12-2006

Effects of Live Music on Pain, Mood, and Exercise Adherence with Rehabilitation Patients

Victoria Storm
Western Michigan University

EFFECTS OF LIVE MUSIC ON PAIN, MOOD, AND EXERCISE ADHERENCE WITH REHABILITATION PATIENTS

by

Victoria Storm

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Music
School of Music

Western Michigan University
Kalamazoo, Michigan
December 2006

ACKNOWLEDGMENTS

I would like to acknowledge the constant support of my husband and parents who have encouraged me in all the steps of this project. I am forever grateful also to my thesis committee, Brian Wilson, Edward Roth, and David Smith, who believed that what I had to share was worthwhile. They are talented and insightful music therapists, wise with patience and guidance.

This project would not have been possible without the support of the talented friends and colleagues at the Institute for Therapy through the Arts and the Rehabilitation Institute of Chicago. Specifically, Ted Rubenstein who offered his expertise and his friendship, Diane Gross who walked through the research sessions with me each step of the way, for the time and support of Tom Richey, Brienne Costa and Shelly Williams of the Therapeutic Recreation Department, and Dr. Santiago Toledo and Gary Vornheder for their belief in the study and support towards its completion.

Victoria Storm

EFFECTS OF LIVE MUSIC ON PAIN, MOOD, AND EXERCISE ADHERENCE WITH REHABILITATION PATIENTS

Victoria Storm, M.M.

Western Michigan University, 2006

Incorporating music into treatment protocols is a non-pharmacological approach to pain management. Music can aid in mood and motivation, and assists in coordination of movement through rhythmic entrainment. Few studies have looked at the effectiveness of music on pain and mood while actively engaged in exercise. In this study, patients in an inpatient physical rehabilitation facility were provided with rhythmically synchronized music during upper extremities exercises. Self-reported ratings (McGill Pain Questionnaire - Short Form and Feeling Scale) of pain and mood were taken through a pretest post-test between subjects group design. Rate of Perceived Exertion (Borg's RPE) was taken post-test only. Trained observers measured participant's adherence to exercise. It was hypothesized that exercising to rhythmically synchronized live music would be more effective than rhythmic counting alone in reducing the perception of physical pain, improving mood, and improving adherence to exercise during an upper extremities exercise group. Results instead showed a similarity in response to both live music and rhythmic counting, and no statistically significant difference between groups.

TABLE OF CONTENTS

Table of Contents - Continued

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Research Problem

Patients recovering from reconstructive surgeries often struggle with physical pain, and although resting and limiting movement tends to be a natural desire, prescribed exercise is a very important and necessary component to therapy and subsequent healing process. Identifying effective strategies to make therapeutic exercise more enjoyable, motivating, and less painful could positively influence best practices. To demonstrate that specifically designed music is one such strategy, this type of research is needed.

Researchers focusing on the effects of music and development of best practices in music therapy have a large body of knowledge regarding pain, mood, and physical exercise. There are, however, very few studies investigating the relationships between pain perception and mood in regards to persons who are actively engaged in strenuous physical activity during the rehabilitation process.

Purpose of Research

The purpose of this study was to identify the effects of using rhythmically synchronized live music in upper extremities exercise sessions on pain perception, mood, and exercise adherence in the physical rehabilitation setting with and without music. Older patients receiving inpatient rehabilitation treatment for bone or joint

reconstruction surgeries (knee, hip, limbs, or non-traumatic spine) were the population.

The main research questions were:

(1) What are the effects of using rhythmically synchronized live music in upper extremities exercise sessions on pain perception in the physical rehabilitation setting with and without music? The assumption was that exercising to live music is more effective in improving pain than to rhythmic counting alone.

(2) What are the effects of using rhythmically synchronized live music in upper extremities exercise sessions on mood in the physical rehabilitation setting with and without music? The assumption was that exercising to live music is more effective in improving mood than to rhythmic counting alone.

(3) What are the effects of using rhythmically synchronized live music in upper extremities exercise sessions on exercise adherence in the physical rehabilitation setting with and without music? The assumption was that exercising to live music is more effective in improving adherence than to rhythmic counting alone.

CHAPTER II

REVIEW OF THE LITERATURE

Pain

The process of healing after a serious injury is multifaceted. Along with the rigorous physical rehabilitation prescribed to bring a person back to full functioning is the need for the management of pain. As defined by the International Association for the Study of Pain, pain is "an unpleasant sensory or emotional experience associated with actual or potential tissue damage or described in terms of such damage" (Mersky, 1986). The National Institutes of Health (1986) elaborated on this definition:

> "Pain is a subjective experience that can only be perceived by the sufferer. It is a multidimensional phenomenon that can be described by the pain location, intensity, temporal aspects, quality, impact and meaning. Pain does not occur in isolation, but in a specific human being in psychological, economic, and cultural contexts that influence the meaning of the experience and verbal and non-verbal expression of pain," (p. 4).

Pain can be transient or acute, and over time can become chronic or persistent. The components of pain have anatomical, physiological, and psychological aspects, and can be grouped into four broad categories: 1) nociception (the detection of tissue damage); 2) perception of pain (triggered by injury, disease, or lesions in the nervous system); 3) suffering (negative responses due to physical or psychological factors); and 4) pain behaviors (how the person responds), (Loeser & Melzack, 1999). The widely accepted Gate Control Theory of pain introduced by

Melzack and Wall (1965) was among the first to account for the complexity of pain including psychological influences on pain. Nociception and perception of pain begin when the painful stimuli or noxious input is transmitted through small diameter fibers to the dorsal horns of the spinal cord and then to cortical and subcortical structures in the brain. Higher level processes known as descending influences go through the midbrain and medulla to influence the inhibition of the response to the transmitting cells of the discomfort (Craig & Rollman, 1999), and essentially shut the gate of stimulus coming through the dorsal horns. The neural mechanisms of the dorsal horns increases and decreases the flow of nerve impulses depending on the number of large and small diameter fibers and descending influences from the brain (Buckelew & Frank, 1989.) More simply stated, when one stimulus is present to introduce the pain, introduction of another stimulus may close the gate of additional stimulus to the brain. When the gate is closed through pharamocolgical or non-pharmacological means, there is a reduction in the perception of pain from the source. This theory has undergone modifications over the last 50 years, but remains essentially unchanged and accepted (Turk, 1996). An elaboration is what Melzack described as the "neuro-matrix", a pattern generating mechanism in the brain capable of "sustaining an image of the body upon which sensory data are played" (Loeser & Melzack, 1999, p. 1607). This explains the phenomena of phantom pain in amputees, and physical sensation below the point of feeling for spinal chord injury patients. This neuro-matrix is the culmination of the physiological and psychological processes, including memory.

In Briggs' (2002) article about nursing management of pain in older people, the autonomic changes associated with nociception and perception of acute pain were listed. These include increased heart rate, blood pressure, respiration rate and decreased lung capacity, reduced blood flow to the skin, elevated blood-sugar levels, increased gastric secretions and decreased gut motility, nausea and vomiting, increased sodium and water retention, and dilated pupils (Hamil, 1994). In Buckelew and Frank's (1989) chapter on the psychological factors and treatments of pain, many of these same autonomic functions were listed and indicated a link between physical pain and anxiety by identifying the similarities of these to the stress response.

When considering suffering and pain perception, it is useful to understand the neuroanatomical structures involved. The limbic system houses the structures related to emotion in the brain. In it are two major efferent pathways. Chesky and Michel (1991) reviewed the pain literature and stated,

> "One pathway originates in several regions of the cortex. It descends to the periaqueductal gray matter of the midbrain, travels through the reticular formation, and projects finally to the inhibitory dorsal horn nociceptive neurons. Cognitive distraction through purposeful activities can activate the cortical pain-modulating system" (p. 34)

This cognitive distraction is a neuro event in perception which interrupts a person's experience of the pain. This phenomena is in keeping with the Gate Control Theory in that the distracting stimulus closes the gate of pain perception. Chesky and Michel further explain the descending influence by stating,

> "The second pathway apparently originates in the limbic system and sends projections to the hypothalamus, midbrain, medulla, and dorsal gray matter of the spinal cord.... This system is responsive to affect, emotions, and changes in mood" (p. 34).

These two pathways linking to the dorsal horn and to the limbic system provide further explanation of the cooperative connections between physical experience and emotion.

Pain medications are, of course, an appropriate way to treat pain. However, it is widely agreed that administering the least amount of pain medication necessary results in a reduction in adverse outcomes related to intrusive pain management (Gloth, 2000). Because of this and the evidence that the emotions and physical experience are inherently linked, non-pharmacological means of reducing a patient's pain is an important component in treatment along with appropriate medication management. Many of the professionals who deal directly in treating patients with pain are psychologists, mental health counselors, (Craig & Rollman, 1999) and others. Music therapists and music therapy researchers are among these professionals and have addressed these areas for decades.

Music Therapy for Treating Pain

Several studies indicate the effectiveness of music in treatment for pain perception. Rider (1985, 1987) showed positive effects in reducing the perception of pain through music-mediated imagery. Brown (1991) found music effective in suppressing the perception of pain in the postoperative recovery room. Malone (1996) used live music to distract pediatric patients during needle insertions and effectively reduced the perception of pain. Nichols (2000) found a significant improvement in pain and anxiety levels for emergency room patients receiving

intravenous needle insertions. Listening to tape recorded music with headphones (synthesized music, harp, piano, orchestral, or slow jazz styles) was found to be an effective intervention in reducing postoperative pain levels of abdominal surgery patients (Good, Stanton-Hicks, Grass, Anderson, Choi, Schoolmeesters, & Salman, 1999). Several nursing journals site music listening as an effective intervention in assisting patients to reduce perception of pain (Bamason, Zimmerman, & Nieveen, 1995; Good, Stanton-Hicks, Grass, Anderson, Lai, Royulchaloen, & Adler, 2001; Zimmerman, Nieveen, Bamason, & Schmaderer, 1996; Momhinweg, 1992). Standley (1986) reported in her meta-analysis of music therapy for medical and dental treatment procedures that live music was found to be more effective than recorded music in reducing anxiety and increasing pain thresholds.

