

# Effect of breathing rehabilitation that took in the game in muscular dystrophy patients

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Received 1 March 2011 ; received in received from 7 March 2011 ; accepted 16 March

## Abstract

We devised forms of extra rehabilitation that could be continued while enjoying breathing rehabilitation by adopting a factor of the play. For six patients with Duchenne muscular dystrophy, oxygen saturation (SpO<sub>2</sub>), the pulse, respiratory function (the lung capacity, tidal air volume, peak expiratory flow) were measured before and two months after the introduction of the breathing rehabilitation. Hardly any changes were found in regard to oxygen saturation (SpO<sub>2</sub>) and pulse rate after the rehabilitation. Although the lung capacity decreased slightly, a tendency for an increase was found with the tidal air volume and the peak expiratory flow. However, the statistical significant difference was not clear. From the impression of the subjects, this rehabilitation did not cause pain. It is considered that this treatment was well accepted by the patients.

**Keywords:** Muscular dystrophy, play, breathing rehabilitation

## Introduction

Breathing rehabilitation is usually received only by some patients who show a decline in respiratory function after wearing a respirator. However, when breathing rehabilitation is provided continuously from a period before the respirator is worn, a decline in pulmonary thoracic compliance is prevented, and it is possible to maintain inspiratory capacity. As a result, wearing of the respirator can be delayed.

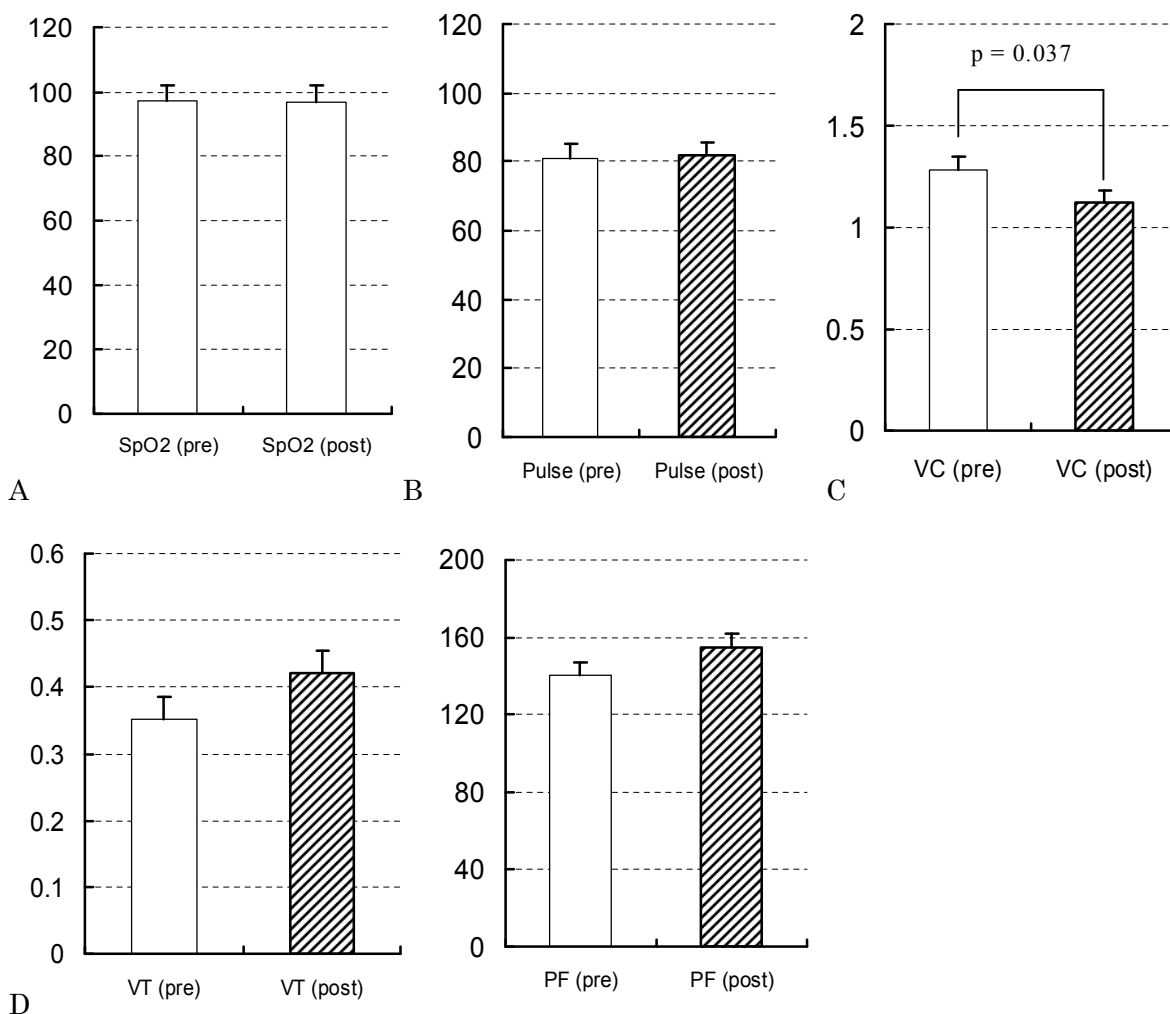
We devised forms of extra rehabilitation that could be continued while enjoying breathing rehabilitation by adopting a factor of the play [1].

