

Dimensions of Depression in the Dynamics of Recovery of Elderly Patients with Post-Traumatic Sequelae

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Abstract: *Background: Any physical trauma, regardless of the chronological age reference, involves the restructuring of psychological functionality, both cognitively and emotionally. The older the age at which physical injuries with post-traumatic sequelae occur, the more the context of mental life is affected in a manner that leads to the development of post-traumatic stress disorder. One of the premises of this research is that the integrated physical and psychological approach of the patient in post-traumatic recovery for elderly patients allows the improvement of their attitude toward the traumatic situation, implicitly activating the patient and reducing the depressive factor, in addition to increasing their awareness of their own body in the recovery process. Results: The experimental group consisted of 35 subjects, who scored a total of 376 points in the initial phase and 178 points in the final phase, resulting in a difference of 198 points between the two phases of testing. The control group also consisted of 35 subjects, who scored 339 points in the initial phase and 298 points in the final phase, with a difference of 41 points between the two phases. Conclusions: Given this, collaboration among doctors, physical therapists, and psychologists becomes essential in the physical recovery process for elderly patients. Reconnecting the individual with their inner self, encouraging voluntary engagement, and identifying personal strengths and past achievements can provide realistic new frames of reference.*

Keywords: *elderly, post-traumatic recovery, holistic approach to the patient, depression.*

How to cite: Șlicaru, A.-C., Sandovici, A., Ababei, C., Ochiană, G., Nechifor, C., Dobrescu, T., & Raveica, G. (2025). Dimensions of depression in the dynamics of recovery of elderly patients with post-traumatic sequelae. *Revista Românească pentru Educație Multidimensională*, 17(1), 277-292. <https://doi.org/10.18662/rrem/17.1/950>

Background

Population aging, a universal phenomenon characterized by great scale, depth, and speed, is the inevitable result of demographic transformation. Along with a significantly older population, age-related diseases are becoming increasingly common and widespread, negatively impacting global public health. With the development of an aging society, the rising number of fractures has become one of the public health challenges affecting the healthy lifespan and quality of life of older adults/adults. Hip fracture is one of the most severe types of fractures (Barak et al., 2020). Post-Traumatic Stress Disorder (PTSD) is often associated with deficits in the speed of information processing and more rarely with the inability to distract attention from current painful stimuli (Qureshi et al., 2011; Twamley et al., 2009). Certainly, psychological functionality is significantly influenced both at the time of trauma (physical in this case – falling, hitting, muscle, and joint tears and injuries, etc.), but especially when structuring the meaning of the trauma experienced (Mittal et al., 2001). When referring to the elderly, the risk of severe injuries is significantly higher compared to other age groups. The occurrence of any physical injury affects the psychological dimension of the elderly, who can understand the significance of the trauma, but especially its repercussions (Hadjistavropoulos et al., 2011). Numerous studies have shown that age is an important predictor of the development and progression of hip fractures. By 2050, an estimated 6.26 million hip fractures are expected worldwide, with individuals aged 65 and older accounting for 80% of cases (Kleiven, 2020).

Many studies dedicated to active aging have highlighted dimensions of the psychological functionality of the elderly in relation to trauma. Since the 1980s, the concern for this phenomenon of active aging has increased, given the global phenomenon of population aging. In this context, studies have focused on psychological aspects related to the fears of the elderly regarding living an active life. Themes such as the fear of falling, self-efficacy in managing falls, lack of trust in balance, and concerns about consequences have better outlined the psychological profile of the elderly vulnerable to physically and mentally traumatizing events. Research in this field has shown that at the mental level of the elderly, there are numerous concerns about possible personal injuries or those of their partners, worries about the consequences of an injury (Jørstad et al., 2005).

Often, in addition to the fear of falling itself and the inefficiency of physical recovery, elderly individuals express concern about not being able to get up or needing assistance in daily life activities after a fall or injury

(triggering psychological disorders such as depression or senile dementia) (Teshler & Hobson, 2005). The quality of life of patients with post-traumatic sequelae is severely affected by the prolonged cycle of treatment and recovery. For the rehabilitation of older adults after hip fracture surgery, scientific and appropriate postoperative self-care is crucial. Developing self-care skills is important for disease management, symptom control, and the postoperative health of patients. Therefore, a comprehensive rehabilitation intervention, both physical and psychological, is a priority (Khatiban et al., 2018).

