The Effects of Self-Massage On Osteoarthritis of the Knee

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Dissertation submitted to the Faculty of Holos University Graduate Seminary in partial fulfillment of the requirements for the degree of

DOCTOR OF THEOLOGY

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The work reported in this thesis is original and carried out by me solely, except for the acknowledged direction and assistance gratefully received from colleagues and mentors.

Dorothea Virginia Atkins

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Some people come into our lives and go quickly,

Some awaken us to new understanding with a passing whisper

of encouragement;

Some stay for a while and leave footprints on our hearts

And we are never, ever the same...

Unknown

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Philippians 1:3, "I thank my God upon every remembrance of you..."

ABSTRACT

THE EFFECT OF SELF-MASSAGE ON OSTEOARTHRITIS OF THE KNEE

The purpose of this study is to investigate the effects of self-massage on reported pain, stiffness, function and limited range of motion in individuals with osteoarthritis (OA) of the knee. Both the knee joint and the quadriceps muscle have been reported to potentially affect symptoms and progression of knee OA. Massage has been well documented as an effective therapeutic intervention for various musculoskeletal conditions; however, the use of self-massage for OA of the knee has not. Of the 42 adults with doctor-diagnosed knee OA, 40 were randomly assigned to either an intervention (n=21) or a wait list control (n=19) group. The study consisted of 10 supervised and 3 unsupervised self-massage intervention therapies, and a control group of 4 supervised no intervention therapies. Data was collected at baseline, twice per week for eight weeks and at follow-up on the twelfth week. Outcome measures for both the right and left knee consisted of the Western Ontario and McMaster's Osteoarthritis IndexTM (WOMAC) and knee range of motion (ROM) using a goniometer. All changes in pain, stiffness, function and ROM for the treatment group were statistically-significantly different from baseline. For the control group there were no statistically-significantly changes from baseline as all p_values were greater than 5%.

The study results showed that participants who have OA of the knee may benefit from the self-massage intervention therapy and consistent self-massage therapy may equate to more improved results. Further studies are needed to clarify the long-term effects of self-massage on the progression and symptoms of OA of the knee.

Keywords: massage, self-massage, osteoarthritis, self-management, knee osteoarthritis, musculoskeletal, and chronic pain.

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CHAPTER 1:

INTRODUCTION

Background of the Problem

Osteoarthritis (OA), also known as degenerative joint disease, is the most prevalent form of arthritis. It is a common disease of aging for which no specific cure, treatment, or means of prevention has been identified. It affects adults beginning at age 50, with incidence increasing with age.¹ Historically, OA has been described as the "wear and tear" of weight-bearing joints of the body, which causes changes in the joints' cartilage, lining, and underlying bone.²

The knee is the joint most commonly affected by OA. Given projected increases in the aging and obese populations, the incidence of OA of the knee is predicted to rise.³ Despite earlier research indicating joint cartilage degeneration is a possible primary cause of knee OA— initiating internal joint inflammation, edema, and pain—recent research has investigated the causative role of the quadriceps muscle, which is located on the anterior thigh. In this muscle, impairments in function, and weakness; influence on knee joint loading, and proprioceptive deficits seem to contribute to the development or progression of knee OA.⁴ Sufficient quadriceps function is essential to basic activities of daily living, such as rising from a chair, standing, walking, and ascending and descending stairs.⁵ Researchers have found correlation among quadriceps weakness, increased pain, and altered walking patterns.⁶

Retired adults comprise an older populace that is vulnerable to physical disability, health problems, and social isolation.⁷ In the treatment of OA in members of this population, the priority is symptom management.⁸ Conventional healthcare management of knee OA involves nonpharmacological measures—such as patient education, exercise, physiotherapy, braces, and

complementary and alternative medicine (CAM) modalities—followed by pharmaceutical management and surgery.⁹

For patients with OA, CAM interventions provide practical alternatives to conventional medical treatments.¹⁰ A growing body of research supports the efficacy of CAM modalities in helping this population. Currently, Americans with OA spend more money on CAM therapies such as glucosamine, herbs, and non-drug modalities than on drug therapies.¹¹

Massage therapy, acupuncture, prayer, and chiropractic are among the accepted, established CAM modalities employed for a range of medical problems in the United States.¹² A 2002 report from the National Health Survey indicated 62 percent of adults in the United States had used some form of CAM therapy and that 5 percent had used massage therapy for pain relief, rehabilitation, stress reduction, relaxation, depression relief, and general wellness.¹³

Applied touch, manual manipulation, manual technique, and soft tissue manipulation are synonyms for massage.¹⁴ The reported benefits of massage include breaking the pain cycle, improving function, reducing edema, promoting relaxation, and facilitating healing in various medical conditions.¹⁵ While a plethora of research has explored the use of massage for lower back pain and other chronic musculoskeletal conditions,¹⁶ a recent study also supports the use of full-body massage therapy for the pain and dysfunction caused by OA of the knee.¹⁷ Additional studies, although few, have found that the use of self-massage has an impact on the symptoms of musculoskeletal pain. To this researcher's knowledge, the Touch Research Institute at the University of Miami School of Medicine has conducted the only study on self-massage to date, in which the painful symptoms of carpal tunnel syndrome decreased significantly with self-massage while grip strength increased.¹⁸ In another small study, 22 patients with wrist/hand arthritis applied a similar self-massage protocol to their hands and wrists, achieving significant improvements in pain relief.¹⁹

OA of the knee is a chronic degenerative joint disease for which self-management of symptoms is the primary treatment of choice. The present research investigated the use of self-massage of the quadriceps muscle as a safe, economical, and therapeutic self-help practice that is much like yoga, meditation, and T'ai Chi, all of which have been recognized in the scientific literature as promising self-care alternative therapies for the self-management of OA (see review in Chapter Two). In the present study, the researcher explored the effects of a self-massage intervention performed twice weekly for twelve weeks by participants diagnosed with knee OA. The self-massage intervention session consisted of common Swedish strokes such as gliding, tapping, and friction applied by the participants to the quadriceps muscle located on the front of the thigh. The study's supervised-group method of instruction, self-massage sequence, and methodology were created by the researcher.

The researcher sought to answer the following questions: Does the study's intervention increase the knee's range of motion (ROM) in addition to decreasing pain, stiffness, and dysfunction in the knee? If the intervention has these positive affects, should additional research explore it as a promising self-management strategy for people at risk for, or diagnosed with, OA of the knee?

Statement of the Problem

Symptomatic knee OA has a functional impact on more than 1 in 10 adults, or 4.3 million older adults in the United States.²⁰ Among the elderly, chronic musculoskeletal knee pain, which may result in mobility and disability in weight-bearing activities of daily living, is the most common presenting problem of knee OA, for which one quarter of people over 55 seek medical attention.²¹ Often, patients with knee OA are fearful of falling because of knee joint instability or buckling when descending stairs or curbs. This fear can promote sedentary habits.²²

The primary goal of conventional treatment for knee OA is self-management of its symptoms; however, such treatment is often hampered by noncompliance. Treatment adherence is the principal predictor of a treatment's long-term outcome.²³ CAM interventions provide a practical alternative to conventional approaches to the disease.²⁴ The exploration of safe, cost-effective interventions or adjunct therapies to address the chronic physical symptoms of knee OA is the problem addressed in this study.

Purpose of the Study

The purpose of the study was to examine the benefits of self-massage intervention therapy for participants diagnosed with knee OA, as seen in improvements in knee pain, joint stiffness, physical functioning, and knee ROM. The primary investigator knows of no studies in the literature investigating the effects of self-massage on knee OA; however, based on the results of an eight-week pilot study conducted by the researcher (see Chapter Three), it was expected that self-massage would have an impact on the symptoms of knee OA.

The researcher designed the self-massage sequence, a variation of Swedish massage techniques often used in research studies, in the hope that any findings emerging from this study would stimulate more rigorous research regarding patient-centered self-massage interventions for knee OA.

Research Questions

This study was designed to answer two primary questions.

Research Question 1

What is the effect of the self-massage intervention for the quadriceps muscle on the pain, stiffness, and physical-functioning aspects of knee OA, as measured using the Western Ontario and MacMaster's Osteoarthritis Index TM (WOMAC) questionnaire?

In 1988, the WOMAC instrument was designed for the disease-specific evaluation of patients with lower-leg and hip OA. It is a self-administered survey intended to assess knee pain, stiffness, and physical functioning in individuals with this disease. It has also been used as an outcome measure in evaluating the effect of other therapeutic interventions (e.g., acupuncture or intra-arthroscopic medication).²⁵

For the present study, twenty-four WOMAC questions were condensed into four groups. Question 1 through Question 5 constituted an assessment of how much pain a participant experienced as a result of OA. Question 6 and Question 7 comprised an assessment of the joint stiffness a participant experienced as a result of OA. Question 8 through Question 24 formed an assessment of the physical-functioning participant sustained as a result of OA.

Null hypothesis: The intervention of self-massage will have no effect on the pain, stiffness, and functioning of participants with knee OA as demonstrated in their responses to the WOMAC questionnaire.

Research Question 2

What is the effect of the self-massage intervention on knee ROM, both flexion and extension, as measured using a goniometer?

A universal goniometer is an instrument used to measure joint ROM. The evaluation of a joint with this instrument includes an assessment of its positioning, stabilization, and alignment. The scales on a half-circle goniometer read from 0 to 180 degrees and from 180 to 0 degrees. Increments on the scales range from 1 to 10 degrees, though one- and five-degree increments are the most common. Normal knee flexion for males and females between the ages of 25 and 74 is 132 degrees, and extension is zero degrees according to a study by Roach and Miles.²⁶

In the present study, the ROM measurements of the right knee bent (right flexion), left knee bent (left flexion), right knee straight (right extension), and left knee straight (left

extension) were taken by trained researchers using a goniometer and were measured in degrees to assess participants' mobility as a result of the self-massage intervention. Additionally, right and left knee bent (both flexion) measurements were combined by calculating the average for each participant, and right and left knee straight (both extension) measurements were combined into a group by calculating the average for each participant.

Null hypothesis: The self-massage intervention will have no effect on knee ROM in terms of flexion or extension as assessed using a goniometer.

Importance of the Study

The United States is facing a healthcare crisis that demands reform. By 2019, the number of uninsured people will grow by more than 30 percent in 29 states and by at least 10 percent in every state.²⁷ Additionally, across the country, the costs of healthcare premiums are rising at a higher rate than wages between 1999 and 2009. For example, in New Jersey, premiums have increased by 95 percent, whereas wages have increased by 38 percent; in Missouri, premiums have grown by 112 percent while wages have risen by 46 percent.²⁸ There appears to be a growing interest in restructuring the healthcare system to facilitate the promotion of wellness rather than simply the management of disease and treatment.²⁹

In this environment, the use of CAM therapies is on the rise. A comparison of data from 2002 to 2007 indicates that the use of CAM therapies—such as deep breathing, meditation, massage, and yoga—increased significantly over this period. Specifically, the use of massage therapy for health- and illness-related issues increased from 5.0 percent in 2002 to 8.3 percent in 2007.³⁰ Research studies have found CAM therapies to be beneficial for arthritis and other musculoskeletal conditions (see the review in Chapter Two). Further, for arthritic patients, the

chronicity of the illness, lack of a cure, costs, and side effects of medications and treatments—as well as a sense of helplessness—make CAM therapies attractive.³¹

This original investigation into the field of mind-body research focused on a fresh, costeffective, participatory single or adjunct self-care intervention with the potential to modify disease progression and to affect the symptoms of chronic musculoskeletal disease and other illnesses. There is a clear need for research addressing the body's innate ability to heal itself that focuses on disease prevention and health promotion.

Scope of the Study

The scope of this study included research associated with the cause, prevalence, symptoms, and treatment of knee OA, a common form of OA that leads to chronic pain and physical limitations for a rising population of older adults. This study also examined massage therapy—specifically, self-massage—as a mind-body, safe, economical, and beneficial alternative to traditional nonpharmacological self-management therapies for knee OA. The researcher conducted group training and education in a classroom workshop setting using an inperson method of instruction similar to an exercise program. The study examined the benefits of the self-massage intervention therapy on knee pain, joint stiffness, physical functioning, and quadriceps muscle ROM for participants diagnosed with knee OA.

Forty independent age-eligible women and men with knee OA were recruited and then randomly assigned to either the intervention group (n = 21) or the control group (n = 19) using a uniform distribution. The use of a uniform distribution helped to ensure that all participants were members of the same distribution family and had an equal probability of selection for the intervention or control group. All participants were 50 years of age or older and had no other limitations that would hamper mobility of the knee. The intervention group participated in 10

supervised and 3 unsupervised self-massage intervention therapies. The control group had no intervention therapies. The members of the intervention group continued their usual care and performed a supervised self-massage intervention therapy twice weekly for eight weeks. After eight weeks, the intervention group continued usual care and performed an unsupervised self-massage intervention therapy twice weekly for three weeks. Intervention group members returned for a supervised visit in the twelfth week. The members of the control group continued their usual care but did not perform the self-massage intervention therapy during the twelve-week study period.

Definition of Terms

Complementary and alternative medicine (CAM) is a term that describes a group of diverse medical and healthcare systems, therapies, and products that are not presently considered within the framework of conventional medicine.³²

Effleurage is a gliding massage stroke that takes the form of a long broad movement with moderate to heavy pressure. The use of this stroke affects the soft tissue.³³

Friction is a massage method that consists of small, deep movements performed on a local area.³⁴

Joint loading is the amount of weight supported by a joint.

Manual therapy involves passive movements applied by a physical therapist with the purpose of increasing joint motion or reducing joint stiffness. Techniques may include muscle stretching, soft tissue mobilization, and forms of massage.³⁵

Massage therapy is a generic term that denotes (a) the promotion of health and wellbeing by way of soft tissue manipulation and movement of the body and (b) the healthcare profession engaged in by massage practitioners.³⁶

Mind–body interventions are techniques designed to facilitate the mind's ability to affect the body's functioning and symptoms.

Petrissage is a massage stroke that one performs by kneading the soft tissue through lifting and rolling motions.³⁷

Proprioception is the sensation of movement or strain in muscles, tendons, and joints, or "muscle sense."

Spirituality is an individual's private search for meaning and connection— in particular, through his or her relationship with God.³⁸

Spiritual healing is a positive experience through which an individual receives help in healing the whole body's physical symptoms by using intuition to assist in the identification of physical or psychological disharmony.³⁹

The *synovial joint capsule* is made up of two or more bones that articulate with one another to allow movement.

T'ai Chi is an ancient Chinese exercise that is safe, promotes physical movements that strengthen muscles, fosters relaxation and concentration, and is suitable for the geriatric population.⁴⁰

Tapotement is a massage stroke that can be applied with two hands by hitting the body alternately as if tapping, hitting, or drumming.

Therapeutic massage includes any massage manipulations that stimulate physiological responses.

Therapeutic Touch (TT) is a specific technique that involves centering intention as the practitioner moves his or her hands through the recipient's energy field for the purpose of assessing and treating energy-field imbalance.⁴¹

The *tibiofemoral knee joint* is the joint formed where the femur (thigh bone) meets the tibia (large shin bone).

Trigger point denotes an area of local nerve facilitation of a muscle that is aggravated by stress of any sort and affects the body and mind of an individual.⁴²

Limitations

- A blind trial was not possible for this active intervention conducted with participants in a group setting. The PI and RAs were not blinded when working with the intervention and control groups.
- The intervention group could not be controlled for expectation (Rosenthal) effects.⁴³ Among the members of this group, interest in the study reflected an expectation of some benefit.
- Likewise, the research assistants' attention to, interest in, and concern for study participants could have stimulated nonspecific effects and general optimism (i.e., the Hawthorne effect).⁴⁴
- 4. As with studies of other physical treatments, it was impossible to withhold the effects of the technique from study participants.
- 5. The study's follow-up period was four weeks. A longer follow-up period would have allowed for better long-term observations.

The researcher intended for the study to have a minimum of 60 participants, 30 in each cohort, as required by Holos University Graduate Seminary. However, despite the use of multiple avenues of advertisement—radio, newspaper, e-mail, and direct mailings—only 40 individuals qualified for the study. There were enough participants to maintain the level at 80 percent. Thus, the low

number of participants (n-40) posed no threat to the results of the study, and the researcher's

faculty advisor and dissertation committee allowed the study to continue.

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CHAPTER 2:

REVIEW OF LITERATURE

This review examines massage as a therapy for the pain and dysfunction of osteoarthritis (OA), with a broad overview of the underlying physiological and psychological benefits of massage with a focus on self-massage and its benefits on knee OA. The review begins with some historical background of massage, then describes its use and effectiveness on various musculoskeletal conditions, and concludes with a presentation of current research on the use of self-massage for pain and dysfunction of knee OA. Additionally, the knee joint and muscular function and pain research are presented, followed by research findings linking the quadriceps femoris muscle to the possible development of knee OA. The review then focuses upon the nonpharmacological management of the disease, as well as normal aging, both of which influence the impact of the disease. Moreover, an overview of various complementary and alternative medicine therapies research that benefit OA are described. Finally, the integration of self-massage as a form of self-healing for chronic pain as an area for future research is highlighted.

The evaluation of the effectiveness of self-massage for knee OA has not been presented in any research. The researcher therefore presents a framework for understanding the possible outcome of applying a self-massage intervention, to the quadriceps muscle of individuals with symptomatic knee OA. The review will present relevant empirical research that leads to the importance of this study and new research questions requiring further inquiry.

Therapeutic Massage

Massage therapy is considered a form of medical treatment covered by national health in China, Russia, and West Germany. However, in the United States massage therapy is considered an alternative treatment, not a medical treatment, and thus is not covered by most insurance.¹ It is considered part of complementary alternative medicine (CAM) and rehabilitation therapy. Massage, a form of applied touch, is one of the oldest healing techniques. It has evolved in America, primarily because valid research is now available to support its therapeutic value. According to the American Massage Therapy Association, "massage therapy" is a generic term that denotes both (a) the promotion of health and well-being by way of soft tissue manipulation and movement of the body and (b) a health care profession engaged in by massage practitioners.² The primary characteristics of massage are touch and movement. The strokes are combined to form a comprehensive intervention often referred to as Swedish massage, the technique utilized by most published trials on massage therapy.³ This form of massage is often used in randomized clinical trials. The terminology, which describes the classic massage movements, is derived from the English and French languages. The following terms describe the classic massage strokes: effleurage (gliding); petrissage (kneading); friction (pressure from fingertips with circular or transverse movement); tapotement (tapping); and vibration (shaking).⁴ When massage is used for salutary purposes, it is referred to as therapeutic massage, which is the manual application of a technique to the skin, soft tissue, muscles, tendons, ligaments, and/or fascia for beneficial purposes.⁵ Massage therapy is considered part of both complementary and alternative medicine (CAM) and rehabilitation therapy. As stated earlier, a 2002 report from National Health Survey indicated that sixty-two percent of adults in the United States had used some form of CAM therapy, and five percent used massage therapy for pain relief, rehabilitation, stress reduction, relaxation, and depression and as an aid to general wellness.⁶ Applied touch,

manual manipulation, manual technique or soft tissue manipulation are synonyms for massage. No matter what the terminology, the reported benefits of massage include breaking the pain cycle, improving function, reducing edema, promoting relaxation, and facilitating healing in various medical conditions.⁷ Much of the literature evaluating the use of therapeutic massage for musculoskeletal conditions has provided verifiable objective, evidence for its effectiveness and efficacy.

Effectiveness of Massage Therapy

Evidence-based studies of massage for musculoskeletal conditions yield potentially useful and beneficial alternative pain control techniques that could act on a combination of muscles. Low back pain is one of the most common musculoskeletal conditions in which the application of massage therapy is effective. Several randomized controlled studies have demonstrated its benefits for low back pain; Cherkin and colleagues specifically evaluated massage as a CAM therapy for low back pain. In this study, researchers looked at 262 randomly chosen patients with persistent low back pain. The study's participants were randomly assigned to receive therapeutic massage, traditional Chinese medical acupuncture, or self-care educational materials. At the end of a 10-week treatment period, therapeutic massage proved superior to both acupuncture and self-care educational materials. The one-year follow-up determined the continued benefits of massage, indicating that it remained superior to acupuncture, but not to self-care educational materials. The results of this study suggested that "massage is an effective short-term treatment for chronic low back pain, with benefits that persist for a year."⁸ Additionally, massage proved more economical as it relates to cost to provider, pain medication and outpatient Health Maintenance Organizations. Back care services were about 40 percent lower in the massage group.⁹ A limitation of this study was the lack of a control group; also, the cause of the back pain was not considered, making replication difficult for future research.

In another study on subacute low back pain and massage therapy, Michele Preyde provided worthwhile insight into the relationship between comprehensive massage therapy, soft tissue manipulation, remedial exercise with posture education, and placebo sham laser therapy. Subjects with low back pain were randomly assigned to one of the four groups; all 107 patients received 6 treatments over one a month period. The comprehensive massage group alone had significantly better scores than the remedial exercise and sham (placebo) laser groups on measures of function, pain intensity, and quality. Thus, "massage was significantly better than exercise for measures of function in the short term."¹⁰ Preyde's research contributed a significant perspective of therapeutic massage as an effective treatment for low back pain; however, better defined research is needed to establish a specific protocol for the massage and soft tissue manipulation with adequate descriptions. Further research is also needed to investigate the effects of specific massage techniques (e.g. *petrissage*, friction, trigger points), rather than an integration of comprehensive massage techniques that would allow for better replication of studies.

Similarly, the authors of a Cochrane Review, which investigated the effects of interventions for prevention, treatment and rehabilitation in a health care setting, also concluded that massage therapy might be beneficial for patients with nonspecific subacute or chronic low back pain, especially when combined with exercise and education.¹¹ In a clinical comparative study, Maria Hernandez-Reif and colleagues evaluated the treatment effects of massage for reducing pain, depression, anxiety, stress hormones and improving trunk range of motion associated with chronic low back pain. This study consisted of twenty-four adults with low back pain of at least six months duration who were randomly assigned to either massage therapy (n=12) or progressive muscle relaxation (n=12). The massage group received two 30-minute massage therapy sessions per week over five weeks by trained massage therapists. By

comparison, the superiority of massage therapy over relaxation produced significant improvement in trunk flexion and range of motion, increased serotonin and dopamine levels, reduced depression and anxiety, and improved mood. Subjects receiving relaxation therapy reported less anxiety. Small sample size and lack of follow-up were limitations of this study.¹² Although the findings from the preceding reviews and studies support the effectiveness of massage for a range of musculoskeletal conditions, in an assessment of massage for neck musculoskeletal pain, a systematic review noted "although there has been a marked increase in the number of publications that incorporate massage...the contribution of massage to manage neck pain remains unclear."¹³

In summary, the four preceding studies have provided scientific evidence of the effectiveness of massage therapy for depression and anxiety and musculoskeletal conditions— specifically, low back pain. The trials have reported that massage therapy is superior to acupuncture and exercise, and may constitute the primary intervention or act as an adjunct with other interventions when combined with exercise and education.

Interest in massage therapy has continued for other chronic pain conditions. Jennie Tsao's review focused on the following chronic nonmalignant pain: fibromyalgia, mixed chronic pain, shoulder pain, carpal tunnel, low back pain, and headache pain. This review's examination of its clinical implications concluded that massage therapy has overall beneficial value, but a limitation in the review of massage research is the lack of follow-up assessments.¹⁴ Finally, a meta-analysis review of twenty-seven massage therapy studies, which focused on still other types of pain, concluded that massage therapy did not provide significant effects on pain when assessed immediately following a session; however, lasting benefits were present after a series of massage treatments.¹⁵

In an opposing view, Geoffrey Harris reviewed guidelines on the effectiveness of therapies for musculoskeletal conditions and reported that massage was ineffective. His report on a panel formulating evidence-based guidelines for rehabilitation intervention in the management of pain in the low back, knee, shoulder, and neck indicated that though massage is considered a part of rehabilitation, the major implication of this analysis as it relates to knee pain is that "there is poor evidence to support the use of several widely used interventions in the treatment of knee pain. . . The main difficulty in determining the effectiveness of rehabilitation interventions is the lack of well-designed, prospective, randomized controlled trials."¹⁶

In conclusion, massage therapy has been considered a part of rehabilitation; however, it can also be integrated with other therapies or used alone in therapy. It is reasonable to believe that if massage can help with low back pain and other chronic musculoskeletal conditions, it can also be therapeutic for pain relief and dysfunction in OA of the knee.

The Efficacy of Massage Therapy

Efficacy can provide evidence to support the various claims of massage therapy's effectiveness on musculoskeletal conditions, and provide a blueprint for the replication of future studies. In an editorial article, authors E. Ernst and M. Pittler discuss the important difference between effectiveness and efficacy in research. They assert "typical efficacy study tests whether the experimental therapy generates specific therapeutic effects, while the typical effectiveness study is aimed at quantifying the sum of specific effects and other contributors to the total therapeutic effect."¹⁷ The authors also indicate that for the best research value efficacy data studies are needed prior to research on effectiveness in order to ensure the value of treatments.

In a recent, well-designed landmark 2006 pilot study, Perlman and colleagues were the first researchers to investigate the efficacy of massage therapy on both the range of motion and pain in OA of the knee. Researchers measured the clinical significance of massage therapy as a

treatment option in sixty-eight patients with OA of the knee. The assessment tool used was the Western Ontario and McMaster's Osteoarthritis Index[™] (WOMAC) global rating scale for pain and dysfunction, a visual analog scale of pain assessment, range of motion in degrees, and walking time in seconds. The study compared 34 subjects who had eight weeks of standard Swedish full body massage, with a wait-list cross-over control group (n=34) who received the intervention after an initial delay of eight weeks. The Swedish therapeutic massage intervention was a standard protocol that included petrissage, effleurage, or tapotement provided by licensed massage therapists who performed the one-hour intervention twice weekly during weeks 1-4, followed by weekly massages during weeks 5-8. Although the results of this trial are promising, the lack of a specific standard protocol for the incorporation of specific type, duration, or number of strokes is a limitation for future replication of the study. The researchers also address the possibility of the delay creating a Hawthorne effect,¹⁸ possibly influencing the results, during the initial eight-week delay. It is relevant to mention that the study duration of sixteen weeks allowed the researchers to assess improvement in the eight-week follow-up of the intervention group; however, future studies of OA could benefit from longer follow-up studies. Finally, the authors did an admirable job in providing ample support to suggest that "massage therapy is efficacious in the treatment of OA of the knee, with beneficial effects persisting for weeks following treatment cessation."¹⁹ This research provided worthwhile insight into the relationship between massage therapy not as an adjunct treatment but as a single modality for the treatment of pain and range of motion associated with OA of the knee.

Though this study focused on OA of the knee and used full-body therapeutic one-hour massage administered by a massage therapist, it provided an avenue of speculation for further research to explore more closely other indirect influences, such as relaxation and decreased anxiety, that also could have contributed to the significant results. Also, the use of a full-body

massage and consequent decrease in pain may indicate that the pain relief was a result of other tension in muscles and other psychological factors such as the nonspecific effects of attention and touch. Areas of possible study in future investigations could include carefully designed treatment protocols with control groups addressing various other types of OA such as hip, spine, and hand, clarifying the site and extent of the dysfunction and pain as factors in the efficacy of therapeutic massage.

To date this is the only research to investigate the efficacy of massage for knee OA. Although the trial revealed significant results, the continued use of therapist-administered massage as a regular treatment to ensure its therapeutic value is often cost-prohibitive in longterm nonpharmacological self-management of knee OA, some patients could have difficulty financing regular massages.

The preceding theories and reviews supporting the significant physiological and or psychological value of massage in many conditions were either based on theoretical reasoning, research material or clinical studies; however, the precise explanatory mechanisms of action in massage therapy needs more research. In summary, the studies in this review identify the application of massage for low back pain, OA and other chronic pain conditions. Its short-term effectiveness as an adjunct therapy in preparation for exercise and other interventions were discussed in Furlan's study.²⁰ Similarly, massage proved superior to relaxation, ²¹ acupuncture and self-care education for low back pain.²² Finally, when the study integrated massage therapy into treatments for chronic pain, it was found to be beneficial.²³ In this context, massage has proven to be an effective adjunct, integrative, rehabilitative, and/or therapeutic intervention in the treatment of musculoskeletal and chronic pain conditions, as mentioned previously. The exact mechanisms of action, however, remain unclear, and thus the need for future mechanism studies.²⁴

Mechanisms of Action

Until now, the focus of this literature review has been the efficacy and effectiveness of massage therapy. The previously discussed studies have validated the possible physiological and psychological benefits of massage therapy. However, the theoretical mechanism by which massage operates gives clarity in the clinical integration and application of massage therapy. Nevertheless, a closer look at the relationship between the direct influence of massage on muscles, circulation, and the soft tissue being manipulated has not been extensively researched. The effects of massage are considered to be produced by more than one mechanism or a combination of mechanical, neural, chemical, physiological, or psychological factors that create the basis for research findings.²⁵ For example, the Touch Research Institute at the University of Miami has focused their research on various age groups and medical conditions that may benefit from massage therapy. Despite the studies' reported significant effects on the body's serotonin, dopamine, and cortisol levels, the underlying mechanisms of massage therapy's action are not understood.²⁶

The benefits of massage therapy have been related to the ability of manual massage to influence the skin, soft tissue, muscle, tendons, ligaments, and/or fascia for therapeutic purposes.²⁷ Commonly reported effects of massage therapy suggest that massage produces a combination of effects.²⁸ In his book *Soft Tissue Manipulation*, Leon Chaitow proposes that pressure as applied in deep kneading or stroking along the length of a muscle tendon encourages venous, lymphatic, and tissue drainage, as well as replacement with fresh oxygen. Additionally, the removal of metabolic waste enhances homeostasis and reduces pain. According to Chaitow, the muscle energy technique, which is a type of soft tissue manipulation, when employed in combination with massage, is also capable of relaxing muscles by inhibiting the muscles' capability.²⁹ Another resource book which supports the use of manual hands-on therapy

provides evidence-based theories for professions that incorporate manual therapy in conjunction with other medical therapies. *The Principles of Manual Medicine* by Philip Greenman defines manual medicine's soft-tissue procedure as "the manual application of force directed toward influencing specific tissues of the musculoskeletal system, by peripheral stimulation, enhancing some form of reflex mechanism that alters biologic function. The direct procedures include massage, effleurage and kneading, stretching, friction and so forth...The therapeutic goals are to overcome congestion, reduce muscle spasm, improve tissue mobility, enhance circulation, and 'tonify' the tissue."³⁰ Greenman states the mechanism of massage is also a soft tissue procedure that "can mechanically stretch the skin, fascia, and muscle tissue of the body to enhance their motion and pliability. These procedures are useful in encouraging circulation of fluid in and around the soft tissues of the musculoskeletal system, enhancing venous and lymphatic return, and decongesting parts of the body compromised by injury or disease...These same procedures can have a neurologic effect, modifying muscle physiology to overcome hypertonicity, spasm and the relief of musculoskeletal pain."³¹

The preceding theories involve the application of manual pressure that focuses on the potential of massage to influence muscle and soft tissue in order to effect therapeutic change within the body. This mechanism of massage has not been widely investigated and the evidence is limited; however, Geoffrey Goats' early investigations into the use of massage to promote healing, relaxation, and decreased pain have provided the foundation for the current mechanism theories. His research provided significant contributions in the application of massage with various medical conditions. According to Goats' theory, massage dilates superficial blood vessels and increases the rate of blood flow, which can accelerate healing.³² Similarly, Steven Stanos and others supported Goats' theory in a recent article on "Physical Medicine Rehabilitation Approach to Pain," which classified the beneficial effects of massage into two

areas: reflexive and mechanical. The stimulation of endogenous opioid release and relaxation were considered reflexive. The mechanical pressure exerted by various massage strokes may prevent, delay, or decrease muscle tightness and improve superficial lymph and venous circulation channels.³³

Previously, Maria Hernandez-Reif and colleagues in a small study reported the increase in range of motion and flexibility created with various massage strokes, ³⁴ but another small study, in which the ability of massage to enhance flexibility of the hamstring muscle group was investigated, yielded different results. This study of eleven healthy males had fifteen minutes of effleurage and petrissage massage applied to the hamstring muscles for two sessions. In a sit and reach performance, measurements pre- and post-massage showed no significant change.³⁵

Theories that support massage therapy's influence on lymph drainage to remove muscle toxins and reduce edema are reflected in anecdotal accounts, however, empirical supportive evidence is currently lacking and more conclusive research is needed.³⁶ Finally, in 1965, Melzack and Wall's research, yielded the gate control theory, that suggest pain signals traveling via small nerve fibers are allowed to pass through to the brain signaling pain, while signals sent by large nerve fibers, e.g. touch, are blocked, "closing the gate" to pain. This shed new light on the complexities of understanding acute and chronic pain.³⁷ Specifically, the gate control theory can be is applied to massage therapy, the pressure receptors, which are longer and more myelinated than pain fibers, are stimulated during massage and travel faster, closing the gate to any pain signals. Thus, massage has therapeutic value especially with chronic pain processing, potentially providing some relief and relaxation.

