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RESPIRATORY REEDUCATION IN THORACIC CONTUSION RECOVERY

Case
study

Keywords

Respiratory reeducation,
Thoracic contusion,
„TES” device

JEL Classification

Z00

Abstract

Respiratory reeducation is a way to recover the thoracic contusion. Correcting dyspnea induced by pain, decreases the required postcontuzional recovery time and, therefore, the required social reintegration time. This is achieved an increasing of the patient life quality, and significant savings of human and material resources: reducing medical and somato-functional recovery costs, reducing the sick leave payment and the work days off to. The „TES” device has been designed in order to improve respiratory reeducation and to recover the thoracic contusion. A study showed that the postcontuzional recovery was significantly increased by using the physical exercises of respiratory reeducation. The „TES” device demonstrated his role in this.

All human evolution has been accompanied by violence (wars, arena fights, robberies, domestic accidents). The effects of violence helped the therapies development necessary to treat wounds and traumas. At the beginning the therapy had a god name or a chance name. Then the therapy has transformed into a repeated experience and, finally, became a scientific therapy.

At any time on the human evolution scale, thoracic contusion has developed the same problem: long-term for pain, for somato-functional recovery and for social rehabilitation.

The most efficient improvement of life quality, in any pathology case, has been achieved by an interdisciplinary therapy team. In this way, the thoracic contusion is an example. So, if under strictly medical treatment, the thoracic contusion recovery and social reintegration postcontuzie can be done in 40-60 days, with physiotherapy help, this period may be reduced to 15-25 days.

A study aiming thoracic contusion recovery has been developed in Emergency Hospital "St. Pantelimon" –Bucharest. One of this study hypotheses was submitted to the effect of life quality improving, by using a respiratory reeducation program on subjects suffering from thoracic contusion. The study followed the two subjects group evolution (experimental group and control group, with 50 persons).

The experimental group subjects were evaluated every five days. The comparative evaluation of the two study groups subjects was performed on the first day (initial evaluation), on the 11th day of the program (intermediary evaluation) and on the last day, the 22 th, of the recovery program (final evaluation).

Some evaluation important parameters were the respiratory volumes measurable values (using spirometry).

The subjects suffering from thoracic contusion started the respiratory reeducation in the acute phase (once the doctor has given permission), under medical supervision.

One of the respiratory reeducation exercises used a new device: "TES 1" (named after inventor: **TEodorescu Sergiu**), created to improve, especially, the respiratory current volume and the expiratory reserve volume, using FAB method ("forced abdominal breathing"). The exercise difficulty was increased by opening, over time, more valves. It was used this device prototype, handcraft.

The subject is asked to perform 3-4 resting breaths. He will keep a seating position, with his forearms resting on the seat handles, watching his abdomen to follow the breathing movements.

Figure 1

So, using abdominal breathing, he will forced inspire and, holding the mouthpiece with the lips,

he will forced expire. The valves will be open, one by one, every 3 days, increasing, thereby, the required expire effort.

As an operationaly principle, this device is designed to improve the expired air pressure. So, the monitoring is achieving the quality (not the quantity), by the one side device indicator (the tube that contains a little colored ball) and by the open valves number.

Figure 2

This exercise is repeated 10 times every day (no matter how many valves are open).

This kind of exercise improve the abdominal breathing and the breath streamling and, also, protect the traumatized thoracic side.

On the both study groups initial evaluation, the comparative measurable variables had similar values. On the final evaluation, the comparative measurable variables marked a big difference between the two study groups, to the advantage of the experimental group.

Statistical analysis of the study results show:

1. The obtained scores of the both study groups measured variables had a variation coefficient placed between 2.73% and 24.59% (below 30-35%), demonstrating the homogeneity of the two groups, validating results.

2. On the final evaluation of the both study groups, Pearson correlation coefficient indicates very high significant differences for the respiratory current volume values:

$$p = 0.000011316$$

and for the expiratory reserve volume, to:

$$p = 0.000002697.$$

These values of Pearson correlation coefficient (with p values $p < 0,001$) confirms the study hypothesis, rejecting the null hypothesis.

Final conclusions of the study are:

1. The "TES 1" device, designed specifically for this study, has demonstrated its efficiency, improving the evaluated respiratory volumes.

2. The experimental group subjects had a much shorter recovery period than the control group subjects. So, the control group subjects scored, on the 22nd day an equivalent measured parameters values average with those of experimental group subjects 11th day.

3. Pain felt by the experimental group subjects began to decrease faster (even in the medication absence) compared with the pain degree accused by the control group subjects.

4. By the kinetic therapy is obtained a better pain management and a respiration improvement that, as a result, improve the experimental group subjects life quality.

5. By reducing the need to receive medical services, they were saved material and human resources.

6. The decrease of recovery thoracic contusion needed days for the experimental group subjects, have determined the decreasing of the sick leave days and the social rehabilitation period, decreasing, in this manner, the social costs involved in those.

References:

- [1] Beers, Mark H. (2011), *Manual medical* (în traducerea: Trif nescu, Oana și Vasilescu, Andrei-Vlad), Editura All, București
- [2] Bojor, Ovidiu, coordonator, (2004), „*Afecțiunile aparatului respirator: terapii complementare*”, Editura Fiat LUX, București
- [3] Bota, Aura (2002), „*Ritmurile biologice în educația fizică și sport*”, București, Editura Globus
- [4] Browner .BD., Jupiter J.B., Levine A.M., Trafton P.G. - *Skeletal Trauma: Fractures, Dislocations, Ligamentous Injuries*, W.B. Saunders Co., 841-2, 947-1027, 1998
- [5] Buzescu, A., Anton, B. (2005), „*Traumatologie sportivă*”, București, Editura Cartea Universitară
- [6] Calais-Germain, Blandine, (2009), „*Anatomie pentru mișcare (vol. 1. Introducere în analiza tehnicilor corporale și vol. 2. Exerciții de bază)*», Editura Polirom – 2009, București
- [7] Cordon, Mariana (1999) *Postura corporală normală și patologică*, Editura ANEFS, București
- [8] Cordon, Mariana (2009), *Kinantropometrie*, Editura CD Press, București
- [9] Cordon, Mariana (2012), *Kinetologie medicală*, Editura Didactică și Pedagogică, București
- [10] Flynn, Timothy W., Greenmann, Philip, (1996), „*The Thoracic Spine and Rib Cage: Musculoskeletal Evaluation and Treatment*”, Copyright © 1996 by Butterworth-Heinemann
- [11] Ispas, C. (2003), „*Kinetoterapia în afecțiunile ortopedico-traumatice – Deficiențele fizice*”, ANEFS
- [12] Mooney, Madaleine, Ireson, Claire, (2009), „*Occupational Therapy in Orthopaedics and Trauma*”, Editorial office: John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom
- [13] Preda, Aurelia, Teodorescu, S. (2014), „*Recuperarea traumatismelor toracice – curs pentru asistenții medicali*” – editura Tehnoplast, București



*Figure 1 - Respiratory physiotherapy exercises
device "TES 1" - qualitative indicator*



*Figure 2 - Respiratory physiotherapy exercises
device "TES 1" - devices valves*