Other studies show that a majority, over 55%, of individuals approaching retirement who led an active life in terms of family roles, report cognitive concerns about possible injuries. The prevalence increases as they age into their senior years, being more pronounced in women than men (Lach, 2005). Cross-cultural studies (Europe, Australia, and the USA) conducted in the 2000s revealed that more than one-third of older adults fall five to six times a year, with a variable percentage of between 10 and 20% correlating with serious neurological injuries or fractures in the musculoskeletal system (Alexander et al., 1992). The rate of injuries due to falls rises sharply with age, and their consequences are associated with significant morbidity, reduced mobility, diminished independent functioning, or loss of independence (Sterling et al., 2001).

Regarding the response to stress associated with physical injuries, Lazarus and Folkman's stress and adaptation model (1984) suggests that the variety of responses to stressors depends on the evaluation of the stress factor, i.e., unintentional injury. According to this model, individuals actively try to assess the potential threat to their health and well-being, as well as the available resources to cope with the stressor. When referring to the available physical and psychological resources to support the individual, physical injury is perceived as less threatening over time. Conversely, psychological problems (mental deterioration, onset of depression), marital status, or financial issues seem to prolong adherence to specialized interventions and significantly decrease the quality of life. The more limited the personal and social resources are perceived to be, the more likely cognitive deterioration is, and, consequently, a significant reduction in the chances of physical recovery after an injury for elderly individuals.

No matter how much prevention is done at the individual and community level, injuries occur, and their physical consequences cannot be completely undone in a very short time. However, multiple interventions can be made on psychological factors (Bisson & Andrew, 2005). This is particularly important, considering how common psychological morbidities (especially depression, anxiety, and post-traumatic stress disorder - PTSD)

follow unintentional injuries. However, the prevalence of psychiatric morbidity after an unintentional injury varies significantly across studies. An analysis of psychiatric morbidity following traffic injuries found that depression rates ranged from 21% to 67%, anxiety from 4% to 87%, and PTSD from 0% to 100% (Blaszczynski et al., 1998). Another study investigating survivors of traumatic injuries found that the prevalence of depression ranged from 6% to 42%, anxiety from 4% to 24%, and PTSD in most studies from 10% to 30% (O'Donnell et al., 2008). Another study conducted 12 months after the injury found that the prevalence of PTSD ranged from 2% to 38% (Haagsma et al., 2011). Adherence to complex medical treatment depends on understanding the psychological context of the suffering individual. As a result, in the case of physical post-traumatic sequelae, a client-centered approach can make the difference between resilience or deepening physical and psychological morbidity. There is no separate physical recovery and psychological recovery. They are interdependent in a dynamic and complex human process. Functional outcomes do not fully capture the recovery process. There is no widely accepted definition of recovery after an injury, but the following definition of recovery from mental illness might equally apply to injuries: "A deeply personal, unique process of changing one's attitudes, values, feelings, goals, skills, and/or roles. It is a way of living a fulfilling, hopeful life, contributing even within the limits imposed by illness" (Anthony, 1993). The same author further argues that recovery is a multidimensional concept, with many different facets that correlate with returning home, regaining personal autonomy, and accepting the new physical and psychological realities acquired after the traumatic event. The chance of returning to the pre-injury state decreases significantly when referring to the elderly. Therefore, understanding the personal history and connecting to the unique psychology of each individual can make a difference in the new life. A new life with high quality of life should exist.

Methods

As intervention methods for post-traumatic recovery of elderly patients in the experimental group, we applied the biofeedback method, accompanied by psychological counseling sessions. For the control group, recovery sessions based on classical physical therapy techniques were applied. In this paper, we will focus on highlighting the results obtained from the integrative recovery process, specifically concerning depression—considered the central axis in the psychology of the elderly with post-traumatic physical pathology.

Subjects

The study included 70 patients aged between 70 and 90 years, with post-traumatic sequelae in the lower limbs. The selection and division of patients into two groups were based primarily on the results of the MMSE (Mini Mental State Examination) (only patients scoring between 18 and 24 on the MMSE were included in the study) and a well-conducted medical history. All the selected patients were able to consciously give their consent to participate in this research through the selected data. This was made possible through collaboration with the psychologist, physician, and the entire team at the Rehabilitation Center where the research took place.

Another selection criterion, to ensure homogeneity of the group, was the location and type of fracture reduction. Only patients with operated femoral fractures were included in the study. The time from the occurrence of the fracture to surgery is 6–7 months, with a mandatory immediate postoperative recovery period of 10 to 14 days. Each group, experimental and control, included 35 patients.