Even though the underlying mechanisms for massage therapy need further research, its efficacy and effectiveness has stimulated its use by parents for their premature and healthy

infants, sick children, and care givers, as well as self-massage as part of self-care for certain chronic conditions.

Self-Massage

As stated earlier, in Geoffrey Harris's review, massage therapy is considered part of rehabilitation therapy. G. Kelley Fitzgerald and colleagues examined the physical therapy treatment options when incorporating manual therapy techniques with exercise therapy programs. Manual therapy is defined by Fitzgerald and colleagues "as a term used to describe passive movements that are applied by the physical therapist with the purpose of increasing joint motion or reducing joint stiffness. Techniques may include muscle stretching, soft tissue mobilization and massage techniques.³⁸ In a more recent study, researcher Gail Deyle and colleagues compared the effectiveness of supervised clinical exercise and manual therapy versus a home exercise program treatment for OA of the knee of 134 subjects. The results suggested the clinical intervention of manual therapy and supervised exercise was more effective than a home exercise program for increasing knee function and decreasing pain and stiffness. The researchers also recommended the use of self-massage and /or the administration of massage by a spouse.³⁹

Much of the understanding of muscle dysfunction in knee OA is speculative, but selfmassage, (i.e. soft tissue manipulation, or manual therapy) may provide a solution to compliance when the patient is taught the technique and its benefits.⁴⁰ Osteoarthritis is a chronic disease of aging, for which there is no cure; consequently, there is an urgent need to develop safe, effective interventions to enhance the quality of life.

As previously stated, massage was typically administered as an adjunct treatment in preparation for exercise or other interventions and is rarely administered as the main treatment. ⁴¹ Nevertheless, studies presented in this research verify both the efficacy and effectiveness of

massage therapy for musculoskeletal and chronic pain conditions. The massage done in the studies was administered by massage therapists, but if pain relief, maintenance of function and building self-reliance in patients with chronic knee OA is a goal of treatment,⁴² then additional research is needed to establish self-massage as a safe and effective intervention for self-treatment.

Self-massage may be performed naturally on tired feet, eyes, or hands; it is also used to ease tension headaches, all done on bodily areas that are easily accessible. However, selfmassage research is in its infancy, so there is little definitive data to support its therapeutic value. The Touch Research Institute at the University of Miami School of Medicine has thus far conducted the only research on self-massage. The painful symptoms of carpal tunnel syndrome were presented in a randomized four-week study in which sixteen patients performed selfmassage daily for four weeks at home, and a therapist massaged the affected arm weekly. Massage therapy significantly decreased carpal tunnel symptoms of pain while also increasing grip strength.⁴³ In another random study, Tiffany Field and colleagues conducted an experimental study to determine the effects of massage on the pain of wrist/hand arthritis. Twenty-two participants applied a similar self-massage protocol to the affected arm. The selfmassage group showed greater improvement in pain relief.⁴⁴ Finally, Hernandez and colleagues studied the effects of self-massage on anxiety with adults who were attempting to stop smoking. In this study a five-minute self-massage was performed on the hands three times a day and at times of cigarette cravings. The findings produced a reduction of perceived anxiety and mood improvement.⁴⁵ These three studies provided further validation for the importance of this research. Self-massage can be used as a self-treatment in the personal management of certain chronic accessible musculoskeletal conditions.
Overall, the previous self-massage studies demonstrate similar benefits to traditional full body massage. Self-massage can be used as both an adjunct or intervention treatment to reduce pain and anxiety, and to increase circulation to muscle and soft tissues. Even though these studies had methodological limitations, such as small sample size and absence of follow-up assessments, evidence supports the need for further research. In summary self-massage is a self treatment technique for the personal management of conditions and or symptoms that respond to touch, or massage therapy.

Self-Efficacy

Historically, self-massage has been employed as an integral part of treatment and management of chronic medical conditions without formal research evidence. Lymphedema, a condition that results in chronic swelling produced by a reduction in the transport capacity of the lymphatic system, uses self-lymphatic massage as an important part of self-management. It is taught to the patient by an experienced healthcare practitioner and performed daily.⁴⁶ Other research has validated the use of trained family or caregivers for medical conditions. Tiffany Field and colleagues investigated the use of caregivers and family for preterm and full-term infants and juvenile rheumatoid arthritis.⁴⁷ While self-management and family support are important components of wellness, it is difficult to establish compliance in the patient population.⁴⁸ Self-efficacy is an important aspect for compliance with any home-based self-management program. Self-efficacy is the confidence that one has in one's ability to perform a specific behavior.

Positive self-efficacy feelings occur with the interaction of personal, behavioral and environmental factors.⁴⁹ Equally important, a randomized study found patients with OA of the knee who were treated with both soft tissue mobilizations (i.e. massage) and exercise experienced significant improvements in pain, stiffness and function, lasting up to a year.⁵⁰ On

the whole, those with chronic conditions may successfully assume responsibility for managing and maintaining their quality of health. Both home-based massage and exercise can be safe and functional methods for the self-management phase of chronic pain and other musculoskeletal conditions.⁵¹

Musculoskeletal Pain

The subjective nature of reporting pain and the healthcare providers' interpretation of symptoms often cause patients to seek several specialists in their search for answers to the cause of their musculoskeletal pain.⁵² Because massage can provide relief for the physical symptoms associated with muscular pain it is also used as an adjunct therapy and has a long history of use in sports.⁵³

Often, the three common sources of muscular pain are articular dysfunction, (e. g. osteoarthritis), myofascial pain due to trigger points; and fibromyalgia. Prior to administering massage or any other intervention, the source of local muscle pain should be evaluated. The type of local muscle pain is another consideration because the mechanisms underlying this type of pain could be mechanical in nature due to injury, overuse, compensatory use, and exercise; or the pain could result from metabolic problems, inflammation, and vascular impairment. Drug or chemically-induced muscle pain is also a possibility.⁵⁴ The ability of massage to relieve muscular symptoms depends largely on the source and type of local or referred pain. While knee pain is the principal symptom in OA of the knee, it can also be caused by a variety of pathologies depending on the patient's age, medical history, and the anatomical location of the knee pain.⁵⁵

The Physiology of Osteoarthritis

Osteoarthritis (OA), known as degenerative joint disease, is the most common form of arthritis. It is a common disease of aging for which there is no known specific cure, treatment or

prevention. It affects adults starting at age 50 with the incidence increasing with age. ⁵⁶ Historically, OA has been described as "wear and tear" of weight-bearing joints of the body, causing changes in the joints' cartilage, lining and underlying bone.⁵⁷ However, OA researchers have described it as a disease involving more than just cartilage; the classic physiology of OA involves the interaction of the physical, biochemical and biomechanical structures of the articular cartilage and subsequent change in the adjacent tissue, bone, synovial joint capsule, muscles and ligaments. Despite earlier research indicating joint cartilage degeneration as a possible primary cause of OA, which then initiates internal joint inflammation, edema and pain, recent research has investigated the role of the quadriceps muscle. Especially its impairments in function, its weakness, influence on knee joint loading, and proprioceptive deficits, which seem to contribute to the development and or progression of knee OA.⁵⁸ No matter what the cause, knee OA creates pain, anxiety and abnormal joint mechanics, which are variables that affect the impact of the disease.

Knee Pain

The largest and most complex joint in the body is the tibiofemoral knee joint.⁵⁹ The knee is also the most common joint affected by OA and the most common site of chronic pain among the elderly.⁶⁰ The various forms of OA create similar symptoms, pain and dysfunction, yet the exact cause or mechanisms that produce joint pain have only recently resulted in research exploring the complex processes causing arthritic pain.⁶¹ In 2005 OA affected nearly 27 million adults in the United States, and its incidence has increased by 7 million since 1995. Additionally, according to the 2005 population estimates from the census bureau, it is estimated that 9,267,000 adults have symptomatic knee OA.⁶²

The physical assessment of the knee is not enough to assess knee pain, says Paul Creamer, whose research in rheumatology has led to the following observations. "Pain is not simply the result of structural changes but, rather, the outcome of a complex interplay between structural change, peripheral and central pain processing mechanisms, and subjective differences in what constitute pain, in turn influenced by cultural, gender, and psychosocial factors."⁶³ Patients with knee OA are also fearful of falling because of knee joint instability or buckling when descending stairs or curbs, which leads to sedentary behavior.⁶⁴ The patellofemoral joint is the most frequent site for knee OA pain, especially when rising from a chair or descending stairs.⁶⁵ The medial (middle) and lateral (outside) tibiofemoral knee joint compartments can also be affected by knee OA.⁶⁶ The specific cause of knee pain can direct the course of treatment and management of the disease and it is usually diagnosed radiographically by the presence of osteophytes (bone spurs) and loss of joint space.⁶⁷ See Figure 1.



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Figure 1. Osteoarthritis of the Knee

There are inconsistent correlations between structural changes seen on magnetic resonance imaging (MRI) or radiographs and the level of joint pain expressed by patients. On assessment some patients with severe symptoms have normal radiographs and those without pain have evidence of radiographic OA.⁶⁸ Even though an MRI provides the best image of all tissues involved in the osteoarthritic joint, ligaments, synovium, menisci, muscles and subchondral bone, there are some difficulties separating structural changes associated with aging from the

pathology seen in symptomatic OA joints. Due to cost and other factors, there is no routine use for MRI in clinical practice for OA.⁶⁹ Potential reasons for the discrepancies include the subjective nature of pain; the possible causes of knee OA (e.g., mechanical, hormonal or genetic); and variation in the radiographic imaging procedure.⁷⁰ Moreover, there is also discordance between a doctor's diagnostic classification of OA and a patient's use of the term OA.⁷¹ Hence OA, especially OA of the knee, is challenging to assess, diagnose and treat.

The Quadriceps Femoris Muscle

The cause of knee OA has not been attributed to one single factor. A common misconception is that the cause of pain and resulting disability is attributed mainly to the slow progression of cartilage degeneration that causes spur formation. However, David Felson, in his editorial review of knee pain, discusses basic factors affecting knee pain. One of these factors the pain created when climbing or descending stairs—has a possible effect on the function of the quadriceps. He cites these activities which create pain, as being mechanically based in OA.⁷² Equally important, researchers also investigated pathological changes in the knee joint articular cartilage and bone formation structures as possible causes of knee OA. Moreover, their opinion directs attention to the correction of the underlying mechanical abnormality than to the development of pharmacological or biological agents. They also state that OA is not a disease of cartilage, in their opinion, thus research in OA should cease to focus on cartilage and its cells but instead, focus on the local biomechanics in order to make real progress in curing or preventing OA.⁷³ The quadriceps femoris (often referred to as the quadriceps) muscle, located on the anterior thigh, is made up of four distinct muscles that have different points of origin and a common insertion around the knee.



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Figure 2. Quadriceps femoris muscle.

These muscles work together to extend the leg, such as in the movement one makes when kicking a ball.⁷⁴ The muscle also functions to stabilize the leg during such activity as walking, climbing and descending stairs, and to protect the knee joint from injury through proprioception and shock absorption.⁷⁵ The relationship of the changes within the joint and muscle dysfunction of the quadriceps femoris muscle have led researchers to debate whether it is muscle dysfunction or knee joint changes that precipitate knee OA.

Quadriceps weakness is commonly seen in patients with OA of the knee.⁷⁶ The reason for this weakness was investigated by Slemenda and colleagues; they found that in patients with knee OA the only periarticular muscle weakened was the quadriceps. This often causes the knee joint not to be able to contract fully, thus leading to possible damage to the articular cartilage of the knee. The study further suggests that weakness may be due to muscle dysfunction rather than atrophy from disuse.⁷⁷ Despite clinical studies that show strengthening the quadriceps to be beneficial in treating knee OA, another study demonstrated that increased quadriceps strength could potentially cause harm to the knee joint. The study also noted that greater quadriceps strength may affect the intrinsic muscular balance between the quadriceps and hamstring muscles, which are important in motion regulation and ligament protection. This in turn could

cause a shift in the neutral hip, knee, and ankle alignment. This study suggests that exercise intervention focus not only on exercises that target joint-protective muscle actions but also safely maintain muscle strength.⁷⁸ In addition, quadriceps weakness has also been linked to decreased sensory function within the joint capsule, which may result in impaired perception of leg position, affecting balance, increased pain, and altered walking patterns. All of the preceding results of weakened quadriceps may lead to decreased mobility, and contribute to falls, obesity and disability. Research done by Diana L. Sturnieks and colleagues, whose investigation of physiological risk factors for falls with 684 older people with self-reported lower limb arthritis, found significant correlation between increased pain and impairments in the arthritis groups' knee strength, lower leg proprioception, and balance. The findings suggest that older adults with knee OA experience declines in muscular strength and standing balance that result in an increased incidence of falls.⁷⁹ Similarly, Marius Hendriksen and colleagues found a correlation between knee joint pain and quadriceps weakness resulting in a quadriceps avoidance gait pattern. While this study used healthy subjects to induce muscle pain and then assessed the effects of pain on movement, motor activity and control, the results provided significant information. The study demonstrated the need for continuous preservation and improvement of muscle function, as well as ongoing monitoring of knee pain and changes in walking patterns as part of the nonpharmacological management of knee OA.⁸⁰

In summary, the previous research illustrates that the specific cause of knee pain and physical disability of OA is not known. However, research and theories exploring its possible origin varies from systemic factors, knee joint mechanical dysfunction and the role of the periarticular quadriceps femoris muscle. The resulting pain and physical compensation predispose older people to increased disability risks, disease progression and the adoption of sedentary lifestyles. Hence, the adaptations of effective safe, economical self-treatment options

such as exercise and complementary and alternative medicine (CAM) therapies that have been proven effective in the nonpharmacological management of knee OA are needed.

Management of Osteoarthritis of the Knee

The priority for treatment of knee OA is the management of symptoms. The classification criteria for the medical diagnosis of knee OA are knee pain plus osteophytes on radiographs and at least one of the following: age older than 50, morning stiffness lasting 30 minutes or less, and crepitus on motion. ⁸¹ The aims for the outcome in the management treatment of knee OA are disease education, pain control, function improvement and alteration of disease process and its long-term consequences.⁸²

The following is an outline of conventional management of OA progression from mild nonpharmacologic use to severe progression and surgical intervention.



Outline of treatment management of knee osteoarthritis.⁸³

The recommendations for symptomatic relief of chronic pain and dysfunction at any level are usually initiated by a healthcare provider; however, self-management is essential for continued well-being.

The Aging Physical Body and Osteoarthritis

The literature indicates OA is the most common musculoskeletal condition of aging, with most treatment being palliative in nature with functional capacity as the treatment goal. Osteoarthritis, combined with the natural decline of muscles, bones, and the cardiovascular and digestive systems, not only causes a chain reaction, but may also unmask other subclinical conditions.⁸⁴

The effects of aging on the muscular system include a loss of muscle mass as well as the number of muscle fibers. Additionally, reduction of synovial fluid, joint capsule and ligament stiffness, and loss of range of motion can all affect mobility. Finally, the standing posture for these patients, with both knees and hips flexed, creates added compensation and pain when ambulating or performing activities of daily living.⁸⁵ These are but a few of the age-related physical changes for which seniors seek relief, changes that impact the physical limitations and quality of life.

The various treatments and nonpharmacological management approaches for knee OA are varied and individualized; for patients who are looking for additional pain relief or improved function, the benefits obtained from CAM interventions can be an effective means of appealing to OA patients. Older Americans between the ages of 54 to 92 have embraced the use of CAM because of its potential to alleviate pain.⁸⁶

CAM Therapies and Osteoarthritis

CAM interventions provide a practical alternative to conventional medical treatments. A growing body of research supports their efficacy for helping individuals with OA. Americans with OA spend more on CAM drug therapies than any other medical condition.⁸⁷ According to the National Center for Complementary and Alternative Medicine, CAM is defined as a "group of diverse medical and health care systems, practices, and products that are not presently

considered to be part of conventional medicine."⁸⁸ Increased popularity of CAM usage in the U.S. has led to the public spending between \$36 billion and \$47 billion on various interventions; of this, \$12.2 billion and \$19.6 billion was paid out-of-pocket.⁸⁹ The most common conditions for which CAM therapies are used are back pain, neck pain, and joint pain.⁹⁰ Osteoarthritis is a common musculoskeletal condition that causes joint pain for which people seek alternative CAM therapies proven useful for symptomatic relief of pain. This study examines the following CAM therapies that have been investigated for their potential effectiveness in treating the symptoms of OA: acupuncture, botanicals, herbs, magnet therapy, massage (discussed previously), Tai Chi, and Therapeutic Touch.

Acupuncture

Acupuncture is among the most frequently used CAM therapies for osteoarthritic pain. This traditional form of Chinese Medicine originated thousands of years ago. It is used to treat disease, especially pain, by balancing the body's vital life energy (*chi*) with the use of needles placed under the skin along specific invisible channels called meridians.⁹¹ In 2006 the authors of one of the largest randomized trials of acupuncture to date concluded that patients with chronic pain due to OA of the knee or hip who were given routine primary care in addition to acupuncture received significant, relevant and persistent benefits.⁹² In another study, acupuncture was considered safe and effective in reducing the pain and dysfunction in patients with knee OA, when compared to sham acupuncture or education.⁹³

Botanicals

Despite the advances in conventional pain management, the use of CAM by sufferers of OA is on the rise. Arthritis is the sixth most frequently cited health problem treated with CAM in the United States.⁹⁴ Patients suffering from musculoskeletal problems are likely to be users of herbal treatments; however, drug-herb interactions and lack of standardization of herbal remedies

pose potential risks for users.⁹⁵ Botanicals or herbs are complex mixtures whose putative active ingredients may be identified but are often not verifiable.⁹⁶ Many consumers believe herbal medicines are natural and safe; however, herbal drugs are often made of more than one active ingredient, thus the potential for adverse interactions or side effects.⁹⁷ Although small trials have been conducted on supplements, with questionable results, they are not recommended by healthcare providers. The following are a few common effective herbal supplements used for relief of OA pain:

Devils' claw (*Harpagophytum procumbens DC*) –an abstract obtained from the root of the *Harpagophytum procumbens* plant. Has been shown to have anti-inflammatory and analgesic effects and used in capsule form.⁹⁸ In two placebo-controlled studies the extract was associated with a statistically significant decrease in musculoskeletal pain severity.⁹⁹

Green tea (*C. sinensis*)–the most commonly consumed tea with no reported side effects. Laboratory findings found a reduction in biochemical markers correlated with the marked reduction in synovium seen on histopathology studies of mice.¹⁰⁰ Other research findings reported catechins from green tea may provide anti-inflammation and cartilage protection; thus, is an effective adjunct for the treatment of OA.¹⁰¹

Capsaicin–a topical analgesic derived from hot chili peppers. Its topical application in double blind studies demonstrated beneficial results on pain and articular tenderness with mild reversible skin irritation as the only safety issue.¹⁰²

Ginger (*Zingiber officiniale*)–is one of the most popular herbal remedies and has a long history of medicinal use. It can be administered orally, or topically, and both methods successfully decrease pain. It is reported to possess antioxidant, anti-inflammatory and antiseptic properties. Researchers in a recent randomized controlled study demonstrated the efficacy of ginger and orange essential oil, combined with massage, alleviated pain and associated symptoms in patients

suffering from knee OA. A total of fifty-nine seniors were randomized to either an intervention, or placebo control who received massage with only olive oil, and the control group that received no massage. Improvement in physical function and pain were significant in the intervention group at one week post treatment. The researchers concluded that aroma-massage therapy with ginger may potentially be an alternative for short-term knee pain relief.¹⁰³ Additionally, the vibrational nature of essential oils works to balance and heal.¹⁰⁴ While the quality of the ginger is a significant factor in its safe usage, mild gastrointestinal adverse affects were reported with oral usage.¹⁰⁵

Dietary Supplements

A dietary supplement is defined as a product taken by mouth that contains a dietary ingredient intended to supplement the diet, such as an herb or vitamin, mineral or amino acid used to resolve a nutritional deficiency or to improve or sustain the structure or function of the body.¹⁰⁶ What follows is a review of the dietary supplements glucosamine and chondroitin, which have been studied for their effectiveness in treating the long-term effects of arthritis with promising results.

Glucosamine

Glucosamine and chondroitin are advertised as effective in relieving pain associated with knee OA and are sold over the counter. Glucosamine sulfate is derived from oyster and crab shells and has been promoted as a safe and effective option for managing the symptoms of OA; however, a meta-analysis of studies evaluating the efficacy of glucosamine for OA¹⁰⁷ suggested potential benefit from this supplement but raised questions about the scientific quality of the studies. A Cochrane Collaboration Review of glucosamine therapy also suggested the current evidence from clinical trials did not analyze long-term effects and possible toxicity, and there

was no differentiation between which dosage and route is best; additionally, conflicting trials results could be due to the use of different formulations of glucosamine.¹⁰⁸ In contrast, a 2002 study by Karel Pavelka and colleagues suggests that a daily dosage of 1500 mg. of glucosamine sulfate over three years helped slow the natural progression of knee OA. The three-year randomized placebo-controlled, double blind study of 202 patients found significant improvement in pain stiffness, physical functioning and joint mobility, as well as radiographically improved joint space narrowing.¹⁰⁹

Glucosamine and Chondroitin Combination

A study funded by the National Institute of Health called the Glucosamine/chondroitin Arthritis Intervention Trial (GAIT) tested whether glucosamine and chondroitin sulfate used separately or in combination reduced pain in participants with OA. In the multicenter trial, 1583 people with OA of the knee were randomly placed into five different groups. The groups took either glucosamine, chondroitin sulfate, both supplements, the Cox-2 anti-inflammatory pain reliever Celebrex, or a placebo. The subset of participants with moderate to severe pain had the best statistically significant pain relief compared with a placebo; however, because of the small size of the subgroup (354 people), it is considered too small to prove findings. For participants in the mild pain subset, glucosamine and chondroitin sulfate together or separately did not provide statistically significant pain relief.¹¹⁰

Magnet Therapy

The modern term for magnet therapy is "biomagnetism," which is the study of the sensitivity and reaction of living organisms to the earth's field, as well as the artificial magnetic field.¹¹¹ Static magnet therapy is a self-help approach for musculoskeletal pain. While there are no reported side effects with its usage and the mechanism of action is unclear, the therapeutic

effects of magnet therapy will vary according to the following: the use of bipolar or unipolar magnets; the size, composition (thick versus thin), and strength of the magnets; the anatomical site being treated in relation to the magnet's strength (the further away from the skin, the less effective); and Gary Null's suggestions versus manufacturers' claims of field intensity rating.¹¹² Research has focused on the use of electrical current when applied to magnet therapy and the use of a static unipolar magnet. Data in a 2003 study on Hartley guinea pigs demonstrated pulsed electromagnetic fields (PEMF), used in this study promoted healing and reduction in the severity of OA in areas exposed to PEMF.¹¹³ In a double-blind study of unipolar static magnet therapy, forty-three participants with chronic knee pain were randomized into either a magnet group or a placebo. The study concluded that "its surface application over painful knee joints reduced perceptions of pain and functional difficulty to a significantly greater extent than did the application of placebos."¹¹⁴ The use of magnet therapy is generally considered a safe and effective alternative for the treatment of chronic joint pain.

T'ai Chi

The consequences of OA are complex and there is a direct relationship between immobility and pain. Exercise can increase circulation, improve mobility and strengthen muscles.¹¹⁵ T'ai Chi is an ancient traditional Chinese exercise that is safe, promotes physical movements that strengthen muscles, promotes relaxation and concentration and is suitable for the geriatric population. Catherine A. Hartman and colleagues conducted a random control clinical trial, in which 33 community-dwelling older adult participants diagnosed with knee OA had two one-hour T'ai Chi classes for twelve weeks. When compared to no treatment, the Tai Chi participants experienced significant (P<.05) improvements in self-efficacy, quality of life and functional mobility.¹¹⁶

Therapeutic Touch

Therapeutic Touch is a method of energetic healing developed by Dolores Krieger and Dora van Gelder Kunz and initially taught to nurses; however, since its inception in 1972, lay persons and practitioners have been trained. Therapeutic Touch (TT) "is a specific technique of centering intention used while the practitioner moves the hands through a recipient's field for the purpose of assessment and treatment of energy field imbalance."¹¹⁷ The proper use of TT not only promotes relaxation and well-being, it is also effective in relieving pain. A clinical study conducted by Susan Eckes Peck determined TT effectively decreased pain in elders with chronic arthritic pain. Its safety and potential physical and psychological benefits combine to make it a significant modality in the alternative management of OA dysfunctions. ¹¹⁸ Additionally, according to James Oschman's book, *Energy Medicine*, CAM therapies (acupuncture, magnet therapy, TT and T'ai Chi), which therapeutically benefit people with OA, as discussed above, are capable of providing an external signal that triggers healing by opening the flow of energy and information stimulating healing. ¹¹⁹

CAM and Osteoarthritis Summary

The use of CAM therapies for pain and dysfunction is increasing as the aging population increases. The physiological, psychological and emotional impact of chronic pain combined with the aging process and other medical conditions make CAM therapies more appealing. Of special interest might be those that can be self-administered—i.e., prayer, meditation, Tai Chi, magnet therapy and self-massage. Self-massage can be considered a mind/body approach to self-healing. It is one alternative approach that promotes self-healing and may create a shift from an emphasis on disease and treatment to one of self-management. Alternative therapies have given researchers options but scientific proof for non-ordinary forms of holistic healing—i.e.,

increased spirituality, self love, feeling whole, or increased energy and movement are being considered.

There is ample evidence to support the therapeutic claims of CAM therapies. However, they are not used enough in the treatment of OA. Often it is due to lack of knowledge on the part of doctor or patient, cost to patient, time constraints with doctor visits, lack of conviction that measures may be helpful, fear of litigation, and increased use of pharmaceuticals for symptom relief.¹²⁰ Consequently, there is a vital need for more holistic research that may increase quality of life, which may ensure better control not only of knee OA symptoms, but of other chronic diseases.

The Physical and Energetic Effects of Aging

The obvious physical changes that occur with aging are gray hair and wrinkled skin, but it is the internal physiological changes which often add to the complexities of OA, a disease affected by the aging process.¹²¹ The aging process is gradual and is influenced by psychological, social, environmental and emotional factors, such as belief systems. Basic physical changes may include decrease in bone density or loss of strength and flexibility in muscles, tendons and joints. In addition, kidneys may become less efficient at removing waste from the bloodstream; the visual and hearing systems may become impaired; memory may become less efficient; and reflexes can become slower, resulting in impaired coordination. Other changes that may occur as we age are thinning skin, which becomes less elastic and more fragile; decreased production of natural oils, which lead to dry, wrinkled skin; thinning hair and a decrease in perspiration; as well as changes in sleep needs and a slowing of metabolism, making it more difficult to lose weight without exercise.¹²²

The posture of the elderly is also affected by gravity; elderly persons who use a walker or cane may have a forward upper body posture that compromises the functions of the abdominal organs and muscles. In Oschman's *Energy Medicine: the Scientific Basis*, he cites Goldthwait's approach to chronic disorders. Goldthwait's research is based on the principle that if the body is vertically misaligned, then organ functions will be compromised.¹²³ Oschman's research expands his theory that "a gravity system consists of muscles, their connective tissue or fascial covering, and their connections to the tendons, bones, ligaments, and cartilage, support us in the gravity field enable us to move and act upon our environment. The 'gravity system' of the body consists of the motor nerves, muscles, connective tissues, and sensory systems that monitor the motion, tension, and position of every part and provide our kinesthetic experience."¹²⁴ The aging body of elderly persons is especially affected by the earth's gravity system and gravity field. This combined with a lifetime of emotional traumas, injuries, disease, and surgery can influence the plasticity of the body's physical structure and movement.¹²⁵

Rolfing, a method of structural integration that aligns the body vertically within the gravitational field, developed by Ida Rolf, also expands Goldthwait's following concepts:

"Because muscles act as pumps, moving blood and lymph, the presence of immobilized and flaccid muscles will reduce the nutrition and oxygenation of the cells and tissues. When a muscle is chronically shortened, it gradually looses its ability to relax. Tension will always be present. Connective tissue fibrils will be laid down to thicken and strengthen structures that are called upon to provide extra support. Traces of altered structure and function can be retained indefinitely after an injury heals. A widely held misconception in our culture is that these accumulated imbalances, and the discomforts associated with them, are an inevitable effect of aging and cannot be reversed."¹²⁶

From the preceding information, it is clear that various bodywork techniques—i.e., deep massage, soft tissue manipulation and self-massage—can be effectively used as an adjunct therapy to facilitate alignment.

Early studies led biologists to initially consider the adult body to be fixed and permanent, but the pioneering research of Rudolph Schoenheimer, M.D., whose development of the concept of metabolic regeneration, led to the important understanding that various kinds of bodywork, such as Rolfing and deep massage, could in fact change body patterns and thus improve movement. These pattern changes also affected the electrical fields that arise from that movement and ultimately change the body structure.¹²⁷

Mind and Emotions

The complexity of the brain and mind are the basis of present day biology and the psychology of emotion is based on a theory of William James. His theory on what is an emotion, according to Joseph LeDoux, "...an emotion in terms of a sequence of events that starts with the occurrence of an arousing stimulus and ends with a passionate feeling, a conscious emotional experience."¹²⁸

Current research has investigated evidence that suggests yet another role for the amygdala other than the one usually attributed to it—that of stimulating the physiological response to fear. This study provided worthwhile insight into the amygdala's responses to emotional auditory stimuli. The cerebra's activity in response to auditory stimuli was also investigated with the use of an event related functional magnetic imaging machine. The research findings suggested that previous research validating the amygdala's involvement in the perception of visual stimuli, such as facial expressions, also applies to auditory stimulation, such as a cough.¹²⁹

A recent research study focused on areas of the brain concerned with processing chronic and experimental pain associated with OA. The study's results indicate that both pain conditions activate the pain matrix that is associated with increased activity in the thalamus and the amygdala. These areas are involved in processing fear and the emotional aspects of pain. Further, the study suggests that there is no unique brain network for processing arthritic pain. However, other findings mentioned in the study imply that "the areas of the brain associated with aversion conditioning, reward and fear, are activated, suggesting that processing the fear of further injury and disability has a possible role in arthritic pain. This circuitry is less commonly revealed during experimental pain and therefore may be important in the development of pain chronicity."¹³⁰ Unexpressed emotion that remains within the body may result in tension and restriction of various parts of the physical body. Thus, mind and body communication may have an impact on the health of the body in patients with knee OA.

Interrelationship of Mind and Body

Evidence in the scientific medicine and CAM communities is mounting that emotions and thoughts affect health and healing. As adjunctive mind-body therapies are used as effectively for common clinical conditions such as chronic pain, OA, cancer, low back pain, depression, and hypertension, a new wave of research continues to emerge. Research that focuses on the efficacy and effectiveness of mind-body interventions, including relaxation, cognitive behavior therapies, meditation, hypnosis, patient education, biofeedback, and guided imagery, has shown the strongest support for its incorporation in the management of chronic symptoms.¹³¹

The field of mind-body interventions has expanded over the past twenty years, due to the various concepts and theories of many authors and researchers. Massage is an act that stimulates the sense of feeling, according to Ashley Montague, in *Touching: The Human Significance of the*

Skin. He notes "touch is the official voice of feeling made up of perceptions of complex blends of tactile components drawn from the skin, joint, muscle and visceral senses...Tactile stimulation plays an important role in influencing emotional tone."¹³² Self-massage gives rise to the possibility of creating an equally important emotional and physiological shift when the sensory feeling of pain is decreased and relaxation occurs as a result of self-massage. It certainly provides a venue for further study.

Robert Adler's pioneering research in the field of psychoneuroimmunology provided the foundation for studies on the relationship between the immune system's effect on both psychosocial and neuroendocrine interactions.¹³³ Candace Pert investigated the biochemical link of emotions' influence on the body's health and disease.¹³⁴ Pert notes that the "mindbody" is the interconnectedness of the mind throughout the body as evidence in the action of the neuropeptides and their receptors, which carry information to the major systems of the body.¹³⁵ Self-massage has the potential to activate bodymind wisdom. If the body is the unconscious mind and feelings are in the body, then massage especially self-massage, can potentially facilitate the healing interrelationship between the body, mind, and emotions.¹³⁶ After all, the human skin is the sensory nexus of the body's external and internal environment, and touch not only accesses both environments but can also be the agent of change that affects them.

