A Randomized Controlled Trial on Posture Improvement and Trunk Muscle Strength by Round Shoulder Posture Improvement Exercise

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ABSTRACT

The aim of this article was to examine investigates the effects of posture-improving exercises on round shoulder posture (RSP) and back muscle strength. 35 college students participated in this study and were measured for both shoulder height and muscle strength. After pretest, participants were divided into shoulder stabilization exercise group (SSEG, \( n_1 = 12 \)), antagonist strength exercise group (ASEG, \( n_2 = 12 \)), and control group (CG, \( n_3 = 11 \)). SEG and ASEG exercised with a trainer 3 times a week for 30 minutes during 4 weeks. After completion of intervention, there was a significant difference in both shoulders and trunk muscle strength is significant difference for SEG, ASEG and CG. This study has found that strengthening exercise is more effective in RSP reduction. However, it is the opinion of the researchers that the 4 week exercise period was not long enough to achieve significant results for other measurements. Further comparative studies related to the effects of strength exercises on RSP reduction, lung capacity, and trunk muscle strength is necessary.

KEYWORDS

Back Strength, Exercise, Posture, Round Shoulder

1. INTRODUCTION

Repetitive daily-operation of smartphones, people habitually adapt a slouched posture which causes rounded shoulder posture (RSP) (Chansirinukor, Wilson, Grimmer, & Dansie, 2001). RSP features the protraction of the shoulders for increased cervical lordosis and upper thoracic kyphosis, their downward rotation, and anterior tilt (Greenfield, Donatelli, & Wooden, 2001; Sahrmann, 2002). Also, the loss of serratus anterior and middle-low trapezius activity, and tightness in the pectoralis and upper trapezius are found (Borstad & Ludewig, 2005). The abnormality in shoulder posture caused by abnormal activities of muscles around the shoulder joint leads to limited movement of

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the sternoclavicular joint which triggers hyper- or hypo- mobility of the shoulders when the upper extremity is in motion (Cools, Witvrouw, Declercq, Danneels, & Cambier, 2003). The overall pain of the upper extremity has been found to be the cause (Sahrmann, 2002). Regarding the conventional treatment methods of RSP, Wang, McClure, Pratt, and Nobilini (1999) applied retraction exercises to the subjects with rounded shoulders, and reported that strength improvement and trunk posture change helped improve shoulder stability and increased the scapulohumeral rhythm.

According to Lynch, Thigpen, Mihalik, Prentice, and Padua (2010), shoulder stabilization exercises and pectoralis minor stretching were effective in improving shoulder pain and function by treatment. Florence Peterson, Elizabeth Kendall, Patricia Geise, Mary McIntyre, and William Anthony (2005) and Sahrmann (2002) reported that shortening muscle stretching and antagonist muscle strengthening exercises were effective at RSP in order to correct postural deformity.

The previous studies proved that shoulder stabilization exercises and antagonist muscle strengthening exercises with stretching as a recent exercise program for improving postures were found to be an intervention method effective for improving RSP. However, there is not much research on the treatment methods that are more effective in improving posture.

Therefore, the purpose of this study is to use stabilization exercises associated with stretching and antagonist muscle strengthening exercises as a treatment method of RSP to find a better RSP treatment method.

2. METHODS

2.1. Subjects

The subjects of this study were 35 male and female adults from G-university. The detailed criteria of the study subjects are presented as follows: those without pain in the scapular girdle or history of injuries; without an orthopedic and neurologic history on the cervical and upper extremity; and those who have more than 2.5cm in height from posterior border of acromion to table at their supine position. The 35 study subjects were divided into three groups: The shoulder stabilization exercise group (SSEG), antagonist muscle strengthening exercises group (ASEG), and control group (CG) (Eunsang, Dae-in, Wonjae, & Seungwon, 2017).

The physical characteristics of the subjects are shown on Table 1.

2.2. Procedure

In order to clarify the effect of improving the acromion height and trunk back muscle strength of both subjects, a study was conducted to compare two experimental groups according to the exercise program. The subjects in the SSEG group performed shoulder stabilization exercises, and the subjects in the ASEG group performed antagonist strengthening exercises, and CG.

Table 1. Demographic characteristics of the subjects

<table>
<thead>
<tr>
<th></th>
<th>SSEG (n1=12)</th>
<th>ASEG (n2=12)</th>
<th>CG(n3=11)</th>
<th>F(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>22.41±2.23</td>
<td>21.50±1.83</td>
<td>21.36±1.75</td>
<td>1.007(0.337)</td>
</tr>
<tr>
<td></td>
<td>(Male/Female)</td>
<td>(7/5)</td>
<td>(6/5)</td>
<td></td>
</tr>
<tr>
<td>Height (cm)</td>
<td>166.78±8.37</td>
<td>168.45±9.86</td>
<td>168.36±7.51</td>
<td>0.140(0.870)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>62.95±10.74</td>
<td>63.89±14.23</td>
<td>63.76±11.46</td>
<td>0.022(0.978)</td>
</tr>
</tbody>
</table>

Note. Values are presented as mean ± SD *.
ASEG: antagonist strength exercise, CG: control group, SSEG: shoulder stabilization exercise group.
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