Organization of the research

The study was conducted over a period of six months (February – July 2024), during which we periodically selected and intervened with the 35 patients included in the experimental group and monitored the progress of those in the control group. The subjects were selected from four specialized healthcare units in Bacău County.

At the time of selecting the patients included in the study, their informed consent was obtained, and they were provided with the necessary information describing the intervention program and the procedures used, ensuring that they understood the study's requirements. Additionally, for the study to be conducted, approval was requested and obtained from the ethics committee of "Vasile Alecsandri" University of Bacău.

Research Aim and Objectives

One of the premises from which this research was designed was that an integrated physical and psychological approach to post-traumatic recovery for elderly patients allows the improvement of the patients' attitude toward the traumatic situation, in addition to increasing awareness of one's body in the dynamics of the recovery process. This would lead to the patients becoming more active and reducing their depressive factors.

Instruments

Evaluation and Intervention Methods

For the research design, we used a quasi-experimental approach with three phases:

1. the initial evaluation phase (patients from both the experimental and control groups),

2. the therapeutic intervention phase (in the experimental group, 5 physical therapy sessions per week for 4 weeks, and 8 psychological counseling sessions; in the control group, 5 physical therapy sessions per week for 4 weeks),

3. the final evaluation phase in which the same instruments as in the initial evaluation phase were applied.

The evaluation instruments used in both experimental phases were:

The MMSE (Mini Mental State Examination) (Folstein et al., 1975) - This is a cognitive function assessment tool with a maximum score of 30 points (very good functionality) and a minimum of 0 points. Using specific scales, it evaluates parameters such as: spatial-temporal orientation, attention and mental calculation, immediate memory, short-term memory, language, repetition, understanding commands, reading, writing, and copying a text.

The Conley Test (Ledford, 1997) - A scale consisting of a 6-variable questionnaire to evaluate the fall risk in elderly people. The total score can range from 0 to 10.

The BINA Test (Gerasch et al., 2014) - A multidimensional scale assessing the level of dependence in elderly patients, with parameters including mobility, sphincter control, cognition, language, visual and auditory sensitivity, daily activities, the need for medical care, and family situation.

The Tinetti Test (Tinetti, 1986) - A test assessing static and dynamic balance, consisting of 9 items for static balance and 7 for dynamic balance, with scores from 0 to 2 for each item.

The Barthel Index (Quinn et al., 2011) - A scale used to evaluate the degree of collaboration of a subject in daily activities. The Barthel Index analyzes 10 variables describing daily life activities, assigning a specific score to each item, which is then summed up to obtain the final global score. The higher the global score, the higher the degree of independence.

The Beck Depression Inventory (Guze, 1995) - In its classic form, this self-assessment scale for depressive symptoms contains 21 items (each item evaluates a depressive symptom on a scale from 0, representing the absence of the symptom, to 3, indicating a very severe symptom). In this study, the shortened version with 7 items was applied, considering the specificity of the elderly patients with post-traumatic sequelae.

Description of the Intervention Methods Applied in the Two Groups

In the experimental group:

a) *The Biofeedback Method* – This method transforms an unconscious biological phenomenon (such as muscle electrical activity) into a perceivable signal (acoustic or visual) which can be used to control the monitored phenomenon. In this study, the electromyographic type of biofeedback was used.

b) *Structure and Conduct of Eight Individual Psychological Counseling Sessions* – These sessions were tailored according to the individual psychological profile of each patient. The goal was to reduce the depressive dimension associated with the traumatic event. This, implicitly, would activate the psychological resources necessary for recovery and post-recovery, so that patients could lead as active and independent a life as possible from a psycho-behavioral standpoint. The main topics addressed during the counseling sessions included: Who am I?; The path of my personal life; My achievements; My personal resources; Strengths and weaknesses; Opportunities and obstacles; Being psychologically active in my life – benefits; Strategies for self-monitoring mental health; Identifying activities with a positive recreational impact in old age. All the topics addressed during the psychological counseling sessions also focused on the component of positive self-education. That is, to relearn how to live an active life, in accordance with the new personal reality experienced.

In the control group, 5 physical therapy sessions per week for 4 weeks were conducted, utilizing recovery sessions based on classical physical therapy methods and techniques.