In treating suffering and pain behaviors, an early study by Wolfe (1978) used group discussion and music tasks to effectively address the needs of patients in a chronic pain rehabilitation program. Using a behavioral approach, the patients showed improvement in verbal interactions and participation in exercise activity. Curtis (1986) found that exposure to music improved relaxation, physical comfort, and feelings of contentment for individuals who were terminally ill. Rider addressed the needs of spinal pain patients (1985) and chronic disease and pain patients (1987) by using the !so-principle. This focuses on Altshuler's ideas that "after having matched music to the existing mood of a person, the mood can be altered through gradual changes in the music" (Dileo & Bradt, 1999, p. 183). Another early study done by Goloff (1981) found that patients with hospital stays of two to ten weeks

responded positively to music therapy as evidenced by improved attitude towards hospitalization, decreased physical discomfort, and significant improvement in mood. When studying hospitalized oncology patients Bailey (1983) found that listening to live music produced a greater level of vigor and lower levels in tension-anxiety than recorded music, as well as changes in physical discomfort and mood. These positive results were likened to the energizing element in the human connection during live music sessions.

Gfeller (1992) summarized ways that music therapists can assist patients in the reduction of their perception of pain, specifically, by facilitating the patient's active focus or distraction to the music, the patient's relaxation response, using music as a masking agent and information agent, and as a positive environmental stimulus. With the incorporation of appropriate prescribed interventions, music may be used to maximize pain reduction and boost a sense of well being.

Music Therapy and Physical Rehabilitation

In the physical rehabilitation setting, it is the physicians, nurses, care team and therapists who are charged with the responsibility of providing patients with quality care and interventions to assist in their return to optimal functioning. For those who are healing and working through the rehabilitation process, many find themselves confined to a wheelchair either temporarily or indefinitely. Upper body strength becomes a focus of treatment. By building upper body strength, a person will be able to experience greater control and self-reliance during and after the rehabilitation process while they are (literally) getting back on their feet.

Occupational Therapists are often the first therapists to address upper extremity strength through individual and group therapy sessions. It is widely acknowledged that exercise promotes health, and in the physical rehabilitation sessions this is an imperative. The benefits of exercise include "delaying age-related changes, improving psychosocial outcomes, preventing falls, enhancing quality of life, and ultimately decreasing health care costs" (Grove & Spier, 1999, p. 188).

The use of nonpharmacological interventions including music were examined for pain and anxiety after total hip and total knee arthroplasty surgery (Pellino, Gordon, Engelke, Busse, Collins, Silver, & Norcross, 2005.) The researchers compared pain and anxiety levels for patients post surgery who did or did not use a kit of nonpharmacological pain reduction materials which included a standard music collection for listening. They found that the participants who had access to and used the nonphannacological strategies subsequently decreased their amount of opioid intake.

In a community exercise study done with well elderly women, compliance with participation was the focal point of the study (Grove & Spier, 1999). The women needed specific structures in place to motivate them, even for those who were relatively healthy and able to exercise. These included exercising with a nurse as leader and exercising in a large group together for the social benefits. They were reluctant to exercise independently, in small groups, or in the community for fear of injury. This phenomenon is not unique to independent living situations. Keeping the patient involved and invested in their therapy program can be a challenge. Grove and

Spier (1999) found a range of 43% to 79% participation in different stages of the exercise program - during the initial phase of the study participation was higher, and declined thereafter as the motivation to continue wained.

The results from a study with bone marrow transplant patients indicated that music "helped to increase exercise endurance over the long term, ... and the patients themselves preferred the relaxation and comfort received from music" (Boldt, 1996, p. 186). MacNay (1995) studied the perceived exertion, mood and time estimation of exercising in cardiac rehabilitation patients. Scores improved for subjects involved in the preferred-music listening condition as compared to the no music conditions. In a study conducted by Johnson, Otto, and Clair (2001), researchers investigated the effect of instrumental and vocal music on adherence to a physical rehabilitation exercise program with elderly persons. The protocol followed the major tenets of rhythmic auditory stimulation (RAS) with consideration of tempo, meter, and rhythm for music enhanced exercising as compared to a non-music condition. Results showed increases in adherence to exercising in 6 of the 14 prescribed exercises by measuring the number of repetitions completed. Unsolicited comments from the participants indicated that their enjoyment was also a motivator for attending the sessions.

In Kim and Koh's 2005 study, the researchers investigated the effects of music on pain perception during upper extremity joint exercise with stroke patients. There was no significant evidence that the music conditions were more beneficial than non-music conditions. The researchers attributed this to a small sample size, to

the participants' difficulty with the pen and pencil test for reporting pain, and the potential biological issues relating to pain perception and effects of stroke, for which they had not considered. Because the testing procedures were also inherently different than the regular routine of previous sessions, more demands were placed on the participants and possibly affected the results. It was anecdotally noted by the researchers that participants made positive comments that they liked the experience, and participants demonstrated "strong motivation in continuing their upper extremity exercise even after the completion of the study," (p 91).

Researchers have provided neurophysiological evidence that there is a profound, strong connection between rhythmicity, brain function, and physical response (Thaut, Kenyon, Schauer, & McIntosh, 1999). The consistency of rhythmic music functions as an external timekeeper to organize and entrain motor responses (Thaut, 1999), and it appears that the human central nervous system is hard-wired for efficient response to a predictable rhythmic pulse. This occurs in the typically developed and functioning person, and has been researched extensively for persons with movement disorders as well (McIntosh, Brown, Rice, & Thaut, 1997; McIntosh, Thaut, Rice, Miller, Rathbun, & Brault, 1995; Thaut et al, 1999; Thaut & McIntosh, 1992). Repetitive movement is perceived as easier for the patient to extend range of motion, hitting the target center, and endurance for physical tasks when entrained to a rhythmic pulse (Thaut, 1999). This may be the physiological link to that which we refer to as motivation. It is applicable to persons with weakness or movement issues in general.

In reviewing the literature, only a handful of the research studies (Wolf, 1978; Boldt, 1996; Johnson et al, 200 I; MacNay, 1995; Kim & Koh, 2005) were found that investigated the dual relationship between pain perception and pain affect and considered these aspects while subjects wereactively engaged in strenuous physical activity during the rehabilitation process. However, the music was used primarily for active attention to acute physical pain and for coping. With the exception of Rider's studies (1985, 1987) and Kim and Koh's study (2005), these studies did not review the effect of the music on the pain perception in combination with the suffering and pain behavior constructs. This is significant in real world settings when patients may find it difficult to participate fully in their therapy program. In their review of the literature relating to music therapy and pain research, Michel and Chesky (1995) advocated for greater replication of the studies to add to greater reliability, as well as more complete descriptions of the treatment procedures for effective replication. Their survey results found that 75% of the music therapists working with patients experiencing pain used music to change a patient's mood, and only a few therapists used live music activities as a part of their treatment protocols. In addition, recent studies conducted by professionals without music therapy training found that music distraction did not provide adequate relief from acute pain symptoms in the emergency and surgery recovery room settings (Tanube, Thomas, Paice, Spiller, & Marcantonio, 2001; Cepeda, Diaz, Hernandez, Daza, & Carr, 1998; Good, 1995).

In considering the literature, music appears to be a stimulus that can draw the attention away from a person's pain, while at the same time assist in motor

functioning. The use of rhythm seems to be both a way to focus on the external stimulus rather than the pain experience, while also attending to the inner physical experience of movement. It seems to be that music can trigger responses from the limbic system, synchronize movement to stimulate efficient use of muscle fibers, and reduce the perception of physical pain for elderly persons. How significant these changes are would be information well worth knowing.

The purpose of this study is to identify the effects of using rhythmically synchronized live music in upper extremities exercise sessions on pain perception, mood, and exercise adherence in the physical rehabilitation setting with and without music. Patients who were in treatment for bone or joint reconstruction surgeries (knee, hip, limbs, or non-traumatic spine) served as the population.

Null Hypothesis

(I) There will be no difference in reported pain levels for participants who listen to live music which is synchronized to prescribed movements over those who participate in sequenced rhythmic movements without music.

(2) There will be no difference in reported mood levels for participants who listen to live music which is synchronized to prescribed movements over those who participate in sequenced rhythmic movements without music.

(3) There will be no difference in observed adherence to exercise for participants who listen to live music which is synchronized to prescribed movements over those who participate in sequenced rhythmic movements without music.

CHAPTER III

METHODOLOGY

Subject Selection

Thirty inpatients, age 65 and older, included in the Upper Extremities (UE) Exercise group on the Orthopedic Rehabilitation unit of the Rehabilitation Institute of Chicago (RIC) served as participants. The unit serves the rehabilitation and medical needs of adult patients primarily recovering from re-constructive bone and joint surgeries (knee, hip, limbs and non-traumatic spine). Participants are referred to the UE exercise group by their treating physician and primary occupational therapist. As defined in the Rehabilitation Institute of Chicago Occupational Therapy Guidelines (see Appendix A), inclusionary criteria for referral to the UE Exercise group are the need to enhance upper extremities range of motion strengthening and/or active tolerance, the ability to tolerate a group environment, and the ability to follow an exercise program with demonstration cues. The study used a convenience sample; all the patients in the group were invited to participate at 11:00 a.m. or 1:30 p.m. on Mondays between February 16, 2004 and April 12, 2004 (9 sessions), depending on scheduling of therapies and appointments. The average length of stay for participants was 13 days. No participants attended any of the treatment sessions more than once.

Group A consisted of 6 men and 8 women, averaging 77 years old, with a mean length of stay of 14 days. Group B consisted of 3 men and 13 women,

averaging 74 years old, with a mean length of stay of 12 days. Although all the participants were being treated on the same unit, participants carried significantly varied primary diagnoses (see Table 1) and pain management regimens (see Table 2). Beyond pain medications, two participants were prescribed the antidepressant Zoloft (25 mg HS), one participant was prescribed the antidepressant Paxil (Paxil 20mg HS) and one participant was prescribed the antipsychotic medication Risperdal (lmg HS 2100 PO). Only one participant carried a secondary diagnosis, which was Early Alzheimer's Disease. Due to the lack of access to the daily medical record, data was not collected on the actual amount or time the medications were taken during the day. Only the physicians orders were collected, not the actual time or amount of medication taken.