From a psychological perspective, Babette Rothschild, a psychotherapist, addresses issues of somatic memory, the impact of trauma on the body and its emotional significance in healing. In *The Body Remembers*, Rothschild discusses the relationship between memory and emotions and their effect on the body. In the same way the type of emotion and an individual's consciousness of bodily sensations, may also affect the body. For instance, anger produces muscle tension, fear, a fast heart rate or flight, and sadness, crying. These and other emotions not only communicate the feelings to others but also the awareness of how they register inside of the

body.¹³⁷ Responding to or treating physical changes and sensation that result from emotional trauma is different from treating the emotions created from physical dysfunction or chronic pain. Rothschild describes the need for monitoring body sensations as a guide for pacing therapy. Additionally, she asserts, while muscle tension, which occurs as a result of pain or stress, is reduced by massage, meditation or yoga, muscle tensing actually helps reduce unpleasant sensations in post-traumatic stress disorders (PTSD). So induced relaxation may cause increased anxiety or flashbacks but can be useful in later stages of therapy. ¹³⁸ While Rothschild's book focuses on the impact of trauma on the body, her notion that memories create emotions and emotions are essentially an experience of the body may also be applicable to those affected by chronic musculoskeletal conditions. Since B. Kulkarni's research links arthritic pain to fear, the chronicity of knee pain often experienced with knee OA may also generate chronic anxiety and fear of falling issues.¹³⁹ Perhaps, self-massage, if properly integrated into therapy, may also be used to reduce an individual's bodily experience of emotions when traumatized by pain.

Mind-body approaches to chronic pain are not new. In *Mind over Back Pain*, John Sarno, M.D. presents what was then, in 1982, considered a new radical approach to the treatment of back pain. Dr. Sarno, a professor of clinical rehabilitation medicine at New York University School of Medicine, confirmed the relationship between anxiety and chronic muscle tension (and not structural factors) as a cause of chronic back pain.¹⁴⁰ He named this condition *tension myositis syndrome* (TMS). He notes, "TMS is characterized by varied patterns of pain in the neck, shoulders, upper or lower back and often in the legs and arms as well... Pain and the fear of pain sharply restrict physical activity."¹⁴¹ Of particular interest in his research with TMS patients was how negative emotions triggered mind-body interactions and thus affected the patients' bodies. The treatment involved freeing patients from misconceptions and fears by teaching facts about the disease as well the treatment. The treatment protocol included not only

education, but moist heat, exercise, and massage. Additionally, he encouraged patients to be active participants in their natural ability to heal.¹⁴² While there is a paucity of self-massage and self-healing research, the self as healer is a new dimension for study.

An illustration of the effects of negative emotion on the cardiovascular and immune system was investigated by Peter Salovey and others, whose research examined the connection between emotional states and physical health or disease. The study examined the immune and cardiovascular system effects on the negative emotion of anger. The consequences of anger produced a decrease in the antibody secretion of immunoglobulin A (S-IgA), an antibody considered the first line of defense against the common cold.¹⁴³ This supports the previous discussions and research, as well as the growing body of research in the fields of psychoneuroimmunology, mind-body medicine and psychology that identifies the interrelationship between the mind, body, emotion and spirit and their influence on health and disease.

Dr. Richard Gerber concurs with the aforementioned studies; in *Vibrational Medicine*, he asserts that over time negative emotions can constrict the natural flow of energy through the body, thus creating an environment for potential disease. ¹⁴⁴ He notes that the presence and release of internal and external energy facilitates normal bodily function and produces frequencies detected by imaging technologies, such as the electrocardiogram, electroencephalogram and electromyography, which, respectively, detect normal and abnormal internal electrical energy within the heart, brain and muscles. Newer imaging technologies, such as computed tomography (CT) scan, positron emission tomography (PET) scan and magnetic resonance imager (MRI) provide physicians with comprehensive images of the body's internal structure and function.¹⁴⁵ Moreover, his vision for the future of holistic healing is the

development of an electromagnetic resonance scanner to visualize external energy present in the etheric body field to observe disease-related changes.¹⁴⁶

The conscious experience of the mutual relationship between the body and mind in theory and practice has provided research that examined improvement of emotions and physical symptoms through physical methods such as self-massage, yoga or exercise. Future research and technological advances should center on early detection and new forms of mind-body interventions that focus on prevention and personal empowerment found in the integral approach to medical care.

Religion, Spirituality and Osteoarthritis

Osteoarthritis has no known cure; thus, the self-management of symptoms is the proven effective method of management. The pain and disability associated with OA causes physical and emotional stress, making it difficult for seniors to live independently without utilizing various forms of cognitive, assertive or diversion coping strategies.¹⁴⁷ Along with the physical dysfunctions, the long-term psychological impact of OA creates secondary anxiety, depression, feelings of helplessness and reduced self-efficacy, while the long term risks include depression, hypertension, and diabetes.¹⁴⁸ Research on chronic stress has determined that the brain is the key organ of stress response because it determines what is stressful and the appropriate emotional and physiological response.¹⁴⁹ Research has indicated that CAM interventions have been used as coping strategies by people seeking psychological and physiological relief. In the 2002 study conducted by the Center for Disease Control (CDC), in the United States indicated prayer was among the 10 most commonly used CAM therapies during the previous 12 months. The study indicated 43.0% used prayer specifically for their own health; 24% used prayer

performed by others for their own heath; and 9.6% participated in prayer groups for their own health.¹⁵⁰

Prayer may evoke physiological and emotional effects on the mind and body. Larry Dossey, a physician and author, notes in Dr. Herbert Benson research, the body's response to Christian prayer was similar to other autogenic and progressive relaxation therapies; the heart, breathing and blood pressure were lowered. This, Dr. Benson's research, is consistent with the actual words used in prayer, which also invokes relaxation of the body and inner peace.¹⁵¹

Whether recognizing the power of prayer or the existence of God or a higher power or searching for inner peace, prayer is personal. Prayer provides personal empowerment and coping resources and seems to have a beneficial impact on one's sense of personal health and well-being.¹⁵² There is modest research on the therapeutic efficacy of prayer for health. Alexander H.S. Harris et al., examined five religious/spiritual interventions: cognitive behavior techniques, meditation, Twelve Step fellowship, forgiveness and prayer. The study found prayer in different forms as a coping method for stress and stressful situations proved potentially beneficial for overall well-being.¹⁵³ Additionally, studies have explored the impact of intercessory prayer—people who pray for others—on health outcomes, self-esteem, anxiety and depression. Dale A. Mathews et al., examined health effects of intercessory and distant supplemental prayer on rheumatoid arthritis. The small study found beneficial effects of inperson intercessory prayer was useful, but that supplemental distant prayer offered no additional benefits.¹⁵⁴ In contrast, a landmark randomized double-blind study of 990 patients in a coronary care unit successfully used remote intercessory prayer. This four week study conducted by William S. Harris et al., found that "supplementary, remote, blinded intercessory prayer produced measurable improvement in medical outcomes of critically ill patients."¹⁵⁵ Moreover, Larry Dossey, pioneer researcher of controlled prayer studies¹⁵⁶ and author of books on prayer,

responded in support of distant intercessory prayer in an editorial commentary to physicians who implied the study of remote prayer is wrong in principle.¹⁵⁷ Dr. Dossey linked, research in psychokinesis, the ability to move objects with your mind, to the foundation for intercessory prayer. He further commented that scientists do have spiritual beliefs, noting that "in a recent survey of spiritual beliefs of American scientists, 39% of biologists, physicists, and mathematicians said they not only believed in God, but in a god who answers prayers.¹⁵⁸ In the final analysis, when addressing the question of when, how and by what method to consider the use of intercessory prayer as an adjunct to conventional medicine, Dr. Dossey concluded "although skepticism is an invaluable component of scientific progress, it can shade into a type of dogmatic materialism that excludes intercessory prayer in principle, as when Newton's critics condemned universal gravity as occult nonsense without weighing the evidence."¹⁵⁹ Many studies of the healing effects of intercessory prayer for various medical conditions have drawn skepticism; however, successful replications of various studies provide supportive evidence.¹⁶⁰

Substantial research continues to link religion and spirituality to physical and mental health.¹⁶¹ What is the difference between religion and spirituality? In *The Faith Factor*, Dale Mathews, M.D. states that "spirituality connotes an individual's private search for meaning and connection, particularly his or her relationship with God; religion suggests the individual's adherence to an organized set of beliefs and practices endorsed by a community of fellow believers. One can be religious and spiritual ...this combination is ideal for enhancing health and well-being. One does not have to be religious in order to be spiritual, or vice versa."¹⁶² In essence, one's personal doctrine may include both internal and or external beliefs/practices depending on an individual's healing or medical needs. For example, in a study that considered the relationship between religion/spirituality and the physical and mental health of patients with chronic musculoskeletal pain, this relationship's longevity was determined using a newly created

instrument designed to measure domains of religion and spirituality. Here it was not important to regard the impact of the illness, but to look at the long term economical, medical, emotional and psychosocial effects on religion and spirituality. In this vein, researcher A. Elizabeth Rippentrop et al. conducted a questionnaire study with 122 patients with musculoskeletal pain of the knee, shoulder or neck/back. The Multidimensional Measure of Religion/Spirituality for Use in Health Research instrument was created to measure health outcome related to religion and spirituality. This study concluded that "pain patients' religious and spiritual beliefs appear different than a healthy population. Those who are doing worst physically may be more likely to turn to private religion activities as a way to cope with their poor health. Religion/spirituality was unrelated to pain intensity and life interference due to pain."¹⁶³ Finally, while research has established the role of spirituality as a resource for coping with chronic pain, studies have indicated that spirituality may also affect one's perception of health. In a study that examined spirituality and health perception in older adults with rheumatoid arthritis, 47 seniors between the ages of 60 and 87 who were living in a nursing home participated in the study. The study found arthritis was a significant independent predictor for spirituality, and it noted a correlation between spirituality and health perception.¹⁶⁴ In summary, studies have found prayer, religion and spirituality, like CAM, mind-body and massage therapy; provide holistic self-management approaches for coping with and improving chronic pain, and the physical and psychological stress of OA, as well as an improved sense of health and well-being.

Self-Massage: A Path to Self-Healing

Self-massage is a form of contact healing that requires focus and connection with any body part. It is this connection, focused on the body's functional "dis-ease," with the intention to heal, that stimulates the mind and body's self-healing energy, the "inner physician." In *The Intuitive Healer: Accessing Your Inner Physician*, author and psychologist Marcia Emery describes the "inner physician" as an inner guide, inner healer, or health advisor who is an inner source of healing insights from the intuitive mind.¹⁶⁵

Dr. Bernard Rappaport's work in the human potential movement led him to explore alternative paths to therapy. In an article entitled "Carnal Knowledge: What the Wisdom of the Body Has to Offer Psychology," he describes Alexander Lowen's definition of bioenergy. "We work with the hypothesis that there is one fundamental energy in the human body, whether it manifests itself in psychic phenomena or in somatic motion. This energy we call simply 'bioenergy." The goal of therapy Rappaport asserts, "is the removal of blocks, discharge of the blocked energy and freely flowing energetic system—as manifest in the person's psychic, emotional and physical life."¹⁶⁶ Rappaport also supports other body therapies that incorporate the body's wisdom for healing, such as massage, yoga, dance and T'ai Chi Chuan. He claims that "they are an important and often neglected domain in the field of psychology." Thus, over thirty years ago the field of psychology recognized the need for change, an integration of the mind and body therapies for a holistic approach to psychic changes through physical means. Additionally, during the 1970s other pioneers in various fields of research also recognized interactions between the mind and body.

Self-massage could conceivably be described as a form of bioenergy healing. In addition, its participatory nature and resulting physical and emotional changes could be measured by pre-and post-cortisol and blood pressure changes or by using biofeedback instrumentation. Eventually though it is still in its infancy, self-massage offers fertile ground for further research in mind-body medicine.

Self-massage for OA of the knee can be taught or transferred, it can provide a sense of improved movement and pain relief, and it can also provide body awareness. Equally important, this may incorporate mind and body integration along with a sense of physical and emotional

well-being. As previously stated, this simple method of self-massage can release endorphins, serotonin, and other neurotransmitters, which can ease pain and promote relaxation and sleep, as well as releasing trapped physical and emotional energy. The spirit is the third component in the holistic approach to self-healing and holistic health. The writings of many accomplished researchers and authors have directly or indirectly defined or described spirit and spirituality in broad terms. Spirit is defined by Dr. Dan Benor as "the surviving of the self after death that may be perceived by the living... a transcendent aspect of Self that connects the self to the eternal All.¹⁶⁷ In *The Anatomy of the Spirit*, Caroline Myss refers to the spirit as one's source of human consciousness and spirituality, as "an individual experience directed toward releasing fears of the physical world and pursing a relationship to the Divine."¹⁶⁸ In Sacred Healing: The Curing Power of Energy and Spirituality, Dr. C. Norm Shealy states that "spirituality is a personal communication with God, soul, or Divine energy."¹⁶⁹ In *The Faith Factor*, Dale Mathews, M.D. describes spirituality in the following fashion: "spirituality connotes an individual's private search for meaning and connection; particularly his or her relationship with God."¹⁷⁰ Thus, the essence of spirit and spirituality is an individual, personal experience that connects to an inner or higher power.

So spiritual healing can be viewed as a positive individual experience that, according to Dr. Benor, offers help when healing the whole body's physical symptoms, using bodily intuition to assist in the identification of the physical or psychological disharmony.¹⁷¹ While Dr. Benor sees spiritual healing as a passive act, Caroline Myss believes it is an active intervention. She states "talking does not heal, taking action does… Healing one's body requires daily practice and attention. Healing illness in particular may be a full-time occupation."¹⁷²

Integrating the mind, body and spirit, and using CAM therapies can provide individuals with self-management interventions that facilitate and support healing. Cultivating a spiritual

relationship could reduce stress and facilitate healing with both the external God or Divine and the God within, thus reducing the suffering in the physical body, the emotional body and the spiritual body.

Holistic self-massage may provide a vehicle for relaxation, meditation and improved circulation, while releasing tension and promoting physiological improvement and increased energy; it may also facilitate attunement for exercise, yoga or other movement therapies. Selfmassage is both an internal and external first step on the transformational journey of self-healing.

Self-Massage Compared to Conventional Massage

Characteristics of massage are touch and movement. In Swedish massage, strokes and movement are combined to form comprehensive interventions.¹⁷³ The order and combination of strokes and amount of pressure will vary according to the individual needs of the client. According to the 2009 American Massage Therapy Association Massage Industry report, massage use has increased in the United States during seven out of the ten last years.¹⁷⁴ Furthermore, previous research discussed in Chapter Two, indicated the benefits of massage for musculoskeletal conditions, pain and stress management.

Additionally, in Chapter Two, massage has been used for chronic conditions such as lymphedema. A certified therapist trained patients using a written protocol. However, the Primary Investigator is not aware of any written self-massage protocol for chronic musculoskeletal conditions. A 2006, 16-week pilot study which investigated the efficacy and effectiveness of full body massage for knee OA yielded significant results in pain, stiffness, function and range of motion related to knee OA.¹⁷⁵ Equally important, the current study incorporated the use of self-massage as a single intervention for knee OA. The study's results are consistent with, but not identical to, the research investigating full body massage for knee OA.

Full body massage is a passive therapy while self-massage is an active therapy. Selfmassage applied to an accessible body area is convenient, therapeutic and economical. While full body massage administered by a therapist promotes relaxation and is therapeutic, it can entail economic hardship for people with chronic conditions. Self-help massage therapy is not meant to interfere or compete with the use of full body massage administered by a certified massage therapist; it provides a self-administered on-demand massage therapy that supports an ongoing need for pain relief. The therapeutic effects of massage are limited; like any therapy (i.e. yoga, exercise, meditation or prayer); it must be performed regularly in order to maintain its physiological or psychological value.

In the researcher's opinion, self-massage is a self-help technique which is not meant to distract or replace the role of a massage therapist, but rather draw attention to its therapeutic value.

Conclusion

Although in the literature, there are no known studies on self-massage for knee OA, evidence presented in this research study suggest self-massage should complement, not replace, standard medical care in the management of knee OA. In brief, research has observed first, massage is superior to acupuncture and exercise, second massage improves range of motion and trunk flexion; next, the number of massage sessions may influence pain relief, next, it is effective for pain relief in chronic back pain and OA of the knee. Additionally, the mechanisms of action and therapeutic effects of a full body massage are identical to self-massage. In fact, the quadriceps muscle is easily accessible, and research has shown massage is effective in the treatment of knee OA. In the final analysis, self-massage may promote self-care, compliance and self-efficacy. Hence, long-term physical effects of self-massage for OA of the knee provide fertile ground for future research.

In summary, this research brings a fresh new self-help approach for the

nonpharmacological management of knee OA. Self-massage may slow down progression of OA and or decrease its symptoms and dysfunction, and also promote holistic healing and self-care. It is not clear if self-massage has lasting benefits. However, the advantages of this intervention are; it cost nothing, can be performed whenever necessary and is capable of providing continuous benefits. Further studies are needed to clarify the long-term effects of self-massage on knee OA and its clinical significance.

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CHAPTER 3:

Research Methods

Introduction

In this chapter the researcher's methods, research design and rationale, recruitment and selection of participants; assessment instruments, and intervention protocol are identified to address the following theoretical question. Does this intervention increase the knee's range of motion as well as decrease knee pain, stiffness and dysfunction in individuals with OA of the knee? Additionally, this chapter provides a description of methods used to collect data, sample-size determination, randomization, data collection and analysis and ethical considerations. Finally, as a result of the descriptions, the reader can determine the validity of the research study's findings and conclusions.

Research Design

This study examined the benefits of self-massage intervention therapy on knee pain, joint stiffness, physical functioning and knee range of motion on participants diagnosed with knee osteoarthritis (OA). The study consisted of two treatment groups, an intervention group of 10 supervised and 3 unsupervised self-massage intervention therapies, and a control group of 4 supervised no intervention therapies. The groups were divided into a supervised therapy and

unsupervised therapy for the intervention group due to the expectation of low attendance during a major winter holiday.

The intervention group continued usual care and performed a supervised self-massage intervention therapy twice weekly for eight weeks. After the completion of eight weeks, the intervention group continued usual care and performed an unsupervised self-massage intervention therapy twice weekly for three weeks, and returned for a supervised visit on the twelfth week. The control group continued usual care but did not perform self-massage intervention therapy during the twelve week study period, see study flow chart below.



The self-massage intervention was conducted according to a structured center-based group learning format, for greater supervision which facilitated observation and individual adaptations necessary in the performance of the intervention. The self-massage protocol, developed by the Principal Investigator (PI), who, observed a need for the development of a selfhelp technique using clinical massage therapy (the manual manipulation of the soft tissue to relieve specific complaints of pain and dysfunction), to relieve knee pain. (see Appendix A) Additionally, the PI conducted a pilot study to establish the protocol, assess the research protocol process, identify logistical problems, and train research assistants (RA) and evaluate outcome measures WOMAC and knee range of motion used in the study. (see Appendix B)

Each bi-weekly supervised session was one hour in length included preparation, the intervention, and completion of the WOMAC written survey and knee range of motion assessments. All sessions were led by a RAs, one narrated the scripted sequence, while the other RA led the intervention sequence as the participants followed. The PI observed participants for posture, correct procedure and assisted only when necessary during the intervention.

Participants

Men and woman aged 50 years or older, who possessed no limitations that prevented mobility of the knee and had a written diagnosis of osteoarthritis (OA) of the knee, were recruited during a six week period of time, August to September 2009. This brief period of time was due to the June completion of the eight week pilot study.

The PI has been employed in the capacity of educator, facilitator of community wellness and massage therapist for over 15 years at the Lourdes Wellness Center, located in Collingswood, NJ. This facility is the wellness arm of Lourdes Medical Center, in Camden, NJ. It has developed and offered wellness programs to hospital personnel and the community for over thirty years. The Lourdes Wellness Center agreed to host the three month study. The proposal was submitted and accepted by Our Lady of Lourdes Medical Center's institutional review board (IRB) which granted full approval for the study and IRB letter of acknowledgement of the study's conclusion. Additionally, a letter of support from Holos University Graduate Seminary was required. (see Appendix C and D)

Recruitment and Inclusion/Exclusion

The recruitment criteria were met through focused mailings via Lourdes Wellness' Fall Program Guide and email blast (see Appendix E), advertisements in local newspapers (see Appendix F), and radio advertisement (see Appendix G). Second, those with knee OA and interested in the study were directed to call an answering service for an initial eligibility interview by trained telephone interviewers to determine if interested individuals qualified for the study according to the following inclusion criteria:

- 1. knee pain;
- 2. pain on most days of the prior month;
- 3. age 50 or greater;
- 4. morning stiffness lasting less than 30 minutes;
- 5. crepitus on motion and bony enlargement at affected joints.¹
- 6. written documentation of knee OA from a health care provider
- 7. ability to attend 75% of scheduled self-massage sessions
- perform no routine physical exercise or receive no self-massage during the study.

Those who qualified on the telephone evaluation were contacted via telephone by the PI, who then screened for the exclusion criteria; (see Appendix H)

- 1. presence of active rheumatoid arthritis, fibromyalgia, recurrent cancer, or other serious medical conditions;
- 2. intra-articular knee injection of a steroid within the previous 3 months;
- 3. significant injury to the knee within the previous six months;

4. surgical procedure on either lower extremity in the past six months.

Those individuals who met requisite inclusion criteria and did not screen for any exclusion criteria were mailed a packet and asked to complete and bring the information to the enrollment orientation. The cover letter (See Appendix I) included a brief description of the study, the length and time commitment and description of randomization. (see Appendix J) Additionally, the packets included two copies of the informed consent (one copy their records) (see Appendix K), Health Insurance Portability and Accountability (HIPPA) form, (see Appendix L) Confidential Health and Patient Survey Intake Form (see Appendix M) and Western Ontario and McMaster's Osteoarthritis Index[™] (WOMAC) (see Appendix N) to be completed during the orientation process. Also included in the letter, a reminder to supply written documentation of knee OA by a licensed health care professional. These requirements minimized risks to participants and ensured safety during the intervention. The prospective participants were instructed they would be notified by letter which group, intervention (see Appendix O) or control ((see Appendix P), they were randomized into.

Procedures

Pilot Study

The self-massage study is founded on massage research that has consistently proven massage therapy is beneficial for musculoskeletal pain. Further, research studies link knee OA as a chronic joint disease, which causes knee joint dysfunction and pain to the quadriceps muscle, which functions when walking, sitting and using stairs. Since muscles respond to chronic physical dysfunction by shortening, and shortened muscles cannot function effectively,² and participants consistently report pain with these movements, it is reasonable to correlate the knee pain with quadriceps muscle movement. Hence would self-massage of the quadriceps muscle release tight areas within the muscle and soft tissue, thereupon, affecting the pain,

stiffness, function and range of motion affected by knee OA? Due to the paucity of research on self-massage and given the challenges of treating OA of the knee, a plainly identified need for further research to evaluate nonpharmacological therapies that are safe, effective and economical.³ Additionally, because this is an original research study investigating self-massage for knee OA, a pilot study was recommended by the dissertation committee to establish the protocol, assess the research protocol process, identify logistical problems, and train research assistants (RA) in the many elements of the research process. Also, to evaluate outcome measures WOMAC and knee range of motion used in the study.

The 8 week pilot study, which included 4 weeks of supervised self-massage and 4 weeks of unsupervised massage done at home, took place at a senior living facility, Collingswood Manor, located in Collingswood, NJ. They allowed us to use their community room twice weekly for the 4 week study. Participants were recruited through advertisement in a community news paper, wellness fair, and flyer posting in area supermarkets. The pilot study was supervised by Holos University's dissertation committee. The small pilot study of 20 participants (n-10) control and (n-10) intervention, completed HIPPA and informed consent forms at first contact, followed a group instruction format with pre and post assessments.

The small pilot study, provided information for the following changes to the research study;

- **§** relative to the length of study, from 8 to 12 weeks,
- S the self-assessment WOMAC tool and knee range of motion measurements were increased from pre and post to after each bi-weekly session, to evaluate change over time,

- S the need to reach a larger population of people through varied advertisement, such as radio, newspaper, email and focused ads,
- **§** Lastly, relocation was necessary to a wellness related facility to attract an accessible study population.

Orientation

A two hour orientation was held on Saturday September 12, 2010, in the multi-purpose room of Lourdes Wellness Center located in the Station House Office Building in Collingswood, NJ. Prospective participants were given an agenda (see Appendix Q) and welcome gift. (a reusable shopping bag). The spacious room set up theater style, with light refreshments (juice, Danish, fruit and bottled water), and an area for baseline range of motion assessments. Fortytwo potential participants were welcomed. The purpose of the orientation was an introduction to the study, the PI and RAs; complete all baseline forms, present a self-massage demonstration, discuss the randomization process and review study requirements.

Following a welcome and informal background of the study's, purpose and procedure, Holos University Graduate Seminary's mission and location; Lourdes Wellness Center's history and its holistic approach to wellness was presented. Each RA's introduction included their massage training, experience and present employment. The PI then handed out pens and clipboards, reviewed each of the forms and surveys, directed the participants to complete and return form as follows:

The PI instructed everyone to look at the form titled "Research Subject Information and Consent Form". "Is there anyone who did not bring their copy, or needs another one, (allow time for response). I shall only read aloud the purpose of the study, procedures, risks and discomforts and benefits. (PI reads information) is there any question? Please read silently the consent information, then print and sign your name, please include today's date. (state the date). You

may keep the additional copy for your records. When you are finished please raise your hand." After all papers are collected the PI states "now please look at the form entitled Consent Form Addendum this is the Health Insurance Portability and Accountability Act of 1996 better known as HIPPA, please read this form silently, then print and sign your name, then complete the 19 question "Confidential Health and Patient Survey Intake Form" (allow time to complete and collect). "Lastly, we will look at each of the 24 questions on the WOMAC survey, this survey will be completed after each self-massage session and each time the control group meets. Let us look at the first five questions which are concerned about pain you have experienced in the last 48 hours only. There are five choices either you have had no pain, mild, moderate, severe or extreme pain; the next section of two questions are concerned with stiffness, stiffness is a sensation of restriction or of slowness or ease with which you move your joints, any questions? The third section of the WOMAC survey has seventeen question concerned with your physical function. Take a moment to look them over. Does anyone need clarification with any of the questions?" (Allow time) "Are there any questions? Let's take a five minute break before the self-massage demonstration".

Second the PI discussed the self-massage intervention. "The self-massage intervention was created and tested to be performed in a group setting and includes a warm-up, the intervention and cool down with relaxing breaths. The self-massage intervention is performed in a seated position and requires access to your thighs, so please wear or bring shorts or appropriate clothing. We will now observe a typical self-massage session." One RA will narrate the scripted sequence while the three other RAs seated in various locations in the room, demonstrate the massage strokes. "Are there any questions? "It is important to note that everyone's body is physically different, the self-massage sequence is a blueprint, only, and can be modified to suit your needs. You will perform the massage only under our supervision twice weekly to ensure

that it is done properly and we will assist anyone to make modification that will not compromise the therapeutic value of the massage technique. Participants randomized to the intervention group will be required to attend on Monday and Thursday, you may choose the afternoon from 2-3 or evening from 6-7, both sessions will be taught the same information, therefore, you may attend either the afternoon or evening session on any given day, however, I need to be notified. You will receive a printed copy of the self-massage sequence during the sixth week of the study."

Next was the description of the knee range of motion process (see Appendix R) followed by each person randomly selected to go to the back of the room in a screened area to get knee range of motion measurement. In the interest of time while the ROM were measured and recorded by two trained RA's, a group discussion of a patient handout entitled "Managing Your Arthritis Pain" occurred. (see Appendix S) This was followed by group introductions and refreshments. After the completion of all baseline knee ROM assessments, the PI discussed the randomization selection process and the requirements for each group. Finally, all participants received, three month computer generated calendars, which included all dates and time for both the intervention and control group assessment. (see Appendix T)

At the conclusion of the orientation the PI states "You will receive a letter indicating whether you are in the self-massage intervention group or the control group. Please note both groups will learn the self-massage sequence. We thank you for your time and interest in the study, have a safe trip home".

Intervention Group Sessions

The self-massage sessions were held in a large conference room, with 2 adjacent vacant offices on the third floor of a 5 story office building which housed the Wellness Center and other offices. The building also had adjacent ample free parking. Within the room chairs were

arranged in a semi-circle facing two chairs. A table on the side held bottled water, healthy snacks, and fresh fruit was available for participants at each session.

The first and last sessions were 90 minutes all other sessions were 60 minutes. The biweekly sessions were conducted from 2 -3 PM and 6-7 PM. Participants selected which session, was convenient, however since the exact same information was taught at both sessions, they could attend either session, notification was required. During the beginning of each session the PI reminded participants not perform any other exercises or the self-massage technique, and time was allotted to address any concerns or answer any questions. Each one hour session consisted of 15-20 minutes of information relevant to osteoarthritis of the knee or the self-massage technique; 20 minutes for the narrated intervention and 10 minutes to complete the WOMAC questionnaire and 10 minutes for knee range of motion assessment. The four trained RAs, were divided, based on convenience, two in the afternoon and the other two in the evening, the PI was present during all sessions. The RAs conducted the individualized ROM measurements in the vacant adjacent offices. (see Appendix U)

The beginning of each session is as follows unless otherwise stated:

Upon entering the room relaxing music "Peace of Mind" by Stephan Halpern was playing, participants selected their name tag and a seat, the PI took attendance. The RA, who elected to narrate the self-massage sequence, asked if there were any questions or concerns and reminded participants not to exercise or practice the massage sequence between sessions. As the narration began the music stopped playing, the other RA administered massage cream to anyone that requested it. Thighs were properly exposed, and quick observations were made for discoloration, swelling, etc., then the self-massage sequence began.

The post self-massage sequence:

The PI handed out the WOMAC questionnaire, pen and clip board to each participant, who upon completion, waited in turn for their knee ROM measurements, followed by the PI thanking them for their attendance and reminding them to take a bottled water and refreshments if they wanted.

Post session conference with RAs:

A brief post session conference with RA's and PI was held following each session, to discuss observations and assessments of participants' progress. (Often the participants talked with RA's in private what they would not say within a group setting or to the PI).

Summary of sessions:

The PI played relaxing music of Stephen Halpern's "Peace of Mind" on a CD player, prior to beginning each session and during the closing relaxation breaths. On Monday of the 3rd week, October 5, a 20 minute DVD entitled "Mayo Clinic Wellness Solutions for Arthritis" was shown to participants. It presented current understanding of OA, conventional and CAM therapies. On Monday October 19 a fifteen minute power point presentation on "Massage and OA of the Knee" was created and presented by the PI to participants. The presentation discussed the causes of knee pain, the structure and function of the knee joint and common and CAM therapies for knee osteoarthritis. (see Appendix V).

On Thursday October 29, the 6th week of the study, participants were given a written copy of the self-massage intervention. (See Appendix W) The participants then practiced working independently without the benefit of narrated guidance. On November 5, each participant was also given a copy of the self-massage summary reference sheet (see Appendix X) which was used in the final participant check list which evaluated each step of the self-massage intervention. (See Appendix Y)

Week One

Monday September 21; time 2:00-3:30 PM and 6:00-7:30 PM

Participants were welcomed by RAs and PI and directed to select a blank nametag on which to write their name and they were invited to help themselves to the refreshments. Brief introductions were made among the participants, an outline of the procedure for each session, absence notification procedure, followed by question and answers.

Copies of the WOMAC questionnaire were handed out, the PI reviewed directions, each of the 24 questions and answer choices to ensure participants' comprehension. Additionally, the purpose and function of each step of the massage sequence was explained as we practiced. The groups then followed the self-massage intervention procedure, the WOMAC questionnaire completion, followed by the recording and measurement of the knee ROM.

Thursday, September 24, 2009; 2:00-3:00 and 6:00-7:00

This session had a routine beginning; however the intervention session was prolonged in order to make necessary adjustments to accommodate ease of movement of participants. For example one person had short legs feet did not touch the floor, so a pillow was placed under her feet, another person had a frozen shoulder, and the strokes were modified.

Participants completed WOMAC questionnaire, followed by knee ROM assessments.

