

# CHAPTER 1

## Introduction

Neck pain is the second most common musculoskeletal complaint in the general population (1). Women experience more pain than men (1-3). Neck pain appears to peak in the middle-age groups (4, 5). In an overview of the neck pain epidemiological literature, estimates of the overall prevalence of neck pain in the general population range between 0.4 and 86.8%; point prevalence range from 0.4% to 41.5% and 1 year prevalence range from 4.8% to 79.5% (1). In Thailand, the 1-year incidence of neck pain was estimated at 46% in undergraduate students (6). It is evident that neck pain has an impact on one's health as well as health-related quality of life (7-9).

Neck pain has been demonstrated to be associated with cervicoscapular impairments (10). This includes impairments of the sternocleidomastoid, anterior scalene and upper trapezius functions (11-14). Recently, studies have also demonstrated impairment of lower trapezius muscle in patients with chronic neck pain (10, 15, 16). Lower trapezius muscle is one of the scapular stabilizers, which holds the scapular to the chest wall and the spine (17). It is an essential component of the normal scapulohumeral rhythm (17, 18). Lower trapezius works in tandem with the upper trapezius and serratus anterior to produce upward rotation of the scapula, particularly throughout the mid-range of arm elevation (17, 19, 20). Petersen et al (16) have investigated lower trapezius muscle strength using a handheld dynamometer in patients with unilateral neck pain. The results showed a significantly less force in lower trapezius strength on the side of neck pain compared to the non-painful side. Percent deficit of the lower trapezius muscle was also not found to be associated with the Norwick Park Neck Pain Questionnaire (NPQ) and duration of neck pain. Likewise, Wegner et al (15) investigated a difference in trapezius muscle behavior in individuals with neck pain who displayed poor scapular posture compared to healthy control

during a functional typing task. The results revealed lesser electromyography (EMG) activity of the lower trapezius muscle and greater activity in middle trapezius during the typing task in patients with neck pain compared with the control group. From the previous results, it may suggest that patients with neck pain have impairment of the lower trapezius performance.

It is documented that muscle performance is often correlated with muscle thickness (21). A number of studies also suggested that changes in muscle thickness can be indicators of neck muscle dysfunction (22-24). Rezasoltani et al's study (24) have demonstrated significant correlations between the neck extensor strength and the thickness of the semispinalis capitis muscle in patient with chronic non-specific neck pain. Additionally, Muñoz-Muñoz et al (25) have demonstrated that the neck disability was associated with sleep quality in patient with mechanical neck pain ( $r = 0.55$ ;  $p = 0.03$ ). A greater impairment has also been suggested to be associated with an intensity of neck pain (25-27). To date, impairments of the lower trapezius muscle associated with neck pain have been subjected to previous studies by EMG and dynamometer (10, 16). However, investigation of muscle thickness of the lower trapezius muscle in patients with neck pain has not been conducted previously. A study investigating the thickness of the lower trapezius muscle was provided a unique insight into understanding of the lower trapezius muscle dysfunction in association with neck pain. Thus the aims of this study were be to assess the thickness of the lower trapezius using ultrasound imaging (USI) in patients with chronic neck pain, compared to those without neck pain. Relationships of the thickness of the lower trapezius muscle and intensity of pain and neck pain, and disability also were determined in the study. USI was chosen as it has been widely used for measuring changes in muscle size (thickness or cross-sectional area) (28-30). It is an inexpensive-cost, safe and noninvasive method. There is also evidence showing that USI is a valid and reliable tool to measure the thickness of the neck and lower trapezius muscles (29, 31-33).

## **Aims and hypotheses of the study**

### **1.1 Aims of the study**

1. To investigate the thickness of the lower trapezius muscle between the ipsilateral and contralateral sides in patients with chronic unilateral neck pain
2. To investigate the thickness of the lower trapezius muscle in patients with chronic unilateral neck pain compared to those without neck pain
3. To determine relationships between the thickness of the lower trapezius and intensity of neck pain, and neck pain and disability scores

### **1.2 Hypotheses of the study**

1. The thickness of the lower trapezius muscle on the ipsilateral side would be less than that on the contralateral side in patients with chronic unilateral neck pain
2. The thickness of the lower trapezius muscle would be reduced in patients with chronic unilateral neck pain compared to those without neck pain
3. There would be negative correlations of the lower trapezius thickness and intensity of neck pain, and neck pain and disability scores