Primary Diagnosis on Admission	Secondary Diagnosis on Admission
Acute Renal Failure/ Right Total Knee Arthroscopy	None
ASF/Replacement PSF	None
Bilateral Total Knee Arthroscopy	None
Bilateral Total Knee Arthroscopy	None
Bilateral Total Knee Arthroscopy	None
Brainstem Infarction	None
Critical Stenosis C3-4	None
Deconditioning S/P Pneumonia	None
Deconditioning S/P Prolonged Hospital Stay	None
Gait Instability/ Falls	None
L3-L5 LAMI	None
Left Hip Fracture	None
Left It Fracture, Gamma Nail 3/6	None
Left Sub/Inf Pubic Ramos Fracture	None
Left Total Hip Arthroscopy	Early Alzheimers
Left Total Hip Arthroscopy	None
Left Total Hip Arthroscopy	None
Left Total Hip Arthroscopy	None
Lumbar Spine Decompensation, L2-L5 Spinal Fusion	None
Multiple Level Vertebroplasty	None
Proximal Lower Extremities Weakness, DM, Neuropathy	None
Right Acetabular Fracture	None
Right Total Hip Arthroscopy	None
Right Total Hip Arthroscopy	None
Right Total Hip Arthroscopy	None
Right Total Hip Arthroscopy	None
Right Total Hip Arthroscopy Revision	None
Right Total Knee Replacement	None
S/P Right Ankle ORIF	None
T7-T8 LAMI / T5-T9 Fusion	None

Table I. Primary and Secondary Diagnosis on Admission

Prescribed Pain Medications
Acetaminophen 650 mg Q4H PRN
Acetaminophen Q4H PRN; Darvon Pulvules Q4H PRN
Analgesic Balm Q4H PRN (topical)
Aspirin 325mg 8am/8pm; Tylenol 650mg Q4H
Dilandid 2 mg Q4H prn; Oxycontin CR 20 mg BID
Methadone HCI 2.5 mg QID; Tylenol 650 mg Q4H prn
None
None
None
None
None
Norco I0/325 bid; Norco I0/325 Q4H pm; Tylenol 650 mg Q4H prn
Norco I0/325 bid; Norco 10/325 Q4H prn; Tylenol 650 mg Q4H prn
Norco I0/325 Q4H I tab
Norco I0/325 Q4H PRN
Norco I0/325 Q4H prn; Lidoderm 3 each, QAM; Tylenol 650mg Q4H
Norco I0/325 Q4H prn; Tylenol 650 mg Q4H prn
Norco I0/325 Q6H; Tylenol 650mg Q4H
Norco 5/325 Q4H, Norco 10/325 8 7 12:00
Norco 5/325 qQ4H prn
Oxycontin CR IO mg BID
Tylenol 500 mg Q6H prn
Tylenol 650 mg BID, Ultram 50 mg Q4H prn
Tylenol 650 mg Q4H prn
Tylenol 650 mg Q4H prn; Norco 5/325 Q4H prn
Tylenol 650 mg Q4H; Vicodin 5/500 Q4H
Tylenol Q 4h, 650 mg
Tylenol w/ Codeine H3 Q6H; Ulfiam 50 mg Q4H; Tylenol 650mg Q4H
Ultram 50 mg, Q4H prn; Tylenol 500 mg Q8H prn
Vicodin 5/500 Q4H prn; Ultram 50 mg Q4H prn; Tylenol 650 mg Q4H prn

Table 2. List of Prescribed Pain Medications

Apparatus

As defined in the RIC Occupational Therapy Guidelines (Appendix A), the purpose of the group was:

- "To increase endurance to enhance performance of basic and instrumental activities of daily living.
- To increase active range of motion of both upper extremities to allow for ease of performing basic and instrumental activities of daily living.
- To learn a home exercise program which can be done post discharge" (p. 1).

The incorporation of music was addressed in the Occupational Therapy Guidelines stating, "Music should not be distracting to class participants or others treating in the area. Music should be chosen to fit group goals and not to serve as background music," (p. 2). The protocol for incorporating music into the ongoing UE Exercise group was developed in consultation with an Occupational Therapist and a Certified Occupational Therapy Assistant (COTA), both on the treatment team at the RIC.

Rhythmic Auditory Stimulation (RAS) is a therapeutic music experience designed to enhance motor functioning through the use of an external, regular, predictable pulse (Thaut, 1999), and was chosen as the primary technique for music facilitation.

The group exercises were predetermined by the Occupational Therapy Department. Several exercises incorporate Proprioceptive Neuromuscular Facilitation (Meyers, 1995; Meyers, 1981), a traditional physiotherapeutic approach that is comprised of various patterns of movement and posture "with attention to sensory stimulation from manual contacts, visual cues, and verbal commands to bring

as many favorable influences as possible to bear on the patient" (Meyers, 1995, p. 474). Incorporation of music into this protocol is a natural extension of the theory in that music adds to the sensory information imparted to the patient.

A handout of exercises was given to each patient for home use (see Appendix A) prior to discharge, and was used to design therapeutic music experiences to accompany the exercise.

The recommendations for clinical application identified in Standley's 1986 meta-analysis of medical/dental treatments were also considered in creating a uniform group protocol for the session. These include the following recommendations:

> I) "Evaluate patient's baseline capacity for exercise in terms of speed, duration, repetitions, etc.
> 2) Select style of music that matches above traits and also desired kind of motor movement (i.e., disco music for forceful movements, waltz music for fluid movements).
> 3) Model appropriate movements and teach patient to match them to music.
> 4) Change music in successive approximations as patient progresses. In this category, patient's music preference is important but is secondary to the music's matching properties with desired exercise.
> 5) Teach focusing (if exercise routine requires it) by pointing out musical elements for which the patient might listen.
> 6) Reinforce exercising, pain-free verbalizations, matching the exercise to the music, focusing attentiveness, and overt signs of patient's motivation to succeed or progress" (p. 84-85).

The first of Standley's guideline as stated above had been considered initially for this population by the Occupational Therapists who designed the exercises. The fourth guideline regarding graduating the exercises over time was not applicable due to the one time treatment protocol. The other guidelines were adhered to in designing the treatment protocol.

The songs selected for use in the protocol were based on three considerations: I) patient preference data collected in a pilot investigation on the unit prior to the experimental study, 2) published research indicating the ten most preferred titles as reported by a sample of geriatric population, and 3) consideration of the most rhythmically and musically appropriate compliments to the set of prescribed exercises done each day in the UE group.

First, a pilot investigation was conducted to identify the preferred musical selections of the population to be tested. Song selection data was collected from sessions on the unit with male (n= 4) and female (n= 25) patients in group and individual music therapy between March 22, 200 I and June 15, 200 I. Patients were asked to choose the songs they would most prefer to hear from a list of 78 songs (see Appendix B), comprised of familiar American pop and folk songs regularly used in music therapy sessions. This list of 78 songs was compiled in 1998 by this researcher in response to two years of direct contact working with this population, pulling from songbooks and by taking suggestions from patients. The list has many songs in common with those compiled by the Music Educators National Conference (1996) songbook, "Get America Singing... Again!" which highlighted the most popular songs of American folk music. Suggestions made by patients for songs that were not on the list were also recorded and tallied. The cumulative data of patient selections was analyzed in order to identify the top 15 songs. The results of the survey in order of preference and number of requests can be seen in Table 3.

Preference Order	Song Title	Number of requests
1.	He's Got the Whole World in His Hands	7
2.	Edelweiss	5
3.	Love Me Tender	5
4.	Amazing Grace	4
5.	Home On the Range	4
6.	Let Me Call You Sweetheart	4
7.	Tennessee Waltz	4
8.	This Land is Your Land	4
9.	Yesterday	4
10.	Your Cheatin' Heart	4
11.	Hush Little Baby	3
12.	Puff the Magic Dragon	3
13.	Sentimental Journey	3
14.	She'll Be Coming Around the Mountain	3
15.	You Are My Sunshine	3

Table 3. Songs Most Requested by Patients During Pilot Investigation

Second, Moore, Staum and Broton's 1992 survey of musical preferences of 514 persons older than 65 years identified the following songs to be the most preferred titles. They were in order of preference as follows: 1) You Are My Sunshine, 2) Star Spangled Banner, 3) Let Me Call You Sweetheart, 4) By the Light of the Silvery Moon, 5) God Bless America, 6) America the Beautiful, 7) My Wild Irish Rose, 8) Shine on Harvest Moon, 9) Amazing Grace, and 10) How Great Thou Art.

The third consideration for song selection was the elements of the musical stimulus. The specific exercises used for the protocol were those defined by the Occupational Therapy team, and were familiar to the patients involved in the daily groups. Musical consideration was then given by this researcher for the most appropriate choices for the accompaniment, including: rhythm, meter, tempo, and

form. The "theme" or real-world application of the movement was also considered. For example, the song selected for a shoulder exercise resembling swinging one's arms from side to side while clasped in front of the body as if rocking a baby was "Hush Little Baby." The songs and associated movements are listed in Appendix C. The lyrics sung by this researcher were only slightly modified to fit the number of repetitions for the prescribed exercise (see Appendix D.) Texture and dynamics were added later to further inform the participants on directionality and force of movements.

A six-string nylon acoustic guitar was used by the researcher to accompany singing the treatment songs. A metronome was used to begin each exercise and maintain a consistent beat across sessions. (See Appendix C for tempo markings.) Group members sat in a circle facing inward. This investigator with the guitar and data collection tools (video camera) was on the opposite side of the circle. The investigator asked the participants, "Can you hear this? Is this a comfortable volume for you?", to assure their ability to hear the stimulus. All responded affirmatively.

Questionnaires

As Michel and Chesky (1995) stated in their survey of music therapists working with patients in pain, more music therapists need to use recognized and standardized forms of measurement. Through this commitment, the research will be more widely accepted by professionals outside the very specialized field of music therapy. This recommendation was considered by the researcher when reviewing the many measurement tools for this study.

In their review of pain measurement scales, Jensen and Karoly (1996) advise to "define the dimensions of pain relevant to one's purposes, and to demonstrate that the selected dimensions are conceptually related to pain and distinct from one another," (p. 136). Pain intensity, pain affect, and pain location are the three dimensions to consider. For this study, it is most appropriate to select tools to measure pain intensity and pain affect. Because the study was not focusing on pain location specifically, a tool was not used to gather this information. The special needs of the geriatric population were also considered. One such consideration was the avoidance of using a Visual Analog Scale **(VAS),** commonly used in pain measurement, which has been documented as difficult for the elderly to use effectively (Jensen and Karoly, 1996). Also considered was the necessity for a quickly administered tool in a group setting that is essentially self-explanatory, sensitive to change over a brief amount of time, and easy to score.