Week Two

Monday, September 26, 2009; 2:00-3:00 and 6:00-7:00 PM

Prior to the routine session, the PI took five minutes to discuss the importance of deep breathing for relaxation and practiced breathing as described in the narration.

The self-massage narration and sequence continued, followed by the WOMAC and ROM measurements.

Thursday, October 1; 2:00-3:00 and 6:00-7:00 PM

The self-massage narration and sequence, followed by the WOMAC and ROM measurements were conducted as usual, however, during the narration and self-massage session the PI and RAs observed for proper breathing and massage technique.

Week Three

Monday, October 5; 2:00-3:00 and 6:00-7:00 PM

Following routine opening, the PI showed a 20 minute DVD "Mayo Clinic Wellness Solutions for Arthritis", after which there was a brief discussion, followed by the routine narration and self-massage routine, WOMAC questionnaire and ROM assessment. *Thursday, October 8; 2:00-3:00 and 6:00-7:00 PM:*

Prior to routine narration the PI reminded participants to focus on each step, they would be observed for proper form and technique during the massage session. The self-massage narration and sequence, followed by the WOMAC and ROM measurements were conducted as usual, however, the participants appeared to be more focused during the narration and following the sequence a brief discussion about the importance of technique followed.

Week Four

Monday October 12; 2:00-3:00 and 6:00-7:00 PM

Upon entering the room prior to routine narration, the PI showed a muscle model of the quadriceps muscle, and handed out copies of a diagram of the quadriceps muscle, (See Appendix Z) reviewed the function and location on the muscles involved in knee OA prior to the routine narration, massage sequence, WOMAC and knee ROM followed.

Thursday, October 15; 2:00-3:00 and 6:00-7:00 PM

Prior to the routine beginning, the PI encouraged participants to focus on feeling their quadriceps muscle when massaging their thighs during the self-massage intervention. The session continued as usual.

Week five

Monday, October 19; 2:00-3:00 and 6:00-7:00 PM

Prior to the narration, the PI presented a 15 minute power point presentation on "Massage for OA of the Knee", followed by a brief discussion.

The routine self-massage narration and sequence began after the discussion, followed by the WOMAC and ROM measurements.

Thursday, October 22; 2:00-3:00 and 6:00-7:00 PM

Prior to the routine self-massage intervention the PI briefly discussed common self-help therapies that have been proven to help manage OA, such as, exercise, yoga, meditation and acupuncture. The routine self-massage narration and sequence began after the discussion, followed by the WOMAC and ROM measurements.

Week six

Monday, October 26; 2:00-3:00 and 6:00-7:00

Prior to beginning the narration, the PI spent 15 minutes reviewing briefly the symptoms of knee OA, function of the quadriceps muscle, the importance of self-assessment for physical symptoms, deep breathing and proper body alignment. The self-massage narration and sequence then began, followed by the WOMAC and ROM measurements.

Thursday, October 29; 2:00-3:00 and 6:00-7:00

At the beginning of the session the PI handed out a folder which contained the printed and illustrated copies of the self-massage sequence. She then went through each step reading aloud the abbreviated participant's version of the intervention. Participants were then instructed to become familiar with the sequence only, we continued to perform the sequence during the regular session. During the last 2 weeks, two different volunteer participants narrated and led the next three self-massage sessions while the PI and RAs observed; on the final day of the 8 week session participants worked individually with handouts as needed in front of one of the 4 RA's, who evaluated according to a checklist, to ensure proper technique. Tutorials were given as needed.

The PI answered any questions, the self-massage narration and sequence began, followed by the WOMAC and ROM measurements.

Week Seven

Monday, November 2; 2:00-3:00 and 6:00-7:00PM

The PI asked for two volunteers, one narrated, the other led the session using their handouts as a guide. The PI and RAs observed participants perform the intervention, followed by WOMAC and knee ROM procedures.

Thursday, November 5; 2:00-3:00 and 6:00-7:00PM

For this session the participants were divided into smaller groups of three with only one new volunteer from each group leading as the participants followed. A RA or PI observed each group assisted as needed, followed by the routine completion of the WOMAC and knee ROM.

Week Eight

Monday, November 9; 2:00-3:00 and 6:00-7:00PM

The same procedure for this session as Thursdays, however, prior to the session the RAs and PI commended participants on their progress. The participants were again divided into smaller groups of three, in which participants worked alone completing the self-massage sequence as RAs or PI observed the session and assisted as needed. The group came together and briefly discussed their progress and any concerns, followed by the routine completion of the WOMAC and knee ROM. Thursday, November 12; 2:00-3:30 and 6:00-7:30 PM; the final supervised session.

On this the last session, the PI stressed the importance of continuing the biweekly practice of the self-massage technique. The PI reviewed basically what was taught during the eight weeks; the purpose of the various massage strokes, importance of proper body mechanics, summary of OA and the CAM therapies, and answered any questions. Each participant was also given the self-massage sequence summary sheet, which list each of the eleven steps and will serve as a quick reference to ensure each step is completed while at home and unsupervised.

The final self-massage session was conducted with each of the 4 RAs dividing into small group of 4 or 5 and observed their group performing the self-massage sequence from memory while they evaluated using the "Intervention Check List" (see Appendix Y). Light refreshments were served as each completed the WOMAC questionnaire and completed their knee ROM assessments. As each person departed the PI encouraged continued practice and reminded them of the December 12 conclusion and holiday celebration from 10-12 Noon.

Final session December 12, 2009

The final session was a combined holiday celebration and closing. The intervention group came from 10:00 to 12 Noon and the control group came from 12:00 Noon to 3:00 PM. (see Appendix AA). The room was decorated with a Holiday theme, the refreshments were juice, Danish, fruit, and candy. The afternoon and evening self-massage participants had an opportunity to meet one another. The PI and RAs welcomed everyone and thanked them for their participation. The PI narrated this last self-massage session while RAs observed the intervention group. Participants then completed the WOMAC questionnaire and took turns getting their knee ROM assessments. Participants discussed any benefits or experiences that resulted from participating in the study with each other. Some of the comments and testimonies are:

"Before I started the self-massage class, I was wearing a brace every day and taking pain pills every day. Now, I only take pills about every 3 days. I am able to get in & out of the car m much easier. That makes it better for my job, also." Ron P.

"I have found the self-massage technique to be extremely helpful in reducing, and sometimes eliminating, knee pain when going up and down the stairs. I used to pull myself up and now I don't need to do that." George G.

"I am less stiff upon stepping out of bed in the AM and also able to stand up from a chair quicker and with fewer aches. This class definitely made me a believer in self-massage." Dolores S.

The short time it has taken to do these "exercises" certainly is worth the long-term benefits gained. It is a worthwhile technique.

The RAs and PI shared other self-massage techniques and discussed self-management options offered by the Lourdes Wellness Center. All of the participants indicated they enjoyed the study and learned more than they had anticipated.

Control Sessions

The random selection of the wait-list control group was large enough for statistical analysis, equally important, only one out of nineteen or 5%, dropped of this out of the study. This may reflect their desire for hope and optimism in learning the self-massage technique upon completion of the study.

The wait-list control group sessions were conducted by appointment with the PI, who projected a caring and positive attitude with personal support during each of the three meetings. Additionally, the control participants were reminded one week prior to each of the assessment dates, October 17, November 17 and December 12, 2009. Also, as an incentive, a scratch lottery ticket was included with the letter. (see Appendix BB) The appointments were made at half hour intervals. There were light refreshments available (water, juice, cheese crackers and raisins). They were asked to complete the WOMAC survey followed by the knee range of motion assessment using the same procedure as the intervention group. The final December 12th

assessments were followed by a 3 hour instruction session on the self-massage technique for OA of the knee. The purpose of the abbreviated version was to ensure all participants of the control group learned the intervention. The PI and 4 RAs divided the 16 control participants present into two groups (three were absent) of 8, with 2 RAs in each group. The PI observed and assisted when necessary. The lesson was conducted in the following manner: I. The control participants received the handout "Managing Arthritic Pain" (see Appendix S); the self-massage sequence (Appendix W), a picture of the musculoskeletal system (See Appendix Z) and the self-massage summary sheet. (see Appendix X). II. Each step of the self massage sequence was demonstrated, followed by a practice session. III. The sequence was then narrated by one RA, the group followed the other RAs' lead. IV. The control group then performed the self-massage sequence using their hand-out, assistance was given as needed. Finally, the RAs observed the control group using only the summary sheet as a guide until each participant felt comfortable with the technique. We then shared the testimonies of the participants who completed the 12 week study, (see Appendix CC), had a question and answer period, and then thanked everyone for participating.

The three control participants who were not able to attend the December 12th final session, came the following Monday, December 14th. The PI and 1 RA met them for 3 hours and completed their WOMAC and knee ROM followed by learning the self-massage sequence. The four steps described above were conducted by the PI and one RA in the following manner: The control participants received the handout "Managing Arthritic Pain" (see Appendix S); the participants' self-massage sequence (Appendix W), the picture of the musculoskeletal system (See Appendix Z) and the self-massage summary sheet. (see Appendix X). II. Each step of the self-massage sequence was demonstrated, followed by a practice session. III. The sequence was then narrated by the RA, the group followed the PI's lead. IV. This control group then

performed the self-massage sequence using their hand-out, assistance was given as needed. Finally, the RA and PI observed the control group using the summary sheet as a guide until each participant felt comfortable with the technique. The testimonies of the participants who completed the 12 week study, (see Appendix CC) were shared, followed by a question and answer period.

The Dissertation Study

This study examined the benefits of the self-massage intervention therapy on knee pain, join stiffness, physical functioning and quadriceps muscle knee range of motion on participants diagnosed with knee osteoarthritis (OA). The study consisted of two treatment groups, an intervention group of 10 supervised and 3 unsupervised self-massage intervention therapies, and a control group of 4 supervised no intervention therapies. The groups were divided into a supervised therapy and unsupervised therapy for the intervention group due to the expectation of low attendance during a major holiday.

The intervention group continued usual care and performed a supervised self-massage intervention therapy twice weekly for eight weeks. After the completion of eight weeks, the intervention group continued usual care and performed an unsupervised self-massage intervention therapy twice weekly for three weeks, and returned for a supervised visit on the twelfth week. The control group continued usual care but did not perform self-massage intervention therapy during the twelve week study period.

Participants

Men and woman aged 50 years or older who possessed no other limitations to prevent mobility of the knee and had been diagnosed with osteoarthritis (OA) of the knee were recruited for a twelve week study to participate in a self-massage intervention therapy.

Dependent Variables

Participants were evaluated for changes in pain, joint stiffness, and physical function through the use of two instruments, 1) the Western Ontario and McMaster's Osteoarthritis Index[™] (WOMAC) questionnaire, and 2) changes in quadriceps muscle knee range of motion (ROM) using a goniometer. The dependent variables consisted of four ROM measurements and four WOMAC measurements. ROM measurements were to consist of knee flexion (bent) and knee extension (straight) for both the right and left knee. WOMAC measurements were to consist of knee pain which is made up of WOMAC Question 1 through Question 5; joint stiffness is made up of WOMAC Question 6 through Question 7; and physical functioning is made up of WOMAC Question 8 through Question 24.

Sample-Size Determination

The appropriate sample-size for a one-tailed test on paired participants was determined prior to the start of this study by setting the Type I error rate to 5%, the Type II error rate to 20%, and the central tendency (mean or median) difference to 1 variability unit (1 standard deviation or 1 interquartile range), with the goal to test whether range of motion (ROM) of participants in the intervention group improved from baseline to follow-up visits due to self-massage therapy, where ROM is defined as either right flexion, left flexion, right extension, or left extension; whether range of motion (ROM) of participants in the control group improved from baseline to follow-up visits with no intervention therapy, where ROM is defined as right flexion, left flexion, right extension, or left extension; whether WOMAC of participants in the intervention group improved from baseline to follow-up visits due to self-massage therapy, where WOMAC is defined as pain, joint stiffness, or physical function; whether WOMAC of participants in the control group improved from baseline to follow-up visits with no intervention therapy, where WOMAC is defined as pain joint stiffness, or physical function. It was determined that for the central tendency equal to 1 variability unit the number of participants in each group should be 8 participants or a total of 16 participants.

The appropriate sample-size for a two-tailed test on independent participants was determined prior to the start of this study by setting the Type I error rate to 2.5% on each tail, the Type II error rate to 20%, and the central tendency (mean or median) difference to 1 variability unit (1 standard deviation or 1 interquartile range) with the goal to test whether range of motion (ROM) at baseline of participants in the intervention group was the same as range of motion (ROM) at baseline of participants in the control group as compared to range of motion (ROM) at baseline of participants in the intervention group was not the same as range of motion (ROM) at baseline of participants in the control group, where ROM is defined as right flexion, left flexion, right extension, and left extension; whether WOMAC at baseline of participants in the intervention group was the same as WOMAC at baseline of participants in the control group as compared to WOMAC at baseline of participants in the intervention group was not the same as WOMAC at baseline of participants in the control group, where WOMAC is defined as pain, joint stiffness, and physical function. Other variables were used to compare equality between the intervention and control groups such as age, gender, race, marital status, alcohol consumption, smoker, hours of sleep per night, medicine intake for OA, amount of exercise per week, OA of which knee, years diagnosed with OA, seeing a professional for OA, immediate family history of knee replacement, any inflammatory condition, non-professional massage in last 12 months, and rating of massage for muscle pain. It was determined that for the central tendency equal to 1 variability unit the number of participants in each group should be 17 participants or a total of 34 participants.

Randomization

Forty independent age-eligible women and men with kneeOA were recruited and then assigned either to the intervention group (n=21) or the control group (n=19) randomly using a uniform distribution. By using the uniform distribution, the assumption holds that all participants are members of the same distribution family and have equal probability of selection to either the intervention group or the control group.

The Researcher's Role

The researcher's role was one of creator, visionary, organizer, observer, collaborator, and manager. The researcher's fifteen plus years of knowledge and experience as a nurse, educator and massage therapist has lead to her personal theory. If the function of the musculoskeletal system is protection and movement, and a primary function of pain is to establish an awareness or alarm of condition within an area of the body that needs attention. The first natural reaction is looking and touching or rubbing. Thus, a bodily stimulus creates a natural reaction for its protection. Out of this interaction the researchers' personal theory; 'if pain created by knee dysfunction causes the muscle (the quadriceps) that moves the knee to tighten in response, then the natural instinct of self-massage may affect the muscle that moves the knee joint.' This theory consequently, not only produced the focus of inquiry, but created the self-massage protocol. (see Appendix DD) Following the conception of the intervention, the vision of the researcher was to teach and certify other massage therapist to facilitate self-massage processes. (see Appendix EE) The lesson plans (see Appendix FF) for a thirty hour certification process which included an understanding of osteoarthritis and the self-massage technique. The selection of the four RAs was followed by a letter invitation. (see Appendix GG). The certification process required bimonthly, meeting pass a written test (see Appendix HH and II) based on handouts and power point presentations created by the researcher, on osteoarthritis (see Appendix V) and selfmassage for OA of the knee (see Appendix W). The researchers' role also included creating a strategy for the intervention fidelity (see Appendix JJ) and a checklist to evaluate RAs' fidelity. (see Appendix KK). Additionally, the researcher and the RAs were trained by a physical therapist to perform the knee range of motion. Finally the researcher created the script for narration of the self-massage intervention, (see Appendix LL) and piloted the measures, protocol experimental process prior to initiating the research study. In summary, the researcher created the protocol, recruited and certified the research assistants, organized, recruited and conducted a pilot study in preparation for the research study.

During the research study, the researchers' role was to recruit participants for the study, obtain a location, preparation of room; maintain regular written and verbal communication with participants, RAs, and wellness center staff; organize procedures, and the proper protection and storage of confidential information. In order to minimize bias, the researcher monitored the study, answered questions on procedures; designed data collection forms, and prepared the final Lourdes Medical Center IRB report. The intervention and assessments were conducted by RAs; the role of the researcher was observer. All intake forms were kept in a locked cabinet in an office of the Lourdes Wellness Center. The researcher also entered all data onto collection forms, submitted data regularly, via email, to the statistician, who blindly tabulated the statistics.

Research Assistant

In January 2009, the PI recruited four research assistants based on their completion of a 500 hundred hour training program in massage therapy from an accredited program, availability, interest, and willingness to learn and participate in a research study. Following a verbal interest the PI sent a letter of confirmation to the RAs. (see Appendix GG). As a result of their participation and completion the PI certified them. (see Appendix EE) The RA's were given

their job description which they performed during both the eight week pilot study and twelve week research study. (see Appendix MM)

Data Collection

Data from the Western Ontario and McMaster's Osteoarthritis Index[™] (WOMAC) survey and knee ROM using a goniometer were utilized. At baseline, WOMAC and ROM measurements of both the intervention and control group were collected along with an intake questionnaire, and a 10% discount incentive for future massage therapies at the Lourdes Wellness Center, was offered to the control group with the assurance to be taught self-massage intervention therapy techniques at the end of study.

The intervention group ROM and WOMAC measurements were collected at baseline and every week following up to eight weeks, and on the twelfth week. The control group ROM and WOMAC measurements were collected at baseline and repeated every four weeks up to twelve weeks.

Treatment of Data

WOMAC

There were twenty-four WOMAC questions which assesses pain, joint stiffness, and physical functioning. The WOMAC questions consisted of index values between 0 and 4, where 0 equals no pain, 1 equals mild pain, 2 equals moderate pain, 3 equals severe pain, and 4 equals extreme pain. These questions were treated as ordinal variables as the index values are defined as non-negative integers and the order matters, meaning for example a participant who has a pain-level of 3 (severe) has more pain than a pain-level of 1 (mild). The median value was utilized to denote the central tendency and the interquartile range was utilized to denote the variability of the WOMAC questions.

Intervention group participants' met twice weekly for eight weeks for supervised intervention, and continued unsupervised intervention twice weekly for three weeks, returning for a final supervised intervention on the twelfth week. The intervention groups' last supervised visits of a particular week were the measurements utilized in this study. The control group participants' met at baseline, and every subsequent four weeks following baseline for supervised no intervention therapy; therefore, there was only one measurement collected every four weeks and this measurement for each supervised visit was utilized in this study.

The WOMAC questions were combined into 4 groups: pain, joint stiffness, physical functioning, and global WOMAC. Pain is defined as the median value of Question 1 through Question 5 for each participant. Joint stiffness is defined as the median value of Question 6 through Question 7 for each participant. Physical functioning is defined as the median value of Question 8 through Question 24 for each participant. Global WOMAC is defined as the median value of value of Question 1 through Question 24 for each participant.

Range of Motion (ROM)

ROM measurements such as right flexion, left flexion, right extension, and left extension possess bell-shaped distributions. The mean was utilized to denote the central tendency and the standard deviation was utilized to denote the variability of the ROM measurements.

Intervention group participants' met twice weekly for eight weeks for supervised intervention, and continued unsupervised intervention twice weekly for three weeks, returning for a final supervised intervention for the twelfth week. The mean value of the bi-weekly supervised visits for each participant was utilized in this study. The control group participants' met at baseline, and every subsequent four weeks following baseline for supervised no intervention therapy; therefore, there was only one measurement collected every four weeks and this measurement for each supervised visit was utilized in this study.

Two additional variables were created, both flexion and both extension. Both flexion is defined as the mean value of right and left flexion for each participant for each weekly visit. Both extensions is defined as the mean value of right and left extension for each participant for each weekly visit.

Missing Treatment Week

Three participants in the intervention group were excluded from the study due to missing too many treatment visits, which reduced the sample size from (n=21) participants to (n=18) participants. Of these participants in the intervention group one participant missed Week 4, Week 6, Week 7, Week 8, and Week 12; another participant in the intervention group missed Week 2, Week 4, Week 6, Week 7, and Week 12; another participant in the intervention group missed Week 3, Week 7, and Week 12. These participants were considered different from the other participants who continued intervention at least once weekly and were omitted from the study. One participant in the control group only participants to (n=18) participants.

Two other participants in the intervention group missed one treatment week but returned for the following treatment week. For these two participants, the missing treatment week data was replaced with a replicate of the data for the following (returned) week.

Treatment of Missing Data

One participant in the intervention group omitted WOMAC Question 23 for all treatment visits; therefore no treatment could be applied to all missing values for a particular participant. Question 23 was omitted from the physical functioning and global WOMAC calculations for both the intervention and control groups. There were no missing ROM measurements; therefore no treatment for missing observations was performed.

Outliers

Range of Motion (ROM)

There exists a coding error pattern for the intervention group left flexion ROM at baseline and the intervention group right extension ROM at Week 12 for participants 005, 010, 015, and

| Coding Error Pattern between Left Flexion (LFLX) and Right Extension (REXT) | | | | | | | | | | | | |
|---|-------------|------|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | Treatment Period (in Weeks) | | | | | | | | | |
| Group | Participant | ROM | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 12 |
| INT | 005 | LFLX | 63 | 90 | 98 | 100 | 100 | 100 | 100 | 103 | 105 | 115 |
| | | REXT | 10 | 10 | 10 | 15 | 15 | 20 | 20 | 25 | 30 | 63 |
| INT | 010 | LFLX | 50 | 90 | 90 | 95 | 98 | 100 | 100 | 103 | 115 | 125 |
| | | REXT | 5 | 10 | 13 | 13 | 15 | 15 | 15 | 15 | 20 | 50 |
| INT | 015 | LFLX | 50 | 100 | 103 | 105 | 105 | 108 | 110 | 110 | 110 | 113 |
| | | REXT | 10 | 10 | 10 | 10 | 15 | 20 | 20 | 20 | 25 | 63 |
| INT | 032 | LFLX | 68 | 108 | 110 | 110 | 113 | 115 | 115 | 120 | 120 | 120 |
| | | REXT | 5 | 5 | 10 | 10 | 10 | 10 | 13 | 13 | 15 | 63 |

032. The ROM values for this coding error pattern are described below.

These coding errors were corrected by replacing left flexion baseline value with left flexion Week 1 value and right extension Week 12 value with right extension Week 8 value. For example, participant 005, ROM for left flexion at baseline is 63 degrees which is 37 degrees from 90 degrees at Week 1 and ROM for right extension at Week 12 is 63 degrees which is 33 degrees from 30 degrees at Week 12. ROM for left flexion at baseline was changed to its Week 1 value of 90 degrees and right extension at Week 12 was changed to its Week 8 value of 30 degrees.

ROM measurements were examined for outliers by examining a box plot with a 10% lower tail and 90% upper tail for each ROM variable across weekly treatment periods for both intervention and control groups. No adjustments were made for the treatment of outliers using a box plot analysis.

WOMAC

WOMAC questions were examined for outliers by examining a box plot with a 10% lower tail and 90% upper tail for each WOMAC variable across weekly treatment periods for both intervention and control groups. No adjustments were made for the treatment of outliers using a box plot analysis.

Verification

In order to ensure the credibility of the RA gathering and recording of the knee range of motion, the PI and RAs were trained by a physical therapist and practiced on each other. Additionally during the pilot study and research study, the PI randomly observed the procedure and re-tested the knee ROM and verified the RAs' assessment and recording. The integrity of all assessments and intake forms were collected, processed and stored after each session by the PI, who then emailed them to the statistician. All communication with participants was confidential, and conducted by the researcher.

Ethical Considerations

The institutional review board of Our Lady of Lourdes Medical Center which provides oversight for Lourdes Wellness Center, located in Collingswood New Jersey, approved the study.

The PI was also conscious of the participant's well-being and safety. Prior to each selfmassage intervention session safety precautions were recited and physical observations made. Additionally adaptations were made for physical limitations, for example, while seated if the participant felt more comfortable, a stool was provided. Also a first aid kit was always present for any unexpected minor injury.

¹ Marc Hochberg, and others, "Guidelines for the Medical Management of Osteoarthritis: Part II. Osteoarthritis of the Knee. American College of Rheumatology," *Arthritis Rheumatism*: 38, no. 11(1995):1544.

² James H. Clay and David M. Pounds, *Basic Clinical Massage Therapy: Integrating Anatomy and Treatment* (New York: Lippincott Williams and Wilkins, 2003), 310.

³ National Institute for Health and Clinical Excellence :Osteoarthritis: The Care and Management of Osteoarthritis in adults, February 2008. <u>http://www.nice.org.uk/nicemedia/pdf/CG59NICEguideline.pdf Accessed</u> <u>December 20</u>, 2009.

CHAPTER 4:

RESEARCH FINDINGS

Descriptive Statistics

Baseline demographics along with WOMAC and ROM data comparing the intervention group to the control group are presented in Table 1. In addition to descriptive statistics, Table 1 is used to determine if the intervention and control group populations come from the same distribution. The Wilcoxon Rank Sum test was used to compare continuous and ordinal variables and Fisher's Exact test was used to compare discrete variables. There is an insignificant p_value for all variables at the 5% significance-level, which means that the intervention and control groups come from the same population and are appropriate for comparing results of this study to determine whether participants with OA of the knee have improved pain-level, improved joint stiffness, improved physical functioning, and improved range of motion (ROM) due to self-massage intervention therapy.

The average age of these participants are 66 years of age, residing in the South Jersey area, within a 20 mile radius of Collingswood, N.J. The majority of these participants were female (86%) and of Caucasian (89%) race, and more than half of these participants are married (56%), followed by 39% either divorced or widowed. More than half of these participants of these participants consume alcohol (56%) and the majority of these participants do not smoke, 97%. More than half (61%) of these participants' sleep less than 8-hours per night, take medicine (56%) related to OA, and exercise at least one time per week, 64%. More than half of these participants' (61%) have OA of both knees, have been diagnosed with OA of the knee (61%) for more than 4 years, have massaged their knees (56%) within the last 12 months, and are seeing a professional for OA of the knee (53%). The majority of these participants (83%) does

not have an immediate family with history of knee replacement and does not have any inflammatory condition (75%) of the knee.

Most participants (80%) at baseline believed that self-massage provides a poor or fair improvement to the muscle pain they experience due to OA of the knee. The pain-level, joint stiffness, and physical functioning of the knees at baseline were moderate. The average range of motion at baseline for right flexion and left flexion was 108 degrees. The average range of motion at baseline for right extension was 6.7 degrees and left extension was 7.1 degrees.

| | | , | | | |
|-------------------|------------------|------------------------|-------------------|-----------------|----------------------|
| Intake Questions | Statistics | Intervention (N=18) | Control (N=18) | Total (N=36) | p_value ¹ |
| Age | Mean (Std) | 65.8 (9.36) | 65.6 (8.33) | 65.7 (8.73) | 0.9124 |
| Pain | Median (IntQ) | 2 (1.00) | 2 (1.00) | 2 (1.00) | 0.6615 |
| Joint Stiffness | Median (IntQ) | 2 (0.00) | 2 (1.00) | 2 (1.00) | 0.5316 |
| Physical Function | Median (IntQ) | 2 (1.00) | 1 (1.00) | 2 (1.00) | 0.2526 |
| Global WOMAC | Median (IntQ) | 2 (1.00) | 2 (1.00) | 2 (1.00) | 0.8440 |
| Right Flexion | Mean (Std) | 108 (13.6) | 113 (13.0) | 110 (13.4) | 0.2080 |
| Left Flexion | Mean (Std) | 108 (16.2) | 114 (11.5) | 111 (14.2) | 0.2791 |
| Both Flexion | Mean (Std) | 108 (13.8) | 114 (10.2) | 111 (12.3) | 0.2479 |
| Right Extension | Mean (Std) | 6.7 (4.54) | 9.4 (3.79) | 8.1 (4.36) | 0.0711 |
| Left Extension | Mean (Std) | 7.1 (3.46) | 10.3 (5.81) | 8.7 (4.98) | 0.0988 |
| Both Extension | Mean (Std) | 6.9 (3.75) | 9.9 (3.88) | 8.4 (4.05) | 0.0289 |
| Gender | Female | 14 (77.78%) | 17 (94.44%) | 31 (86.11%) | 0.3377 |
| | Male | 4 (22.22%) | 1 (5.56 %) | 5 (13.89%) | |
| Race | Caucasian | 17 (94.44%) | 15 (83.33%) | 32 (88.89%) | 0.6026 |

Table 1.Self-Massage Therapy Study Baseline Demographics Intervention
Group Compared to Control Group

| | | Treatment Group | | | | | | |
|--------------------------|-----------------------|-----------------|----------------------|----|-------------------|----|-----------------|----------------------|
| Intake Questions Statist | | In | tervention (N=18) | | Control (N=18) | | Total (N=36) | p_value ¹ |
| | African- American. | 1 | (5.56 %) | 3 | (16.67%) | 4 | (11.11%) | |
| Marital Status | Divorced | 3 | (16.67%) | 5 | (27.78%) | 8 | (22.22%) | 0.6155 |
| | Married | 10 | (55.56%) | 10 | (55.56%) | 20 | (55.56%) | |
| | Single | 2 | (11.11%) | 0 | (0.00 %) | 2 | (5.56 %) | |
| | Widowed | 3 | (16.67%) | 3 | (16.67%) | 6 | (16.67%) | |
| Consume Alcohol | No | 6 | (33.33%) | 10 | (55.56%) | 16 | (44.44%) | 0.3145 |
| | Yes | 12 | (66.67%) | 8 | (44.44%) | 20 | (55.56%) | |
| Smoker | No | 18 | (100.0%) | 17 | (94.44%) | 35 | (97.22%) | 1.0000 |
| | Yes | 0 | (0.00 %) | 1 | (5.56 %) | 1 | (2.78 %) | |
| Hours Sleep / Night | 6 hrs. | 2 | (11.11%) | 5 | (27.78%) | 7 | (19.44%) | 0.7685 |
| | 7 hrs. | 8 | (44.44%) | 7 | (38.89%) | 15 | (41.67%) | |
| | 8 hrs. | 7 | (38.89%) | 5 | (27.78%) | 12 | (33.33%) | |
| | 10+ hrs. | 1 | (5.56 %) | 1 | (5.56 %) | 2 | (5.56 %) | |
| Medicine Intake OA | None | 10 | (55.56%) | 6 | (33.33%) | 16 | (44.44%) | 0.3881 |
| | Once | 4 | (22.22%) | 6 | (33.33%) | 10 | (27.78%) | |
| | Twice | 4 | (22.22%) | 4 | (22.22%) | 8 | (22.22%) | |
| | Three+ | 0 | (0.00 %) | 2 | (11.11%) | 2 | (5.56 %) | |
| Exercise / Week | Zero | 7 | (38.89%) | 6 | (33.33%) | 13 | (36.11%) | 0.2119 |
| | Once | 4 | (22.22%) | 1 | (5.56 %) | 5 | (13.89%) | |
| | Twice | 1 | (5.56 %) | 5 | (27.78%) | 6 | (16.67%) | |
| | Three+ | 6 | (33.33%) | 6 | (33.33%) | 12 | (33.33%) | |
| Knee OA | Right | 5 | (27.78%) | 2 | (11.11%) | 7 | (19.44%) | 0.6350 |
| | Left | 3 | (16.67%) | 4 | (22.22%) | 7 | (19.44%) | |
| | Both | 10 | (55.56%) | 12 | (66.67%) | 22 | (61.11%) | |
| Yrs. Diagnosed with OA | < 1 Yr. | 1 | (5.56 %) | 3 | (16.67%) | 4 | (11.11%) | 0.7965 |
| | 1-3 Yrs. | 5 | (27.78%) | 5 | (27.78%) | 10 | (27.78%) | |
| | 4-9 Yrs. | 7 | (38.89%) | 5 | (27.78%) | 12 | (33.33%) | |

| | | , | | | |
|---|----------|------------------------|-------------------|-----------------|----------------------|
| Intake Questions Statistics | | Intervention (N=18) | Control (N=18) | Total (N=36) | p_value ¹ |
| | 10+ Yrs. | 5 (27.78%) | 5 (27.78%) | 10 (27.78%) | |
| Professional for OA | Yes | 8 (44.44%) | 11 (61.11%) | 19 (52.78%) | 0.5051 |
| | No | 10 (55.56%) | 7 (38.89%) | 17 (47.22%) | |
| Family History Knee Replacement | Yes | 3 (16.67%) | 3 (16.67%) | 6 (16.67%) | 1.0000 |
| | No | 15 (83.33%) | 15 (83.33%) | 30 (83.33%) | |
| Any Inflammatory Condition | Yes | 4 (22.22%) | 5 (27.78%) | 9 (25.00%) | 1.0000 |
| | No | 14 (77.78%) | 13 (72.22%) | 27 (75.00%) | |
| Non-Professional Massage Last 12 Mo | 0 | 10 (55.56%) | 6 (33.33%) | 16 (44.44%) | 0.4339 |
| | 1 | 6 (33.33%) | 6 (33.33%) | 12 (33.33%) | |
| | 2-4 | 1 (5.56 %) | 4 (22.22%) | 5 (13.89%) | |
| | 5+ | 1 (5.56 %) | 2 (11.11%) | 3 (8.33 %) | |
| Rate Massage Muscle Pain | Poor | 8 (44.44%) | 5 (27.78%) | 13 (36.11%) | 0.1720 |
| | Fair | 5 (27.78%) | 11 (61.11%) | 16 (44.44%) | |
| | Good | 5 (27.78%) | 2 (11.11%) | 7 (19.44%) | |

¹p_value based on Wilcoxon Rank Sum for ordinal and continuous and Fisher's Exact for discrete.

