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## THE EFFECT OF REHABILITATION TECHNOLOGY ON QUALITY OF LIFE OF MIDDLE-AGE WOMEN AFTER UPPER LIMB TRAUMA

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Received on 25-10-2016

Accepted on 02-11-2016

### Abstract

The article presents the attempts of theoretical analysis and generalization of experimental data on the impact of traumatic stress on the quality of life of middle-age women, who suffered from upper limb trauma during the post-immobilization period. The study involved 52 women aged 55-65 years diagnosed with a fracture of the distal radial metaphysis.

Patients of the main group passed a rehabilitation course according to the proprietary methodology consisting of auto-relaxing exercises complex carried out by applying the hydrothermal effect on the injured limb. At the end of the rehabilitation period, the indicators of performance status and vitality in women of both groups were significantly increased in comparison with the background level that indicates a decrease in lassitude and increase in vitality of patients, as well as proves the effectiveness of conducted interventions. In the course of applying the set of auto-relaxing exercises, the desired effect of restoring the damaged limb function at the background of improving the general well-being of women, was achieved in two weeks of exercises, while women in the control group, attending therapeutic exercises sessions, reached this effect two months later. In addition, at the beginning of the rehabilitation course, women of the main group evaluated their treatment perspectives higher as compared to women in the control group. Indicators of social and especially role-emotional functioning in the women of both groups at the end of the rehabilitation course significantly increased in comparison with the background level that indicates an increase of social contacts, communication level of women, enhancement of their vitality, disappearance of discomfort in everyday life and in public places, etc. Indicators of mental and physical health components of women in both groups have improved at the end of the rehabilitation course in comparison with the data of baseline survey that indicates the improvement of their physical health and self-confidence, reduction of anxiety, improvement of mental well-being and emotional resilience.

**Key words:** Rehabilitation technologies, quality of life, mental health component, physical health component, women, middle age, upper limb trauma, autogenic relaxation complex.

## **1.Introduction**

On the totality of subjective experiences, any trauma affects physical, mental and social well-being of a person. Quality of life is an important criterion of the effectiveness of the rehabilitation measures proposed to patients. Adapting to new conditions of life, the injured person acquires a new experience of communication with the surrounding reality and inevitably registers stressful feelings.

Stress-response in humans is characterized by complex of behavioral and physiological changes in the body. Behavioral responses may include a variety of manifestations, including activation, lethargy, apprehensive attitude, acute attention and much more, reflecting in general "orientating response" and "pain readiness" [8, 11, 13].

Any stress in general and traumatic stress, in particular, is biologically justified phenomenon allowing the body to meet any malicious agent in the state of "readiness for action", to overcome the difficulties and adapt to the new environmental conditions [9, 15, 16, 18, 19].

For middle-age women, upper limb injury is significant psychological trauma, having a pronounced social component. After the trauma, women, as a rule, hardly perform the usual manipulations, including household chores, personal hygiene activities, mobility, care about relatives, i.e. their total work capacity is reduced significantly.

Since the traumatization is a random process, women are not ready for it psychologically. It is difficult for them to change their way and rhythm of life that greatly complicates the forthcoming recovery.

Post-traumatic anxiety disorders in the middle-age women' organism may have a significant impact on the dynamics of the recovery period, during which a woman's organism gradually adapts to the stress. This evidences the possibility to train the stability of the organism to various stressors within a certain range and, as a consequence, enhance the emotional resilience of personality [1, 2, 10, 12].

Middle-age women, at the time of the typical radial bone fracture, i.e. under the primary effect of the stressor (fall, shock, etc.) experience a stress reaction, which plays in this case the role of the adaptive process aimed at further recovery of the homeostasis parameters and preservation of normal functioning of the body [3, 4, 5, 17].

The mechanisms of such adaptive response of women organism to stress are extremely complex, because the stress, on the one hand, always manifests itself through specific symptoms (alarm reaction, fastness, inanition of the body), and on the other hand, is nonspecific in its origin [6].