For pain intensity and pain affect, the short-form McGill Pain Questionnaire (SF-MPQ) was selected (Melzack, 1987). The longer, standard form of the MPQ is reliable, valid, and sensitive to change following therapeutic interventions. Although the SF-MPQ has been tested less, it has been reported to be equally reliable, valid, and sensitive to change (Melzack & Katz, 1994). In a study of cognitively impaired nursing home residents, the pain affect and intensity sections of the MPQ were the assessment tools with the highest completion rate of five pain assessment tools (Ferrell, Ferrell and Rivera, 1995). The short form evaluates intensity and affect only. The SF-MPQ consists of 15 words from the MPQ that are representative of the

affective and sensory categories of the standard form. Each of the 15 words are rated on a scale from zero to three. The descriptive words are as follows: throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, splitting, tiring-exhausting, sickening, fearful, and punishing-cruel. Participants were instructed to place a check next to the words that describe how they were currently feeling with a corresponding rating of O(none), I (mild), 2 (moderate), or 3 (severe).

The SF-MPQ also contains a visual analog scale with the anchors "no pain" and "worst possible pain." As discussed earlier, there are limitations in using the VAS with the elderly, so the numerical graphic rating scale of ratings from zero to ten was used instead, with the same anchors of "no pain" and "worst possible pain." The validity of the Numeric Rating Scale (NRS) has been well documented, demonstrates sensitivity to treatments that are expected to impact pain intensity, is easy to administer and easy to score, may be treated as ratio data, and is appropriate to use with geriatric populations (Jensen and Karoly, 1996). lt is essentially the same as the VAS with the addition of the numbers and corresponding lines. Presented in a graphic format, the NRS is an I I-point rating scale from O to I0, where O represents one end of the pain intensity continuum, "no pain", and the IO represents the other extreme, "worst possible pain". Participants circled the number that best described their current pain intensity level.

The final part of the SF-MPQ is the present pain index like that in the standard form. It is a six point rating scale from O to 5, with written descriptors as

follows: 0 - no pain; 1 - mild; 2 - discomforting; 3 - distressing; 4 - horrible; and 5 - excruciating. Participants were instructed to place a check next to the word descriptions to indicate how they were feeling.

Researchers reported that traditional measures of mood may be ineffective in reflecting exercise-induced changes in subjective states (Byrne & Byrne, 1993). Because of this, the Feeling Scale (FS) was also chosen for use in this study as another measure of affect, not specific to pain. It was constructed to measure dynamic changes in affect during physical exercises (Rejeski, Best, Griffith & Kenney, 1987). It is an 11-point bipolar scale ranging from -5 to 5 with word descriptors from very good to very bad. Specifically, -5 = very bad, -3 = bad, -1 = fairly bad, 0 = neutral, 1 = fairly good, 3 = good, and 5 = very good. This scale was developed and reported to be sensitive to the positive and negative mood states as defined on the Multiple Affect Adjectives Check List (Zuckerman & Lubin, 1965). FS scores are directly associated with the positive value of physical activity as identified by participants and is sensitive to negative feeling states (Hardy & Rejeski, 1989). The FS is not foreign to the music therapy literature either. McNay (1995) used the FS to assess the influence of preferred music on mood before and after exercise with patients in cardiac rehabilitation. Haneishi (2001) used the FS to assess the influence of the Music Therapy Voice Protocol (MTVP) on mood through pre- and post-test measures for patients with Parkinson's Disease. It is a simple index for evaluating the pleasure-displeasure dimension of affect (Frijda, 1988) during physical work.

Rejeski, Gauvin, Hobson, and Norris (1995) asserted that consideration should be given to how a person *perceives* the demands placed on him or her, or how a person feels when being required to exercise. Because one person may respond to challenging exercise with excitement or vigor and another may perceive such exertion as miserable, it is an important consideration in measuring how hard the participants feel they are working. On the post-test, an additional question was added to gain a sense of level of effort or strain perceived by the participant of the routine. These ratings of perceived exertion (RPE) were collected using the Borg scale (Borg, 1985). It consists of numerical values ranging from 6 to 20 with modifiers (6 = No exertion at all, 7.5 = Extremely light, 9 = Very light, 11 = Light, 13 = Somewhat hard, 15 = Hard (heavy), 17 = Very hard, 19 = Extremely hard, 20 = Maximal exertion) to describe the participants perceived exertion. Reliability is reported to be high and many studies have used this measurement (Rejeski et al. 1995).

The paper-and-pencil version of the tasks was chosen for confidentiality and ease of use in the group setting. Although the MPQ is given primarily as a verbal interview, pain intensity has been shown to not be effected by the paper-and-pencil format (Klepac, Dowling, Rokke, Dodge, & Schafer, 1981). For all of the paper-and-pencil tasks, the type face used was 16 point Arial font to assist those with farsighted vision.

The Philadelphia Pain Questionnaire (Eimer & Freeman, 1998) was considered also for its evident validity and sensitivity to change, however it was ruled out since it is usually presented in VAS format. The long form of the MPQ was

considered (Melzack, 1975a) but was also ruled out due to the necessity for IO to 15 minutes of testing time for completion. This was deemed to take too long for the design of this study.

Several other measures were evaluated to gather affect or mood scores. The Geriatric Depression Inventory (Sheikh and Yesavage, 1986) was eliminated because it essentially evaluates depressive symptoms for long-term needs related to clinical depression, rather than mood states in the moment. It was also not concise enough to use in a group format due to time constraints. The State Trait Anxiety Inventory (Speilberger, Gorusch, Lushene, Vagg, & Jacobs, 1983,) the Multiple Affect Adjective Check List (Zuckerman et al, 1965) and the Profile of Mood States (McNair & Droppleman, 1981) were considered but ruled out due to lack of ease of use in a group setting. The Bonny (1983) Scale of Mood inventory was considered for its ease of use and clear understanding, but ruled out due to its lack of standardization and limited use only in the music therapy setting.

In summary, the tools for measuring pain intensity perception, pain affect, mood, and perceived exertion were identified. Pretest and post-test questions consisted of the Short-Form of the McGill Pain Questionnaire (SF-MPQ) with the substitution of a Numerical Graphic Rating Scale instead of the Visual Analog Scale, the Feeling Scale, (Appendix E) and the additional Rate of Perceived Exertion scale on the post-test only (Appendix F).

Observation Forms

Because there are inherent limitations in a study which uses only self-reported data, observational measures were considered as a reliability test to the participants self-reports. According to Hadjistavropoulos and Craig, (2002),

> "Self-report measures primarily capture expressive pain behavior that is under the control of higher mental processes, whereas observational measures capture behavior that is less subject to voluntary control and more automatic. Automatic expressive behaviors are subject to less purposeful distortion than are behaviors dependent upon higher mental processes. Observational measures can be used and have clinical utility as indices of pain when self-report is not available, for example, in infants, young children, people with intellectual disabilities or brain damage, and seniors with dementia" (p. 551).

Craig and Prkachin (1983) and Linton, Melin, and Stjernlof (1985) were among the researchers who aimed to develop observational assessment tools for pain assessment but neither proved to be appropriate for a diverse clinical population (Simons & Malabar, 1995). Simons and Malabar developed an observation form of pain behaviors for nurses to use with elderly non-verbal patients (1995). Pain behaviors such as grimacing and guarded postures may not be reliable indicators across populations because of difference in coping styles, cultural backgrounds, and potential anxiety and depression issues (Closs, 1994). Because of the complexities related to observational methods of pain, the choice was made to measure adherence to exercise protocols instead.

In the 2001 study done by Johnson et al., counting frequencies of movement repetitions by the participants was found to be an inappropriate measure of exercise adherence. Because some participants had poor form while doing the exercise, and others completed the exercises quicker than others, and others paused their

movements while singing along, it was concluded that the frequency of movements did not give an accurate account of participation and adherence to the exercise routine. As suggested by Johnson et al., the frequency of time intervals in which participants were appropriately engaged in the prescribed movements was a behavior measurement of the adherence to exercise. Conversely, the frequency of time that participants are not engaged in the prescribed movements would indicate a lack of adherence to exercise. This method was chosen for collecting data through observation for the study.

Each session was videotaped and observed post session by this investigator and two trained observers. The observers were shown how to use the Behavior Analysis Form (see Appendix G) and what behaviors to watch for on the videotape, specifically, when the participants pause in their exercising during the music or counting. Resting as a group between exercises was considered not applicable. The investigator and observers then watched the tapes together at the same time. Each time a participant was observed to be resting for more than one second, the tape tape was rewound and the investigator and observers all agreed to the moment the participant stopped and then resumed exercise. For participants who stopped and did not resume until the next set of exercises, time was counted through the end of the given exercise. All participants resumed at the beginning of each exercise. The time spent resting as a group between exercises was not counted. Participant confidentiality was maintained because their seating number was the code used for data collection (see Appendix H). Names were not disclosed, and the researchers did

not use the participants name during the treatment session in an effort to further maintain confidentiality on the videotape.

It should be noted that several biological measures were considered as well. Occupational therapists, physical therapists, and a member of the nursing staff were consulted for their expertise. Heart rate and oxygen levels were considered using the pulse-ox machine available on the unit at RIC. Because the act of exercising is a physically involved process, it was expected that the participant's heart rate would increase and their oxygen consumption levels would increase therefore, these markers could not be exclusively attributed to the music/non-music conditions. Because the study was also designed to be conducted in a group environment, more sophisticated testing methods such as EKG levels were not feasible. Within the context of the participants' regular therapy and exercise regimen, the buildup of lactic acid in the muscle tissues could not be linked solely to the treatment conditions. These measures could not be considered indicators of change of mood or pain levels alone, due to the nature of the physical exercise.

Data that was collected from the medical records database included participant admission date, discharge date, date of birth, gender, primary diagnosis upon admission, secondary diagnosis, pain and antidepressant medications taken one day prior to, the day of treatment, and one day post treatment. These data were intended for data analysis (see Appendix I.)

Research Design

A pre-test post-test between subjects group design was used. According to scheduling, participants were assigned by the unit staff for either the 11 a.m. or 1:30 p.m. UE exercise group, but not both. Only those patients referred for group were invited to be participants. (See Appendix A for the criteria for referral and group membership.) For each group, membership was not consistent from session to session, and participants received only one treatment session.

The protocol for Group A was conducted in five live music sessions, consisting of live singingt, guitar playing, and the metronome. Data was collected on a total of 14 participants for Group A. The protocol for Group B was conducted in four rhythmic counting sessions consisting of live counting to the metronome. Data was collected on a total of 16 participants for Group B. Because of a significant rate of refusal to participate and the low census numbers during the time of the study, a small sample size of 30 was used. Data was not collected on the days or numbers of potential participants who refused to participate in the study.