Changes in WOMAC and ROM from Baseline to Follow-up

Participants with OA of the knee completed WOMAC questionnaires and ROM

measurements were taken by researchers at Baseline, 4 weeks, 8 weeks, and 12 weeks for both

the intervention and control groups.

Table 2A and Table 2B provides a change from baseline to the 4-week follow-up of the

same participant (paired participants) and compares the intervention group to the control group,

Table 3A and Table 3B provides a change from baseline to the 8-week follow-up of the same participant (paired participants) and compares the intervention group to the control group, and Table 4A and Table 4B provides a change from baseline to the 12-week follow-up of the same participant (paired participants) and compares the intervention group to the control group. A p_value based on Student's *t* Distribution was utilized to determine a 5% significance-level for ROM measurements and the Wilcoxon Signed-Rank test was utilized to determine a 5% significance-level for womAC questions. Median differences and interquartile ranges are presented for WOMAC assessments, and mean differences and standard deviations are presented for ROM assessments.

There were twenty-four WOMAC questions that were condensed into 4 groups. Question 1 through Question 5 makes up the assessment of how much pain a participant possesses as a result of osteoarthritis, Question 6 and Question 7 makes up the assessment of the joint stiffness a participant possesses as a result of osteoarthritis, Question 8 through Question 24 makes up the assessment of the physical functioning a participant possesses as a result of osteoarthritis, and all WOMAC questions, Question 1 through Question 24, excluding Question 20 and Question 23, consists of the combined median value of degree of pain, joint stiffness, and physical functioning for each participant as a result of osteoarthritis.

Range of motion (ROM) measurements of the right knee bent, left knee bent, right knee straight, and left knee straight were taken by RAs using a goniometer to assess a participants' mobility as a result of OA. Additionally, right and left knee bent (both flexion) measurements were combined into a group by calculating the average for each participant, and right and left knee straight measurements were combined into a group by calculating the average for each participant.

Four-Week Follow-Up

At the four-week post-intervention follow-up there were statistically-significant changes observed in the treatment group for: pain (p=0.0010), joint stiffness (p=.0052), physical functioning (p=.0002), global WOMAC (p=.0003), right flexion (p<.0001), left flexion (p<.0001), both flexion (p<.0001), right extension (p<.0001), left extension (p<.0001), and both extension (p<.0001). All changes for the treatment group were statistically-significantly different from baseline. For the control group there were no statistically-significantly changes from baseline as all p_values were greater than 5%. At the four-week post-intervention follow-up, the (absolute median difference=1 is equivalent to the interquartile range=1) in the treatment group for: pain, joint stiffness, physical functioning, and global WOMAC which agrees with the requirement of 80% power.

At the four-week post-intervention follow-up, the (absolute median difference=1) and is equivalent to the (interquartile range=1) in the treatment group for: pain, joint stiffness, physical functioning, and global WOMAC which agrees with the requirement of 80% power. Additionally, in the treatment group for: right flexion (mean difference=7.2) exceeds the (standard deviation=6.4), left flexion (mean difference=7.8) exceeds the (standard deviation=7.3), both flexion (mean difference=7.5) exceeds the (standard deviation=4.0), right extension (mean difference=6.7) exceeds the (standard deviation=3.9), left extension (mean difference=5.2) exceeds the (standard deviation=3.1), and both extension (mean difference=5.9) exceeds the standard deviation=3.0) which agrees with the requirement of 80% power.
| | | | Interver (N=1 | | Control (N=18) | | | | |
|------|----------------------|--------------------|------------------|-------|----------------------|--------------------|----------------|-------|----------------------|
| Week | Variable | Before to After | Median Diff | IQR | p_value ¹ | Before to After | Median Diff | IQR | p_value ¹ |
| 4 | Pain | 1.5 to 1.0 | -1.0 | 1.000 | 0.0010 | 1.5 to 1.5 | 0.0 | 0.000 | 0.9844 |
| 4 | Joint Stiffness | 2.0 to 1.0 | -0.5 | 1.000 | 0.0052 | 2.3 to 2.0 | 0.0 | 0.500 | 0.2031 |
| 4 | Physical Function | 2.0 to 1.0 | -0.8 | 1.000 | 0.0020 | 1.5 to 1.5 | 0.0 | 0.000 | 0.6250 |
| 4 | Global WOMAC | 2.0 to 1.0 | -1.0 | 1.000 | 0.0107 | 1.5 to 2.0 | 0.0 | 0.000 | 1.0000 |

Table 2A: WOMAC Comparisons of Intervention Group to Control Group from Baseline to 4-Week Follow-up

¹p_value is based on Wilcoxon Signed Rank test.

Table 2B: ROM Comparisons of Intervention Group to Control Group from Baseline to 4-Week Follow-up

| Intervention (N=18) | | | | Control (N=18) | | | | | |
|------------------------|--------------------|--------------------|--------------|-------------------|----------------------|--------------------|--------------|--------|----------------------|
| Week | Variable | Before to After | Mean Diff | Std | p_value ¹ | Before to After | Mean Diff | Std | p_value ¹ |
| 4 | Right Flexion | 107.8 to 114.9 | 7.2 | 6.428 | 0.0002 | 113.1 to 116.7 | 3.6 | 9.043 | 0.1085 |
| 4 | Left Flexion | 107.4 to 115.2 | 7.8 | 7.310 | 0.0003 | 113.3 to 117.5 | 4.2 | 10.880 | 0.1226 |
| 4 | Both Flexion | 107.6 to 115.1 | 7.5 | 4.033 | <0.0001 | 113.2 to 117.1 | 3.9 | 9.244 | 0.0922 |
| 4 | Right Extension | 6.7 to 13.4 | 6.7 | 3.908 | <0.0001 | 9.4 to 8.6 | -0.8 | 4.618 | 0.4544 |
| 4 | Left Extension | 7.1 to 12.3 | 5.2 | 3.130 | < 0.0001 | 10.6 to 10.8 | 0.3 | 6.524 | 0.8588 |
| 4 | Both Extension | 6.9 to 12.8 | 5.9 | 2.960 | < 0.0001 | 10.0 to 9.7 | -0.3 | 4.918 | 0.8135 |

¹p_value is based on Student's t Distribution.

Eight-Week Follow-Up

At the eight-week post-intervention follow-up there were statistically-significant changes observed in the treatment group for: pain (p=0.0002), joint stiffness (p=.0002), physical functioning (p=.0024), global WOMAC (p=.0010), right flexion (p<.0001), left flexion (p<.0001), both flexion (p<.0001), right extension (p<.0001), left extension (p<.0001), and both extension (p<.0001). All changes for the treatment group were statistically-significantly different from baseline. For the control group there were no statistically-significantly changes from baseline as all p_values were greater than 5%.

At the eight-week post-intervention follow-up, the (absolute median difference=1 is equivalent to the interquartile range=1) in the treatment group for: pain, joint stiffness, and global WOMAC, which agrees with the requirement of 80% power. The (absolute median difference=1) does not exceed the (interquartile range=2) in the treatment group for physical functioning which does not agree with the requirement of 80% power. Additionally, in the treatment group for: right flexion (mean difference=12.6) exceeds the (standard deviation=7.1), left flexion (mean difference=15.2 exceeds the (standard deviation=11.5), both flexion (mean difference=13.9) exceeds the (standard deviation=7.6), right extension (mean difference=11.7) exceeds the (standard deviation=4.2), left extension (mean difference=10.9) exceeds the (standard deviation=3.8) which agrees with the requirement of 80% power.

| | | | Interver (N=1 | | Control (N=18) | | | | |
|------|----------------------|--------------------|------------------|-------|----------------------|--------------------|----------------|-------|----------------------|
| Week | Variable | Before to After | Median Diff | IQR | p_value ¹ | Before to After | Median Diff | IQR | p_value ¹ |
| 8 | Pain | 1.5 to 0.0 | -1.0 | 1.000 | 0.0002 | 1.5 to 2.0 | 0.0 | 1.000 | 0.7891 |
| 8 | Joint Stiffness | 2.0 to 1.0 | -1.0 | 0.500 | 0.0002 | 2.3 to 2.0 | 0.0 | 0.500 | 0.4805 |
| 8 | Physical Function | 2.0 to 0.5 | -1.0 | 1.500 | 0.0024 | 1.5 to 2.0 | 0.0 | 0.000 | 1.0000 |
| 8 | Global WOMAC | 2.0 to 1.0 | -1.0 | 1.000 | 0.0010 | 1.5 to 2.0 | 0.0 | 0.000 | 1.0000 |

Table 3A: WOMAC Comparisons of Intervention Group to Control Group from Baseline to 8-Week Follow-up

¹p_value is based on Wilcoxon Signed Rank test.

Table 3B: ROM Comparisons of Intervention Group to Control Group from Baseline to 8-Week Follow-up

| | | | Interve (N=1 | | Control (N=18) | | | | |
|------|--------------------|--------------------|-----------------|--------|----------------------|--------------------|--------------|-------|----------------------|
| Week | Variable | Before to After | Mean Diff | Std | p_value ¹ | Before to After | Mean Diff | Std | p_value ¹ |
| 8 | Right Flexion | 107.8 to 120.4 | 12.6 | 7.064 | <0.0001 | 113.1 to 116.4 | 3.3 | 9.393 | 0.1505 |
| 8 | Left Flexion | 107.4 to 122.6 | 15.2 | 11.547 | <0.0001 | 113.3 to 117.2 | 3.9 | 9.934 | 0.1151 |
| 8 | Both Flexion | 107.6 to 121.5 | 13.9 | 7.638 | <0.0001 | 113.2 to 116.8 | 3.6 | 8.796 | 0.0996 |
| 8 | Right Extension | 6.7 to 18.3 | 11.7 | 4.201 | <0.0001 | 9.4 to 8.4 | -1.1 | 4.412 | 0.3243 |
| 8 | Left Extension | 7.1 to 18.0 | 10.9 | 4.351 | <0.0001 | 10.6 to 10.3 | -0.3 | 6.057 | 0.8480 |
| 8 | Both Extension | 6.9 to 18.2 | 11.3 | 3.813 | <0.0001 | 10.0 to 9.3 | -0.7 | 4.544 | 0.5419 |

¹p_value is based on Student's t Distribution.

Twelve Week Follow-Up

At the twelve-week post-intervention follow-up there were statistically-significant changes observed in the treatment group for: pain (p<.0001), joint stiffness (p=.0002), physical functioning (p=.0005), global WOMAC (p=.0001), right flexion (p<.0001), left flexion (p<.0001), both flexion (p<.0001), right extension (p<.0001), left extension (p<.0001), and both extension (p<.0001). All changes for the treatment group were statistically-significantly different from baseline. For the control group there were no statistically-significantly changes from baseline as all p_values were greater than 5%.

At the twelve-week post-intervention follow-up, the (absolute median difference=1) is equivalent to the (interquartile range=1) in the treatment group for: joint stiffness and global WOMAC, which agrees with the requirement of 80% power. The (absolute median difference=1) does not exceed the (interquartile range=0) in the treatment group for pain and the (interquartile range=2) in the treatment group for physical functioning which does not agree with the requirement of 80% power. Additionally, in the treatment group for: right flexion (mean difference=9.2) exceeds the (standard deviation=8.7), left flexion (mean difference=14.9) exceeds the (standard deviation=18.6), both flexion (mean difference=12.1) exceeds the (standard deviation=18.6), both flexion (mean difference=2.8) exceeds the (standard deviation=3.9), left extension (mean difference=4.3) exceeds the (standard deviation=3.9), left extension (mean difference=4.3) exceeds the (standard deviation=4.1), and both extension (mean difference=3.5) exceeds the (standard deviation=3.3) which agrees with the requirement of 80% power.

| | | Intervention (N=18) | | | | Control (N=18) | | | |
|------|----------------------|------------------------|----------------|-------|----------------------|--------------------|----------------|-------|----------------------|
| Week | Variable | Before to After | Median Diff | IQR | p_value ¹ | Before to After | Median Diff | IQR | p_value ¹ |
| 12 | Pain | 1.5 to 0.0 | -1.0 | 0.000 | < 0.0001 | 1.5 to 1.0 | 0.0 | 0.000 | 1.0000 |
| 12 | Joint Stiffness | 2.0 to 1.0 | -1.0 | 0.500 | 0.0002 | 2.3 to 2.0 | 0.0 | 1.000 | 0.6074 |
| 12 | Physical Function | 2.0 to 0.5 | -1.0 | 1.500 | 0.0005 | 1.5 to 2.0 | 0.0 | 0.500 | 0.1875 |
| 12 | Global WOMAC | 2.0 to 0.0 | -1.0 | 1.000 | 0.0001 | 1.5 to 2.0 | 0.0 | 0.000 | 1.0000 |

Table 4A: ROM Comparisons of Intervention Group to Control Group fromBaseline to 12-Week Follow-up

¹p_value is based on Wilcoxon Rank Sum test.

Table 4B: ROM Comparisons of Intervention Group to Control Group from Baseline to 12-Week Follow-up

| | | | Interve (N=1 | | Control (N=18) | | | | |
|------|--------------------|--------------------|-----------------|--------|----------------------|--------------------|--------------|-------|----------------------|
| Week | Variable | Before to After | Mean Diff | Std | p_value ¹ | Before to After | Mean Diff | Std | p_value ¹ |
| 12 | Right Flexion | 107.8 to 116.9 | 9.2 | 8.787 | 0.0004 | 113.1 to 115.3 | 2.2 | 9.735 | 0.3464 |
| 12 | Left Flexion | 98.7 to 113.6 | 14.9 | 18.681 | 0.0035 | 113.3 to 116.1 | 2.8 | 9.583 | 0.2355 |
| 12 | Both Flexion | 103.2 to 115.3 | 12.1 | 12.405 | 0.0007 | 113.2 to 115.7 | 2.5 | 8.135 | 0.2097 |
| 12 | Right Extension | 6.7 to 9.4 | 2.8 | 3.919 | 0.0079 | 9.4 to 8.3 | -1.1 | 3.234 | 0.1631 |
| 12 | Left Extension | 7.1 to 11.4 | 4.3 | 4.198 | 0.0005 | 10.6 to 10.3 | -0.3 | 6.057 | 0.8480 |
| 12 | Both Extension | 6.9 to 10.4 | 3.5 | 3.283 | 0.0003 | 10.0 to 9.3 | -0.7 | 4.004 | 0.4719 |

¹p_value is based on Student's t Distribution.

CHAPTER 5:

DISCUSSION

Did Self-Massage Affect the Pain, Stiffness, Function and Knee Range of Motion in Osteoarthritis of the Knee?

In this research, self-massage intervention in a sample of community-dwelling adults with a diagnosis of osteoarthritis of the knee significantly affected pain, joint stiffness, physical function and range of motion. The two dependent variables in this study are 1) the Western Ontario and McMaster's Osteoarthritis IndexTM (WOMAC) questionnaire, which evaluates clinically important patient-relevant changes in health status as a result of an intervention; and 2) active range of motion (ROM) of both knees (at full extension and flexion) using a goniometer.

Previous research, described in the Literature Review, has not definitively identified the cause of knee pain and knee OA. However, theories of its possible origin vary from systemic factors, mechanical dysfunction of the knee joint, and the role of the quadriceps femoris muscle. The resulting pain and physical compensation predispose older people to increased disability risks, disease progression and the adoption of sedentary lifestyles. Hence, the significant clinical outcomes as measured by WOMAC scores may indicate the intervention has the potential to affect the disease, and to influence pain and stiffness and physical function. In addition, ROM measurements are affected by the rectus femoris muscle, which is one of the four muscles that make up the quadriceps muscle group. This muscle crosses both the hip and knee and, if shortened, may affect knee flexion in knee OA.¹

The randomized self-massage study used outcome measures assessed at baseline and repeated weekly for eight weeks and at twelve weeks post-intervention. There were progressive and statistically significant improvements in pain, stiffness, function and range of motion over eight of the twelve weeks in the intervention group, compared to no change in the control group. There are several possible explanations for the significant results. The self-massage sessions were conducted twice weekly in a supervised group setting, ensuring proper technique, compliance and support from other participants. The expected benefits of the intervention may also be compared with its nonspecific effects. Second, the sequences were narrated and demonstrated by certified research assistants, who guided the participants through each step of the sessions, and thus ensured their compliance. Lastly, following each session, the WOMAC questionnaire and ROM measurement were completed, allowing participants to experience the immediate sensation of touch and its possible effects on ambulation.

Self-massage reduced pain, stiffness, and function over an eight-week period. Although the underlying mechanism of massage is not well understood,² proponents of massage propose that pressure applied in deep kneading or stroking along the length of a muscle tendon encourages venous, lymphatic, and tissue drainage. In addition, the removal of metabolic waste enhances homeostasis and reduces pain.³ This is reasonable, considering that the sole intervention, self-massage, performed bi-weekly for eight weeks, may have produced clinically significant outcomes. That is, these results may make an important difference to someone with knee OA, and has practical value.

Limitations

- A blind trial was not possible for this type of active intervention, which was conducted with participants in a group setting. The PI and RAs were not blinded when working with intervention and control groups.
- 2. The intervention group could not be controlled for expectation (Rosenthal) effects.⁴ Their interest in the study reflected an expectation of some benefit.

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- Likewise, the research assistants' attention to, interest in, and concern for study participants could have stimulated nonspecific effects and general optimism (i.e., the Hawthorne effect).⁵
- 4. As with studies of other physical treatments, it is impossible to withhold the effects of technique from study participants.
- 5. Given that the WOMAC self-report inventory was administered after each intervention, response bias may have occurred when responding to the same survey questions repeated over eight weeks.
- 6. The study included a four-week follow-up period; a longer follow-up period would have been advisable in that the longer the follow-up period, the better the long-term observations.
- 7. The study was expected to have a minimum of 60 participants, 30 in each cohort, as required by Holos University Graduate Seminary. However, despite all avenues of advertisement—radio, newspaper, e-mail, and direct mailings—only 40 qualified for the study. There were enough participants to maintain the level at 80 percent, thus posing no threat to the results of this study, and the researcher's faculty advisor and dissertation committee allowed the study to continue.

Study Strengths

- The research study was conducted at Lourdes Wellness Center, a nonprofit, integrated health and wellness center, offering the unique emphasis on the spirituality component of wellness and health to the South Jersey area for thirty years.
- 2. The dependent variable, knee range of motion was measured by a reliable and validated instrument, the goniometer.

- 3. The intervention and control groups were randomized, an essential feature of a valid trial.
- 4. Control group adherence occurred because of an interest in learning the selfmassage intervention.
- The one hour self-massage intervention took place in the afternoon or evening. The opportunity to choose which session to participate in may have affected attendance and participation.
- 6. Self-massage for knee OA, a form of mind-body self-therapy, the study design, research process and plan were successfully investigated in a pilot study prior to conducting the current study by the researcher.

Summary

The four-, eight-, and twelve-week follow-up each shows an improvement over baseline due to self-massage intervention therapy. While both the 8 and 12 week showed improvement over the baseline. There was no improvement between the 8 and 12 week period of time. The twelve-week follow-up occurred after a three-week unsupervised intervention.

Figure 3A, seen below, is the twelve week median WOMAC graph indicating changes, joint stiffness gave the highest responsiveness from baseline to 4 weeks and baseline to eight week, followed by physical function then, global WOMAC and pain were equal as compared to no change in the median control group's WOMAC results in 3B below.



Figure 3A: WOMAC Median Difference by Treatment Period for Intervention Group



Figure 3B Control Group 12 Week WOMAC Findings



Figure 4A ROM Mean Difference by Treatment Period for Intervention Group

In Figure 4A while this study did not have scientific data to compare flexion to extension of right, left and both knees, it appears that flexion of right, left and both knees demonstrated continued improvement over the extension of right, left and both knees during the twelve week study. Extension decline, while still improved over baseline, reflected the possible direct relationship between self-massage of the quadriceps muscle (which is responsible for knee extension), performed during the first eight weeks of supervised self-massage and the final weeks of unsupervised self-massage. The twelve-week follow-up of range of motion also shows an improvement as compared to baseline, but is not improved compared to the eight-week follow-up. The control group showed no significant changes, patterns are similar and declining.



Figure 4B: ROM Mean-Value by Treatment Period for Control Group

Although the graphs reflect no improvement after the three-week unsupervised intervention, research has documented that mutiple doses have a significant effect for delayed assessment of pain, especially when massage is applied over a course of treatment. Patients who were assessed days or weeks after treatment ended exhibited continued lower levels of pain.⁶

Implications for Application

The complex issue of healthcare reform in American has shed new light on integrative medicine as a feasible arm of a new healthcare system. A recent September/October 2009 issue of *Explore: The Journal of Science and Healing* published an article on patient-centered care as a fundamental component of integrative medicine. It asserts that "although evidence is limited, empowered patients have higher satisfaction with care, adherence to treatment regimes and

improved outcomes."⁷ Research studies presented in the Literature Review discussed two main consequences of knee OA: pain and disability. The nonpharmacological treatment for knee OA is symptom management. Thus the current research is timely, offering people with knee OA a participatory, cost-effective, self-help approach to managing pain, stiffness, and dysfunction. This study offers the first outcome-based evidence that directly links self-massage of the quadriceps muscle as a standalone self-help therapy for knee OA, and provides firsthand evidence that a patient-centered approach is empowering and capable of producing improved outcomes. The findings may have implications that directly link the regular practice or use of self-massage to the relief of arthritic knee symptoms.

Conclusions

This study contributes to an emerging evidence-based massage research category of self-massage. This category of massage is patient-centered, benefiting patients who are seeking ongoing solutions for chronic symptoms related to knee OA. The researcher presented evidence-based CAM, mind-body self-care therapies (i.e. yoga, massage, prayer, and T'ai Chi) for OA management. Osteoarthritis researchers predict that the prevalence of OA will increase as the population ages and that the need for economical, participatory therapies aimed at managing the pain and disability caused by loss of joint mobility will also increase. This research study presented evidence-based results that the quadriceps muscle may be a causative factor in the pathogenesis of knee OA.⁸ This study provides the first significant evidence that the application of self-massage to the quadriceps muscle may have important implications for future research, particularly in terms of managing pain and dysfunction; and affecting knee ROM of knee OA. Moreover, this research showed that self- administered massage on the quadriceps muscle may significantly affect the pain, stiffness, physical function and knee range of motion caused by OA of the knee.

Implications for Future Research

In an article entitled "Implementing Optimal Healing Environments," in *Explore: The Journal of Science and Healing*, Sita Anath and Wayne Jonas discuss challenges to our healthcare system that block the implementation of what they term "optimal healing environments" (OHEs). Given the challenges of a healthcare system that focuses on managing physical disease with drugs, surgery and expensive technologies, the OHE solution is to foster health programs that support lifestyle modification and chronic disease management. Anath and Jonas identify a second problem: there is little or no reimbursement for preventive programs; they suggest an OHE solution that invests in preventive and wellness-based interventions. They point out that the healthcare system seeks to control or correct each symptom and suggest instead an OHE solution that supports a self-correcting and self-healing health system. Finally, Anath and Jonas recommend expanding the role of evidence-based medicine from a physician-centered system to a patient-centered healthcare system.⁹ The challenges and solutions presented in the article reflect the trends in OA management, which favors minimally supervised or patientcentered care.

Future research with larger samples is needed to determine the efficacy and effectiveness of self-massage in the general population. Future researchers should also test the replicability of this study's findings with other populations, such as people with OA of the ankle or hand. Longterm follow-up studies of self-massage for knee OA to assess adherence, use of medication, and disease progression are also needed. Moreover, the assessment of the long-term benefits of selfmassage may lead to its inclusion in clinical guidelines as a safe and therapeutic therapy for the nonpharmacological management of knee OA. Equally important, self-massage may be considered a mind-body or CAM therapy; as such, future explorations of its clinical application and use with other interventions are warranted. Finally, future studies may also investigate protocols to examine the efficacy and effectiveness of self-massage as an adjunct to other selfhelp therapies such as exercise or yoga.

The Future of Self-Massage

Training Self-Massage Facilitators

The vision of the researcher is to certify healthcare professionals, massage therapists, nurses, and physical therapists to teach the "Arthritis of the Knee, Self-Massage Therapy Method" for knee pain and dysfunction. The 30-hour course will be the same course of instruction given to the RAs of this research study who are now certified to facilitate the training. Second, in the immediate future the researcher will create an instructional DVD, a website, a blog, and an internet professional network. The reseacher intends to publish a book entitled *Your Healing Hands: Self-Massage for Arthritis of the Knee* and to develop plans for an ongoing sixweek training program—"Self-Massage for Arthritis of the Knee"—open to anyone with knee OA or chronic knee pain. This program will be held at Lourdes Wellness Center beginning in spring 2010. Over the next five years, in an effort to expand and certify more healthcare professionals as facilitators in other cities and states, the Principal Investigator plans to conduct weekend workshops or continuing education units at national massage conventions. Finally, as a member of the Holistic Nurses Association, the PI may also extend opportunities for holistic nurse practitioners to learn and incorporate this mind-body approach into self-healing.

A Holistic Approach to Self-Massage

Self-massage is a form of contact healing that requires focus and connection with a part of the body. It is this connection, focused on symptoms or pain with the intention to heal, that stimulates the body's innate ability to heal itself. Authors and researchers such as Dr. C. Norman Shealy, Dr. Christine Page, Marcia Emery, Caroline Myss, Candace Pert and others, have written about this mind-body, intuitive system of self-healing. Self-massage for OA of the knee, which can be easily taught, may create an awareness of physical self-improvement and stimulate physiological communication, thus initiating positive mind and body awareness.

Researchers have explored the potential of massage therapy to release endorphins, serotonin, and other neurotransmitters which can ease pain and promote relaxation and sleep, ¹⁰ as well as release trapped physical and emotional energy.¹¹ Field et al., have also provided evidence that self-massage and care-giver massage can be beneficial.¹²

Spirituality is a component of the holistic approach to self-massage. Spirituality is an individual's personal experience that connects him or her to an inner or higher power. Whether spiritual-healing is an active process of daily practice or a passive process of having others pray or meditate, it integrates the mind, body and spirit into a personal practice which can reduce stress or support self-healing. Additionally, while research has established the role of spirituality as a resource for coping with chronic pain,¹³ it also has significant potential to assist individuals with arthritis in health promotion and health adaptation.¹⁴ Holistic self-massage may provide a vehicle for self-empowerment over chronic pain through meditation, contemplation or prayer while stimulating physiological improvement.

Holistic nurses and spiritual counselors may also be taught to facilitate holistic selfmassage for certain chronic disease conditions. This is fertile ground for future research.

This groundbreaking research study was developed because the PI recognized a gap in the healthcare system, which did not treat the whole person with chronic conditions with evidence-based patient-centered methods for self-care. The vision of the researcher is not only to promote health and wellness, but also to create an awareness of the need for more protocols with step-by-step instructions for people who are seeking self-directed alternative therapies.

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¹ Cynthia C. Norkin and D. Joyce White, *Measurement of Joint Motion: A Guide to Goniometry* (Philadelphia: F.A. Davis Company 2003), 230.

² Tiffany Field et al., "Cortisol Decreases and Serotonin and Dopamine Increase Following Massage Therapy," *Internal Journal of Neuroscience* 115 (2005): 1411. ³ Leon Chaitow, *Soft-Tissue Manipulation: A Practitioner's Guide to the Diagnosis and Treatment of Soft*

³ Leon Chaitow, Soft-Tissue Manipulation: A Practitioner's Guide to the Diagnosis and Treatment of Soft Tissue Dysfunction and Reflex Activity (Rochester: Healing Arts Press, 1988), 19.

⁴. "Pygmalion Effect," Wikipedia.org, http://en.wikipedia.org/wiki/Pygmalion_effect#Rosenthal-Jacobson_study (accessed December 14, 2009).

⁵. "Hawthorne Effect," Wikipedia.org, http://en.wikipedia.org/wiki/Hawthorne_effect#cite_note-MayoHaw-3 (accessed December 14, 2009).

⁶Christopher Moyer, James Rounds, and James W. Hannum, "A Meta-Analysis of Massage Therapy Research." *Psychological Bulletin* 130, no. 1 (2004): 13.

⁷ Victoria Maizes, David Rakel and Catherine Niemiec, "Integrative Medicine and Patient-Centered Care," *Explore: The Journal of Science and Healing* 5, no. 5 (September/October 2009): 278.

⁸ Michael V. Hurley, "The Role of Muscle Weakness in the Pathogenesis of Osteoarthritis," *Rheumatic Disease Clinics of North America* 25, no. 2 (May 1999): 292.

⁹ Sita Anath and Wayne Jonas, "Implementing OHs, *Explore: The Journal of Science and Healing* 6, no. 1 (January/February 2010): 52-53.

¹⁰ Christopher Moyer, James Rounds, and James W. Hannum, "A Meta-Analysis of Massage Therapy Research." *Psychological Bulletin* 130, no. 1 (2004): 5.

¹¹ Candace Pert, *Molecules of Emotion* (New York: Scribner, 1997), 189.

 ¹² Tiffany Field et al., "Cortisol Decreases and Serotonin and Dopamine Increase Following Massage Therapy," *Internal Journal of Neuroscience* 115 (2005) 1405.
 ¹³ Noreen M. Glover-Graf et al., "Religious and Spiritual Beliefs and Practices of Persons With Chronic

¹³ Noreen M. Glover-Graf et al., "Religious and Spiritual Beliefs and Practices of Persons With Chronic Pain," *Religious Counseling Bulletin* 51, no. 1 (Fall 2007): 32.

¹⁴ Mertie L. Potter and Jaclene A. Zauszniewski, "Spirituality, resourcefulness and Arthritis Impact on Health Perception of Elders with Rheumatoid Arthritis," *Journal of Holistic Nursing* 18 (2000): 311.

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APPENDIX A PILOT STUDY RESULTS

The Pilot Study

The self-massage study is founded on massage research that has consistently proven massage therapy beneficial for musculoskeletal pain. Further, research studies link knee OA as a chronic joint disease, may cause knee joint dysfunction and pain to the quadriceps muscle, which functions when walking, sitting and using stairs. Since muscles respond to chronic physical dysfunction by shortening, and shortened muscles cannot function effectively,¹ and researchers consistently report pain with these movements, it is reasonable to correlate the knee pain with quadriceps muscle function. Hence would self-massage of the quadriceps muscle release tight areas within the muscle and soft tissue, thereupon, affecting the pain, stiffness, function and range of motion of knee OA? Due to the paucity of research on self-massage and given the challenges of treating OA of the knee, a plainly identified need for further research to evaluate nonpharmacological therapies that are safe, effective and economical are needed.² Additionally, because this is an original research study investigating self-massage for knee OA, a pilot study was recommended to establish the protocol, and assess the research protocol process, identify logistical problems, and train research assistants (RA) in the many elements of this research process. Lastly, the pilot study evaluated the outcome measures WOMAC and knee range of motion used in the study.

The 8 week pilot study, which included 4 weeks of supervised self-massage and 4 weeks of unsupervised massage done at home, took place at Collingswood Manor, a senior living facility, which allowed us to use their community room twice weekly for 4 weeks. Participants were recruited through community news paper, wellness fair, and flyer posting in area supermarkets. The pilot study was supervised by Holos University and the dissertation committee. The pilot study of 20 participants (n-10) control and (n-10) intervention, completed HIPPA and informed consent forms at first contact, followed a group instruction format with pre and post assessments and randomization by convenience.

The pilot study, provided information for the following changes;

- **§** relative to the length of study ,from 8 to 12 weeks,
- S the self-assessment WOMAC tool and knee range of motion assessments were increased from pre and post assessments to after each bi-weekly session, in order to evaluate any changes over time,
- S the need to reach a larger population of people through varied advertisement, such as radio, newspaper, email and focused ads,
- S lastly, relocation necessary to a wellness related facility to attract a larger accessible study population.