The excitation of the cholinergic system in women occurs from the first seconds of stressor action, since the status of this system in women is higher. We can assume that this is one of the reasons for the greater stability of the cardiovascular system of women to extreme conditions or factors. Increased secretion of catechol amines, glucocorticoids, and vasopressin during stress, inherent to female body, is a prerequisite for the emergence of hypertension and thrombosis, especially during prolonged stress [14]. The above emphasizes the relevance of the conducted study.

## **2. Material and the research methods**

The study was conducted during the period from 2010 to 2012 on the basis of the Municipal budgetary healthcare institution "Municipal Clinical Hospital No. 5". During the post-mobilization period we examined 52 women aged 55-65 years diagnosed with a distal radius metaphyseal fracture. This category of examined patients was divided into two groups (control and basic), 26 women in each. Group formation was carried out based on random sampling.

Exclusion criteria were based on availability of the following concomitant diagnoses in tested women: neuropathy of injured limb (muscle relaxation causes muscle weakness), Parkinson's disease, polyarthritis of the articulations of hand (muscle relaxation causes a sharp increase in regional swelling of the injured area of the upper limb), the lack of consolidation of damaged bones of the injured limb (muscle relaxation provokes the formation of a false joint; there is a risk of damaging regional nerve, blood vessels and muscle tissue).

Before the fracture of the upper limb, all of the women did not comply with certain food diet and their physical activity was low.

During the rehabilitation period the patients of the control group were asked to exercise according to the classical therapeutic exercise methodology using exercises targeted on increase of the amplitude of the injured link in the upper limb.

Patients of the main group passed a rehabilitation course according to proprietary methodology consisting of autogenic relaxation complex carried out by applying the hydrothermal effect on the injured limb.

Innovative aspect of the proprietary methodology consisted in the independent impact of patients in the main group on the recovery process of mobility of the injured link of the upper limb in combination with a specific breathing.

The methodological aspect of the proposed rehabilitation program was self-control aimed at speedy quality recovery of the injured region of the upper limb.

Women were suggested to refuse from any liquids or food intake 1.5-2 hours before and after the intervention.

In the course of the rehabilitation period, the patients were forced to drink 30-40 ml of liquid per 1 kilogram of body weight.

The food should not contain aggressive components (vinegar, fat, fish, fried salty food, as well as sausages and sweets).

Thus, through the pain limit women could control the degree of pressure on the area of the injured limb, increasing and accelerating the recovery process of mobility of the injured region of the limb.

Women of the studied groups were asked to answer the questions of the SF-36 questionnaire describing their quality of life before sessions as well as at the end of the recovery process (in 14 days in the primary group, and 2 months in the control group).

The questionnaire consisted of 11 sections. The results were scored on 8 summary scales, each ranged from 0 to 100 points.

The questionnaire contained certain summary scales: physical functioning, role functioning, bodily pain, general health, vitality, social functioning, emotional state, and mental health.

As a result, all scales form two indices: the mental (mental health component) and physical health (physical health component) [7, 20].

The following indicators were evaluated quantitatively:

- 1) General Health (GH) –describes general state of health;
- 2) Physical Functioning (PF) – describes physical functioning;
- 3) Role-Physical Functioning (RP) – describes the influence of physical state on the role functioning (work, performing daily activities);
- 4) Role-Emotional Functioning (RE) – describes the influence of emotional state on the role functioning;
- 3) Social Functioning (SF) – describes social functioning;
- 4) Bodily Pain (BP) – describes the intensity of pain and its influence on the ability to be engaged in daily activities;
- 7) Vitality (VT) – describes viability;
- 8) Mental Health (MH) – self-esteem of the mental health.

Physical health component consists of the following summary scales: physical functioning; role functioning associated with physical condition; bodily pain; general state of health.

