CHAPTER 1

Introduction

1.1 Rationales

Osteoarthritis (OA) of the knee is one of the most common degenerative joint disease among older adults. The proportions of people affected with knee OA is increasing worldwide due to the aging of the population. In the United States, according to national surveys, the prevalence of symptomatic knee OA were reported to be 16.7% among adults aged 45 and over (1) and 12.1% among adults aged 60 and over (2). The prevalence of knee OA in Thailand has also increased over the past decade due to increased aging population. A community survey in Thailand among the elderly aged over 50 years, with a history of knee pain, and using conventional radiography found that the prevalence of knee OA ranged from 34.5% to 45.6% with greater prevalence among female than male. The knee OA prevalence showed increasing trend with advanced age (3, 4).

Clinical signs and symptoms of knee OA are pain, joint instability and stiffness, resulting in physical functional decline. Individuals with knee OA have greater difficulty in performing essential functional activities, particularly those in daily life that involve mobility and transfers such as walking, sitting to standing, and stair climbing when compared with healthy individuals (5). Functional decline and increased rate of disease progression are related to the muscle weakness caused by OA, specifically, weakness of the quadriceps muscles (6).

In most cases, the common goals of treating osteoarthritis are to control symptoms, restore joint function, and prevent progression of the disease. Treatment plans usually involve a combination of nonpharmacological and pharmacological interventions. Knee orthoses are recommended as part of nonpharmacological/ biomechanical intervention approaches for management of knee OA by the European League Against Rheumatism (EULAR) (7). American College of Rheumatology (ACR)

Subcommittee on Osteoarthritis included bracing as self-use modality in the rehabilitation process of patients with knee OA. Recently, the Osteoarthritis Research Society International (OARSI) published an update to their evidence-based, consensus recommendations for the treatment of OA of the hip and knee, including an update on the use of knee orthoses for the conservative management of knee OA (8).

Bracing for knee OA can be divided into three main types; namely, rest orthoses, knee sleeves, and unloading knee braces (9). Knee sleeves and unloading knee braces are more frequently prescribed by physicians and rheumatologists while prescription of rest orthosis for lower limb OA is uncommon (7). In recent years, knee sleeves and unloading knee braces have become more available as off-the-shelf products worldwide. In Thailand, patients with knee OA symptoms can purchase knee braces without a physician's prescription. Knee sleeves are simple self-use resource for patients to reduce knee pain and improve joint function (10). They are less expensive intervention than unloading knee braces. However, the unloading knee braces may be more specific to the mechanical problem of knee OA. The unloading knee braces are designed to provide corrective force to the leg to correct alignment and redistribute load away from the damaged part of the knee joint. Thus, wearing OA knee braces should reduce knee pain, and potentially allow better joint function. These potential advantages of the two types of knee bracing need to be weighed against the greater costs and treatment effects (10).

Results from several previous studies have shown that both knee sleeves and unloading knee braces improved functional activity for individuals with knee OA compared to not wearing knee orthosis. Bryk et al (11) found that wearing knee sleeves resulted in a better performance (improved gait speed in the 8-meter walk test, decreased performance time in the Timed Up and Go test, decreased knee pain during stair climbing) compared to no-knee sleeve condition. Chuang et al (12) reported significant improvement in static and dynamic balance assessed by a balance system machine for patients who wear knee sleeve compared to those who did not wear knee sleeve. Kirkley et al (13) reported that wearing unloading knee brace added more favorable effect on pain perception during activity but no differences on functional outcomes (a six-minute walk test and a 30-second stair climbing test) compared to no brace and knee sleeve conditions. The majority of prior studies compared the effect of type of knee bracing with a wide variety of outcome measures to indicate improvement

in joint function. Due to the heterogeneity of the studies, the effects of different types of knee bracing on functional outcomes are inconclusive.

According to the latest guideline by OARSI (14), three functional tests including a 30-second chair stand test, a 40-meter fast paced walk test, and a stair climb test are recommended as standard outcome measures. This ensures that the measurement outcomes across different studies can be compared. Thus, this study employed the recommended three functional tests as minimum core set for people with OA and used them as primary outcome measures for comparison between knee sleeve and unloading knee brace. The secondary outcomes included the pain scale during performing these three functional activities.

Therefore, the research question of this study was that what types of knee orthosis (knee sleeve VS unloading brace, i.e., OA knee brace) would result in better functional outcomes in individuals with knee OA. The purpose of this study was to compare functional outcomes, as recommended by OARSI, of individuals with knee OA among the three testing conditions: no orthosis, knee sleeve, and OA knee brace. The hypotheses were that wearing knee bracing would improve physical function compared to no-orthosis condition and the effect of wearing unloading knee brace would be superior to knee sleeve. The results of this study may provide useful information for clinicians to prescribe proper type of knee bracing to the individuals with knee OA.

1.2 Objectives of the study

The purposes of this study were to compare functional outcomes of individuals with knee OA among the three testing conditions: no-orthosis, knee sleeve and unloading knee brace (OA knee brace) conditions and to determine the association between pain and preference of the knee orthosis.

1.3 Hypotheses of the study

Wearing knee orthoses would result in improvement of functional outcomes (increased number of stands and decreased walking and stair climbing times) compared to no-orthosis condition and wearing the OA knee brace would result in better functional outcomes compared to wearing the knee sleeve.

1.4 Advantages of the study

The knowledge gained from this study may provide additional information for clinicians to prescribe or recommend proper type of knee bracing which is a simple and inexpensive device to improve function for knee OA patients.