Procedures

In all treatment groups this investigator was present to distribute and collect the participant's self reports. In Group A this investigator used a six-string acoustic guitar, metronome, and voice for the treatment stimulus. In Group B this investigator used a metronome and counted rhythmically to the same number of exercise repetitions as was done in Group A but without music (guitar or singing).

Participants who were younger than age 65 or chose not to participate in the study participated in the group exercising but were not videotaped and were not asked to fill out the pencil-and-paper questionnaires. No patients were removed or withdrew from the study (see Appendix J.) Treatment sessions were held in the common area of the unit where all of the UE exercise groups are held.

A specific music therapy protocol was used to ensure consistency in treatment sessions, (see Appendix K). Presentation by the investigator was made in the team meeting for the staff and physicians to infonn subjects of the study (see Appendix L). This included being informed of the study by his/her treating physician (see Appendix M), signing the informed consent documents (see Appendix N), completing the pretest (see Appendix E), exercising with or without music, and then completing the post-test (see Appendix F). Analysis of the videotape was conducted post session, and behavior observations were recorded on the frequency of participants not actively engaged in exercise (see Appendix G).

As patients congregated in the session room, they were asked by this investigator if they would be willing to answer a few questions about how they were feeling, and then do their exercises with music or counting depending on the treatment group. The investigator never left the treatment site, and was present during the treatment sessions to produce/administer the music or rhythm and to answer questions. At no point during the session did the investigator discuss the variables or purpose of the study with any participant, nor leave the session.

CHAPTER IV

DATA ANALYSES AND RESULTS

The pretest and post test self report data was collected and entered into a Microsoft Excel spreadsheet by the investigator. Participant age, gender, admission and discharge dates, prescribed medications, and diagnostic information was collected from the medical records, and entered onto a data form (see Appendix I.) It was then transferred onto an Excel spreadsheet by this investigator. Data was analyzed with the computer program Statisxl with which means and standard deviation of pain affect scores, pain intensity scores, Feeling Scale scores for mood, and RPE scores were calculated.

The probability of a pretest treatment interaction was considered. The two-tailed Mann-Whitney U test (chosen because it is a non-parametric test for non-ordinal data) was used to analyze the data from self-reports to compare pretests between Groups A and B. Each of the constructs that appeared on the self report pretest (specifically, McGill's pain affect questions of Throbbing, Shooting, Stabbing, Sharp, Cramping, Gnawing, Hot-Burning, Aching, Heavy, Tender, Splitting, Tiring-Exhausting, Sickening, Fearful, Punishing-Cruel, McGill's pain intensity scores Oto IO and Oto 5, and the Feeling Scale -5 to 5,) were analyzed. A score of under or equal to 54 would have enabled rejection of the null hypothesis. As seen in Table 4, pretest scores ranged from I06 to 154 therefore were not found not to

be significantly different, (n= 14, 16; *df*- 13/15, p=0.05,) so the Mann-Whitney was conducted on the post-test data with the inclusion of the Rate of Perceived Exertion which was a post-test only measure. Results again showed no significant difference in scores between groups on the post tests, and ranged between 116 and 169. For the post-test only measure of RPE, the Mann-Whitney revealed a score of 118, higher than the 54 needed to rejection of the null hypothesis. Based on the results *(df*- 13/15, p=.05), Group A participants showed no significant difference to Group B (see Table 4).

	Pretests comparisons between A and B	Posttests comparisons between A and B
Throbbing	141.0	169.0
Shooting	138.5	146.5
Stabbing	135.0	138.0
Sharp	117.5	146.5
Cramping	124.5	116.5
Gnawing	138.5	128.5
Hot-Burning	123.5	121.0
Aching	154.5	118.0
Heavy	109.0	117.0
Tender	152.0	145.0
Splitting	123.5	143.5
Tiring-Exhausting	123.0	121.5
Sickening	137.5	124.0
Fearful	128.0	129.5
Punishing-Cruel	136.0	137.5
Intensity I - 10	106.0	146.5
Intensity 0 - 5	117.5	121.0
Feeling Scale -5/+5	117.5	117.5
RPE	-	118.0

Table 4. Mann-Whitney U Test Scores Combined for Groups A and B

Due to the subjective nature of the nonparametric scales, that it was a test done over time, and because of the small sample size, the Wilcoxon Signs Rank Test

(*n* = 14, 16; df - 13/15, p=0.05), was chosen to compare pretest and posttest scores within groups. Each of the constructs that appeared on the self-reports (again, McGill's pain affect questions of Throbbing, Shooting, Stabbing, Sharp, Cramping, Gnawing, Hot-Burning, Aching, Heavy, Tender, Splitting, Tiring-Exhausting, Sickening, Fearful, Punishing-Cruel, McGill's pain intensity scores 0 to 10 and 0 to 5, and the Feeling Scale -5 to 5) were analyzed and results are listed in Table 5.

	Group A pretest to posttest analysis results	Group B pretest to posttest analysis results
Throbbing	25.5	11.5
Shooting	10.0	0.0
Stabbing	12.0	3.0
Sharp	9.0	8.0
Cramping	9.0	6.0
Gnawing	15.0	3.0
Hot-Burning	9.0	0.0
Aching	20.0	4.0
Heavy	5.0	2.0
Tender	24.0	6.0
Splitting	2.0	4.0
Tiring-Exhausting	13.5	27.5
Sickening	9.0	3.0
Fearful	6.5	4.0
Punishing-Cruel	6.5	0.0
Intensity 1 - 10	17.0	24.5
Intensity 0 - 5	12.0	10
Feeling Scale -5/+5	9.5	23.5

Table 5. Wilcoxon Paired Signs Test Results between Pre and Post Tests

Based on the Wilcoxon Paired Signs Test results, neither Group A or Group B participants showed any significant change in any of the scores from pre to post test. A score under or equal to 26 for Group A (n= 14) and 36 for Group B (n= 16) would have enabled rejection of the null hypothesis. As can be seen in Table 5,

"Throbbing" and "Tender" approached statistical significance in Group A from pre to post test with scores of 25.5 and 24 respectively. No scores reached significance for Group B *(X^2=36).*

In looking at the data further, the mean scores of the groups were considered and some trends presented themselves. Group A's mean scores for the McGill pain affect scores were calculated for the pretest and the posttest. As seen in Figure I, the pretest means (throbbing: 0.86; shooting: 0.57; stabbing: 0.36; sharp: 0.64; cramping: 0.50; gnawing: 0.57; hot-burning: 0.50; aching: 1.21; heavy: 0.38; tender: 1.00; splitting: 0.43; tiring-exhausting: 0.93; sickening: 0.36; fearful: 0.29; punishing-cruel: 0.36,) and posttest means (throbbing: 1.29; shooting: 0.71; stabbing: 0.50; sharp: 0.79; cramping: 0.43; gnawing: 0.36; hot-burning: 0.29; aching: 1.00; heavy: 0.29; tender: 0.86; splitting: 0.50; tiring-exhausting: 0.79; sickening: 0.43; fearful: 0.36; punishing-cruel: 0.43,) were very similar and followed a similar trend line.

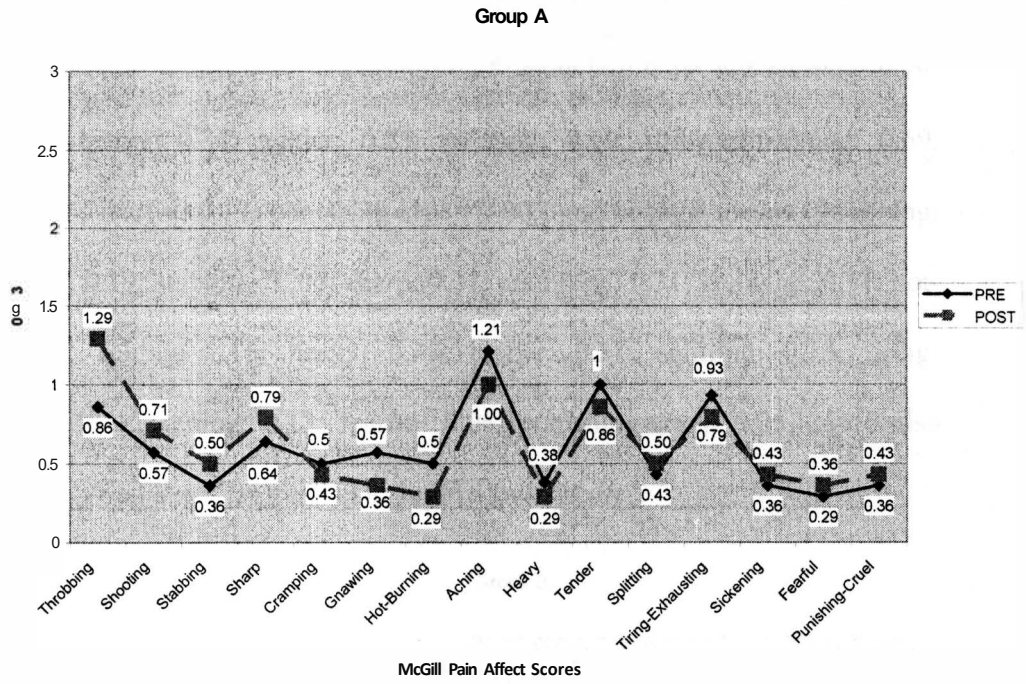


Figure 1. Group A Mean Pain Affect Scores

As seen in Figure 2, Group B's pretest means (throbbing: 0.50; shooting: 0.06; stabbing: 0.19; sharp: 0.50; cramping: 0.25; gnawing: 0.19; hot-burning: 0.19; aching: 0.50; heavy: 0.31; tender: 0.25; splitting: 0.19; tiring-exhausting: 0.69; sickening: 0.06; fearful: 0.13; punishing-cruel: 0.00,) and posttest means (throbbing: 0.38; shooting: 0.19; stabbing: 0.06; sharp: 0.31; cramping: 0.31; gnawing: 0.31; hot-burning: 0.25; aching: 1.13; heavy: 0.38; tender: 0.31; splitting: 0.13; tiring-exhausting: 0.88; sickening: 0.13; fearful: 0.06; punishing-cruel: 0.06,) were also similar and followed a similar trend at a slightly lower score.