Mental health component consists of the following summary scales: mental health; role functioning conditioned by emotional state; social functioning; and vitality.

### **3. Results and discussion**

We have obtained the following data, characterizing the quality of life of women from both tested groups, who experienced the trauma of distal radial metaphysis, during post-mobilization period.

Baseline survey in women of the main group revealed the following average scores of the SF-36 questionnaire scales:

- Physical Functioning (PF) – 33.8 points;
- Role-Physical Functioning (RP) – 3.6 points;
- Bodily Pain (BP) – 1.9 points;
- General Health (GH) – 39.2 points;
- Vitality (VT) – 17.6 points;
- Social Functioning (SF) – 44.2 points;
- Role-Emotional Functioning (RE) – 5.6 points;
- Mental Health (MH) – 32.5 points;
- Physical health component (PH) – 397.2 points;
- Mental health component (MH) – 477.1 points.

Baseline survey in women of the control group identified the following average scores of the SF-36 questionnaire scales:

- Physical Functioning (PF) – 34.2 points;
- Role-Physical Functioning (RP) – 4.4 points;
- Bodily Pain (BP) – 1.8 points;
- General Health (GH) – 40.1 points;
- Vitality (VT) – 16.8 points;
- Social Functioning (SF) – 41.9 points;
- Role-Emotional Functioning (RE) – 5.2 points;
- Mental Health (MH) – 33.4 points;
- Physical health component (PH) – 375.0 points;
- Mental health component (MH) – 480.4 points.

Thus, during the baseline survey, women in both groups revealed low scores on "Physical Functioning" and the "Role Functioning" scales that was due to poor physical condition. This suggests that physical activity of women and their daily activities during this period were significantly limited due to the wrist joint fracture, affecting the physical condition of the patients.

The testees noted that in connection with the trauma they had to increase the time for the performance of the basic type work around house. In turn, the amount of completed work and its quality have reduced.

The results obtained according to the scale "Bodily Pain" in women of both groups at baseline survey were also reduced, indicating that occurring pain significantly restricted the activity of women.

Indicators of general health and vitality in women of both groups obtained in baseline survey were reduced as well that indicates the exhaustion of women and reduction of their vitality. This was caused by the long period of immobilization of the injured upper limb at the background of painful sensations arising at the initial stage of intervention.

At baseline survey, women of both groups have shown the reduction and limitation of social contacts, reduction of communication due to some deterioration of their physical and emotional status, as well as limitations in performing daily work, instrumental activities of daily living, discomfort in everyday life and in public places, while walking, climbing stairs, carrying heavy loads, etc.

Indicators of mental component of health of women in both groups at baseline survey were low that is consistent with the anxious feelings, hints of depressive behavior, mental problems in middle-age women, caused by injury, as well as anxiety about the possible consequences of the fracture affected by sensation of pain.

Upon completion of the autogenic relaxation complex, the indicators of quality of life corresponding to the scales of the SF-36 questionnaire, obtained from women of the main group, have changed as compared to those obtained at the baseline survey as follows:

- physical functioning has increased by 87.6% ( $p < 0.01$ );
- the effect of physical state on the role functioning has decreased by 23 times ( $p < 0.001$ );
- bodily pain has decreased by 35 times ( $p < 0.001$ );
- general state of health has improved by 46.7% ( $p < 0.01$ );
- viability has improved by 4.2 times ( $p < 0.001$ );
- social functioning has improved by 18.8% ( $p < 0.05$ );

- the effect of emotional state on the role functioning has decreased by 17 times ( $p<0.001$ );
- self-esteem of mental health has increased by 2.4 times ( $p<0.001$ );
- physical health component has improved by 3.4 times( $p<0.001$ );
- mental health component has improved by 3.1 times ( $p<0.001$ ).