Summary of Pilot Study Results

- 1. Pain, disability and joint stiffness were all decreased as a result of the self-massage technique.
- 2. The knee range of motion increased as a result of the self-massage increased.

Compared Averages

| | | WOM | | |
|-----------|------|------------|--------------------|--------------------|
| Record | Pain | Disability | Joint Stiffness | Range of Motion |
| Pretest | 1.3 | 1.7 | 2.0 | 61.5 |
| Follow-Up | 0.9 | 1.1 | 1.3 | 63.9 |
| | | | | |





APPENDIX B IRB APPROVAL AND CLOSURE LETTERS

LOURDES Our Lady Digitamber 3, 2000 Dordhves Albins Hi Sussis Autrus Hornes, NJ (30K3 Restortion FIE: Effects of Ref Maximup of Colocethritis of the Trees IPS 4 DE-CIT Review Date: September 3, 2009. Exploritor Date: September 3, 2003. Dear Vo. Alkine: Locaso Manca Corra or Anna Arrow Corr The ISC approal indext. In the ISC approal indext. First Fall Neural 22D Outline, Data data and Theorem Reason This and 22D Outline, Data data and Theorem Reason This and the ISC outline of the ISC OUTLINE Control on the Isc Outline of the ISC OUTLINE Control on the Isc Outline of the ISC OUTLINE Control on the Isc Outline of the Isc OUTLINE Control on the Isc Outline of the Isc OUTLINE Control on the Isc Outline of the Isc OUTLINE Isc Outline of the Isc Outline of the Isc OUTLINE Isc Outline of the Isc Outline of the Isc OUTLINE Isc Outline of the Isc Outline of the Isc OUTLINE Isc Outline of the Isc Outline of the Isc Outline Amount of the Isc Outline of the Isc Outline of the Isc Outline Amount The Isc Outline of the Isc Outline of the Isc Outline Isc Outline of The Isc Outline of the Island Isc Outline Isc Outline of The Isc Outline of the Island Isc Outline Isc Outline of The Island Islan ele The number of subjects approved at this site is 256. Report of the second Marker of Solida Marketon, A Mercing attice Francisco Facer of Marcon 117

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Fax Bear J. Downers Monie Car Control Monie Car Excertised Hard Start Car Cite Law et Locations Heat II Constantions Heat II Constantions Heat II Constantions Leader Strain Leader

Thank you for your interest in participating in this valuable research project

Very truly yours, Robert Ruggero Co-Chairman, Institutional Review Board

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APPENDIX C LETTER OF SUPPORT

HOLOS UNIVERSITY GRADUATE SEMINARY

1501 East Broadway, Suite 2 Bolivar, MO 65613-0297 Phone: 417.777-7717 or toll free 888-272-6109 Fax: 417.267-7711 or toll free 888-528-0746 www.HolosUniversity.org



Institutional Review Board, Our Lady of Lourdes Medical Center, www.lourdesnet.org In care of dmassage1@comcast.net

RE: Dotty Atkins' Research on Self-Massage.

Members of the Board,

The present letter is in support of Dotty Atkins' IRB application before you. Her proposed research has been reviewed by us both in cur Capstone course for the doctorate and the Preliminary Exam required of all of our graduates before they are permitted to begin research on their dissertation.

Ms. Atkins passed both with outstanding performances. We deem her proposed study to have great scientific merit. We further deem that she has all the support and resources to conduct the research in a thoroughly professional manner.

If you have any questions about the research please feel free to write to me about them or call me at 785-863-2176. It is absolutely without reservation that I recommend approval.

Be well.

Bot Tunky Robert E. (Bob) Nunley

> Education - Service - Research With a Focus on

Integrative & Energetic Healthcare and Spiritual Healing

APPENDIX D EMAIL BLAST AD

Are you 50 or older with osteoarthritis of the knee? Participants Needed: Free Study on Self-Massage for Osteoarthritis of the

The Knee STUDY-BEGINS 9/21 CALL TODAY1

The purpose of this study is to better understand what effect self-manage has on pain and range of notion among people with arthritis of the lone. This study builds on the masking all point study conducted asking this year. Benefits: Puricipation in the <u>study is fron</u> participants will learn an easy self-help massage technique, which takes only minutes to do, but may decrease symptome related to lone antivition.

Bendfer Puricipation in the <u>stacks</u> afters participants will keen an easy tabl-help manages techniques, which takes only minutes to do, but may decrease symptoms related to lone arithrais. Three varealisment interestical participants will be assigned to one of twa groups, toppring Stackner 21, 2005. Shaft summany will be longifi in unerbiase groups penalisment with the seek for if weeks.

For information & registration others edentation: Saturday 9/19/09, 2-3 pm or 5/21/09, 6-7 pm

Self-Massage for Ostocarthritis of the Knoe

Research study conducted by Dorothea (Doty) Atkins RN, 85%, MA, Ph.D. Candidate Assisted by 4 certilited research associates who are massage therapists.

Eightity otheria: Must be age 50 and older, and have your healthcare provider's written diagnosis of salesambrits of the knee.

> Donsthou (Dotty) Advins, PN, (55H, MA, Ph.D., Candidate, Principal Investigator: (1556) 428-54888 Einelt: dmassage1:thcomcast.net Regetration required. 8



APPENDIX E NEWSPAPER AD



APPENDIX F KYW RADIO AD

The following thirty second ad ran for two days three times a day.

Do you have arthritis of the knee?

Are you tired of taking medication for knee pain?

There is a FREE opportunity to learn an easy self-help technique.

Volunteers are needed for a research study to evaluate a self-massage protocol on knee arthritis.

Registration is Saturday, September 19 @ 11:00 and Monday Sept. 21 @ 6:00 at Lourdes Wellness Center in Collingswood, New Jersey.

Call (856) 583-6516 again that's (856) 583-6516
Interested participants will call (856) 583-6516, the recording is as follows:

Thank you for your interest in the self-massage for arthritis of the knee research study. This study is designed for people 50 years and over who have been diagnosed with knee arthritis. The study will focus on the effects of self-massage on knee pain and range of motion. The orientation will take place on Saturday, September 19 at Lourdes Wellness Center in Collingswood, NJ at 11:00 AM. Eligibility for the 12 week study requires a doctors' written documentation of knee arthritis, attending one hour self-massage training sessions twice weekly, and the completion of all surveys distributed. One moment please you are being transferred to one of our representatives.

Hello, my name is ______, may I please have your name, phone number, address and email address. Also information from this interview will be entered into the study's database. All information received from you, including your name will be kept confidential and used for research purpose only.

APPENDIX H PRE-STUDY TELEPHONE INTERVIEW

| Name | Date |
|---------------------------------------|---|
| Phone | Email |
| The phone interview will be conduct | ted by the Research Interviewer after the participant |
| responds to a recruitment flyer and s | peakers with answering service interviewer. |

Hello. My name is _______. May I please speak to _______. I am calling in response to your interest in participating in the arthritis study. Thank you for your interest in the self-massage therapy study and speaking with the interviewer. Is this a good time to talk? This study is a university research study for a dissertation. This study will help us to better understand if self-massage therapy can affect pain and range of motion in people with knee osteoarthritis. This study is open to men and women ages 50 and older. It will also require participation in the orientation meeting, biweekly one hour self-massage sessions which last for 8 weeks and require the self-massage sequence to be completed at home for the next four weeks then a return for a summary meeting. We also ask that no routine physical exercise be done during the study or have any other type of massage therapy during the study. The study will be conducted in the afternoon from 2-3 PM or in the evening from 6-7 PM.

Do you think you might be interested in participating in this study?

Before enrolling people in this study, we need to determine if they are eligible. The purpose of this interview is to confirm your eligibility for a study intake session. The interview should take about 10-15 minutes of your time. Your participation is completely voluntary. You may refuse to answer any questions or stop the interview at any time. After the interview, you will receive a letter with dates and information within the next two weeks. Information from this interview will be entered into our study database. All information that I receive from you, including your name will be kept confidential and used for research purposes only. Do you have any questions?

1. Do you agree to participate in this interview? <u>Yes</u> No

2. If yes, Do you give your permission to enter information from this interview into our study data base? _____Yes ____No. If no, stop the interview.

3. Are you able to obtain a written letter from your doctor indicating you have osteoarthritis of the knee? Yes____ No____ We must have it prior to your inclusion in the study.

4. Will you be able to attend the biweekly self-massage sessions? Y___ N___

5. Do you have knee pain on most days of the prior month? Yes____ No____

6. Do you have morning stiffness lasting less than 30 minutes? Yes____ No____

7. Do you have crepitus or creaking of your knee when in motion? Yes___ No____

8. Have you had any intra-articular knee injection of a steroid within the previous 3 months? Yes_____No____

9. Have you had any significant injury or surgical procedure on either lower extremity in the past six months? Yes___ No___

10. Are you taking anticoagulants (blood thinner) within the previous month? Yes___ No___. If yes, do you bruise easily? Yes___ No___

11. Do you take medication for knee pain on most days? Yes__ No__ How often____?

12. Has a doctor told you that you have rheumatoid arthritis, fibromyalgia, or any inflammatory condition? Yes____NO____ if yes, what type?_____

13. Do you have any other serious health issues that would make it difficult to use your hands, or participate in a 12 week study? Yes___ No_____ If Yes list______

14. Have you had any surgeries in the past three months? Yes___ No___ If yes, what type_____

15. Which time would you be available to participate in? 2-3 PM _____ 6-7 Pm_____

16. Are you willing to be randomly selected to either the intervention or control group both will be taught the self-massage technique by the end of the 12 week study? Yes_____No_____

Comments_____

The interview is complete.

Thank you for your time; you will receive a letter or phone call giving you further instructions.

| Interviewer's Name | Date |
|--------------------|------|
| Time | |
| | |

Suggest participation: Yes_____ No_____

| Comments | |
|----------|--|
| | |

APPENDIX I COVER LETTER

Dorothea Atkins RN, BSN, MA, Th.D Candidate Principle Investigator 20 Sussex Ave. Voorhees, NJ 08043 (856) 354-0008 Email: <u>dmassage1@comcast.net</u>

Dear Participant,

You have been selected to participate in the "The Self-massage Therapy for Osteoarthritis of the Knee" study, only a small portion of people from surrounding area have been selected to take part in this study so your participation is very important. The purpose of the study is to determine the effectiveness of self-massage when applied to the thigh muscles in reducing knee pain and increasing knee range of motion. Additionally, results of this study may provide people with a safe, economical self-help method to manage symptoms.

We need your help. Enclosed are copies of questionnaires (WOMAC) about:

- **§** The pain, joint stiffness and joint stiffness experienced as a result of your arthritis.
- § Your personal habits
- **§** Knee osteoarthritis history
- **§** Experiences with massage therapy
- Also Consent forms and Intake Forms are included.

Please take time to complete the questionnaires and bring them to the orientation.

Additionally, **only read** the consent forms, we will review them, ask for your signature and give you a copy of the form.

Your responses are confidential. No names or individual information will be released.

For any concerns or questions, feel free to call Dorothea Atkins at (856) 428-5486 Sincerely,

Dorothea Atkins RN, BSN, MA, Th.D Candidate Principal Investigator

APPENDIX J INTERVENTION AND CONTROL GROUP

Self-Massage for Arthritis of the Knee Research Study Groups Outline

Intervention- the group performing the self-massage technique.

- 1. Randomization
- 2. Intervention group- comes to the Wellness Center on Monday and Thursday from Sept-21-November 12 for one hour.
- 3. Completes the WOMAC and range of motion after every session.
- 4. Sessions last for one hour. Either 2-3 or 6-7 PM
- 5. Performs self-massage technique for 3 more weeks twice a week at home, from Nov. 16-Dec. 12.
- 6. Returns Dec 12 for final ROM and WOMAC reading and holiday celebration.

Control Group- the group will continue with their usual care but will come to the Wellness Center every 4 weeks to get their knee range of motion measured and complete the WOMAC questionnaire form.

- 1. First measurement Sept. 12, 2009.
- 2. Second measurement Saturday Oct 17 bet.9-12 by appointment.
- 3. Third measurement Sat. Nov. 14, bet. 9-12 by appointment.
- 4. Fourth measurement Dec. 12, from 12 to 3 PM. The group will learn the self-massage technique. A make-up session will be scheduled for anyone who is not able to attend the Saturday session.

APPENDIX K RESEARCH SUBJECT INFORMATION CONSENT FORM

Consent Form

TITLE: The Effects of Self-Massage on Osteoarthritis of the Knee PROTOCOL NO

SPONSOR: Holos University Graduate Seminary

Principal Investigator: Dorothea Atkins RN, M.A., Th.D Candidate

INVESTIGATOR(S): Angel Austin, Gloria Adkins, Susan DiGregorio and Angela Santana

Site: Lourdes Wellness Center

Study Related Phone Number(s): (856) 428-54-86

This consent form may contain words that you do not understand. Please ask the study doctor or the study staff to explain any words or information that you do not clearly understand. You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

Summary

You are being asked to be in a research study. The purpose of this consent form is to help you decide if you want to be in the research study. Please read this form carefully. To be in a research study you must give your informed consent. "Informed consent" includes:

- Reading this consent form,
- Having the study doctor or staff explain the research study to you,
- Asking questions about anything that is not clear, and
- Taking home an unsigned copy of this consent form. This gives you time to think about it and to talk to family or friends before you make your decision.

You should not join this research study until all of your questions are answered.

Things to know before deciding to take part in a research study:

- S The main goal of a <u>research study</u> is to learn things to help patients in the future.
- The main goal of <u>regular medical care</u> is to help each patient.
- No one can promise that a research study will help you.
- Taking part in a research study is entirely voluntary. No one can make you take part.
- If you decide to take part, you can change your mind later on and withdraw from the research study.
- The decision to join or not join the research study will not cause you to lose any medical benefits. If you decide not to take part in this study, your doctor will continue to treat you.
- Parts of this study may involve standard medical care. Standard care is the treatment normally given for a certain condition or illness.
- Other parts of this study may involve experimental (investigational) drugs or procedures that are being tested for a certain condition or illness.
- After reading the consent form and having a discussion with the research staff, you should know which parts of the study are experimental and which are standard medical care.

After reading and discussing the information in this consent form you should know:

- Why this research study is being done;
- What will happen during the research;
- What drug or device or procedures will be used;
- Any possible benefits to you;
- The possible risks to you;
- The other medical procedures, drugs or devices that could be used instead of being in this research study; and
- How problems will be treated during the study and after the study is over.

If you take part in this research study, you will be given a copy of this signed and dated consent form.

Purpose of the Study

The purpose of this study is to understand what effect self-massage has on knee pain, function, and range of motion among people with osteoarthritis of the knee. Self-massage is equivalent in technique and benefits to Swedish massage; however, it is done by massaging your own thigh muscles (located on the front of the thigh) while sitting fully clothed in a chair.

Procedures

We are inviting you to participate in this self-massage study because you have osteoarthritis of the knee. Participants will be divided into two groups, however, both groups will be taught to perform the same self-massage sequence.

- **§** Group I will be instructed on the self-massage technique at Lourdes Wellness Center, for one hour twice a week for eight weeks followed by unsupervised self-massage at home over the next four weeks. A survey and knee range of motion will be done following the initial eight week period, and after the final 4 week session.
- **§** Group II will continue with their standard usual care at four week intervals (3 times) during the twelve week study complete a questionnaire and have knee range of motion measured at Lourdes Wellness Center, additionally at the conclusion of the study group will be taught the self-massage sequence.
- S There is no placebo or sham (false) procedures in the study, both groups will learn the same self-massage sequence. The structured 20 minute self-massage session will be done sitting in a chair in a supervised group setting. The principal investigator (PI) or research assistants (RA) will verbally narrate, demonstrate and practice each step of the self-massage sequence. You will also be asked to complete forms about your knee osteoarthritis, and have your knee range of motion measured after each self-massage session. This information will be collected before the first session, after each self-massage session and four weeks after the last session. The survey takes about 10 minutes to complete and the range of motion, 10 minutes.
- S There is a fifty percent chance of being selected in group I or II
- **§** Participants will be randomized using a uniform distribution.

Risks and Discomforts

The discomforts and or risks are minimal and include;

§ The possibility of initially experiencing slight soreness and or stiffness that frequently accompany the initiation of a new physical activity.

There may be side effects that are not known at this time.

New Information

You will be told about anything new that might change your decision to be in this study. You may be asked to sign a new consent form if this occurs.

Benefits

Your knee osteoarthritis may improve while you are in this study; however, this cannot be promised. The results of this study may help people with *knee osteoarthritis* in the future.

Costs

Holos University Graduate Seminary will supervise the study free of charge as part of Dorothea Atkins' dissertation requirement for a doctorate degree.

ALTERNATIVE TREATMENT

This is not a treatment study. Your alternative is not to participate in this study.

Compensation for Injury

The medical services at *Our Lady of Lourdes Medical Center* will be open to you as they are to all sick or injured individuals. Neither *Our Lady of Lourdes Medical Center* nor Holos University Graduate Seminary, nor the government has any program that would pay the costs of the complications of the procedures required or for the use of self-massage.

Voluntary Participation

Taking part in this study is voluntary. You may decide not to take part or you may leave the study at any time. Your decision will not cause any penalty or loss of benefits to which you are entitled.

The study doctor or the sponsor may stop your participation in this study at any time without your consent for any of the following reasons:

- it is in your best interest;
- you do not later consent to any future changes that may be made in the study plan;
- or for any other reason.

If you leave the study before the planned final visit, you may be asked by the principal investigator to complete final forms.

Source of Funding

The sponsor Dorothea Atkins will pay for this research study.

Questions?

Contact <u>Dorothea Atkins</u> at <u>(856) 428-5486</u> for any of the following reasons:

- if you have any questions about this study or your part in it,
- if you feel you have had a research-related injury, or
- if you have questions, concerns or complaints about the research

If you have questions about your rights as a research subject or if you have questions, concerns or complaints about the research, you may contact:

Stanton B. Miller, MD Our Lady of Lourdes Medical Center 1600 Haddon Avenue Camden, NJ 08103 Telephone: 856-580-6378 E-mail: millers@lourdesnet.org

OLLHCS, INC. is a group of people who independently review research.

OLLHCS, INC. will not be able to answer some types of questions, such as questions about appointment times. You may contact OLLHCS, INC. if you cannot reach the research team or if you want to talk to someone else.

Do not sign this consent form unless you have had a chance to ask questions and have gotten satisfactory answers.

Consent

I have read this consent form (or it has been read to me). All my questions about the study and my part in it have been answered. I freely consent to be in this research study.

I authorize the use and disclosure of my health information to the parties listed in the authorization section of this consent for the purposes described above By signing this consent form, I have not given up any of my legal rights.

Consent and Assent Instructions:

Consent: Subjects 18 years and older and able to provide consent must sign on the subject line below.

Consent is provided by the Legally Authorized Representative for adult subjects unable to consent.

For subjects under 18, consent is provided by the Legally Authorized Representative Assent: Is required for adult subjects unable to consent.

Is not required for subjects 6 years and younger. Is required for subjects ages 7 through 17 years using the Assent section below.

Subject Name

CONSENT SIGNATURE:

| Signature of Subject (18 years and older) | Date |
|--|----------------------------|
| Signature of Legally Authorized Representative (when applicable) | Date |
| Authority of Subject's Legally Authorized Representative or Relationsh (when applicable) | nip to Subject |
| Signature of Person Conducting Informed Consent Discussion | Date |
| Contact <u>Dorothea Atkins</u> at <u>(856) 428-5486</u> for any of the follo if you have any questions about this study or your part in it, if you feel you have had a research-related injury, or if you have questions, concerns or complaints about the research | wing reasons: |
| If you have questions about your rights as a research subject or if you h complaints about the research, you may contact: | ave questions, concerns or |

Stanton B. Miller, MD Our Lady of Lourdes Medical Center 1600 Haddon Avenue Camden, NJ 08103 Telephone: 856-580-6378 E-mail: millers@lourdesnet.org

OLLHCS, INC. is a group of people who independently review research.

APPENDIX L HIPPA FORM

CONSENT FORM ADDENDUM

AUTHORIZATION (CONSENT) TO PERMIT THE USE AND DISCLOSURE OF IDENTIFIABLE MEDICAL INFORMATION (PROTECTED HEALTH INFORMATION) FOR RESEARCH PURPOSES

Lourdes Health System Institutional Review Board

TITLE: The Effects of Self-Massage on Osteoarthritis of the Knee

PRINCIPAL INVESTIGATOR: Dorothea V. Atkins RN, BSN, M.A., Th.D. Candidate

ADDRESS: 20 Sussex Ave Voorhees, NJ 08043

CO-INVESTIGATORS: Gloria Adkins, Angel Austin, Sue DiGregorio, Angela Santana

SOURCE OF SUPPORT (SPONSOR): Holos University Graduate Seminary

Why is my additional consent being requested?

You have previously given your authorization (consent) to participate in the above-named research study. The purpose of this additional consent form is to provide you with specific information regarding the use and disclosure of your identifiable medical record information for the purpose of this research study. While much of this information was provided to you previously, recently enacted federal privacy regulations under the Health Insurance Portability and Accountability Act of 1996, as amended (HIPAA), which focus on the privacy of medical record information requires that this information be addressed in a certain manner. Through the use of this additional consent form, we are seeking your authorization for the use and disclosure of your identifiable medical record information for the purpose of this research study as per the requirements in these recently enacted HIPAA regulations.

What uses of my identifiable medical record information will this research study involve?

A physician's written documentation of osteoarthritis of the knee.

This research study will involve the recording of current and/or future identifiable medical information from your hospital and/or other health care provider (e.g., physician office) records. The information that will be recorded will be limited to information concerning *whether you have osteoarthritis of the knee or not*. This information will be used for the purpose of providing written proof of your knee osteoarthritis.

<u>The research study will **not** involve the generation of any information (e.g., diagnostic</u> <u>information, laboratory information, treatment or adverse event information) that will appear or</u> <u>be placed in your medical (i.e., hospital, health care provider) records.</u>

Who will have access to my identifiable medical record information related to my participation in this research study?

In addition to the investigators listed on the first page of this authorization (consent) form and their research staff, the following individuals will or may have access to your identifiable medical record information related to your participation in this research study:

Authorized representatives of the Lourdes Health System (LHS) Institutional Review Board (IRB) may review your identifiable medical record information for the purpose of monitoring the appropriate conduct of this research study.

Holos University Graduate Seminary will have access to the subjects identifiable medical record information for study monitoring or data analysis purposes:

Authorized representatives of the sponsor of this research study, *Holos University Graduate Seminary*, may review and/or obtain your identifiable medical record information for the purpose of monitoring the accuracy and completeness of the research data and for performing required scientific analyses of the research data. While the study sponsor understands the importance of maintaining the confidentiality of your identifiable medical record information, the LHS and the IRB cannot guarantee the confidentiality of this information after it has been obtained by the study sponsor.

The investigator involved in the conduct of this research will not receive funding from any sponsor; this research is required for a doctorate degree.

This research study does not involve any evaluation of any article (e.g. ,a drug, device, electronic product, food additive) regulated by the U.S. Food and Drug Administration.

May I have access to my medical record information resulting from participation in this research study?

In accordance with the LHS Notices of Privacy Practices document that you have been provided, you are permitted access to information (including information resulting from your participation in this research study), will be mailed to you upon completion of the full study.

May I refuse to provide my authorization for the use of my identifiable medical record information for the purpose of this research study?

Your authorization to use and disclose your identifiable medical record information for the purpose of this research study is completely voluntary. However, if you do not provide your written authorization for the use and disclosure of your identifiable medical record information, you will not be allowed to participate or continue to participate in the research study.

Whether or not you provide your authorization for the research use and disclosure of your medical record information will have no affect on your current or future medical care at a LHS hospital or affiliated health care provider or your current or future relationship with a health care insurance provider. Whether or not you provide this written authorization will have no affect on your current or future relationship with the LHS IRB.

May I withdraw, at a future date, my authorization for the use of my identifiable medical record information for this research study?

You may withdraw, at any time, your authorization for the use and disclosure of your identifiable medical record information for the purpose of this research study. However, if you withdraw your authorization for the use and disclosure of your identifiable medical record information, you will also be withdrawn from further participation in this research study. Any identifiable medical record information recorded for, or resulting from, your participation in this research study prior to the date that you formally withdrew your authorization may continue to be used and disclosed by the investigators for the purposes described above.

To formally withdraw your authorization you should provide a written and dated notice of your decision to the principal investigator of this research study at the address listed on the first page of this form.

Your decision to withdraw your authorization for the research use and disclosure of your medical record information will have no affect on your current or future medical care at a LHS hospital or affiliated health care provider or your current or future relationship with a health care insurance provider. Your decision to withdraw this authorization will have no affect on your current or future relationship with the LHS IRB.

For how long will the investigators be permitted to use my identifiable medical record information?

The investigators may continue to use and disclose your identifiable medical record information for the purposes described above for an indefinite period of time, unless you provide written notice to withdraw your authorization.

VOLUNTARY CONSENT

All of the above has been explained to me and all of my current questions have been answered. I understand that, throughout my participation in this research study, I am encouraged to ask any additional questions I may have about the research use and disclosure of my identifiable medical record information. Such future questions will be answered by the investigators listed on the first page of this form.

Any questions I have about my rights associated with the research use of my medical record information will be answered by Stanton B. Miller, MD, Chair of the LHS Institutional Review Board, (856-580-6378) or the LHS Privacy Officer at 856-824-3488.

By signing this form, I agree to allow the use and disclosure of my medical record information for the purposes described above. A copy of this authorization form will be given to me.

Participant's Signature

Date

Participant's Name (Print)

APPENDIX M INTAKE FORM

Confidential Health and Patient Survey Intake Form

| Last Name | | _First I | Name | |
|---------------------------------|----------|----------|-------------------|-----------|
| Date ID # | | | | |
| Street | | | Apt # | |
| City Home Telephone # (|) | Sta | te | Zip |
| Email address (if you have or | ne): | | | |
| Date of Birth | Age | | - | |
| Male Female | | | | |
| Marital Status: Single | _ M | _ D | SW | / |
| Please circle or check only on | e answer | <u>:</u> | | |
| 1. Race / Ethnicity: | | | | |
| a. White/Caucasian | L | | d. America | an Indian |
| b. Black or African | | | e. Other | |
| American c. Spanish or Hispa | nic | | | |
| 2. Select age category: | | | | |
| a. 50 - 60 | | | c. 71 - 80 | |
| b. 61 - 70 | | | d. 81 or ol | der |
| 3. Alcohol consumption: | Yes | | No | |
| 4. Do you smoke: | Yes | | No | |

- 5. Hours of sleep per night:
 - a. 6 hours
 - b. 7 hours

c. 8 hours

- d. 10 hours or more
- 6. Pain medicine intake per day:
 - a. Nonec. Twiceb. Onced. Three or more
 - Unce
- 7. Amount of exercise per week:
 - a. Zero
 - b. Once

c. Twiced. Three or more

- 8. Do you have osteoarthritis of the:
 - a. Right knee

c. Both Knees

- b. Left knee
- 9. Amount of years diagnosed with knee osteoarthritis:
 - a. 1 year or less
 - b. 1 3 years
 - c. 4 9 years
 - d. 10 years or more
- **10.** Are you currently seeing a doctor or other health care professional for arthritis?
 - a. Yes b. No
- **11.Has anyone in your immediate family had <u>knee</u> replacement surgery for arthritis?**

a. Yes b. No c. Don't know

- 12.Who do you live with (for example, with your spouse, relatives, or friends)? Please mark all that apply.
 - a. I live alone
 - **b.** Live with spouse
 - c. Live with children
 - d. Live with other relatives or friends
- **13.Has your doctor told you that you have rheumatoid arthritis, fibromyalgia, or any inflammatory condition?**
 - a. Yes b. No

14. How often have you received massage in the previous 12 months?

- a. Never
- **b.** once
- c. 2-4 times
- d. on a regular basis
- **15.If** you have had a massage, your reasons for using massage therapy. (circle all that apply)
 - a. pain relief or muscle soreness
 - b. recovery from injury
 - c. relaxation
 - d. all the above
 - e. N/A
- 16.If you have <u>not</u> received massage within the previous 12 months, your reasons. Select all that apply.
 - a. did not find it necessary
 - b. there is no perceived value in receiving one
 - c. cost
 - d. not comfortable receiving massage
- 17.Have you massaged your body on a regular basis in the past 12 months for pain relief or muscle soreness?a. Yesb. No
- 18.Right now how would rate self-massage for muscle pain or soreness? a. poor b. fair c. good d. very good
- 19.How did you learn about our study? a. newspaper b. friend/colleague c. radio d. flyer

APPENDIX N WOMAC

Holos University Graduate Seminary Self-massage for Knee Osteoarthritis Study

| Nam | e | | |
|------|------------|------|-----------|
| | Print Last | | First |
| Date | | | ID |
| [] | Baseline | Post | Follow-up |

WOMACTM Osteoarthritis Index³

Instructions to participants

In section A, B, C questions will be asked in the following formats and you should give your answer by putting an "X" in one of the boxes.

For example:

- If you put your "X" in the left-hand box, that is
 x None □ mild □ moderate □ severe □ extreme
 Then you are indicating you have no pain.
- 2. If you put your 'X" in the left-hand box, that is \square None \square mild \square moderate **x** severe \square extreme Then you are indicating you have severe pain.

Notes:

- a. The further to the right you place your "X", the more pain you are experiencing.
- b. The further to the left you place your "X", the less pain you are experiencing.
- c. Please do not place your "X" outside the box.

Section A

Instructions to participants

The following questions concern the amount of **pain** you have experienced as a result of your arthritis. For each situation, please enter the amount of pain experienced in the **last 48 hours.** Please answer by putting a, "X" in one of the boxes.

How much pain do you have?

| Walking on a flat | surface. | | | |
|---------------------|--|--|--|--|
| □ None | □ mild | □ moderate | □ severe | □ extreme |
| | | | | |
| Going up or down | stairs. | | | |
| □ None | □ mild | □ moderate | □ severe | □ extreme |
| | | | | |
| At night while in b | bed. | | | |
| □ None | □ mild | □ moderate | □ severe | □ extreme |
| | | | | |
| Sitting or lying. | | | | |
| □ None | \square mild | □ moderate | □ severe | □ extreme |
| | Walking on a flat s None Going up or down None At night while in b None Sitting or lying. None | Walking on a flat surface. None mild Going up or down stairs. mild None mild At night while in bed. mild None mild Sitting or lying. mild | Walking on a flat surface. None mild moderate Going up or down stairs. mild moderate None mild moderate At night while in bed. mild moderate None mild moderate Sitting or lying. mild moderate | Walking on a flat surface. None mild moderate severe Going up or down stairs. None mild moderate severe At night while in bed. None mild moderate severe Sitting or lying. None mild moderate severe |

5. Standing upright.

| \square None \square mild \square moderate \square severe \square extrem |
|--|
|--|

Section B

Instructions to participants

The following questions concern the amount of **joint stiffness** (not pain) you have experienced as a result of your arthritis. For each situation, please enter the amount of stiffness experienced in the **last 48 hours.**

Stiffness is a sensation of restriction or of slowness in ease with which you move your joints. Please answer by putting a, "X" in one of the boxes.

| 6. | How | severe is yo | our stiffness after f | irst waking in the | morning? | |
|----|-----|--------------|-----------------------|----------------------|--------------------|-----------|
| | | None | □ mild | □ moderate | □ severe | □ extreme |
| | | | | | | |
| 7. | How | severe is yo | our stiffness after l | ying or sitting or 1 | esting later in th | he day? |
| | | None | □ mild | □ moderate | □ severe | □ extreme |

Section C

Instructions to participants

The following questions concern you **physical function**. By this we mean your ability to move around and to look after yourself. For each of the following activities please indicate the degree by putting a, "X" in one of the boxes.

