

PHYSICAL THERAPY



Ultrasound echo intensity of cervical muscles in women with and without forward head posture

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ABSTRACT

Objective: Forward head posture (FHP) is a common abnormal posture in neck disorders. FHP causes an alteration of the strength in the cervical muscles. Since both muscle quantity and quality impress the muscle strength, this study aimed to compare the echo intensity of cervical muscles (index of muscle quality) between women with and without FHP.

Method: Echo intensity of cervical muscles was measured by Adobe Photoshop software and compared between two groups.

Results: The findings of the current study indicate the insignificant difference between two groups regarding the echo intensity of cervical muscles.

Conclusion: Evaluation of echo intensity of cervical muscles may expand knowledge about the muscle quality and function.

KEYWORDS

Forward head; posture; cervical; muscle; echo intensity; ultrasonography

Introduction

Forward head posture (FHP) is the most prevalent poor posture associated with neck pain [1]. In FHP, the head is anterior to the plumb line crossing anterior to lateral malleolus in a standing position. FHP eventuates muscle imbalance [2] and induces the abnormal forces on the cervical spine [3]. According to previous studies, FHP is associated with musculoskeletal problems (e.g. shoulder pain, neck pain, headache, craniofacial pain, and temporomandibular problems) [4].

FHP can lead to the altered strength and length of cervical spine muscles. In FHP, there is lengthening of anterior cervical muscles and shortening of posterior cervical muscles. Any change in the muscle length can affect the length–tension relationship and the force production ability of the muscle. The results of previous studies showed the altered performance of posterior cervical muscles in the subjects with FHP in comparison with control subjects [2].

The strength of cervical muscles is fundamental for the stabilization of the cervical spine, and assessment of the strength of these muscles can detect neck dysfunction [5]. Longus colli (LCo), sternocleidomastoid (SCM), oblique capitis superior (OCS), rectus capitis posterior (RCP), and semispinalis capitis (SSC) are

important cervical muscles to maintain the normal head and neck posture [6,7].

The architecture of skeletal muscle describes the muscle function [8]. The muscle quantity (muscle mass) and muscle quality (the amount of non-contractile tissue) determine its strength [9]. These two factors contribute independently to the muscle strength [10]. The tension generation capacity of a muscle may be reduced in spite of no change in muscle size [11]. This matter highlights the importance of muscle quality in muscle function.

Muscle echo intensity (EI), an objective index of muscle quality, demonstrates the amount of non-contractile tissue within the muscle (fat or fibrous tissue) [9,12]. According to previous studies, EI is a noninvasive method to evaluate tissue composition [12]. The increased adipose and intramuscular connective tissues increased the EI [13]. EI has a negative correlation with the muscle strength [10], and this association is independent of the muscle size or age [14]. According to previous studies, EI is able to distinguish diseased versus healthy skeletal muscle and may represent muscle injury or adaptations induced by exercises [15]. EI is the mean pixel intensity of the muscle [14]. EI is assessed by measuring the darkness of a region of muscle; black color represents high muscle quality [15].