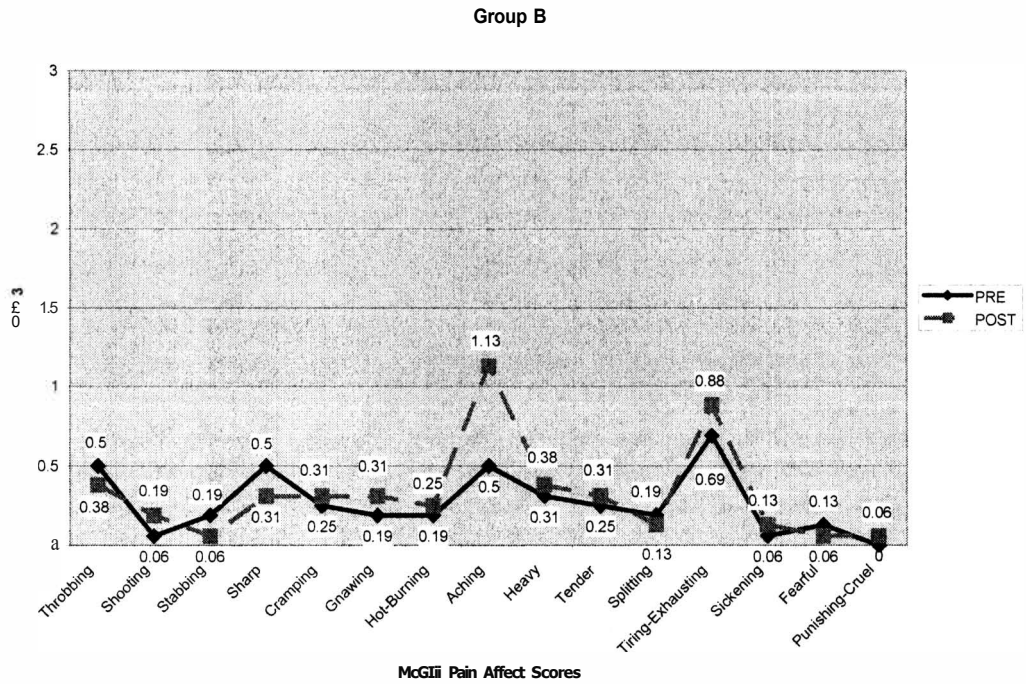


Figure 2. Group B Mean Pain Affect Scores

In considering the comparison of pretest between groups, Group A pretest means (throbbing: 0.86; shooting: 0.57; stabbing: 0.36; sharp: 0.64; cramping: 0.50; gnawing: 0.57; hot-burning: 0.50; aching: 1.21; heavy: 0.38; tender: 1.00; splitting:

0.43; tiring-exhausting: 0.93; sickening: 0.36; fearful: 0.29; punishing-cruel: 0.36,) and Group B pretest means (throbbing: 0.50; shooting: 0.06; stabbing: 0.19; sharp: 0.50; cramping: 0.25; gnawing: 0.19; hot-burning: 0.19; aching: 0.50; heavy: 0.31; tender: 0.25; splitting: 0.19; tiring-exhausting: 0.69; sickening: 0.06; fearful: 0.13; punishing-cruel: 0.00,) showed a similar trend appeared as seen in Figures 3.

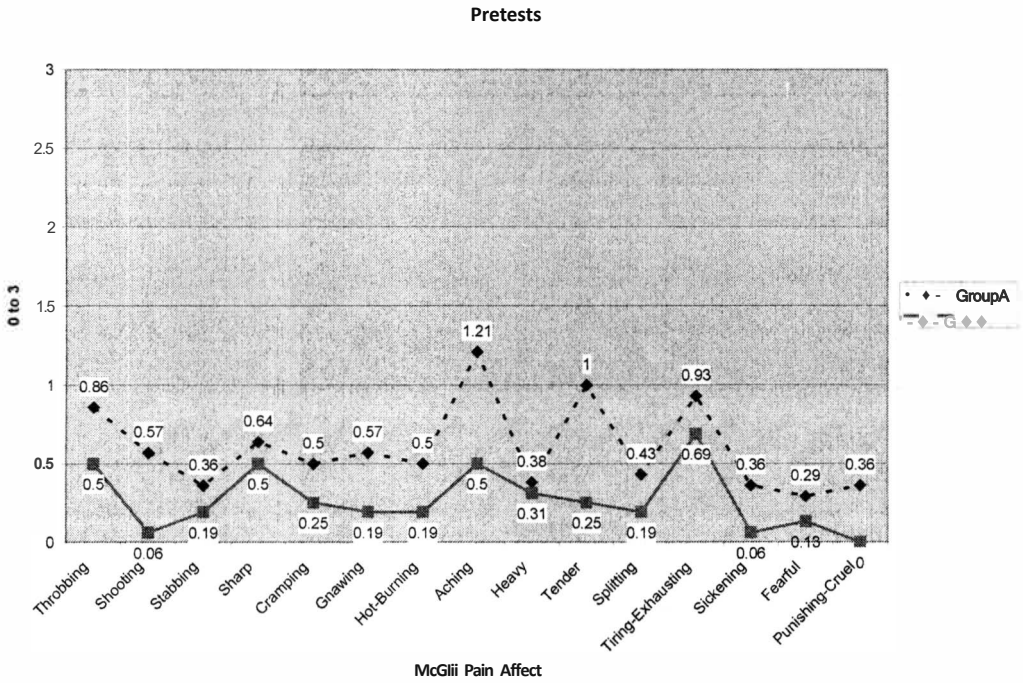


Figure 3. Mean Pretest Scores of McGill Pain Affect

Again, the same trend between Group A posttest means (throbbing: 1.29; shooting: 0.71; stabbing: 0.50; sharp: 0.79; cramping: 0.43; gnawing: 0.36; hot-burning: 0.29; aching: 1.00; heavy: 0.29; tender: 0.86; splitting: 0.50; tiring-exhausting: 0.79; sickening: 0.43; fearful: 0.36; punishing-cruel: 0.43,) and Group B posttest means (throbbing: 0.38; shooting: 0.19; stabbing: 0.06; sharp: 0.31;

cramping: 0.3 I; gnawing: 0.31; hot-burning: 0.25; aching: 1.13; heavy: 0.38; tender: 0.31; splitting: 0.13; tiring-exhausting: 0.88; sickening: 0.13; fearful: 0.06; punishing-cruel: 0.06,) was noticed (see Figure 4.)

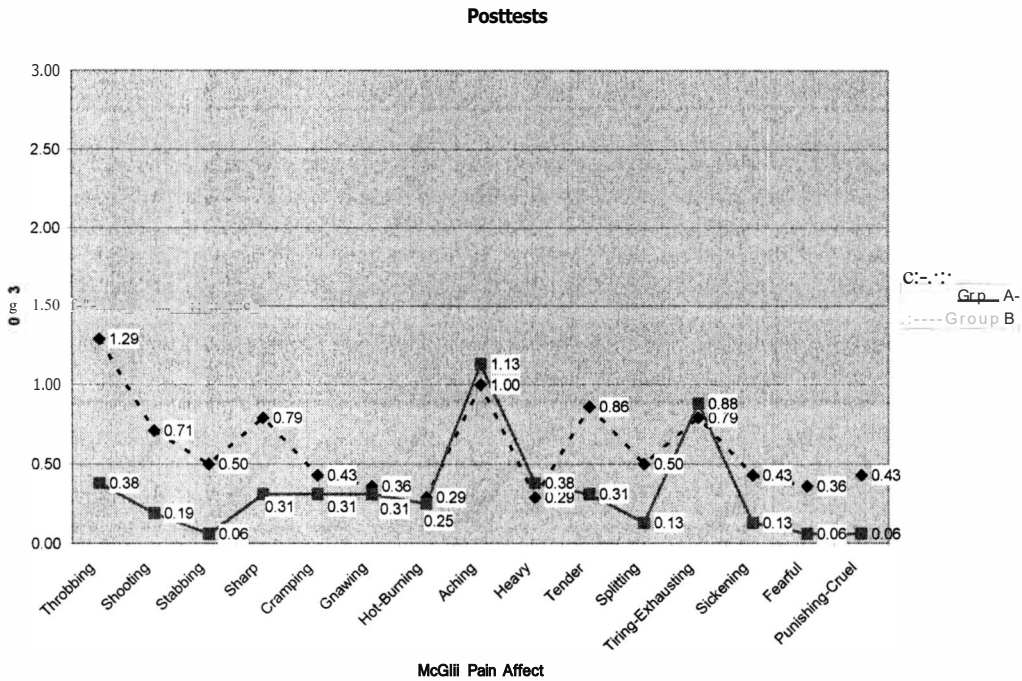


Figure 4. Mean Posttest Scores of McGill Pain Affect

The McGill Pain Affect Scores as listed above were then collapsed, and considered in context of the other data collected including the McGill Intensity scores, Feeling Scale, RPE scores, and observed amount of time spent resting. Similar trends emerged between Group A and Group 8. The means of Group A pretest were .60, 3.57, 1.36, 1.71 for Affect, Intensity I to 10, Intensity Oto 5, and Feeling Scale respectively. Post test scores were 0.60, 5.00, 1.57, 2.50 for Affect,

Intensity I to I0, Intensity 0 to 5, and Feeling Scale respectively. Post test only scores for RPE and observed time resting were 11.86 and 13.36 seconds respectively (see Figure 5.)

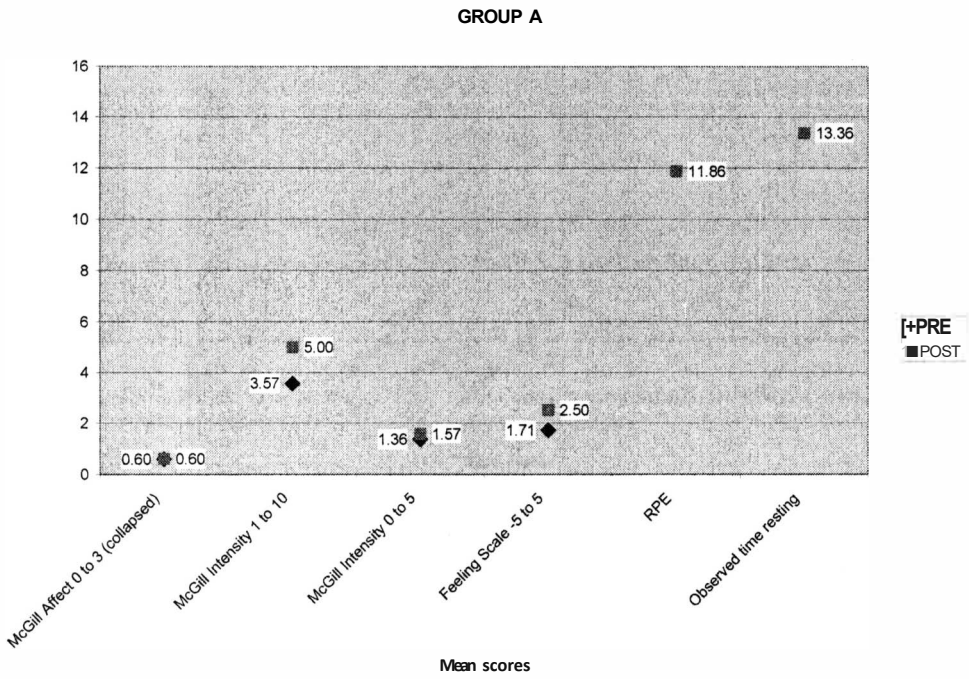


Figure 5. Group A Mean Scores

The means of Group B were .27, 3.57, .93, and 2.64 for Affect, Intensity I to I0, Intensity 0 to 5, and Feeling Scale respectively. Post test scores were o.33, 3.25, 1.19, 2.38 for Affect, Intensity I to I0, Intensity 0 to 5, and Feeling Scale respectively. Post test only scores for RPE and observed time resting were 12.25 and 13.56 seconds respectively. (See Figure 6.)

