



The Effects of Respiratory Muscle Training on the Respiratory Function, and Weaning Among Ventilator-Dependent Patients

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Background:

Patients with prolong time using ventilator were suffered from decreased respiratory muscle strength.

We hope the training of respiratory muscle could improve the rate of successful weaning.

Objectives:

The aim is to discuss the following effects of respiratory muscle training on patients with long-term mechanical ventilator:

1. respiratory function index
2. weaning rate

Method:

The inclusion criteria were depended on MV support more than 21 days, ≥ 20 years old, at least elementary graduated, vital signs stable (BT < 38°C, RR < 30 bpm, SpO₂ > 90%), RSI < 105, and no using muscle relaxant. 13 Patients were randomly allocated into experiment group, and 11 Patients were randomly allocated into control group by random table. A total number of 24 patients were included. Respiratory muscle training (abdominal muscle training) was the intervention. The intervention is put sandbag between iliac crest and xiphoid process from 9AM to 9PM/ 28 days. The initial weight is 1 kg, and adds 0.5 kg per seven days if patient can tolerance. We use SPSS 20.0 for statistical analysis. We will examine the effectiveness of the respiratory muscle training intervention at 1, 7, 14, 21 and 28 day (Table 1, 2).

Results:

After the intervention, the experimental group's average APACH II Score was 23 lower than before the intervention began (24), length of day on MV support was 43.28 (SD=15.37) days. The control group's average APACH II Score was 18.55 lower than before the intervention began (25), length of day on MV support was 41.38 (SD=13.36) days (Figure 1). The experimental group's average Pimax was -30.8 cmH₂O better than the control group -26.6 cmH₂O (Figure 2). The experimental group's average Pimax at 5 time points are -31, -32, -29, -37 and -25 cmH₂O. The control group's average Pimax at 5 time points are -29, -25, -26, -19 and -34 cmH₂O (Figure 3). But the weaning rate between each group were no significant different ($p > .05$).

Conclusion:

The experimental group's pimax improvements after the intervention are clear. Patient can improve the inspiratory muscle strength by respiratory muscle training.

Table 1 Study diagram

N=24

| | | | | |
|---|------|----|------|--------|
| E | O1n1 | Xn | O1n2 | (n=13) |
| C | O2n1 | | O2n2 | (n=11) |

O: HR, RR, SPO₂, Pimax, Pemax, APACH II etc....; X: Respiratory muscle training; n=1-5; n=1 or 2, sandbag 1kg; n=3 sandbag 1.5kg; n=4 sandbag 2kg; n=5 sandbag 2.5kg; The intervention is put sandbag between iliac crest and xiphoid process from 9AM to 9PM/ 28 days.

Table 2 Demography

| | Experimental group | | Control group | |
|---------------|--------------------|-----------|---------------|-----------|
| | n (%) | M ± SD | n (%) | M ± SD |
| Gender | | | | |
| male | 9 (69.2) | | 10 (90.9) | |
| female | 4 (30.8) | | 1 (9.1) | |
| Age | | 79.3 14.6 | | 81.6 14.1 |
| Smoke | | | | |
| Yes | 5 (38.5) | | 4 (36.4) | |
| No | 8 (61.5) | | 7 (63.6) | |

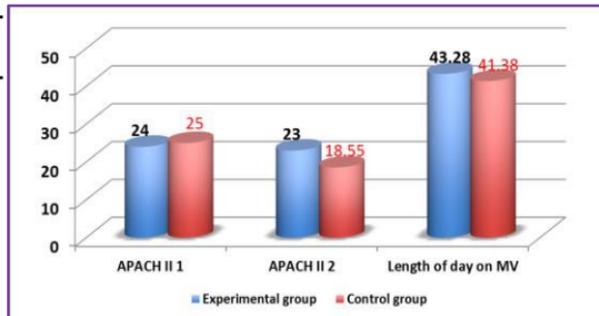


Figure 1 APACH II, length of day on MV between two groups

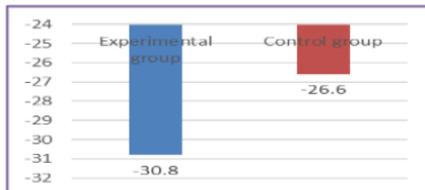


Figure 2 Average Pimax

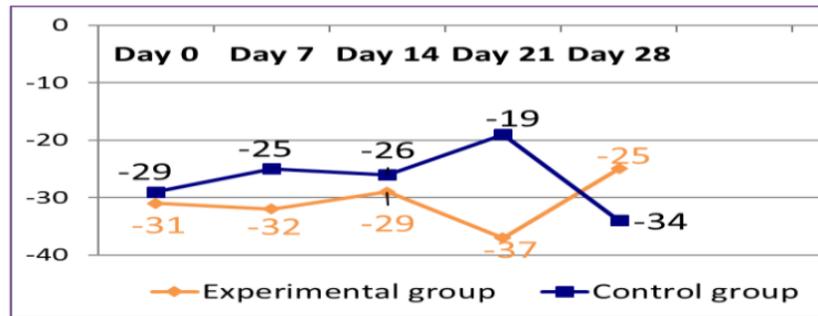


Figure 3 Five points Average Pimax between two groups