment and its outcomes based on materials from hospitals in the Moscow Military District (MMD) are presented in (Table 1).

**Table 1:** The effect of the therapeutic physical culture quality on the duration of treatment and its outcomes (according to the MMD).

The grade of therapeutic physical culture setting	Number of hospital	Contingent of the wounded	The average duration of treatment in bed days	Treatment outcomes	
				% of return to service	% of completely dismissed
good	355	of moderate severity	43.1	93.2	6.8
satisfactory	3774		56.5	81.5	8.5
good	2801	lightly wounded	45.0	95.3	4.7
unsatisfactory	3469		54.3	48.8	21.5
Was not carried out	3170		71.0	58.7	23.8
	3176		85.0	46.0	30.6

The data in the table indicate that the use of exercise therapy is directly related to the magnitude of treatment outcomes. At the same time, it is worth noting that the results of poor performance of exercise therapy are similar to the results of its absence. So, in hospital No. 3170, where functional treatment was not delivered, the average stay of a group of lightly wounded is 71 days, the outcome of the wound: 58.7% were discharged to the unit and recovering battalions, 23.8% were deregistered. The same is in

hospitals No. 3176, 3469, where the percentage of those dismissed reaches 21-30%, and the average stay is from 54 to 85 days. At the same time, in hospital No. 2801, where was a good performance of therapeutic physical culture, the average duration of treatment was 45 days, and the percentage of the dismissed was 4.7. We give other MMD data on the connection of treatment duration with the quality of physical therapy in hospitals (Table 2).

**Table 2:** The duration of treatment in evacuation hospitals (EH) with various physical therapy settings (MMD data).

Hospital Number	Duration of treatment before admission to the Hospital in bed days	The duration of treatment in hospital in bed days	Total treatment duration in bed days	Treatment setting
422	32.5	36.3	68.8	good
1371	15.7	55.3	71.0	satisfactory
2743	23.2	60.1	83.1	

The influence of therapeutic physical culture quality on the results of treatment is clearly shown. So, in hospital No. 422, where exercise therapy was carried out, the total duration of treatment was 68.8 days. In hospitals Nos. 1371 and 2743, where exercise therapy

was satisfactory, the total duration of treatment exceeded 71 days. Below are the data from the frontline evacuation point 77 (FEP-77), which also show different treatment outcomes, depending on the quality of the physical therapy setting (Table 3).

**Table 3:** Comparative data on the results of treatment in hospitals with different settings for physical therapy (according to FEP-77).

The Months of 1942	Discharged to the unit, %	
	From the hospitals with unsatisfactory TPC	From the hospitals with proper TPC
March	38	70.6
April	28	90.6
May	42	64.0
June	56	74.0

On average, from 64 to 90.6% of patients were discharged from hospitals with a proper setting of exercise therapy. While with an unsatisfactory setting - from 28 to 56%. Similar data are given in the report of the Leningrad Front for 1941-1942. So, with average data, extracts to the front unit account for 58.5%. 65.8% were discharged from an EH with a good setting of exercise therapy. Of the EH with a satisfactory setting of exercise therapy - 46.7%. Of the EHs that did not use exercise therapy, 29.4%. Data on the distributed evacuation

site 95 (DES-95) on various initial treatment methods, depending on the quality of treatment for the wounded and sick (Table 4). The table below also clearly indicates the connection between the performance of functional treatment, the duration of treatment and the results (Table 5). According to the data presented, the improvement in the usage of physiotherapeutic exercises as the leading link in functional treatment has allowed the return back to duty of a large number of wounded from 81.5 to 95.3%.

**Table 4:** Data on treatment outcomes in hospitals with good and satisfactory physical therapy performance (according to DES-95).