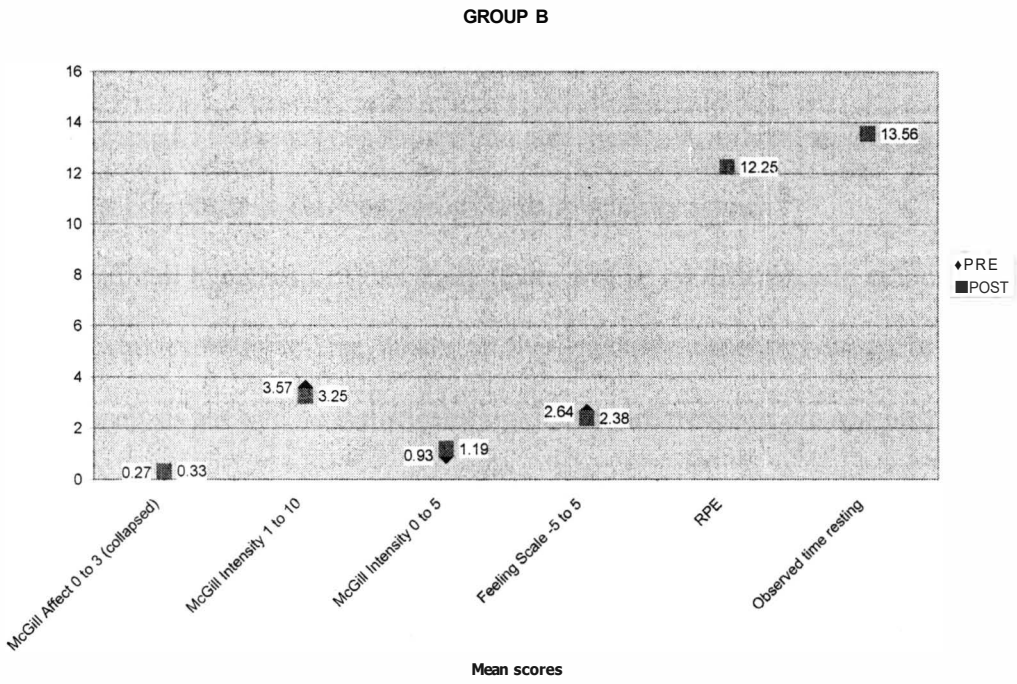


Figure 6. Group B Mean Scores

Videotapes were analyzed by the investigator and two volunteers. At each interval that there was the cessation of participant activity, the two volunteers and this investigator agreed to the exact stop time and resumption time of each participant's active exercise as seen on the videotape. Calculation of inter-rater reliability was not necessary due to the verbal agreement while watching the videotape done by the investigator and two volunteers. Group A spent an average of I3.36 total seconds resting during active exercise (see Figure 5.) Group B spent an average of 13.56 total seconds resting during active exercise (see Figure 6.) This .2 second difference in the total 20 minute session showed very little change.

Based on the results, the first null hypothesis of this study (there will be no difference in pain levels for participants who exercise to live music or live rhythmic counting) was accepted. Data analysis showed no statistically significant difference in pre and post test comparisons between groups in pain intensity scores.

The second null hypothesis of this study (there will be no difference in mood for participants who exercise to live music or live rhythmic counting) was also accepted. Data analysis showed no statistically significant difference in pre and post test comparisons between groups in the Feeling Scale or McGill pain affect scores.

The third null hypothesis of this study (there will be no difference in adherence to exercise for participants who exercise to live music or live rhythmic counting) was also accepted. Data analysis showed no statistically significant difference in groups in the post test only exertion ratings or observed behavior of adherence to exercise.

Data was collected from the medical records database regarding participant admission date, discharge date, date of birth, gender, primary diagnosis upon admission, secondary diagnosis, pain and antidepressant medications taken one day prior to, the day of treatment, and one day post treatment. Although these were considered for data analysis, analysis was not completed since no significant levels of change were indicated in the initial analysis of the treatment data. Since the results of the study could not be interpreted further, there was no need for further interpretation through analysis of covariance.

CHAPTER V

DISCUSSION

The purpose of this study was to identify the effects of using rhythmically synchronized live music in upper extremities exercise sessions on pain perception, mood, and exercise adherence in the physical rehabilitation setting with and without music. The results showed there were no effects of such interventions.

One study may point to further explanation for the findings here. In 1997, Thaut, Rathburn, and Miller studied the effects of music versus a metronome timekeeper during a rhythmic motor task. They found similar responses by the subjects when participating in a finger tapping exercise to music and to a steady beat. This was essentially the findings of this current investigation. When considering the mean scores as shown in the results section figures, very similar experiences were reported by both the participants of Group A and Group B and the trend lines are strikingly similar. It should be pointed out that a metronome was used to keep the steady tempo in both Groups A and B for this study when both the rhythmic counting and the voice/guitar served as the stimulus. It could be stated that the results of this study actually show that there is no difference in exercising to music or exercising to a rhythmic pulse, and confirm the findings of Thaut, Rathburn, and Miller. In considering this further, it may be argued that the "no music" treatment in the current study was not actually devoid of music, in that there was a predictable rhythmic pulse

facilitated by the metronome and the human voice counting along. That which was missing in this "no music" condition was meaningful lyrics, melody, and harmony. Rhythm and the spoken voice remained.

Having that said, there also seemed to be a lack of the "energizing element" that Bailey referred to in her 1983 study. She found that listening to live music produced a greater level of vigor and lower levels in tension-anxiety than recorded music, as well as changes in physical discomfort and mood, and likened it to the energizing element in the human connection during live music sessions. Chesky and Michel (1991) also referred to the pathways in the brain linked to the limbic system, and the pleasurable experiences often associated with listening to music. Due to the desire to maintain a high level of consistency between groups, this researcher did everything possible to not vary the treatment conditions between groups. In groups prior to the study, the researcher had been able to take the liberty of changing the music at will to accommodate the differences in group members from session to session. This lack of flexibility due to the rigidity of the research protocol may have made the sessions less enjoyable for the participants, not fully exploiting the pleasurable or energizing component of music-making. It may prove useful for future studies of this type to include sessions without any type of consistent musical intervention, that is, to exercise in the typical fashion without the contribution of music or a consistent rhythmic pulse. Results may differ with this lack of music as a control group.

Problems arose during the study related to recruitment. First, this researcher did not anticipate that many of the potential participants would choose not to participate. Some explained that they did not want to be videotaped when they were not looking their best. Data on the number and reasons for refusals to participate was not collected. Second, the consent forms that the participants needed to complete prior to participation in the study were extremely long. Seven pages to read and sign seemed excessive for this study, and those that did not want to go through it all chose not to participate in the study. For those who did take the time, approximately 15 minutes needed to be dedicated at the beginning of group before the protocol could even begin. Lastly, this researcher was only able to be on site during actual days when the research was being conducted. This lack of rapport with the physicians on the unit made it impossible to ensure that the patients were being adequately informed of the study prior to the day of the session. No data was gathered from the physicians regarding their efforts in recruiting participants. The sample size was half of what had been intended.

Many pre-intervention group differences were also inherent in the study, which limited the ability to compare and contrast the groups. There was a large variety in diagnoses, different times of day that the treatment was conducted, different music based stimulus existed throughout the environment beyond just the treatment stimulus (television, other radios, etc.), social forces influenced the participants willingness to or not to participate, and data regarding the time of day which each participant received pain medication was not accessible. In some

instances, participants commented that their pain level was a "zero" because they had just taken their medication. The simple presence of the videocamera may also have had an impact on participant's comfort with active exercise.

As reported earlier, there are also limitations inherent in using self-reports as the primary data collection tool. Because of the limitations of doing such a study in a group context, this pencil and paper tool was the only practical way to gather data. It would be recommended in the future to have staff and lab resources available to collect pulse and blood oxygenation levels, or other biological measures, or look at a different set of data entirely that focused more on participant satisfaction levels. Such data collection measures may have revealed additional information.

That having been stated, this researcher believes that the participants involved in the UE group had a greater level of satisfaction with the session when music was involved. This is because of the many anecdotal comments that were made to this researcher over many months of co-facilitating the group with the Certified Occupational Therapy Assistant. When this researcher arrived on the unit with guitar in hand, a heightened level of excitement was sensed in the groups, and the participants made comments such as wanting to have music to exercise to every day. Theoretical underpinnings support this hypothesis, as described earlier in the literature review.

In looking at the literature, treatment models which address developmental, physiological, psychological, sociocultural, and spiritual variables can affect a patient's return to wellness (Kain, 2000). In the clinical setting, Sedei-Godley (1987)

found that patients who had more positive attitudes, optimism towards treatment, and an internal locus of control had greater treatment results than those with pessimistic or negative views. Aratjizik (1994), stated that psychological approaches strengthen coping skills, and tasks such as using biofeedback, hypnosis, imagery, and music provide relief from not only physical pain but also anxiety and distress associated with pain. Ruud (1997) suggested that music increases awareness and feelings of vitality, can provide a sense of belonging, and can create a sense of meaning and coherence in life for persons in treatment. Such outcome measurements may be a more appropriate measures than pain intensity, mood, perceived exertion and exercise adherence in future studies.

