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The Consequence of the Relationship between Shoulder and Cervical Multifiduc Muscles Contractions

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Cervical multifidus muscles (MM) are small and strong spinal muscles which are well suited to keep the posture of cervical vertebras [1]. They are located in the deepest layers of posterior neck area attaching directly to the facet joint capsules and cervical bones. The function of this muscle may be disturbed in people who work for a long period of time while their head and neck are kept in a static bended posture. In these cases, the muscle may fail to function normally because of the fatigue and inability to bear the weight of head and neck. On the other hand, MM may provide a strong base for upper limbs movements as it keeps firmly the posture of cervical and thoracic vertebras [2]. Similar function has been reported for lumbar MM while upper or lower limbs muscles are activated. In an interventional study, [3] reported that the electromyography activity of lumbar MM was increased after a course of squat and dead lift resisted exercise programs. In another study, the size of lumbar MM was reported to be increased after a course of lower limb training program [4]. Therefore, it can be assumed that cervical MM is also activated in respond to the contraction of upper arm muscles.

In the study entitled "The effects of the contraction of shoulder muscles on the dimensions of the cervical MM in a group of healthy office workers", the authors were going to document the relationship between shoulder and neck MM contractions [5]. They were also trying to provide an idea to increase the strength of MM by using the contraction of shoulder muscles. In fact, the important theoretical assumption was to find an easy way to activate cervical multifidus muscle in order to prevent or treat patients with neck pain.

The authors of this study have measured the dimensions of cervical MM by a real-time ultrasonography and the strength of shoulder muscles (in 6 directions and 6 levels of muscle contractions) by an isometric muscle strength measurement device. They have synchronized the outcome measures of two devices by a computer software program. After reporting a high relative and absolute reliability for both muscle dimensions and strength measurements, the authors indicated that the size of the MM increased concurrently as the level of shoulder muscle contraction increased in all directions of movements. Further, the authors imply that the MM was more reactive in higher levels of shoulder muscle contraction and more in shoulder abductor and external rotator than the other directions [6].

This work well advances our knowledge of the relationship between MM and shoulder muscle contraction in healthy individuals. The main overall outcome of this study would be to apply the method of testing in a form of training to improve the function of MM in a group of patients with neck pain. The method of this kind of training has been already applied in healthy subjects where the dimension of cervical MM was reported to be increased after 12 weeks of shoulder abductor muscle trainings [7]. Therefore, to strengthen the neck stabilizer muscles, it may be possible to employ shoulder muscle performance where the neck movement is painful or prohibited. The method is also applicable in those individuals who are at risk of developing neck pain e.g. office workers and dentists by means of prevention. An easy way of doing this kind of exercise is recommended by using a suitable tra-band and performing isotonic shoulder muscle contractions **(Figures 1a and 1b)**. Three sets of isotonic shoulder abduction a day with ten times per each set and one minute rest interval between each set is recommended.

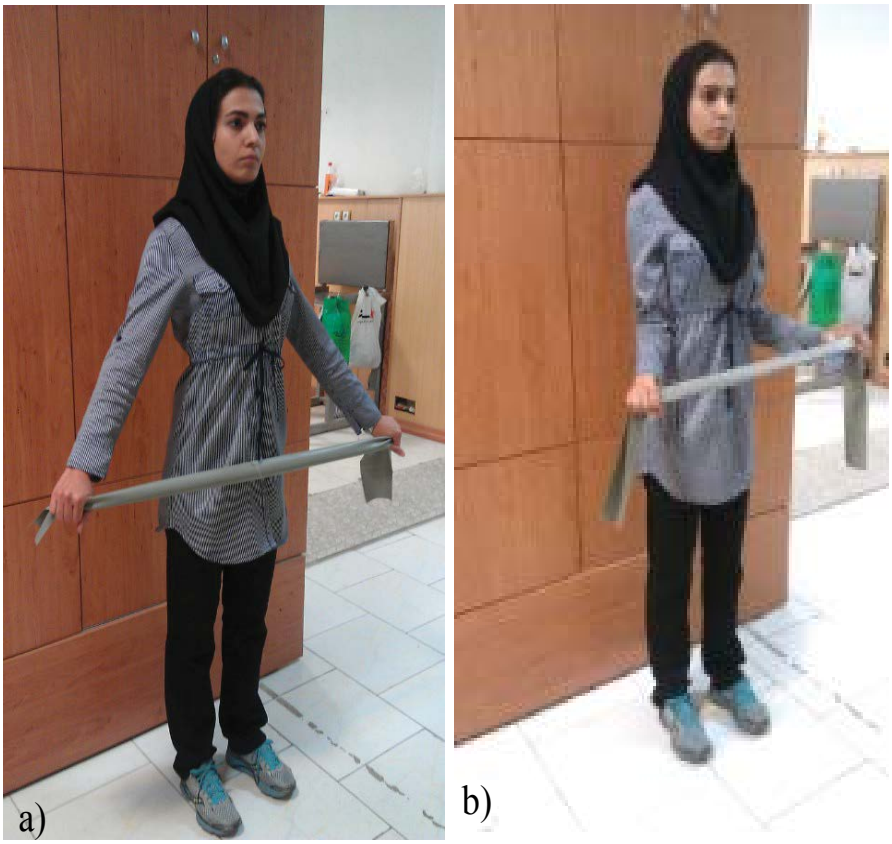

Figure 1 **1a, and 1b** Isotonic shoulder abductors (a) and external rotators (b) muscles training by using a tra-band.

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