## Subjects and methods

The study period was from September, 2009 to December, 2009. The subjects were two people of wearing with six patients with Duchenne muscular dystrophy only in the respirator night of those. The average age of

the patients was 21.83 years old, men, stage 8. The forms of breathing rehabilitation that we devised were the following four kinds. A soccer game conducted with a straw, a basketball game, blowback and soap bubbles structure. Oxygen saturation (SpO<sub>2</sub>), the pulse, respiratory function (the lung capacity, tidal air volume, peak expiratory flow) were measured before and two months after the breathing rehabilitation was introduced. Also, the subjects gave subjective evaluations at these times. The statistics used the Wilcoxon signed-ranks test.

This study received the approval of the Tokushima National Hospital Ethical Review Board. The purpose of the study was explained to the study patients, and we obtained their consent. Participation in the study was optional, and it was explained that the patients would suffer no disadvantage by declining to participate. The identities of the participants were kept anonymous.



**Figure 1.** Changes in oxygen saturation (SpO2), pulse rate, vital capacity (VC), tidal air volume (VT), peak expiratory flow (PF) were measured before and two months after the breathing rehabilitation was introduced.

## Results

The results are shown in figure 1. The SPO2 levels before and after the enforcement of the breathing rehabilitation, were 97.1% (SE, 0.290) and 97.03% (SE, 0.34), respectively. The pulse rate was 81.14 /m (SE, 3.47) and 81.79 /m (SE, 4.12), respectively. Neither showed a significant difference together by rehabilitation before and after. The lung capacity before rehabilitation was 1.28 L (SE, 0.278), but decreased with 1.12 L (SE, 0.273) after rehabilitation adversely ( $p=0.037$ ). The tidal air volume before the rehabilitation was 0.352 L (SE, 0.0568), and was 0.42 L (SE, 0.0335) after rehabilitation. The peak flow

rate before the rehabilitation was 140 L/m (SE, 8.37) and was 154.6 L/m (SE, 13.20) after rehabilitation. The means of tidal air volume and the peak flow rate increased, but a clear significant difference was not detected. The impression of subjects was that five of six people were appropriate when the rehabilitation was being carried out. Enforcement places were replied in all the members being appropriate. All the participants said that rehabilitation was not tiring. The most enjoyable activities were soccer for three patients, basketball for one patient, soap jewelry for one patient, and blowback for one patient. There were no patients who did not enjoy any of the

activities.

Four patients did not feel a physical change during breathing rehabilitation. None of the patients felt pain. Four patients wanted to continue in future.

## Discussion

The breathing rehabilitation was effective. However, there is an image to be hard training from the patients side cruelly. This was the main factor that made giving the rehabilitation continuously difficult. As measures to solve this problem, we devised methods through which breathing rehabilitation could be carried out enjoyably by adopting a game format. The questionnaire results showed that this training was accepted well. Pain was not felt, and most participants wanted to continue in the future. Also, patients who had not participated in breathing rehabilitation often showed interest. The atmosphere of the sickroom improved by doing this rehabilitation. Unfortunately, a clear significant difference could not be detected about end-point. This may be due to three reasons. 1) Only a small number of patients participated (six people in this study). 2) The experiment period was short. 3) When the physical state of the patients was poor, data could not be collected. Since the oxygen saturation and the pulse did not fluctuate, this rehabilitation did not involve a physical burden. Rehabilitation procedures will be reviewed further in future. Also, we will increase the number of participants, and the effects will be further examined.

## References

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