Results

According to the hypothesis presented, we will now highlight and present the results obtained in the two groups (experimental and control) concerning depression, based on the results from the application of the Beck Depression Inventory in both the initial and final evaluation phases.

The experimental group consisted of 35 subjects, who scored a total of 376 points in the initial phase and 178 points in the final phase, resulting in a difference of 198 points between the two phases of testing. The control group also consisted of 35 subjects, who scored 339 points in the initial phase and 298 points in the final phase, with a difference of 41 points between the two phases. The results are presented in the following figure.

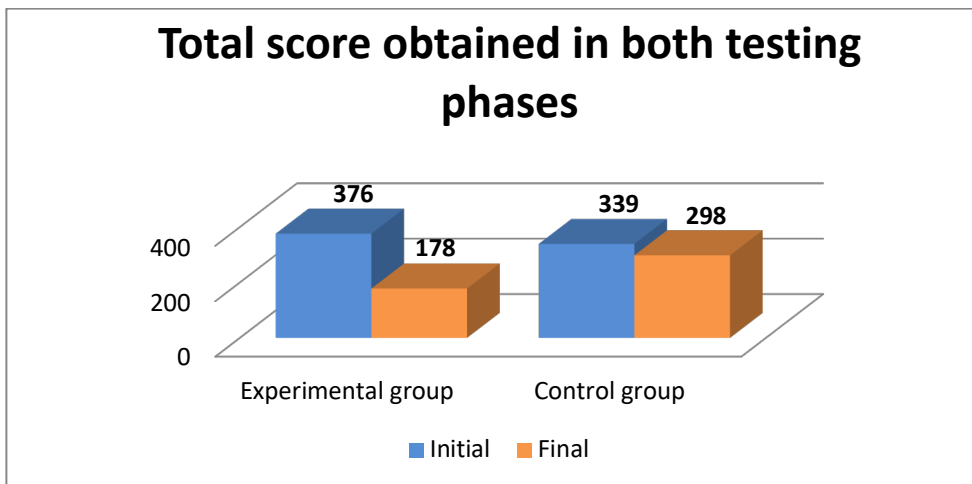


Figure 1. Total score obtained in both testing phases.

Regarding the classification of the raw results obtained in standardized classes for the two patient groups, the results are presented as follows:

Table 1. Initial results for the experimental group

Initial results for the experimental group					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Mild depressive symptoms	3	8.6	8.6	8.6
	Moderate depressive symptoms	27	77.1	77.1	85.7
	Severe depressive symptoms	4	11.4	11.4	97.1
	Very severe depressive symptoms	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

According to Table 1, for the experimental group, at the initial phase, 3 subjects (8.6%) were classified with mild depressive symptoms, 27 subjects (77.1%) with moderate depressive symptoms, 4 subjects (11.4%) with severe depressive symptoms, and 1 subject (2.9%) with very severe depressive symptoms. The data obtained are presented in the following graph. It is observed that most subjects were classified with moderate depressive symptoms.

In the case of the control group (Table 2), at the final phase, 7 subjects (20.0%) were classified with mild depressive symptoms, 26 subjects (74.3%) with moderate depressive symptoms, and 2 subjects (5.7%) with severe depressive symptoms. It is observed that most subjects were classified with moderate depressive symptoms.

Table 2. Initial results for the control group

Initial results for the control group					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Mild depressive symptoms	7	20.0	20.0	20.0
	Moderate depressive symptoms	26	74.3	74.3	94.3
	Severe depressive symptoms	2	5.7	5.7	100.0
	Total	35	100.0	100.0	

At the final evaluation phase (Table 3), for the experimental group, 4 subjects (11.4%) had insignificant symptoms/absence of depression, 27 subjects (77.1%) had mild depressive symptoms, and 4 subjects (11.4%) had moderate depressive symptoms. It is observed that most subjects were classified with mild depressive symptoms.

Table 3. Final results for the experimental group

Final results for the experimental group					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Insignificant symptoms/ absence of depression	4	11.4	11.4	11.4
	Mild depressive symptoms	27	77.1	77.1	88.6
	Moderate depressive symptoms	4	11.4	11.4	100.0
	Total	35	100.0	100.0	

In the control group, at the final phase (Table 4), 13 subjects (37.1%) had mild depressive symptoms, 21 subjects (60%) had moderate depressive symptoms, and 1 subject (2.9%) had severe depressive symptoms. It can be observed that most subjects were classified with moderate depressive symptoms.