Denomination of wounds	Estimation of exercise therapy	Coverage of exercise therapy, %	Outcomes, %		
			Discharged to unit	Serviceable limitedly	Totally dismissed
Hand	good	83.4	90.9	7.4	1.7
	satisfactory	79.2	69.6	26.4	4.9
Soft tissue injury of the shoulder and forearm	good	81.1	81.1	2.8	0.96
	satisfactory	67.4	67.4	1.3	10.6

**Table 5:** Data on treatment outcomes in hospitals with different physical therapy settings.

Functional treatment performance estimation	Hospital Number	Average bed days number	The number of discharged to unit, %	Totally dismissed from the Red Army, %	Contingents of the wounded
Good	355	43.1	93.2	6.8	moderate severity
Satisfactory	3774	56.5	81.5	8.5	
Good	2801	45.0	95.3	4.7	
Unsatisfactory	3469	54.3	48.8	21.5	lightly wounded
Was not performed	3170	71.0	58.7	23.8	
	3167	85.0	46.4	30.9	

**Discussion**

Most patients are characterized by a decrease in vitality due to a decrease in physical activity in bed rest conditions. At the same time, the flow of proprioceptive stimuli is sharply reduced, which leads to a decrease in the lability of the nervous system at all its levels, the intensity of the course of vegetative processes and

muscle tonus. With prolonged bed rest, especially in combination with immobilization, there is a violation of the functions of the autonomic and somatic nervous systems. Disease (trauma) and lack of exercise lead to significant changes in homeostasis, muscle atrophy, functional disorders of the endocrine and cardiorespiratory systems, etc. [6]. Therefore, the use of physical exercises for the

prevention and treatment of diseases is pathogenetically justified. When performing physical exercises, there is a significant increase in the functional activity of internal organs. All this is associated with the activation of humoral regulators of metabolism, hormones of the endocrine glands, neurohumoral mechanisms.

So, when performing muscle work, hormones are released into the bloodstream, which have a stimulating effect on the heart, and regional blood circulation is activated due to metabolites formed in the muscles [4,7]. In general, there is an increase in the balance and mobility of the processes of excitation and inhibition, an improvement in the activity of the motor, vestibular, auditory, visual, tactile analyzers necessary for the quickest recovery of patients [1]. During the Second World War in the USSR physical education organizations and sports schools carried out significant work on physical therapy in hospitals and battalions for recovering. From year to year, it has been applied on an ever-increasing scale. If at the beginning of the war, exercise therapy only 25% of the wounded were captured, then by the end of the war up to 88%. Particularly great importance was attached to physical therapy in hospitals for the wounded and in departments and battalions for recovering.

For them, classes in therapeutic gymnastics were conducted in the wards, developed original devices for kinesitherapy, they were taught self-massage skills. Along with this, at this stage, breathing exercises, active exercises for injured limbs, posture treatment, and massage were used to a significant extent. Also, in local evacuation centers, hardware physiotherapy, paraffin treatment, mud therapy, and treatment with mineral waters were performed [5]. Today, exercise therapy as a component of physical rehabilitation is used in the treatment of various diseases in neurology, cardiology, pulmonology, traumatology, orthopedics, dentistry, nephrology and pediatrics [1,3,7,8,9,10,11,12].

In addition, it has been established that while engaging in physical exercises, the patient himself actively participates in the healing process, and this has a beneficial effect on his psychoemotional sphere [13].

## Conclusion

Historical and literary data, as well as practical experience in the use of physical exercises for medical and rehabilitation purposes, indicate the high effectiveness of this area of treatment and rehabilitation. Correct and timely use of exercise therapy accelerates recovery, helps to restore impaired ability to work and return to normal life. Being one of the most important elements of modern complex treatment, exercise therapy affects not only

pathologically altered tissues, organs or organ systems, but also the whole organism. Physical exercises affect the reactivity of the whole organism and involve mechanisms that participated in the pathological process into the general reaction. In this regard, physiotherapy exercises can be called a method of pathogenetic therapy. The further development of the use of physical exercises for medical and rehabilitation purposes should be in accordance with the development of clinical and preventive medicine.

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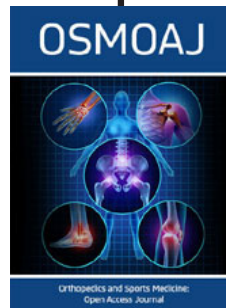
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