CHAPTER I
INTRODUCTION

1.1 Rationale and background

Neck pain is one of the most common problems in the general population, especially in the working age group. It has been reported that most people experience neck pain at some point in their life (Pernold et al., 2005). The prevalence of neck pain has been reported to be 15 per cent in men and to be 23 per cent in women (Gummesson et al., 2006). Over one-third of neck pain patients will develop chronic symptoms lasting more than 6 months (Cote et al., 1998, 2000). Additionally, nearly one third of neck pain patients who experience a first time onset of neck pain will continue to report healthcare utilization for their symptoms for at least 10 years (Enthoven et al., 2004). Further, the economic expense caused by neck pain is extremely high in the United States (Wright. et al., 1999). Additionally, approximately 25 per cent of out-patient physical therapy visits consist of patients with symptoms involving the neck region (Jette et al., 1994). Mechanical neck pain is the most common neck pain found in the general population (Ahn et al., 2007; Martı´nez-Segura et al., 2006)

The source of mechanical neck pain is not completely understood, however it has been reported that it is related to various pain-sensitive structures, including zygapophyseal joint, ligaments, muscles, uncovertebral joints, intervertebral disks, or neural tissues around the cervical spine (Maitland et al., 2000; Martı´nez-Segura et al., 2006). One of the most common causes of mechanical neck pain is related to mechanical dysfunction of the cervical spine (Bogduk & April, 1993), which results in a reduction of neck mobility (Triano, 2001). Therefore, the aims of mechanical neck pain treatment are to reduce pain and to increase range of motion for restoring normal functions to the cervical spine (Martı´nez-Segura et al., 2006).

Cervical manipulation and mobilization have been commonly used to treat mechanical neck pain (Cassidy et al., 1992; Gross et al., 2002; Hurwitz et al., 2002; Hoving et al., 2001; Vernon et al., 1990). Some previous studies have demonstrated

the effectiveness of cervical manipulation (Cassidy et al., 1992; Martı´nez-Segura et al., 2006; Vernon et al., 1990) and cervical mobilization (Cassidy et al., 1992; Kanlayanaphotporn et al., 2009) for patients with mechanical neck pain and shown good results with them. The previous study has compared the effect between cervical manipulation and cervical mobilization in neck pain patients (Cassidy et al., 1992) and their study demonstrated that cervical manipulation is more effective than mobilization in decreasing pain in patients with mechanical neck pain. Additionally, the source of mechanical neck pain can be related to muscles around the vertebral column (Maitland et al., 2000; Martı´nez-Segura et al., 2006). A previous study (Vernon et al., 1990) investigated the effect of cervical manipulation on pressure pain threshold in patients with mechanical neck pain and their study showed that the group receiving manipulation showed an improvement in pressure pain threshold in paracervical muscle. However, the complications of this intervention have shown serious complications, especially a risk of vertebro-basilar artery insufficiency after cervical manipulation (Gross et al., 2002; Martı´nez-Segura et al., 2006; Schalkwyk et al., 2000). Furthermore, a number of previous studies have reported some complications after performing cervical manipulation, for example headache, neurological deficit and stiffness (Gross et al., 2002), which have been shown to give mild to moderate symptoms. For these reasons it has been suggested that perhaps the thoracic manipulation and thoracic mobilization may improve symptoms in mechanical neck pain patient in the similar way as cervical manipulation and mobilization, but less complication.

Recent studies have shown that performing a thoracic spine manipulation on mechanical neck pain patient results in immediate improvements in symptoms and function of their neck (Cleland et al., 2005; Fernandez-de-las-Peñas et al., 2004; Gonzalez-Iglesias et al., 2008). Additionally, Cleland et al., (2007) investigated the effect of manipulation versus mobilization directed at multiple levels of thoracic spine in patients with neck pain and found that thoracic manipulation could reduce in pain level more than thoracic mobilization does in patients with neck pain. It has been found that thoracic spine manipulation can activate descending inhibitory mechanisms resulting in hypoalgesia in distant areas (Vicenzino et al., 1996). Furthermore, it has been suggested that there are some biomechanical, anatomical and nerve relationships

between the cervical and thoracic spine, and this could contribute to the improvement of neck pain after performing a thoracic spine manipulation (Edmondston and Singer, 1997; Fernandez-de-las-Peñas et al., 2007). For these reasons it has been suggested that perhaps the thoracic spine manipulation may have hypoalgesic or biomechanical effects on the cervical spine. A previous study has shown that cervical mobilization can produced hypoalgesia (Sterling et al., 2001) and it has been found that cervical mobilization may stimulate mechanoreceptors via a large diameter to inhibit pain at the spinal cord level as in gate control theory (Melsack and Wall, 1965) and may affect dorsal periaqueductal gray (Wright et al., 1995).

For these reasons it has been suggested that perhaps the thoracic spine mobilization or manipulation may have hypoalgesic effects on the cervical spine. However, improvements in symptoms and function in patients with neck pain from previous studies have been shown by directly performing manipulation on several levels of thoracic spine. Furthermore, previous studies have a limited evidence to support the effect of thoracic manipulation and thoracic mobilization directed at a single level on the thoracic spine. Therefore, the current study aims to investigate and compare the immediate effect of single thoracic manipulation and single thoracic mobilization on chronic mechanical neck pain in a randomized controlled trial.

1.2 Research questions

1.2.1 Do single thoracic manipulation and single thoracic mobilization differently affect the cervical range of motion in chronic mechanical neck pain?

1.2.2 Do single thoracic manipulation and single thoracic mobilization differently affect pain level at rest in chronic mechanical neck pain?

1.2.3 Do single thoracic manipulation and single thoracic mobilization differently affect pressure pain threshold in chronic mechanical neck pain?

