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Comparative effect of modified shrug exercises with and without abdominal muscle activation on scapular upward rotator EMG and thickness in subjects with scapular downward rotation syndrome**Ji-Hyun Kim, Hyeo-bin yoon, Joo-hee Park and Hye-seon Jeon**
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Scapular downward rotation syndrome (SDRS) is a common scapular alignment impairment that causes insufficient upward rotation and muscle imbalance, shortened levator scapulae (LS) and rhomboid and lengthened serratus anterior (SA) and trapezius. A modified shrug exercise (MSE), performing a shrug exercise with the shoulders at 150° abduction, is known as an effective exercise to increase scapular stabilizer muscle activation. Previous studies revealed that scapular exercise is more effective when combined with various abdominal muscle contractions in decreasing scapular winging and increasing scapular stabilizer muscle activation. Therefore, the purpose of our study was to clarify the effect of MSE with or without abdominal muscle contraction in subjects with SDRS. Eighteen (18) volunteer subjects (male=10, female=8, mean age=22.8) with SDRS were recruited for this experiment. All subjects performed MSE under 3 different conditions: (1) MSE, (2) MSE with an abdominal draw-in maneuver (ADIM) and (3) MSE with an abdominal expansion maneuver (AEM). The muscle thickness of the lower trapezius (LT) and the SA were measured using an ultrasonography in each condition. Electromyography (EMG) data were collected from the LT, LS, SA and upper trapezius (UT) muscle activities. Data were statistically analyzed using one-way repeated analysis of variance at a significance level of 0.05. The muscle thickness of the LT and the SA were the significant difference among the conditions ($p < 0.05$). In both LT and SA, the order of muscle thickness was MSE with AEM, MSE with ADIM and MSE alone. No significant differences, however, were found in the EMG activities of the SA, UT, LS and LT. In conclusion, MSE is more beneficial to people with SDRS when combined with abdominal muscle contraction by increased thickness of scapular stabilizer muscles.

**Biography**

Ji-Hyun Kim is a M.Sc student in the Department of Physical Therapy at the Graduate School of Yonsei University. She received B.S. degree in department of rehabilitation health from Yonsei University. Her main research interests are orthopedic rehabilitation, athletic rehabilitation and motor control.

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