Comparison of the effects of pectoralis muscles stretching exercise and scapular retraction strengthening exercise on forward shoulder posture

Won-gyu Yoo

1) Department of Physical Therapy, College of Healthcare Medical Science and Engineering, Inje University: 607 Obangdong, Gimhae, Gyeongsangnam-do 621-749, Republic of Korea

Abstract. [Purpose] The purpose of this study was to compare effect in a group of stretching and a group of muscle strengthening exercise for patients with forward scapular posture. [Subjects and Methods] This study was performed in 20 subjects who defined to the forward shoulder posture. The subjects were divided into a group of pectoralis muscles stretching and a group of muscle strength exercise for scapular retraction. [Results] The forward shoulder posture of the group of the scapular retraction exercise was significantly decreased when compared to that of the group of the pectoralis muscles stretching. [Conclusion] It is expected that therapeutic effect can be improved and the period can be shortened when strength exercise for forward shoulder posture is applied as a therapeutic intervention.

Key words: Forward scapular posture, Pectoralis muscles, Strength exercise

INTRODUCTION

Forward shoulder posture (FSP) is defined as a posture in which the acromion process is protruded anterior to the body’s line of gravity. It along with forward head posture, increases anteflexion of the neck bones and kyphosis and induces abnormal scapulohumeral rhythm due to the scapular dislocation. Intervention for shortened pectoralis serves as an important factor in scapular pathology and rehabilitation of FSP, while stretching and soft tissue manipulation are provided to treat insufficient extension of the pectoralis muscles. Stretching of the pectoralis muscles is used to correct abnormal postures and shoulder impingement syndrome. Manual manipulation stretching for the pectoralis muscles is usually performed as a type of intervention for off-neutral postures or shoulder impingement syndrome. Retraction exercise that selectively strengthens the rhomboid and lower trapezius muscles may be appropriate for patients with forward scapular posture. Although many studies have compared conditions of FSP patients before and after muscle strengthening exercise and stretching, few reports have compared effects of stretching for shortened muscles and strengthening exercise for weakened muscles on FSP patients. The purpose of this study compared to effect in both a group of stretching and a group of muscle strengthening exercise for patients with forward shoulder posture.

SUBJECTS AND METHODS

This study was performed in 20 subjects who defined to the FSP. The purpose and methods of the study were explained to the subjects, and written informed consent was obtained, in keeping with the ethical principles of the Declaration of
Helsinki. When a FSP patient lay in a supine position with their arms in a neutral position, the investigators palpated the right acromion process and measured the vertical distance from the process to the floor with a steel ruler. When the distance was 3 cm or more, the patient was selected to be the subject of this study. For FSP, the investigator palpated the acromion process of a patient in a supine position and measured the vertical distance from the process to the floor with a steel ruler. The subjects were divided into a group of pectoralis muscles stretching (n=10) and a group of muscle strength exercise for scapular retraction (n=10). The stretching group was 23.5 ± 1.3 years old, 169.3 ± 7.4 cm in height, and 62.2 ± 13.8 kg in body weight, while the muscle strength exercise group was 22.2 ± 0.6 years old, 165.5 ± 5.8 cm in height, and 56.9 ± 12.1 kg in body weight (p>0.05). There was no significant difference of the two groups in the vertical distance between the initial acromion process and the floor before the exercise (6.24 ± 1.60 cm of the stretching group and 6.20 ± 1.97 cm of muscle strength exercise group) (p>0.05).

The stretching group performed muscular extension for both stretching the pectoralis major and the pectoralis minor. For the former, the subjects stood with one arm touching the edge of the wall and abducted the shoulder horizontally to the ground. For the latter, the subjects were in a supine position with their shoulders abducted and extended the shoulders while raising their arms over their heads. Each of the movement was held for 30 seconds; three movements were considered one set, which was performed a total of six. For scapular retraction to strengthen the muscles, the subjects were asked to be in prone position with their arms spreading horizontally. Then, they lifted dumbbells whose weights were 60% to 80% of the IRM of each subject to endure moderate resistance. Ten movements were considered a set; two sets were performed. A two-minute rest was given between the sets. The experiment period was two weeks. The Mann Whitney U test was used to compare changes in FSP when the pectoralis muscles stretching or the scapular retraction exercise was applied. The statistical significance was set at p<0.05. The SPSS version 18.0 for Windows (IBM, New York, NY, USA) was used for statistical analysis.

RESULTS

The FSP of the group of the scapular retraction exercise (4.50 ± 1.33 cm) was significantly decreased when compared to that of the group of the pectoralis muscles stretching (5.54 ± 1.30 cm) (p<0.05).

DISCUSSION

FSP was reduced by treatment consisting of stretching of the anterior shoulder muscles (the levator muscle of scapula, the sternocleidomastoid muscle, the pectoralis major) and strengthening of posterior shoulder muscles (the trapezius, the lower trapezius, the serratus anterior). Self-stretching of the pectoralis minor was effective in reducing FSP, while strengthening shoulder retraction muscles with close kinetic chain exercise significantly decreased activation of the upper trapezius. Many previous studies have reported exercise effects before and after treatment when each of intervention for FSP was applied.

Thus, we in this context compared effects of pectoralis stretching and scapular retraction muscle strength exercise in terms of interventions for FSP. The results of this study showed that the FSP of the muscle strength exercise group was significantly reduced when compared to that of the stretching group; these results may be due to the muscular strength exercise that complexly induce effects of pectoralis stretching, along with scapular retraction muscle strength. Therefore, exercise of scapular retraction muscle strength may produce faster effects as a type of FSP intervention when compared to pectoralis stretching exercise. It is expected that therapeutic effect can be improved and the period can be shortened when strength exercise for forward shoulder posture is applied as a therapeutic intervention. The results of this study may serve as useful clinical data in appropriate distribution of time for stretching and muscle strength exercise. This study has a limitation. The effects of prolonged exercise were not measured. Therefore, further studies are needed to compare the effects of prolonged exercise.

Conflict of interest

None.

REFERENCES

1) Sahrmann SA: Diagnosis and treatment of movement impairment syndromes. St. Louis: Mosby, 2002.
2) Kendall FP, McCreaey EK, Provance PG, et al.: Muscles: testing and function with posture and pain, 5th ed. Baltimore: Williams & Wilkins, 2005.
3) Lynch SS, Thigpen CA, Mihalki JP, et al.: The effects of an exercise intervention on forward head and rounded shoulder postures in elite swimmers. Br J Sports Med, 2000, 44: 376–381. [Medline] [CrossRef]
4) Wong CK, Coleman D, diPensia V, et al.: The effects of manual treatment on rounded-shoulder posture, and associated muscle strength. J Bodyw Mov Ther, 2010, 14: 326–333. [Medline] [CrossRef]
5) Escamilla RF, Yamashiro K, Paulos L, et al.: Shoulder muscle activity and function in common shoulder rehabilitation exercises. Sports Med, 2009, 39: 663–685. [Medline] [CrossRef]