1.3 Objectives of the study

1.3.1 To compare the effectiveness of single thoracic manipulation with that of single thoracic mobilization on chronic mechanical neck pain patients.

1.3.2 To compare the effectiveness of single thoracic manipulation with that of a control group on chronic mechanical neck pain patients.

1.3.3 To compare the effectiveness of single thoracic mobilization with that of a control group on chronic mechanical neck pain patients.

1.4 Outcomes

1.4.1 Cervical range of motion

1.4.2 Pain level at rest

1.4.3 Pressure pain threshold

1.5 Hypotheses of the study

1.5.1 The cervical range of motion in the single thoracic manipulation group would be increased significantly greater than the single thoracic mobilization group.

1.5.2 The pain level at rest in the single thoracic manipulation group would decrease significantly greater than the single thoracic mobilization group.

1.5.3 The pressure pain threshold in the single thoracic manipulation group would increase significantly greater than the single thoracic mobilization group.

1.6 Benefits of the study

1.6.1 The results of immediate effects of single thoracic manipulation and single thoracic mobilization would be alternate choice to treat the chronic mechanical neck pain for the physical therapists.

1.6.2 The data from this study may be beneficial for research in a further study.

1.7 Scope

To study the immediate effects of single thoracic manipulation and single thoracic mobilization on cervical range of motion, pain level at rest and pressure pain threshold (PPT) in patients with chronic mechanical neck pain, aged 18-60 years (Cleland et al., 2005), the subjects were recruited from the Physical therapy Unit, Srinakarind Hospital, Faculty of medicine, Khon Kaen University. A Cervical Range of Motion (CROM) device, a visual analog scale (VAS) and a pressure algometer were used to define the cervical range of motion, pain level at rest and PPT respectively.

1.8 The conceptual framework for treatments of mechanical neck pain

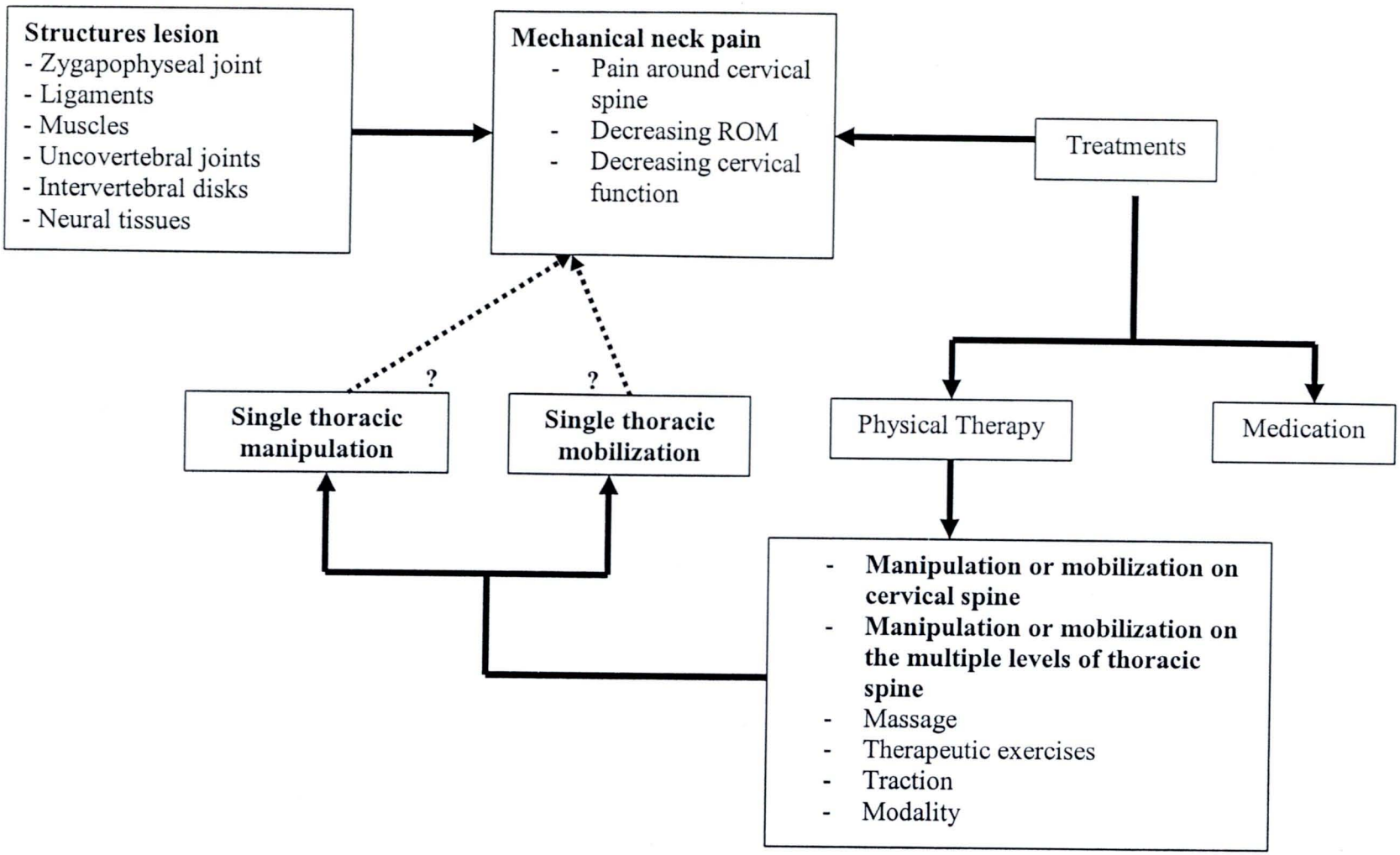

Figure 1 The conceptual framework for treatments of mechanical neck pain