What degree of difficulty do you have?

| 8. | descen □ | ding stairs None | mild | moderate | severe | extreme |
|-----|---------------|---------------------------|------|----------|--------|---------|
| 9. | ascend □ | ing stairs None | mild | moderate | severe | extreme |
| 10. | rising f □ | from sitting None | mild | moderate | severe | extreme |
| 11. | standir □ | ng None | mild | moderate | severe | extreme |
| 12. | bendin | g to floor None | mild | moderate | severe | extreme |
| 13. | walkir □ | ng on a flat surf None | mild | moderate | severe | extreme |

| 14. | getting | g in / out of the | car | ſ | | | |
|-----|--------------|---------------------------|-----------|------------|----------|--------|---------|
| | | None | | mild | moderate | severe | extreme |
| 15. | going s □ | shopping None | | mild | moderate | severe | extreme |
| 16. | putting | g on socks / stoo None | ckin | ng mild | moderate | severe | extreme |
| 17. | raising □ | from bed None | | mild | moderate | severe | extreme |
| 18. | taking □ | off socks / stoc None | kin □ | g mild | moderate | severe | extreme |
| 19. | lying i □ | n bed None | | mild | moderate | severe | extreme |
| 20. | getting □ | in / out of the None | bat | h mild | moderate | severe | extreme |
| 21. | sitting □ | None | | mild | moderate | severe | extreme |
| 22. | getting □ | on / off the toi None | ilet □ | mild | moderate | severe | extreme |
| 23. | heavy | domestic duties None | s □ | mild | moderate | severe | extreme |
| 24. | light de | omestic duties None | | mild | moderate | severe | extreme |

Thank you

APPENDIX O INTERVENTION LETTER

Dorothea Atkins RN, BSN, MA, Th.D Candidate Principle Investigator 20 Sussex Ave. Voorhees, NJ 08043 (856) 354-0008 Email: dmassage1@comcast.net

Dear Participant,

You have been randomly assigned to the **Intervention Study Group.** This is a study of the benefits of self-massage on knee pain, joint stiffness, physical function and range of motion on patients diagnosed with knee osteoarthritis (OA). These patients are aged 50+ and possess no other limitations to prevent mobility of the knee. Data will be collected weekly, twice per week on these patients up to twelve weeks for both the right and left knee through the use of a Western Ontario and McMaster's Osteoarthritis IndexTM (WOMAC) and knee range of motion (ROM) using a goniometer. ROM measurements will consist of knee flexion and knee extension. The WOMAC survey measures knee pain, join stiffness, and physical function.

The intervention group will continue usual care and perform a supervised self-massage intervention twice weekly for eight weeks. You will also be asked to perform an unsupervised self-massage intervention twice weekly for four-weeks following the eight-week study period and to complete a survey; the control group will also be asked to complete a survey. At the end of the home self-massage the survey, ROM and WOMAC measurements will be collected.

For any concerns or questions, feel free to call Dorothea Atkins at (856) 428-5486

Sincerely,

Dorothea Atkins RN, BSN, MA, Th.D Candidate Principal Investigator

APPENDIX P CONTROL GROUP LETTER

20 Sussex Ave. Voorhees, NJ 08043 (856) 354-0008

Dear Control Group Participant,

You have been randomly assigned to the **Control Group.** This is a study of the benefits of self-massage on knee pain, joint stiffness, physical function and range of motion on patients diagnosed with knee osteoarthritis (OA). The participants are aged 50+ and possess no other limitations to prevent mobility of the knee

As part of the control group you will continue usual care but will **not** perform a selfmassage intervention during the twelve week study period; however, ROM and WOMAC measurements will be taken at baseline and repeated every four weeks on the following dates: Saturday Oct 17, Saturday November 14 and December 12. Additionally, you will be taught the self-massage sequence on December 12, 2009.

You will receive a reminder prior to each date.

For any concerns, questions, any conflicts, feel free to call Dotty Atkins; H- 856- 428-5486; cell: 609-313-0965.

Sincerely,

Dorothea (Dotty) Atkins RN, BSN, MA, Th.D Candidate Principal Investigator

APPENDIX Q ORIENTATION AGENDA



Orientation September 12, 2009

Welcome

Dorothea (Dotty) Atkins

Introductions

Research Associates

Gloria Adkins RN, CGRN, MT Angel Austin MT Sue DiGregorio MT Angela Santana MT

Purpose of Study

Review and complete forms: 1. Intake form

2. Consent form

- 3. HIPPA
- 4. WOMAC

Discuss Class session 2-3 and 6-7PM Discuss conflicts and make-up time Review what each session will consist of: information on OA, Demonstration and return demonstration, Completion of WOMAC form and ROM

Self-massage Demonstration and Practice Session Review Schedule for upcoming sessions and make-up dates Question and answers Randomization- control group or intervention group

APPENDIX R RANGE OF MOTION PROCEDURE

Knee Range of Motion Procedure

The Procedure will be done in a supine position (lying face up on the massage table).

Materials needed: Goniometer, massage table and a sheet. Participants are asked to wear loose fitting clothing. (No jeans)

The Research Assistant will explain the procedure in this manner:

- The purpose of measuring the motion of your knee joint, the flexion and extension. The purpose is assessment, measurement and comparison of changes over a period of time. (A RA will demonstrate the action of the knee, flexion and extension).
- 2. We will use an instrument called a goniometer, (hold it up), it has two



Model- Sammons Preston #7514 southwestmedical.com

extensions that move see figure above (demonstrate the movement) to measure the flexion and extension.



http://images.search.yahoo.com/images/view

- **3.** Next we will locate what is called anatomical landmarks located on the hip, knee and ankle, which helps align the hip and leg (see figure above). A small bolster will be placed under the ankle to allow the knee to extend fully.
- **4.** For extension, the leg is extended and the ankle is placed on the bolster, then the center fulcrum of the goniometer will be aligned over the lateral (outside) epicondyle of the femur position 1, then align the proximal arm (the arm closest to the head) of the goniometer with the midline of the femur using the hip bone (greater trochanter) for reference, position 2. Finally, align the distal arm (the arm closest to the foot) with the lateral malleolus (ankle bone), and the measurement will be recorded, position 3.
- 5. For active flexion, the participant will be asked to bend their knee and slide their foot toward their hip; the RA will use their hand to guide the participant's lower leg and foot toward the hip. When full flexion ROM is determined, the goniometer is positioned with the fulcrum at the bend of the knee, the greater trochanter of the upper thigh was palpated, the proximal end of the goniometer is aligned with the thigh, the distal extension of the goniometer is then aligned along the lateral malleolus, a reference point, and the measurement recorded. The process is repeated on the opposite leg.

APPENDIX S PATIENT HANDOUT

Patient Handout

Your doctor or therapist has given you this patient education handout to further explain or remind you about an issue related to your health. This handout is a general guide only. If you have specific questions, discuss them with your doctor or therapist.

Managing Arthritis Pain

Almost all of us know somebody with osteoarthritis (OA)—a problem that affects 21 million Americans. The condition, which is the most common type of arthritis, strikes at bone cartilage so that joints rub painfully against each other. If you have OA, you probably can't perform simple, daily activities without pain. In fact, pain, stiffness, fatigue and fear of doing more harm can make you afraid of any physical activity. But inactivity may increase your symptoms because you become weaker and less flexible.

Therefore, you should participate in safe, appropriate exercise programs to maintain strength, endurance and flexibility. The following three types of exercise can reduce arthritis-related disability and pain.

• *Flexibility or stretching*. Gentle, low-intensity exercises performed daily to maintain or improve range of motion are the foundations of most therapeutic exercise programs. Adequate flexibility improves function and

reduces the chances for injury.

• *Muscle conditioning* (strength and endurance). These activities are more vigorous than flexibility exercises and are usually performed every other day. They're designed to make muscles work harder than usual. This

extra workload may be achieved from lifting the weight of your arm, leg or trunk against gravity, or using weights, elastic bands or weight machines for more resistance. Muscles adapt to the new demands by getting stronger and become capable of working longer.

• *Cardiorespiratory conditioning*. These activities use large body muscles in rhythmic and repetitive movements. They can improve heart, lung and muscle function, as well as improve weight control, mood and general health. These aerobic exercises include swimming, aerobic dance or aquatics, biking, or exercising on equipment, such as treadmills or rowing machines.

Daily activities—mowing the lawn, raking leaves, sweeping driveways, playing golf or walking the dog—are aerobic exercises. The most effective and safest intensity for aerobic exercise is moderate exertion. This

means the exerciser can speak normally, doesn't get out of breath or over-heated and can carry on activities at a comfortable pace.

Thirty minutes is the current recommendation for regular aerobic activity on most days of the week. These 30 minutes can be accumulated in three, 10-minute periods of activity over the course of the day for the same health benefits as one continuous 30-minute session. Along with exercising, you can manage arthritis by building your life around wellness, not pain or sickness. To that end, your mind plays an important role in how you feel pain and respond to illness. If you think of pain as a signal to take positive action rather than an ordeal you have to endure, you can learn to manage it.

Some suggestions include:

• *Relaxation*. When people are in pain and experience stress, muscles tighten, breathing becomes fast and shallow, and the heart rate and blood pressure go up. Relaxation can help you reverse these effects and give you a sense of control and well being, making it easier for you to manage pain. Relaxation involves learning ways to be calm and in control. Methods that

can help you do so include yoga, meditation, Tai Chi, and relaxation video and audio tapes.

• *Massage*. Massage warms and relaxes painful areas. You can massage your own muscles or ask your doctor to recommend a massage therapist. When doing self-massage, stop if you feel any pain. If you have a professional massage, make sure the massage therapist has experience working with people who have arthritis. Other ways to manage arthritis include thinking positive thoughts, having a sense of humor, eating a balanced diet and enjoying activities with friends and family. While a comprehensive exercise program for people with arthritis includes these components, the content and progression of a program depends on individual needs and capabilities. If you have a long-standing, severe disease or multiple-joint involvement, be sure to talk to your health care team. The most successful exercise programs begin with the knowledge and support of people who are experienced with arthritis and exercise. In addition, enlist their support to learn about pain management techniques.

Information adapted from the American College of Rheumatology via www.rheumatology.org/patients/factsheet/exercise.html and the Arthritis Foundation via www.arthritis.org/answers/tips_managepain.asp explain or remind you about an issue related to your health. This handout is a general guide only. If you have specific questions, discuss them with your doctor or therapist.

 \sim



APPENDIX T CALENDAR

| Octo | ober- | Self-Mas | ssage | Arthritis | Study | r Dates |
|------|-----------------------------------|----------|----------|---|-----------|--|
| Sun | Mon | Tue | Wed | Thu Self-Massage Class (SMC) | 2^{Fri} | Sat 3 |
| 4 | SMC SMC | 9 | L | 8 smc | 6 | 10 |
| 11 | 12 SMC Columbus Day | 13 | 14 | 15 SMC Ath week celebration Door-prizes and Door-prizes and | 16 | 17 Group II ROM & questionnaire assessment 9-12 by appointment |
| 18 | 19 swc | 20 | 21 | 22 smc | 23 | 24 |
| 25 | 26 Self-Massage Class (SMC) | 27 | 28 | 29 No Class- Homework- practice at home | 30 | 31 |
| | | | | | | 2009 |

APPENDIX U ROM ASSESSMENTS FORM

| | Last Name | First Name | Group (Interventio n or Control) | Treatment Period | Date | Right Flexion | Left Flexion | Right Extension |
|-----|--------------|---------------|---|---------------------|------|------------------|-----------------|--------------------|
| | Richmond | Melinda | Intervention | Week | | | | |
| 004 | | | INT | Week | | | | |
| 015 | | | INT | Week | | | | |
| 025 | | | INT | Week | | | | |
| 019 | | | INT | Week | | | | |
| 016 | | | INT | Week | | | | |
| 014 | | | INT | Week | | | | |
| 010 | | | INT | Week | | | | |
| 029 | | | INT | Week | | | | |
| 009 | | | INT | Week | | | | |
| 006 | | | INT | Week | | | | |
| 002 | | | INT | Week | | | | |
| 007 | | | INT | Week | | | | |
| 022 | | | INT | Week | | | | |
| 028 | | | INT | Week | | | | |
| 032 | | | INT | Week | | | | |
| 034 | | | INT | Week | | | | |
| 035 | | | INT | Week | | | | |
| 037 | | | INT | Week | | | | |
| 039 | | | INT | Week | | | | |
| 040 | | | INT | Week | | | | |
| 005 | | | INT | Week | | | | |

Control Group

APPENDIX V CHRONIC KNEE PAIN AND TREATMENT

Chronic Knee Pain and Treatment

• Dorothea V. Atkins, RN, MA, Th.D Candidate



Graduate and Post-Doctoral Certificate

Introduction

- Sources of muscle & knee pain.
- The knee joint
- · Effects on activities of daily living (ADL)
- Common treatments
- CAM treatments
- Massage



Causes of Chronic Knee Pain

- 1. Knee arthritis is a common progressive degenerative disease of aging, affecting over 9 million in the United States.¹
- 1. Reva Lawrence and et al. "Estimates of the Prevalence of Arthritis and other Rheumatic Conditions in the United States," Arthritis and Rheumatism, 58 no. 1 (January 2008): 26-35.
- Cartilage around the knee wears away, causing chronic pain that is aggravated by walking & relieved by rest.



Causes of Chronic Knee Pain

2. Pain and tenderness can be referred to muscles from other joints.(2)

2.Walter Calmbach and Mark Hutchens, "Evaluation of Patients Presenting with Knee Pain: Part II. Differential Diagnosis", *American Family Physician* 68, no. 5 (September 1, 2003): 917-22.



3

4

www.round-earth.com

Causes of Chronic Knee Pain

- 3. Previous injury to joint
- 4. Inflammation



- 5. Quadriceps Muscle Function
- Stability during physical activity
- Protect the knee joint from injury
- Extend the leg, as in kicking a ball (3)

 3. Michael V. Hurley, "The Role of Muscle Weakness in the Pathogenesis of Osteoarthritis," Rheumatic Disease Clinics of North America,25 no. 2 (May 1999): 1-16.



5

Function of Quadriceps & Hamstrings



The Knee Joint

A complex joint made up of 4 bones;

Femur Patella Tibia Fibula Ligaments- stabilizes the knee Menisci- cushions the joint



8

The Knee Joint

- It is a common site of injury and pain
- Quadriceps & hamstring muscles bend, straighten and rotate the knee.



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The Chronic Pain of Arthritis May Cause

- Immobility
- Disability
- Loss of Selfesteem
- Stress
- Muscle tension



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Chronic Knee Pain May Cause

- Fear of falling
- Pain raising from a chair
- Pain climbing or descending stairs
- Pain when walking



Non-Pharmacological Treatments

- 1.Exercise
- 2. Weight loss
- 3. Education
- 4. Physical therapy
- 5. Complementary &
- alternative therapy
- 6. Massage therapy





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Complementary and Alternative (CAM) Therapies for Arthritic Pain

• What is CAM?

Medical and health care systems, practices, and products not part of conventional medicine.

Why people use CAM? Dissatisfaction

Ineffectiveness Cost Side effects

Money spent on CAM therapies; between \$36 billion and \$47 billion. (4)

4.<u>http://nccam.nih.gov/news/camuse.pdf</u>

CAM Therapies

- Common CAM Practices
- 1. Diets and Herbal
- 2. Massage and Chiropractic
 - 3. Yoga, Prayer & Meditation
 - 4. Magnets and Energy therapies
 - 5. Naturopathy, Homeopathy and Acupuncture

Most Common CAM Therapies Used:

Herbal (10%) Chiropractic (8%)

Massage (6%) (5)

 Patricia M. Barnes, Kim McFann and Richard L. Nahin, "Complementary and Alternative Medicine Use Among Adults: United States, 2002", Advanced Data, 343 (2004):1-19.

14

Massage Therapy

- One of the oldest healing techniques .(6)
- Hippocrates in the fifth century B.C used it. The primary characteristics of massage are touch and movement.
- Promotes health and well-being by soft tissue manipulation and movement of the body

6. Robert Calvert, *The History of Massage* (Rochester, VT: Healing Arts Press, 2002).

15

Benefits of Massage for Arthritis

- Improves circulation
- Decreases pain
- Increases range of motion of joints
- Decreases swelling
- Promotes relaxation
- Decreases anxiety
- Reduces muscle tension (7)
- 7. Sandy Fritz, Fundamentals of Therapeutic Massage (New York: Station Hill Press, 1987) 32.

Self-Massage

- 1. Provides equal benefits as massage
- 2. Stimulates mind and body awareness
- 3. Improve psychological & physical effects of arthritis
- 4. Can be done at anytime; it is free, safe, and effective
- 5. Affect symptoms of arthritis of the knee
- 6. Self-empowerment over health issues
- 7. Affects quality of life

Self-Massage Is.....

- Easy to Teach
- Easy to Learn
- Easy to Perform
- Easy to Remember
- Easy to Maintain
- Easy to Incorporate
 and
- Hard to Live Without

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APPENDIX W SELF-MASSAGE FOR KNEE OA

Self-Massage for Osteoarthritis of the Knee

• Created by:

- Dorothea V. Atkins RN, M.A., Th.D



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Precautions

- Do not massage areas of:
 - Injury
 - Infection
 - Open wounds
 - Discoloration
 - Unusual swelling
- The self-massage protocol is not intended as a substitute for medical advice. Stop if undue pain, shortness of breath, or dizziness occurs.
- Beginning a new physical activity, (i.e. selfmassage) may cause muscle soreness.

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Guidelines for Practice

Each individual's body is unique, use common sense when following directions, make adjustments when necessary.

- Wear comfortable loose clothing which allows easy access to the thigh.
- The self-massage session takes approximately.
- 20 minutes; 5 minute warm-up, 10 minute massage, and 5 minute relaxation.
- Maintain good posture and balance.
- Select a sturdy chair and apply lubricant as needed.



3

4

Self-Massage and Strokes

- Self-massage is a self-treatment technique for the personal management of conditions or symptoms that respond to touch, manual, soft tissue manipulation or massage therapy.
- Strokes used:
 - Effleurage (glide) horizontal strokes on soft tissue using heel of hand.
 - Tapotement (tapping) springy taps to the thigh with closed loose fist.
 - Friction- short focused movements with finger tips on the underlying tissue.

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Self-Massage Phases

- Warm-up- general breathing and movements to warm the muscles and soft tissue.
- Application- apply series of easy massage strokes with heel of hand and closed fist to quadriceps (thigh) muscles.
- Relaxation- deep breathing.

Self-Massage Sequence

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- Warm-up
- Application (Self-Massage)
 - Gliding
 - Tapping
 - Friction strokes
- Relaxation

Quadriceps muscle



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Warm-Up Phase: Deep Breathing

- 3 deep breaths
- Inhale naturally to the count of four
- Exhale to the count of four



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Warm-Up Phase: Shoulder Shrug

- Raise right shoulder three times
- Raise left shoulder three times
- Raise both shoulders together three times



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Warm-Up Phase: Arm Reaches

- Raise right arm to front shoulder height
- Lower right arm to lap
- Raise left arm front to shoulder height
- Lower left arm to lap
- Repeat two more times



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Warm-Up Phase: Arm Raises

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- Inhale
 - Raise right arm to ceiling
- Exhale
 - Lower right arm to side
- Inhale
 - Raise left arm to ceiling
- Exhale
 - Lower left arm to side
- · Repeat two more times

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Warm-Up Phase: Wrist Circles

- Sit with elbows tucked at waist
- Forearms out in front (waist height)
- Palms facing down
- Circle right wrist five times
- Circle left wrist five times Copyright 2009 Dorothea V. Atkins

Warm-Up Phase: Thigh Muscle

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- Hands on top of thigh
- Raise right knee
 - Hold for a count of three
 - Lower to floor
- Raise left knee
 - Hold for a count of three
 - Lower to floor
- Repeat four more times



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Application: Tapotement /Tapping Thigh

- With soft closed fists
- Rhythmically tap both fists to the top of both thighs:
 - Upper- times 10
 - Middle- times 10
 - Lower-times 10
- Repeat once more
- Take three deep breaths



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Application of Lubricant

Apply lotion or cream to both thighs

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www.mothernature.com/.../newchoices/229B.GIF

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Key Concepts for Application of Self-Massage

1. Rocking - forward and backward motion with each stroke using heel of hand.



2. Reposition- sit forward, extend lower leg.



Application: Front Glide of Right Thigh

- Place heel of hand at hip crease
- Glide down front of thigh using heel of hand, shift upper body into a forward lean (rocking forward) until stroke is complete
- End at top of knee
- Release hand sweep up, rocking backward into upright sitting position
- Repeat four more times



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Application: Outside Glide of Right Thigh

- Place heel of hand at top of outside thigh
- Glide down to knee.
 Rocking forward
- Release
- Sweep up-rock backward
- Repeat four more times



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Application: Inner Glide of Right Thigh

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- Place heel of left hand on inner right thigh
- Glide down to knee- rock forward
- Release
- Sweep up- rock backward
- Repeat four more times
- Take three deep breaths



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Application: Front Glide of *Left* Thigh

- Place heel of hand at crease of pants
- Glide down front of thigh using heel of hand, rock forward
- Release hand, sweep up, rocking backward into upright sitting position
- Repeat four more times



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Application: Outside Glide of *Left* Thigh

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- Place heel of hand at top of outside thigh
- Glide down to knee, rock forward
- Release
- Sweep up, rock back
- Repeat four more times

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Application: Inner Glide of *Left* Thigh

- Place heel of right hand on inner left thigh
- Glide down to knee, rock forward
- Release
- Sweep up, rock back
- Repeat four more times
- Take three deep breaths



Application: Outside Glide of *Left* Thigh

- Place heel of hand at top of outside thigh
- Glide down to knee, rock forward
- Release
- Sweep up, rock back
- Repeat four more times

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Application: Knee Friction

- Place palm over knee, finger tips compressed firmly into tissue
- · Five strokes back and forth motion:
 - Below the knees
 - Outer part of knees
 - Top of knees
 - Inner part of knees
- Repeat two more times



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Application: Glide Stroke

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- Place palms on each thigh, fingers forward
- Glide down around knee to outside thigh
- Repeat two more times
- Glide down inner thigh
- Sweep around knee to outside thigh
- Repeat two more times
- Take three breaths



Relaxation – Breath Work

- Sit comfortably
- Close your eyes
- Inhale for four counts
- Exhale for four counts
- Repeat two more times



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APPENDIX X SELF-MASSAGE SEQUENCE SUMMARY

1

2



Self-Massage Sequence Summary

Warm-up Application Relaxation

Self-Massage Summary

1. Take 3 deep breaths

2. Shoulder shrugs-

Right- 3 times Left- 3 times Both- 3 times

3. Alternating Arm reaches-3 times for each arm

- Right arm raised to shoulder
- Raise left arm

4. Alternating Arm Raise – 3 times

for each arm-Inhale raise right arm> exhale lower. Inhale raise Left arm> exhale lower

3

4

5. Wrist Circles – 5 times right then left

• 6. Thigh raise and hold- for count of 3> REPEAT cycle 5 times- Right knee up hold then left up and hold

7. Thigh Tapping- 10 times with both fist> top>middle>bottom twice

- **8. Self-massage of thigh-** use Heel of hand, extend leg- Front of thigh> right leg- 5 times
- Outside thigh- 5 times
- Inside thigh- 5 times
- Repeat left leg
- Take 3 breaths

9. Friction- 3 times around

5

6

Five strokes back and forth: Below the knees Outer part of knees Top of knees Inner part of knees

Repeat two more times

- 10- **Finishing glide-** hands on each thigh
- Glide from top, around knee to outside thigh 3 times
- Glide from top inside thigh around knee>outside- 3 times followed by 3 breaths
- 11- **Relaxation-** sit back, feet on ground, eyes closed, take 3 deep breaths.

APPENDIX Y INTERVENTION CHECKLIST

SELF-MASSAGE PROCEDURE OBSERVATION CHECK-LIST

Date_____ Research Assistant_____

Each participant will sign in and wear an identification badge.

Warm-up procedure

| Correct | Yes | No |
|--|-----|----|
| 1. Sit upright, feet on floor | | |
| 2. Inhale naturally three times | | |
| 3.Shoulder shrugs (three each) right shoulder, left, then both | | |
| 4. Forward reach (three) alternate right then left | | |
| 5. Stretch up and pull down (three) inhale up, exhale pull | | |
| down. | | |
| 6. Wrist circles to the outside 5 times then inside five times | | |
| 7. Quadriceps muscle warm-up- raise right thigh up, hold for | | |
| five, repeat on left leg. (Repeat sequence three times). | | |

Comments

Self-Massage sequence

| Correct | Yes | No | |
|---|-----|----|--|
| 1. Tapotement-both hands will administer 10 sequenced | | | |
| rhythmic strokes to each area, upper thigh, then middle thigh | | | |
| and end above knee. Then repeat to sequence upper, middle | | | |
| and lower thigh again End with three deep breaths. | | | |
| Research assistants will observe application of | | | |
| massage cream to both thighs. | | | |
| Change sitting posture, sit near edge of chair right leg | | | |
| extended | | | |
| 2. Effleurage stroke- glide down with heel of hand on front | | | |
| thigh from crease of pants to knee top, using moderate | | | |
| pressure, while moving upper body forward. At knee top, | | | |
| release pressure, sweep hand upward to starting position. | | | |
| Repeat movement five times. Keep shoulders relaxed. | | | |
| Lateral (outside) thigh- adjust knee toward opposite leg. | | | |
| Begin at hip, apply moderate pressure downward, rocking | | | |
| forward, and then sweep up rocking backward. Repeat five | | | |
| times. | | | |

| Medial /inner thigh-Using opposite hand, apply downward | |
|---|--|
| stroke to inner thigh, from groin to knee. Repeat for five | |
| strokes, rocking forward on downward stroke, rocking back | |
| with upward sweep. Repeat entire sequence on opposite thigh. | |
| 3. Friction stroke-around both knees at the same time. Apply | |
| light to moderate pressure while moving tissue under the skin | |
| back and forth three times in each area. Place each hand palm | |
| down over each knee with fingers resting below knee cap; | |
| apply friction stroke, then move both hands to the outside of | |
| knee, apply friction stroke, next move to top of knee, apply | |
| friction, lastly apply fingers to inside knee, friction, repeat | |
| sequence around knee twice more. | |
| 4. Effleurage/glide finishing stroke- Three gliding strokes: | |
| using full open hands, one hand on each thigh using light | |
| pressure, glide down front of thigh around the knee and up | |
| outside thigh to the hips. Then glide down inner thigh sweep | |
| around knee and up outer thigh to top of hip repeat five times. | |
| End with three deep breaths. | |

Cool down/relaxation-

| | Correct | Yes | No | |
|---|---------|-----|----|--|
| 1. Sit up straight, place both feet on floor, both hand | ds on | | | |
| thighs. Close eyes take three deep breaths. | | | | |

Comments

APPENDIX Z MUSCULOSKELETAL SYSTEM AND OA

Musculoskeletal System that Affects Osteoarthritis



APPENDIX AA CONTROL GROUP REMINDER LETTER

Control Group Reminder Letter

20 Sussex Ave Voorhees, NJ 08043

October 8, 2009

Dear _____,

I would like to thank you for taking the time to participate in the control group of "Effectiveness of Self-Massage Therapy for Osteoarthritis of the Knee" study.

The purpose of the study is to determine the effectiveness of self-massage in reducing pain and increasing range of motion related to osteoarthritis of the knee. Additionally, the self-massage sequence may provide knee pain relief with no side effects. You will be taught the technique on Sat. Dec. 12.

The purpose of this letter is to schedule your first 4-week knee range of motion (ROM) and have you complete the enclosed WOMAC knee assessment survey. This will only take 15 minutes of your time. We will be available on Saturday Oct. 17 between 9:00-12 noon, Monday 3-6 PM or Thursday Oct 15 between 3-6 PM. If these dates are not convenient let me know when you call to schedule your appointment

My telephone number is ______.

Enclosed is a good luck instant lottery ticket (just scratch and win).

Again, I appreciate your participation

APPENDIX BB CLOSING AGENDA

Self-Massage Conclusion Meeting

December 12, 2009

From: Dotty Atkins, Gloria Adkins, Susan DiGregorio, Angel Austin, & Angela Santana

Welcome

Range of Motion measurements

Review Statistics and personal testimonies

Self-healing- the personal act or process of regaining health- review Self-Healing Book

Self-massage techniques- hand and fingers, rolling pin for hamstrings and calf muscles hand massagers and foot massager.

Key Principles for Discussion

- 1. Support your body- proper use of pillows
- 2. Listen to your body
- 3. Stake deep cleansing breaths at least three times daily
- 4. Drink water at least 4-8 oz glasses daily
- 5. Your body is connected proper body alignment when walking and sleeping
- 6. Muscles above the joint usually move the limb below it- thigh (quadriceps and hamstrings move extend and bend the knee).
- 7. Release the muscle with self-massage or tennis ball, then apply heat, then stretch and exercise.
- 8. Explore other healthy options- alternative and complementary T'ai Chi, yoga, acupuncture, exercise and stretching class.

APPENDIX CC TESTIMONIES

Comments and Testimonials on the effects of self-massage for knee OA Given with written permission

"Before I started the self-massage class, I was wearing a brace every day and taking pain pills every day. Now, I only take pills about every 3 days. I am able to get in & out of the car m much easier. That makes it better for my job, also." Ron P.

"I also helped another staff member at Lourdes to reduce the pain in her knees. She did not believe me at first; but one week later, she saw me and told me her knees were feeling better. You definitely made a believer out of me. Now I made her a believer." Ron P.

"I have found the self-massage technique to be extremely helpful in reducing, and sometimes eliminating, knee pain when going up and down the stairs. I used to pull myself up and now I don't need to do that." George G.

"I find I'm having much less pain (severe kind). I'm moving around to do so much more. I have told everyone I see about the self-massage class." I use the information gained whenever I feel the pain start. The doctor suggested knee replacement, now I'm not going to have it." Nancy E.

"My doctor kept mentioning knee replacement surgery. I was pleasantly surprised that the selfmassage has worked wonders on my knees and I would highly recommend it to everyone who suffers from osteoarthritis of the knee." Pat K.

"I am less stiff upon stepping out of bed in the AM and also able to stand up from a chair quicker and with less aches. This class definitely made me a believer in self-massage." Dolores S.

"I found the self-massage program a help in reducing my fear of walking. It gave me confidence so that if I am about to venture any distance, doing the massage before going forth, helps eliminate the stiffness that has always hindered me." Josephine C.

"I always believed that massage could relieve pain and stiffness, but I was somewhat surprised how just self-massage of your knee could relieve the pain and help me to walk, go up and down the steps without worrying about experiencing pain in my knee. It has made life better". Loretta M.

"I wasn't sure how massage was going to help with the osteoarthritis in my knee but after several sessions, I saw changes already. Stairs, walking, rising and other movements were much easier and less painful. Today I feel as if my range of motion is close to normal and have mostly no discomfort in my knee." Gert S.

"Thank you for having this class. I noticed a great improvement in my pain level in both knees since doing self-massage. I can walk better and longer while shopping than I did before. Massage has really helped me!" Marilyn R.

"Whenever I am a passenger in our car, on an extended trip, I use the massage techniques. It really helps. I'm so happy I enrolled in the study." Carol D.

"I am able to maneuver stairs with more ease. I showed this technique to my husband, and he says his knees feel looser." Mary Rita S.

"When I saw the advertisement, I thought I'll try it. It has been very informative and I am grateful for learning the self-massage techniques. Thank you for this opportunity, I could have used it years ago." Diane H.

Comments

I do this knee self-massage now every night as I go to bed.

I also find it convenient to do sitting in the sauna.

When I'm at a traffic signal and there are several cars in front of me, I pound on my thighs to "wake-up' my muscles, which really helps.

The short time it has taken to do these "exercises" certainly is worth the long-term benefits gained. It is a worthwhile technique.

Dotty and the research assistants are to be commented and praised.

The self-massage helped me to have time when I walked normally; without a "hitch in my step".

I am having less difficulty going down the stairs. When I am in the car, traveling far, my knees get stiff. I use the self-massage, and it helps relieve the stiffness and pain.

My husband also does the self-massage twice a week and feels a positive change from the stiffness.

Since learning the massage sequence, I feel like I have more control over my pain without the use of pain medication.

My husband has started to massage his knees after I showed him how to do it. He has done it at work and is slowly starting to believe in the power of massage. The two of us sometimes sit in front of the TV or on the porch in our favorite chairs massaging our knees. Funny, but it helps us live life with less pain.

APPENDIX DD DEVELOPMENT OF SELF-MASSAGE INTERVENTION

Development of Self-Massage Intervention

After fifteen years as a practicing massage therapist and educator with certifications in various massage modalities, the researcher found the prevailing reason for the majority of client visits is chronic musculoskeletal arthritic pain. The pain could often be relieved by various massage techniques— most often deep tissue massage. Additionally, the researcher found that, overall, clients' reasons for return visits involve not knowing what to do to alleviate or prevent the return of their pain. Thus, the researcher observed a need for the development of a self-help technique using clinical massage therapy (the manual manipulation of the soft tissue to relieve specific complaints of pain and dysfunction) to relieve knee pain.