After 14 days of therapeutic exercises, the indicators of quality of life corresponding to the scales of the SF-36 questionnaire, obtained from women of the control group, have changed as compared to those obtained at the baseline survey as follows:

- physical functioning has increased by 24.6% ( $p<0,05$ );
- the effect of physical state on the role functioning has decreased by 7 times ( $p<0,05$ );
- bodily pain has decreased by 16 times ( $p<0.05$ );
- general state of health has improved by 23.7% ( $p<0.05$ );
- viability has improved by 81.5% ( $p<0.05$ );
- social functioning has improved by 19.8% ( $p<0.05$ );
- the effect of emotional state on the role functioning has decreased by 7.7 times( $p<0.05$ );
- self-esteem of mental health has increased by 45.2% ( $p<0.05$ );
- physical health component has improved by 2.1 times ( $p<0.05$ );
- mental health component has improved by 80.1% ( $p<0.05$ ).

All the studied indicators of quality of life in women of the main group after two weeks of therapeutic exercises were significantly higher as compared to women in the control group, indicating a pronounced effectiveness of the proposed set of exercises in comparison with the traditional complex of therapeutic exercises.

After 2 months of therapeutic exercises, the indicators of quality of life corresponding to the scales of the SF-36 questionnaire, obtained from women of the control group, have changed as compared to those obtained at the baseline survey as follows:

- physical functioning has increased by 95.3% ( $p<0.001$ );
- the effect of physical state on the role functioning has decreased by 20 times ( $p<0.001$ );
- bodily pain has decreased by 39 times ( $p<0.001$ );
- general state of health has improved by 54.1% ( $p<0.001$ );
- viability has improved by 4.7 times ( $p<0.001$ );

- social functioning has improved by 46.0% ( $p<0.001$ );
- the effect of emotional state on the role functioning has decreased by 18.5 times ( $p<0.001$ );
- self-esteem of mental health has increased by 2.4 times ( $p<0.001$ );
- physical health component has improved by 3.7 times( $p<0.001$ );
- mental health component has improved by 3.2 times( $p<0.001$ ).

In consequence of the training according to the proposed rehabilitation techniques, women of the main group after 14 days, and women of the control group after 2 months have shown significantly increased indicators corresponding to the scales "Physical Functioning" and " Role Functioning" due to physical condition in comparison with those obtained in the baseline survey. This suggests that physical activity of women and their daily activities have increased significantly due to conducted rehabilitation interventions.

All the results obtained with regard to the scale "Bodily Pain" in women of both groups after completion of rehabilitation, significantly increased in comparison with the baseline survey. This indicates a significant decrease in sensation of pain associated with trauma, which previously substantially limited the activity of the patients.

#### **4. Conclusions**

1. At the end of the rehabilitation period, the indicators of general state of health and vitality in women of both groups were significantly increased as compared to those obtained in the baseline survey. This indicates a decrease in lassitude, increase in vitality and proves the effectiveness of conducted interventions.

2. In the course of applying the autogenic relaxation techniques, the desired effect of restoring the function of injured limb with underlying improvement of the general well-being of women was achieved in two weeks, while in women of the control group, attending therapeutic exercise sessions, similar effect was achieved just two months later. In addition, at the beginning of the rehabilitation course, women of the main group evaluated treatment perspectives higher than women in the control group.

3. Indicators of social and especially role functioning, conditioned by emotional state, in women of both groups at the end of the rehabilitation course significantly increased as compared with the indicators of baseline survey. This indicates an increase of social contacts and communication level of women, as well as enhancement of their vitality, disappearance of discomfort in everyday life and in public places, etc.

4. At the end of the rehabilitation course, mental and physical health components of women in both groups increased in comparison with those obtained at baseline survey. This circumstance indicates a decrease in anxiety, enhancement

*N.V. Chertok\*et al. /International Journal of Pharmacy & Technology*

of mental well-being and positive emotions, improvement of the physical health of middle-age women, suffering from the trauma of the upper limb, as well as their self-reliance.

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