Table 4. Final results for the control group

Final results for the control group					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Mild depressive symptoms	13	37.1	37.1	37.1
	Moderate depressive symptoms	21	60.0	60.0	97.1
	Severe depressive symptoms	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

In Figure 2, the results for the experimental group are presented based on their classification into standardized classes for both the initial and final testing phases. Initially, most subjects were classified with moderate depressive symptoms. In the final phase, most were classified with mild depressive symptoms or no depressive symptoms (absence of depression).

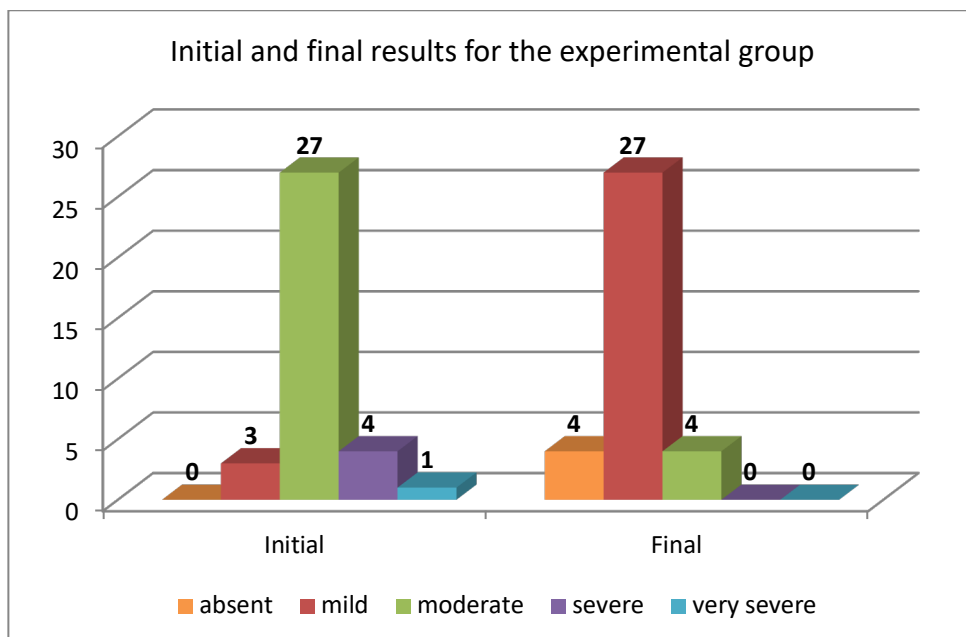


Figure 2. Initial and final results for the experimental group

Regarding the comparison of results within the control group, the results are presented in. While initially, most subjects were classified with moderate depressive symptoms, at the final evaluation, the majority were still classified with moderate and mild depressive symptoms.

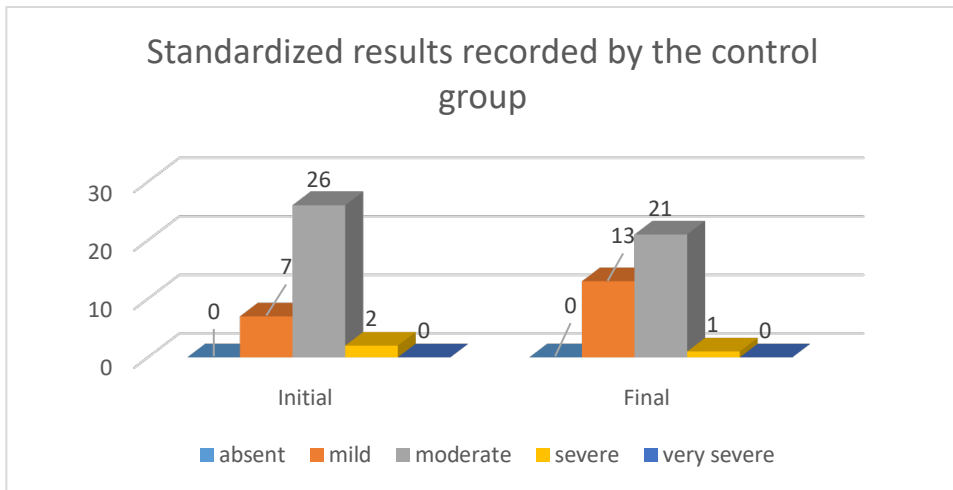


Figure 3. *Initial and final results for the control group*

To determine whether the differences between the two testing phases are statistically significant, the Student's t-test was applied. For the experimental group, the mean difference is 5.63. This difference is statistically significant, $t(34) = 13.601$, $p < 0.001$. For the control group, the mean difference is 1.17, and this difference is statistically insignificant.