The self-massage technique used in this study was founded on the following principles:

- 1. the individual is a whole organism;
- 2. shortened muscle tissue cannot function;
- soft tissue of the body (muscle, tendon, fascia [a type of connective tissue], etc.) respond to touch therapies.⁴

The selection of the quadriceps femoris muscle for this study was founded on the research conducted by Kim Bennell et al. which investigated the role of the quadriceps muscle (located on the anterior thigh) and its impairment of knee function, weakness, influence on knee joint loading (weight bearing), and proprioceptive deficits, all of which seem to contribute to the development or progression of knee osteoarthritis (OA).⁵ Equally important are the direction and arrangement of the muscle fibers and the function of the individual four muscles that make up the quadriceps, which can be affected by dysfunction of knee OA, possibly causing trigger points, weakened muscles and chronic knee pain.

The massage strokes chosen for this intervention were deep gliding (effleurage), tapping (tapotement), and friction; all have the potential to stimulate, soften, and lengthen muscle fibers. These strokes were performed on the quadriceps muscle while in a seated position and administered by the participants. The strokes are as follows:

- 1. Deep gliding massage strokes (effleurage), performed with lubrication, soften and lengthen muscle fibers. Effleurage compresses the tissue as the hand glides from the hip toward the knee in the direction of the muscle fibers. For the study, these strokes were applied using the heel of the hand because of its effectiveness on the large quadriceps muscles. Participants were advised to avoid overextending the wrist, to stop if wrist pain occurred and to observe for any unusual skin discolorations.
- Tapping (tapotement) is applied with loose fist to stimulate circulation and warm soft tissue.
- 3. Friction strokes are applied with no lubrication by pressing fingers firmly into the tissue and compressing a small area while moving the tissue back and forth using short strokes.⁶

In choosing clinical massage strokes and using the quadriceps muscle for the purposes of this study, the researcher considered the safest and most effective methods of achieving therapeutic results. The most effective method of protecting the arm and heel of the hand from overuse when using the self-massage technique is using the upper-body weight rather than the muscle of the arm; this is achieved by holding the arm and hand in position while rocking forward and backward with each gliding stroke to the quadriceps.

Narration of the self-massage sequence was preceded by stating that this self-massage technique was not intended to be a substitute for professional medical advice or treatment. The sequence was then narrated at each session in order to ensure compliance, technique adherence,

and proper body alignment. A handout describing the sequence was given during the seventh week of the sessions. The self-massage intervention, its administration and the narration required no modification and demonstrated that the intervention might be beneficial and costeffective for the management of knee OA. A larger study is warranted.

APPENDIX EE RA CERTIFICATION FLOW CHART

:



•••••

APPENDIX FF LESSON PLANS

LESSON PLAN

| INSTRUCTOR Dorothea Atkins | | | |
|--|-----------------------------------|----------------------|--|
| COURSE TITLE Self-massage for Osteoarthritis of the Knee; Research Study | | | |
| UNIT Research Assistant Training SPECIFIC TOPIC Knee pain and osteoarthritis: two hours | | oain and wo hours | |
| INSTRUCTIONAL GOAL (outcome that students should be able to demonstrate upon completion of the entire unit) To gain familiarity with the cause, signs and symptoms; prevalence, risk factors, common and CAM treatments and massage often associated with knee osteoarthritis. | | | |
| PERFORMANCE OBJECTIVE; RA's will be able to; | | | |
| 1. Understand osteoarthritis, its effects and treatment | | | |
| 2. Understand the basic structure and function of the knee joint and | d quadriceps femoris muscle. | | |
| 3. Understand the relationship between the knee joint and the quad | driceps femoris muscle and knee o | steoarthritis | |
| 4. Develop and awareness of the complementary and alternative medicine therapies. | | | |
| RATIONALE 1. Knowledge of the medical condition promotes compliance and understanding | | | |
| LESSON CONTENT (what is to be taught) 1. Osteoarthritis, the etiology and common nonpharmacological therapies | | | |
| 2. Risk factors and prevalence of OA | | | |
| 3. Anatomy and function of the knee joint and quadriceps muscles | | | |
| 4. Brief review of the history of massage therapy and its benefits | | | |
| 5. Self-massage and its effects and benefits | | | |
| 6. CAM therapies for arthritic pain | | | |
| 7. Introduction to massage therapy and self-massage basic history, principle and purpose. | | | |
| INSTRUCTIONAL PROCEDURES | | | |

1. Lecture on osteoarthritis and causes of knee pain using power point - 40 minutes of the 90 minute program.

2. Watch video "Mayo Clinic Wellness Solutions for Arthritis" - 20 minutes

- 3. Lecture: basic anatomy of knee joint and quadriceps femoris muscle location and function
- Students will palpate their knee joint and quadriceps muscle movement
 Discuss common remedies used for pain relief
- Discuss common remedies used for pain relief
 Discuss the history and benefits of massage and self-massage.

EVALUATION PROCEDURES (how you will measure outcomes to determine if the material has been learned)

1. Question and answer period and discussion.

2. Demonstrate practical working knowledge and understanding of the relationship between self-massage and relief of knee pain and OA.

MATERIALS AND AIDS TV, VCR; Power point projector; individual hand-outs, paper and pen

Lesson Plan:

Topic: Chronic Knee Pain and OA of the Knee (40 minutes)

Lecture on OA of the knee and its physical and psychological effects using a Power Point Presentation .

Slide 2- Introduction- overview of topics to be presented

Slide 3- Causes of chronic knee pain

-Discuss degenerative joint disease and its effects

Slide 4- Second cause of knee pain, referral from joints to muscle

Slide 5- Third and fourth causes of knee pain, previous joint injury and inflammation

Slide 6- Fifth cause of knee pain, quadriceps weakness

Slide 7- The knee joint- discuss its parts

Slide 8- The knee joint – its function

Slide 9-10 The chronic pain of arthritis causes- discuss psychological and physical symptoms

Slide 11-Non-pharmacological therapies- discuss therapies listed

Slide 12- 13- CAM therapies for arthritic pain- define CAM, and why people use it; discuss the 5 categories of CAM practices

Slide 14-15 Review massage therapy and its benefits

Slide 16- Self-massage, discuss its effects and benefits

Slide 17- The self-care cycle- discuss its relations to the self-management of knee OA

Self-massage of Quadriceps Femoris Muscle LESSON PLAN

| INSTRUCTOR Dorothea Atkins | | | |
|--|--|----------------------|--|
| COURSE TITLE Self-massage for Osteoarthritis of the Knee; Research Study | | LESSON NUMBER TWO | |
| UNIT Self-massage- three hours | specific topic Quadriceps femoris muscle massage | | |
| INSTRUCTIONAL GOAL To gain familiarity with the theory and practic | e of this therapeutic self | f-massage technique. | |
| PERFORMANCE OBJECTIVE participants will be ab | le to: | | |
| 1. Demonstrate proficiency using effleurage, friction, and tapoteme | ent strokes and full self-massage s | equence | |
| 2. Develop an awareness of body movement, use of heel of hand a | and deep breathing | | |
| 2. Develop confidence and proficiency using the self-massage tech | nnique. | | |
| 3. Develop an understanding relationship between massaging one | 's thigh muscle and its effects on th | ne knee. | |
| 4. The process of assessing the skin, hands and thighs of participation | ints. | | |
| 5. Perform the self-massage sequence on properly following a scr | ipt. | | |
| RATIONALE 1. The safe and proper technique of the self-massage sequence is necessary for therapeutic results. | | | |
| LESSON CONTENT 1. Demonstration and return demonstration of each step in the massage sequence. | | | |
| 2. Reverse roles; one RA will narrate self-massage sequence while | e the other performs the massage a | as directed | |
| 3. Practice observing hand position, posture, rhythm and breathing | during self-massage sequence. | | |
| 4. Self-massage sequence for quadriceps femoris muscle. | | | |
| INSTRUCTIONAL PROCEDURES 7. Lecture on history and technique of massage using power point and handouts 8. Demonstration and return demonstration of each stroke and contact area of hand 9. Discussion and practice of warm-up phase and cool down/relaxation phase 10. Integration of full self-massage technique- practice and supervision 11. Closure- summarize lesson. | | | |
| EVALUATION PROCEDURES – Be able to apply skills in routine and practice sessions without assistance 1. Observation and proficiency checklist of self-massage sequence 2. Homework- practice self-massage and narration. | | | |
| MATERIALS AND AIDS self-massage technique booklet with pict | ures, power point presentation and | I massage lubricant. | |

Lesson Plan:

Topic: Self-massage of the quadriceps femoris muscle; three and one half hours

This self-massage session will be utilizing with each slide of the Power Point Presentation as a guide for each step in the self-massage sequence, using demonstration and return demonstration. (60 minutes);

Followed by demonstration of a full sequence following the direction of a scripted narration performed by PI (60 minutes);

Then each RA will narrate while the other performs the self-massage sequence, the PI will observe, critique and evaluate the RA's self-massage sequence, and narration (60 minutes);

Review and discussion and wrap-up 30 minutes

Slides 1-3- The self-massage sequence, what is required, precautions and what is self-massage.

Slide 1-12- warm up phases- demonstration and return demonstration

Slide 13 –Specific instruction for use of heel of hand, rocking motion, and posture

Slide 14-18- Self-massage sequence

Slide 19- Relaxation breaths to end
APPENDIX GG LETTER OF INVITATION

20 Sussex Ave Voorhees, NJ 08043

Jan 22, 2009

Dear Research Assistant,

Thank you for agreeing to assist in my research. I am so excited to have reached this point after 5 years. I would like to thank you for taking the time to participate in the "Effectiveness of Self-massage Therapy for Osteoarthritis of the Knee" study, I am conducting as a requirement for a doctorate degree from Holos University Graduate Seminary.

The purpose of the study is to determine the effectiveness of self-massage in reducing pain and increasing range of motion related to osteoarthritis of the knee. Additionally, the self-massage sequence may provide knee pain relief with no side effects.

Enclosed you will find 4 enclosures; I did not email them because it was too much information. Please read them when you can, if you don't have time to read them all don't worry about it, we will discuss them at the meeting.

At some point in our process, I will need your resume, so, please begin to put one together.

The enclosures are;

- 1. The RA/massage therapist job description.
- 2. A brief description of the self-massage and osteoarthritis research.
- 3. The power point presentation of Chronic Knee Pain- look it over, we will see and discuss it.
- 4. The self-massage sequence.

Sincerely,

APPENDIX HH QUIZ ON OA

Chronic Knee Pain and Osteoarthritis

| Instructor | Dorothea Atkins RN, MA, Th.D candidate | Name | |
|----------------------------|--|--------------|----------------------------------|
| | | | |
| | | | |
| | | Date | |
| Read each | n question carefully, and then write T (true) or | F (false) o | n the line next to the question. |
| 1O | steoarthritis is a common cause of pain | | |
| 2 Kr | nee OA is also known as a degenerative | e joint dise | ease |
| 3O | A also can affect children | | |
| 4O | A is a "wear and tear" disease | | |
| 5 Kr | nee OA can cause stress | | |
| 6 C. | AM therapy is covered by insurance | | |
| 7 M | assage is a CAM therapy | | |
| 8O | nly 15 million dollars was spent on CAM | therapies | |
| 9S∈ | elf-massage provides equal benefits as r | nassage | given by a therapist |
| 10 Hi | ppocrates in the fifth century B.C. used | massage | e as a healing technique |
| 11 Lis | t 4 benefits of massage for arthritis. | | |
| 3. <u>-</u> | 4 | • | |
| 12 Lis | t 3 benefits of self-massage. | | |
| ۱. <u>-</u> 3. <u>-</u> | 2 | | |
| 13 Lis | t 4 common CAM practices. | | |
| 1. <u>-</u> | 2 | · | |
| 3. <u></u> | 4 | • | |

Answer Key

Chronic Knee Pain and Osteoarthritis

| 1. True | 2. True |
|----------|----------|
| 3. False | 4. True |
| 5. True | 6. False |
| 7. True | 8. False |
| 9. True | 10. True |

11. Four of the seven benefits of massage: 1. Improve circulation2. Decrease pain3. Increaserange of motion4. Decrease swelling5. Promote relaxation6. Decrease anxiety7. Decreasemuscle tension

12. List 3 of the 8 benefits of self-massage: 1. Stimulate mind and body awareness 2. It can be done anytime 3. It is free 4. This is relatively safe 5. It is effective 6. Improves the physiological and psychological effects of osteoarthritis.

| 13 List 4 of the 10 CAM therapies; | 1. Diet 2. Herbals | 3. Massage | 4. yoga | 5. prayer |
|------------------------------------|--------------------|------------------|---------|------------|
| 6. acupuncture therapy | 7. homeopathy | 8. energy therap | oies | 9. magnets |
| 10. prayer. | | | | |

APPENDIX II QUIZ ON SELF-MASSAGE TECHNIQUE

Self-Massage of the Quadriceps Muscle Quiz

| Instructor: | Dorothea Atkins, RN, MA, Th.D candidate | Name: | |
|----------------|--|------------|--|
| | | Date: | |
| [Carefully re | ad each question and then answer the c | question.] | |

- 1. What is false about self-massage
 - A.____Must be performed by a qualified therapist
 - b. _____There are precautions when massaging one's self.
 - c. _____It can be an effective self-care intervention.
- 2. List three precautions when using self-massage
 - 1._____
 - 2. _____
 - 3. _____
- 3. Define self-massage

4. Which massage stroke is not used in this self-massage sequence

a.____Effleurage

b.____Friction

c.____Petrissage

5. How long will the self-massage sequence last

a.____One hour

b.____15 minutes

- c.____20 minutes
- 6. What major muscle does the self-massage sequence focus on.

a.____Hamstrings

b.____Quadriceps

c.____Knee cap

7. What part of the hand does most of the work during the massage session

Palm

fingers

Heel

8. Can self-massage cause muscle soreness?

Yes

No

Not sure

9. Is a lubricant required for this technique?

a.____No

b.____Yes

c.____Not sure

10. The self-massage technique is performed in

a. ____in a bed

b.____ina chair

c.____standing up

ANSWER KEY

1. A

- List 3 of the 6 precautions: 1. Do not massage areas if injury 2. Do not massage areas of infection 3. Do not massage on open wounds 4. Do not massage on open wounds 5. Do not massage areas of discoloration 6. Do not massage areas of unusual pain.
- 3. Define self-massage: Self-massage is a self-treatment technique for the personal management of conditions and symptoms that respond to touch, manual, soft tissue manipulations or massage therapy.
- 4. C-Petrissage
- 5. C-20 minutes
- 6. B- Quadriceps
- 7. C- Heel
- 8. A. Yes
- 9. B. Yes
- 10. B in a chair

APPENDIX JJ TREATMENT FIDELITY STRATEGY

Self-Massage Treatment Fidelity Strategy

Treatment fidelity strategies can be used in methodology to monitor the reliability and validity of treatment interventions. Intervention fidelity may influence the internal and external validity which may influence the conclusion about the treatment or prevent its replication.⁷ The full treatment implementation model considers the treatment, delivery, the receipt, which involves assessing the degree to which the participant understands and demonstrates knowledge of and ability to use intervention skills, and enactment, which involves assessing the application of the intervention into the daily life of the participant.⁸ The following charts outline the goal, description and strategies for fidelity of the self-massage intervention that may help monitor and enhance reliability and validity.⁹

1. Self-Massage Intervention

| Goal | Description | Strategies |
|-------------------------------|---------------------------------|---|
| To provide the same treatment | To guarantee consistency of | Provide hands-on instruction on the theory |
| dose and procedure. | number, and type of massage | and practice of therapeutic self-massage. |
| | strokes. | Instruction includes demonstration, return |
| | | demonstration, scripted protocol manual. |
| | | Monitor using direct observation of |
| | | sessions; and specialized training of |
| | | research assistant for physical assessments |
| | | and protocol observation of participants. |
| Guarantee same protocol | Each self-massage sequence is | The intervention will be narrated with a |
| sequence for each session. | performed consistently correct. | scripted intervention by PI, participants |
| | | will follow along while being observed for |
| | | accuracy by research assistants. |

| Goal | Description | Strategies |
|-------------------------------|--|--|
| Standardize training | Ensure that training is conducted similarly by RA | Ensure that RA meet standard performance criteria; have RA train together , use standardized training techniques, material, power point presentation, lecture, use structured practice and role playing, observe intervention implementation with pilot participant, use the same instruction for all RA, have training take into account the different learning styles; video tape training for future trainings. |
| Guarantee RA skill attainment | Train RA to well-defined performance criteria. | Observe intervention implementation with standardized pilot participants (role- playing); score criteria adherence according to a checklist; certify intervention pre-intervention and periodically during intervention implementation. |

2. Monitoring Research Assistants (RA)

3. Monitor and Improve Delivery of Intervention

| Goal | Description | Strategies |
|--|---|--|
| Ensure participant understanding | Ensure that participant understands the self-massage intervention information, especially when participants are senior citizens with knee OA. Who may have physical limitations and symptoms; visual and hearing limitations; and may be cognitively compromised. | Have RA attend and partake in participants training sessions; Have RA ask questions/discuss material with participants; RA practice narrating self- massage intervention; and have RA work with participants until they are able to demonstrate the self-massage sequence successfully. |
| Ensure participants ability to use cognitive skills. | Make sure participants are able to use the cognitive skills taught in the intervention (e.g., history of massage, massage sequence, quadriceps muscle function and location, etc. | Have RA work with participants until they can demonstrate skills; have RA monitor and give feedback on practice sessions; measure participants performance using a check list sheet and completion of training session. |
| Ensure participant's ability to perform self-massage sequence. | Make sure participants are able to physically perform skill taught in the intervention. | Complete individual observational assessment checklist, discuss and resolve any physical limitations. |

APPENDIX KK PROTOCOL PROFICIENCY EVALUATION

Self-Massage Protocol Proficiency Evaluation for Research Assistants

Name_

Date

RA must achieve at score of 40-44 points

Place the number one if procedure is done, zero if omitted.

1. <u>RA Self-Massage Protocol</u>

Warm-up: Points: 7

_____Sit up straight in chair, legs and feet hip width apart, and both feet flat on floor, knees over ankles.

____ Three deep breaths;

_____Shoulder shrug; right shoulder up and down, then left shoulder and both; 3 times each.

_____Forward reach, right arm, then left arm **3** times each.

Stretch up and pull down; inhale right arm to ward ceiling, exhale, pull down, and repeat 3 times each.

_____Wrist circles **3** times in each direction.

Quadriceps muscle warm-up; place both hands on thigh, raise right thigh up and hold in up position for the count of 3, lower leg, take a deep breath; repeat opposite leg.

Achieved

Self-Massage Sequence: Points 35

- **Tapotement or tapping**; with loose fist tap both thighs at once, 10 times in each area of the upper, middle and lower thigh.
- _____ End with three deep breaths
- _____Apply lubricant to both thighs
- Preparation for thigh massage sequence: Sit on edge of chair correct leg extended
- ____ Use heel of hand
- Right leg
- _____ Effleurage (glide); glide down top of thigh with heel of hand.
- _____ Rocking upper body forward with each stroke
- _____ Glide down to top of knee, release pressure and sweep up to starting position
- _____ Shoulders relaxed, repeat **5** times.
- _____ Lateral outside thigh; adjust position for better access.
- _____ Glide down with heel of hand from top of hip, rocking upper body forward.
- _____ Sweep hand up, rocking backward, to staring position, no pressure.
- ____ Repeat 5 times

_____Medial/inner thigh, use heel of opposite hand, adjust position for access

- _____Apply downward glide from groin to knee, rock upper body forward
- _____Sweep upward, rocking backward, no pressure

Repeat sequence on left thigh.

- **Effleurage** (glide); glide down top of thigh with heel of hand.
- _____ Rocking upper body forward with each stroke
- _____ Glide down to top of knee, release pressure and sweep up to starting position
- _____ Shoulders relaxed, repeat 5 times.

| | Lateral outside thigh; adjust position for better access. Glide down with heel of hand from top of hip, rocking upper body forward. Sweep hand up, rocking backward, to staring position, no pressure. Repeat 5 times |
|--------------|--|
| | Medial/inner thigh, use heel of opposite hand, adjust position for access Apply downward glide from groin to knee, rock upper body forward Sweep upward, rocking back, with no pressure. |
| | Friction sequence around knee 3 times Place palm of hand on knee rest fingertips below knee move tissue up and down 5 times Move fingers to out side of knee, for 5 strokes Top of knee, 5 strokes Inner knee, for 5 stokes: repeat sequence 2 more times |
| | Effleurage/glide finishing stroke; place both hands on each thigh palms down Glide both hands down top of thigh, sweep around knee and up outside thigh, three times Glide down both inner thighs sweep around knee and up outside thigh three times Take three deep breaths to end. |
| Achieved | points |
| Cool down/re | laxation; Points 2 |
| | Sit up straight, both feet on floor, take 3 deep breaths Inhale to a count of 4, exhale to a count of 4 |
| Achieved | |

Comments:

APPENDIX LL SELF-MASSAGE SCRIPT

Self-massage Protocol Script

Introduction

Good morning, everyone. I thank you for agreeing to participate in the <u>first of eight</u> (state what number the session is) self-massage sessions for knee arthritis research study. The self-massage session will consist of a seated 5-minute warm-up that provides gradual movements to muscles, soft tissues and joints and focused breathing; followed by a ten minute self-massage sequence; ending with directed breathing relaxation. If at any time, before, during or after the session, there are any personal concerns please make us aware immediately, you have our contact information. Keep in mind with any new exercise sometimes muscle soreness occurs. We are also reminding you that this self-massage technique is not intended in any way to substitute for professional medical advice or treatment. In a moment we will begin I will read aloud each step in the self-massage sequence; the research assistants will be observing your technique and offer assistance when necessary.

Warm-up

| Image | Narration |
|---|--|
| 1.A person exhaling | For the first step of the warm-up phase, take three deep breaths naturally. Inhale (pause) 1-2-3-4; exhale slowly1-2- 3-4 (pause) again, inhale 1-2-3-4 (pause) and exhale slowly 1-2-3-4, (pause) and inhale 1-2-3-4 (pause) and exhale 1-2- 3-4. |
| 2. Shrugging shoulder 3 times each | For the shoulder shrug we begin with arms at your side, hands facing toward body, raise your right shoulder up right (pause), relax it downward, again shoulder up (pause) relax it down; last time shoulder up (pause) relax it down. Now your left shoulder up (pause); now relax it down; again raise the shoulder up (pause) relax it down; last time left shoulder up (pause) relax it down. Now both shoulders at the same time up (pause) and down (pause); again, both shoulders up (pause) and down, last time both shoulders up (pause) and down. Good job! |
| 3. Reaching forward 3 times | Now the forward reach. Raise your right arm up to your |
| | shoulder with palm down (pause) now bring it back to your lap; raise your left arm up to your shoulder with palm down (pause), and bring it down to your lap, again right arm up (pause) and down; now your left arm up (pause) and down; last time, right arm up (pause), now down (pause); last time arm up (pause) now down. Good job. |
| 4. | For this exercise place both arms at your side palms facing toward the body. |
| | Inhale, raise your right arm up (pause); now exhale, arm down. Now your left arm, inhale arm up (pause) and exhale bring it down; 2. Inhale right arm up (pause), exhale arm down; inhale left arm up (pause), exhale bring it down; Inhale right arm up (pause), exhale bring it down; Inhale right arm up (pause); exhale bring it down (pause); left arm, inhale raise it up (pause); exhale bring it down (pause). Good job! |
| 5. Wrist warm-up- 5 times to the right and then to the left | Sitting with elbows tucked at your waist, forearms out in front waist height, palms face down. Circular motions |
| | toward the outside with both hands 5 times; one and, two and, three and, four and five (pause) now to the inside, one and, two and, three and, four and five (pause). Good job! |

| 6. A person sitting with hands on | 1. For our last warm-up place both hands on thigh, raise your |
|-----------------------------------|---|
| top of thigh 5 times | right knee up and hold, one and, two and three release, |
| | lower leg to floor, (pause); left knee up, hold, one and two |
| | and three, release (pause); 2. Raise your right knee up and |
| AL | hold; one and two and three (pause) release; raise your left |
| Aug) | knee up and hold, one and two and three, release (pause); 3. |
| () 200 | Raise your right knee up and hold; one and two and three |
| T | (pause) release; raise your left knee up and hold, one and |
| | two and three, release (pause),); 4. Raise your right knee up |
| A EU | and hold; one and two and three (pause) release; raise your |
| | left knee up and hold, one and two and three, release (pause), |
| | last one 5. Raise your right knee up and hold; one and two |
| | and three, and lower (pause), raise your left knee up and |
| | hold; one and two and three (pause); lower (pause). Good |
| | job. |

Self-Massage Sequence

Image

Narration

| 1. A person sitting in a chair, feet | 1. Tapotement or Taping: |
|--------------------------------------|---|
| out in front tapping on thighs | Create soft closed fist with both hands. Rhythmically tap |
| with soft fist for 2 cycles. | both fists to upper thigh. I will count each time your fist |
| | strikes your thigh, begin with upper thigh , 1 and 2 and 3 and |
| | 4 and 5 and 6 and 7 and 8 and 9 and 10 (pause); now move |
| | to the mid thigh; 1 and 2 and 3 and 4 and 5 and 6 and 7 and |
| | 8 and 9 and 10 (pause); above the knee, 1 and 2 and 3 and 4 |
| B | and 5 and 6 and 7 and 8 and 9 and 10 (pause); Now back to |
| | front upper thigh 1 and 2 and 3 and 4 and 5 and 6 and 7 |
| | and 8 and 9 and 10 (pause); now move to the mid thigh; 1 |
| | and 2 and 3 and 4 and 5 and 6 and 7 and 8 and 9 and 10 |
| | (pause); above the knee, 1 and 2 and 3 and 4 and 5 and 6 |
| | and 7 and 8 and 9 and 10 Good job. |
| | Take three deep breaths, inhale (pause), exhale (pause); |
| | inhale (pause), exhale (pause) and finally inhale (pause), and |
| | exhale. Good Job. |
| | |
| | In preparation for the next three steps, everyone adjust your |
| | clothing so that you may apply the lubricant. Apply your |
| Strail | pre-measured massage cream to both thighs please. Allow a |
| | few minutes for application. |

| | The glide stroke to the three areas of the thigh; will be done with the heel of the hand. |
|-------------------------------------|--|
| Heel of the hand | |
| | Reposition yourself move forward with the right leg stretched out. |
| Copyright © 2006 VHI | |
| Copyright © 2006 VHI | The rocking forward and backward motion is done as the heel of your hand glides down and up your thigh. |
| 2.Glide stoke on top of right thigh | The heel of your right (Left) hand is placed at the crease of |
| Inve times | your pants; 1. Now glide down the front of your right (left) thigh to your knee (pause) and release pressure, sweep up to the starting position, good, (pause); again 2. Glide down to the knee, release, sweep up (pause), 3. glide down to the knee, release, sweep up that's three; 4. glide down to the knee, release, sweep up and last one,; 5. Glide down to the knee, release, and sweep up. Good job! |

| 3. Outer thigh glide down five times. | 3. Now to glide down the outside thigh, please adjust your position (pause). Place the heel of your right (left) hand on the outside of your right (left) thigh. On the count of three begin. One-two-three; glide toward your knee, release pressure, and sweep up, that's one ; glide to your knee, release, sweep up (pause) two ; glide down to your knee, release, sweep up, three ; glide to your knee, release, sweep up that's four ; last one, glide to your knee, release and sweep up. Good job! |
|--|--|
| 4.Inner thigh glide, 5 strokes | 4. For the inner thigh stroke, use your opposite hand and adjust your position. Place the heel of your left (right) on your right inner thigh; 1.glide down toward the knee, release, sweeping back to upper thigh (pause); 2. glide down toward the knee, release, sweeping back up; 3. Glide down toward the knee, release, sweep up, again 4. glide down toward the knee, release, sweep up (pause); last one, glide down toward the knee, release, sweep up to upper thigh. Good job. Repeat the entire sequence on the left thigh. |
| 5. Friction strokes around knees 3 times | 5. Place both hands palms down on each knee, using finger tips firmly press below knee (figure A) move skin on knees in an up and down motion as you rock back and forward, I will count the upward strokes; one and two and three and four and five; move fingers to outer knee (pause), one and two and three and four and five; next position move to top of knee, one and two and three and four and five; last position move fingers to inside knee, (lightly bring knees together so the backs of both hands are touching each other, now compress hold in place and rock back and forth fingers in place; one and two and three and four and five (pause). Repeat sequence twice . |

| 6. Finishing glide strokes 3 times each area | 6. Our last stroke will be using the glide stroke once again. Place both hands palm down, one on each thigh, beginning at the top of the thigh fingers are pointed toward the knee; 1. Glide down and around the knee, sweep up outside thigh, again, 2.Glide down and around the knee, sweep up outside thigh last time, 3. Glide down and around the knee. For the second set glide down inner thigh sweep around knee, up the outer thigh, again glide down inner thigh sweep around knee up the outer thigh, last time glide down inner thigh sweep around knee up the outer thigh, end with hands resting on upper thigh. Good job. Let's end with three deep breaths. Inhale (pause), exhale (pause); again inhale (pause), exhale; last time inhale (pause), exhale. |
|---|--|
| 7. Relaxation breaths | 7. Please make yourself as comfortable as you can, sitting in |
| | your chair with both feet flat on the floor. You are welcomed to close your eyes. Inhale (pause) notice how good you feel exhale (pause) Inhale(pause) notice how relaxed you are, exhale (pause) and inhale (pause) take a few moments to appreciate your body, exhale, and open your eyes when you are ready. Thank you. |

APPENDIX MM RA JOB DESCRIPTION

Research Assistant Job Descriptions.

Research assistants/massage therapist: will complete 30 hours of training with an ultimate goal of becoming an independent facilitator of the Self-Massage Technique for OA of the Knee. The RAs duties will include the following:

- 1.1 Hand out and collects data, attendance forms and questionnaires;
- **1.2** Prepare name tags for participants.
- **1.3** Assessment and observation of participants before and during the selfmassage intervention.
- **1.4** Assist participant to prepare for intervention;
- **1.5** Regular assessment of physical appearance of arms and thighs and inquire of any symptoms related to intervention,
- **1.6**Observe the participant's proficiency on completing the intervention and attend to participants needs during the intervention.
- **1.7** Document and explain any deviation from the approved protocol.
- **1.8**Demonstrate an understanding of osteoarthritis, its causes, physical, psychological and psychosocial effects.
- **1.9** Be able to work independently and have good communication skills

¹ James H. Clay and David M. Pounds, *Basic Clinical Massage Therapy: Integrating Anatomy and Treatment* (New York: Lippincott Williams and Wilkins, 2003), 310.

² National Institute for Health and Clinical Excellence :Osteoarthritis: The Care and Management of Osteoarthritis in Adults, February 2008. <u>http://www.nice.org.uk/nicemedia/pdf/CG59NICEguideline.pdf Accessed</u> December 20, 2009.

³ Nicholas Bellamy, W. Watson Buchanan, Charles H. Goldsmith, Jane Campbell and Larry W. Stitt, "Validation Study of WOMAC: A Health Status Instrument for Measuring Clinically Important Patient Relevant Outcomes to Antirheumatic Drug Therapy in Patients with Osteoarthritis of the Hip or Knee," *Journal of Rheumatology* 15 (1988):1833-1840.

⁴ James H. Clay and David M. Pounds, *Basic Massage Therapy: Integrating Anatomy and Treatment* (New York: Lippincott Williams and Wilkins, 2003), 310.

⁵ Kim L. Bennell, Michael A. Hunt et al., "Role of Muscle in the Genesis and Management of Knee Osteoarthritis," *Rheumatic Disease Clinics of North America* 34 (2008): 749.

⁶ Clay and Pounds, 2003, 5.

⁷ Alan E. Kazdin, "Clinical Psychology," (Boston: Allyn and Bacon, 2003) 23-40.

⁸ Louis Burgio, Mary Corcoran, Kenneth L. Lichstein, Linda Nichols, Sara Czaja, Dolores Gallagher-Thompson, Michelle Bourgeois et al., "Judging Outcomes in Psychosocial Interventions for Dementia Caregivers: The Problem of Treatment Implementation", *The Gerontologist* 41, no. 2 (2001): 481-88.

⁹ Albert J. Bellg, Barbara Resnick, Daryl Sharp Minicucci, Gbenga Ogedgbe, Denise Ernst, Belinda Borrelli, Jacko Hecht, Marcia Ory, Denise Orwig and Susan Czajkowski, "Enhancing Treatment Fidelity in Health Behavior Change Studies: Best Practices and Recommendations from the NIH Behavior Change Consortium, *Health Psycholog*, 23 no. 5 (2004): 443-51.