The one-way ANOVA test was applied to compare the means obtained by the two groups. The independent variables were the two groups and testing phases, and the dependent variable represented the depression scores obtained.

Table 5. Mean comparisons between experimental and control groups

Tests of Between-Subjects Effects						
Dependent Variable: Scor						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	633.279 ^a	3	211.093	32.123	.000	.415
Intercept	10132.007	1	10132.007	1541.827	.000	.919
Group	633.279	3	211.093	32.123	.000	.415
Error	893.714	136	6.571			
Total	11659.000	140				
Corrected Total	1526.993	139				
a. R Squared = .415 (Adjusted R Squared = .402)						

The analysis reveals a mean difference of 5.66 between the initial and final testing phases for the experimental group, compared to a mean difference of 1.17 for the control group. Regarding the effect size of the two groups on the dependent variable (depression level), the results show a statistically significant difference ($p < 0.001$, $F = 32.123$, $\eta^2 = 0.415$).

This indicates that 41.5% of the variance in depression scores can be attributed to the intervention applied to the experimental group. The integrated recovery approach, including biofeedback and psychological counseling sessions, significantly reduced depressive symptoms in the experimental group compared to the control group.

Discussions

Physical ailments have a significant psychological impact on resilience, especially in elderly individuals. Emotional suffering at this age is often deeply felt, particularly in individuals with preserved cognitive integrity, as they compare themselves to their past selves—both in terms of physical appearance and capabilities, as well as psychological self-perception. A holistic approach that addresses both the physical and psychological dimensions of suffering is essential for recovery and restoring bodily functionality. This is particularly true for conditions that impair autonomy and independent mobility, as seen in the patients from the two experimental groups in this study. The experimental group achieved better psychological functionality than the control group. However, this does not imply that depression was

eliminated in the experimental group. Multiple factors could explain this, with the primary reason being the specific psychological functioning characteristic of older adults. Research suggests that depression in the elderly tends to be more profound compared to younger individuals with similar post-traumatic conditions (Cuijpers et al., 2012). Psychological interventions tailored to individual psychological needs can play a crucial role in physical recovery. Health problems in older age require a balanced lifestyle, where regular physical exercise—at least three times a week—can have positive effects on preventing or alleviating certain conditions, while also fostering optimism and a positive attitude (Ababei et al., 2019).

Importance of the Study. The selection of the experimental group was based on an evaluation of functional status and cognitive preservation (MMSE), which correlated with several key aspects: patients were aware of their condition, understood the importance of multi-axial recovery (both physical and psychological), and were able to comprehend rehabilitation procedures based on the biofeedback method. Additionally, they gained a deeper understanding of their own psycho-emotional experiences and became more actively involved in self-care, both physically and psychologically. They also became more open to collaborating with specialists, as well as with auxiliary medical staff and caregivers.

Study Limitations. Elderly patients have complex needs, which become even more intricate considering the fragile state they are in after experiencing traumatic injuries and specific surgical interventions. Besides the applied physical rehabilitation method (biofeedback) and psychological counseling sessions, patients in our study did not benefit from socialization activities with one another. Additionally, we were unable to establish a structured schedule of leisure activities to help them channel their mental energy. A well-organized engagement in selected leisure activities would undoubtedly contribute to reassessing personal values, increasing self-confidence, and revitalizing the lives of elderly individuals affected by post-traumatic condition.

Conclusions

Physical pathologies in the elderly that result in loss of mobility—and thus personal autonomy—inevitably weaken psychological resilience. This vulnerability is amplified when risk factors for depression are present. Understanding the individual psychological profile of each elderly person undergoing a major post-traumatic event becomes central to recovery planning and, most importantly, to helping them emerge from trauma by activating latent inner resources. Given this, collaboration among doctors,

physical therapists, and psychologists becomes essential in the physical recovery process for elderly patients. Reconnecting the individual with their inner self, encouraging voluntary engagement, and identifying personal strengths and past achievements can provide realistic new frames of reference. This approach fosters motivation and emotional stability, enabling the patient to navigate the challenging recovery process more effectively.

At the end, we mention that all authors had an equal contribution to the research.

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