APPENDIX A

Rehabilitation Institute of Chicago Occupational Therapy Guidelines

REHABILITATION INSTITUTE OF CHICAGO
OCCUPATIONAL THERAPY GUIDELINES

SUBJECT: CARE OF PATIENTS	Number OT.ill.2
	REVISED: 03/07/02
TITLE: GROUP/CLASS TREATMENT OVERVIEW	PAGE: 1 of 2

Occupational Therapy Practitioners utilize group/class treatment to promote the achievement of goals set in individual Occupational Therapy treatment. Group/class treatment is considered appropriate when this service delivery model can enhance specific goal achievement and/or provide exposure and experience that can not be provided in individual treatment, address patient, family and caregiver need and facilitate goal attainment in a cost-effective manner.

Specific objectives are set for each group with general objectives for groups being set as follows:

1. To achieve goals set in individual treatment sessions.
2. To practice skills and equipment use introduced in individual treatment.
3. To introduce therapeutic equipment and techniques for goal accomplishment appropriate to abilities.
4. To promote learning, problem solving, and adjustment through interactions with others with similar disabilities.
5. To promote self-responsibility and problem solving through reduced staff to patient ratio.

It is the policy of the Rehabilitation Institute of Chicago that the following standards be followed:

Starting Times:

Patients are scheduled to report to all occupational therapy groups at the start of the therapy hour. The group leader may start the class as soon as a majority of patients are present and should start no later than ten minutes past the hour. Late patients may be admitted to class at the group leader's discretion and billed accordingly.

Limiting Group Size:

The group leader may elect to limit the group size if it interferes with group effectiveness. The group leader should speak to the supervisor or resource clinician regarding specific problems that limit group effectiveness prior to limiting group size. When maximum group size is reached it is up to the discretion of the group leader as to how to accommodate additional patient referrals. The therapist is to consider each patient's need for the group and may opt to take actions such as placing the referral on a waiting list or discharging a current group member and adding the new referral to the group.

Visitors:

Patients' families or visitors are allowed to observe group sessions. If they disrupt the group in any way, the group therapist should request that they leave the area. Visitors/family members may only assist the patient they are involved with and only after instruction by and under the group therapist's supervision. Other patients, staff, or visitors not involved in the class should be restricted from the area of the group.

Discharging Patients:

Three indications for discharging patients from a group:

- If the patient masters the skills that are the goal{s) of the group, so the latest referral can join the group, the primary therapist must be notified so he/she can enroll the patient in an advanced group if appropriate.
- Disruptive patient behavior.
- Decreased participation and/or frequent absences from the group.

Activities:
The group !eade has the responsibility of org2rizing 3ppropriate group 2ctivities. The gr0up therepist shou!d consider goa.is of tile group, safety, and efficiency when pianning activities. A group therapist may schedule a special activity for a group that may require expanding group time or changing group locale (e.g. an out-trip by ihe group to the store). The group therapist should discuss changes with the supervisor/resource clinician. Announcements and schedule changes will be made.

in some cases, major structure changes are warranted (e.g. revised format for the community integration group). Any ideas to change ihe structure or organization of the group neecis to be discussed with the supervisor/resource clinician and then announced to the staff.

Groups can meet outside at the discretion of the group therapist provided that the therapist meets the safety and supervision needs can of the patient(s). Music and sports/games can be used to augment group goals. Music should not be distracting to class participants or others treating in the area. Music should be chosen to fit group goals and not to serve as background music.

Age-appropriate games are a change of pace for patients and staff and allow for increased awareness of patient abilities in selecting leisure activities. Some patients do not see games as therapeutic and may choose not to participate. It is suggested that the group as a whole be asked to select and plan the game activity in advance.

The group therapist should be monitoring any distractions that interfere with functioning of class activities. This inc!udes dealing directly with people walking through the group, others treating too close to the group area, etc.

Charges: Group and Class treatment is considered any treatment rendered with a patient to staff ratio of one therapy practitioner to three or more patients. Group is defined as a session when three or more patients are working under the supervision of one therapist and performing individualized exercise programs. Class occurs when three or more patients are performing the same activities as directed by the therapist. There are separate charge codes in RICIS for group and class. An occupational therapy practitioner, trained aides and volunteers may be utilized to augment staffing as appropriate.

If only one or two patients show up for a group, the patient(s) could work on group activities with the group leader (charges would reflect as a "single" or "double charge") "Single charges are entered whenever a patient is seen one to one with a service provider. "Double" charges are utilized whenever one service provider is treating two patients during the same time period.

Referral/Interaction with primary therapist:
Occupational therapy groups accept referrals from all programs, including outpatients. Groups are staffed on a unit basis to meet the specialty needs of that program.

Patients must be referred to groups by a primary therapist who is responsible for that patient's care plan. That therapist or a designee continues to monitor the patient keeping the group leader informed of need for upgrading or other changes in the program that may arise and documents progress made in group treatment with feedback from the group leaders.

Staffing:

Occupational therapy groups are rotated every three months or per unit discretion. This allows opportunities for staff development and varies group leadership responsibilities. Groups will be routinely monitored by the supervisor or resource clinician as needed.

All therapists are expected to participate in group programs. This is to ensure that ail staff learn group p,:,,ciples and techniques, gain an understanding of the activities in each group, and can do coverage in ·,a-'cup groups. Coordination of scheduling therapists into groups is dependent on staffing and other **m ' s • 7e- tson a unit.**

Clinical Educator OT
Center for Clinical Excellence

Director
Center for Ciinical Excellence

REHABILITATION INSTITUTE OF CHICAGO
OCCUPATIONAL THERAPY GUIDELINES

SUBJECT: CARE OF PATIENTS

Number: OT.111.3
REVISED: 03/07/02

TITLE: IMPORTANT CONSIDERATIONS FOR OCCUPATIONAL THERAPY GROUPS/CLASSES

PAGE: 1 of 1

Rehabilitation Institute of Chicago occupational therapy practitioner_s should consider the following when entering patients into Occupalional Therapy Groups.

1. Patients with an unstable spine without an orthosis are not enrolled in class/group.
2. Patients who are on "spinal precautions" are not to be positioned in prone, unless specifically ordered and indicated on referral form. Refer to policy regarding spinal precautions.
3. A patient who was previously wearing a spinal orthosis (SOMI, Halo, etc.) is not to be accepted into group without the orthosis until an order has been received that indicates that the spine is stable without the orthosis.
4. All patients with drug resistant organisms or immunocompromised host precautions will be managed according to the Body Substance Isolation guidelines.
5. Patients with strictfrespiratory isolation are not allowed to attend group.
6. For patients with drug-resistant organism precautions, indicate location and type of organism and procedures required when managing the site of concern. The patient is not permitted to attend group if personnel are routinely required to gown, glove, or mask during transfers or treatment of the patient. The patient is allowed in the group if support staff are available to exclusively tend to the patient's needs. The primary O.T. will supply group therapist with Hibiclens.
7. Considerations when referring a patient with specific pulse, blood pressure or respiratory parameters which must be monitored during the group sessions:

   - Patients must have specific physician orders indicating that the patient may attend the group.
   - If the group leader feels that monitoring the patient or a number of patients becomes too disruptive to the group, the group leader should contact the allied health supervisor regarding how best to handle the situation (i.e., remove a patient from the group).
   - If vital signs do not remain within parameters, the patient's therapist, floor supervisor, or physician will be called depending on the circumstances.

8. Patients with 0 2 or other devices may attend class if the device does not interfere with the patient's performance in the group. When functional mobility is one of the group activities, patients with these devices should <u>not</u> be enrolled in the class unless the patient or a private *duiy* nurse can manage the device(s).
9. For patients with external fixators, note presence and any precautions.
10. -Indicate any weight bearing precautions for any patient.
11. Indicate any seizure precautions for any patient.
12. Patients requiring frequent suctioning are not allowed to attend group unless a caregiver accompanies the patient and is able to manage the secretions. Patients who require occasional suctioning are permitted to attend the group as identified by the specific group criteria and only if the group leader has successfully completed suctioning competency.
13. Indicate any specific comments concerning behavior, communication, private duty nurse, etc.

Clinical Educator OT
Center for Clinical Excellence

;'Director
Center for Clinical Excellence

REHABILITATION INSTITUTE OF CHICAGO
OCClJPATIONAL THERAPY Gu1DELINES

SUBJECT: CARE OF PATIENTS	I Number: OT.ill.4 REVISED: 03/07/02
TITLE: OCCUPATiONAL THERAPY GROUPiCLASS OVERViEW PROCEDURE	PAGE: 1 of 1

Rehabilitation Institute of Chicago Occupational Therapy practitioner undertakes the following steps when a patient is appropriate to participate in a group/class:
A patient is scheduled for a particular grcup/c!ass by his pr:mary therapist according to the patient's specific needs/goals. The patient's primary therapist is responsible for initially filling out a group referral form, informing the group/class therapist of any changes in the patient's program/status, and documenting progress made.

Group/class therapists cannot accept new patients into a group/class without complete referral information.
In addition, a patient must be seen by a occupational therapist practitioner prior to entering a Group/class so that accurate information is given and that proper group placement is done.

RESPONSIBLE PARTY:	ACTION:

Primary Therapist	- Evaluates patient prior to enrolling patient in a group/class
	- Schedules patient for the appropriate group/class
	- Completes group referral form sheet paying special attention to the following:
	  - **The date cf the first scheduled appointment**
	  - The days scheduled
	  - Specific patient diagnosis - e.g. left CVA with expressive aphasia
	  - All precautions. Include positioning limitations secondary to pressure sores/areas and sitting tolerance
	- Monitors patient progress

Group/Class Therapist	- Monitors group/class attendance sheets for completeness and accuracy - Notifies primary therapist regarding patient attendance and performance in group/class (when issues or concerns arise or goals have been met) - Does not allow patients into group/class without accurate and updated information

Clinical Educator OT
Center for Clinical Excellence

-J;rectoi
::site· for C'in1cal cxce lence

REHABILITATION INSTITUTE OF CHICAGO
OCCUPATIONAL THERAPY GUIDELINES

SUBJECT: CARE OF PATIENTS	Number: OT.III.7
	REVISED: 03/07/02
TITLE:OCCIJPATIONALTHERAPYENDURANCE GRQTIP/CT.ASS_SITBACTITIE 345	PAGE: 1 of 1

Purpose of the Group

- To increase endurance to enhance performance of basic and instrumental Activities of Daily Living.
- To increase active range of motion of both upper extremities to allow for ease of performing basic and instrumental Activities of Daily Living.
- To learn a home exercise program (HEP) which can be done post discharge.

Criteria

- The patient needs to enhance his/her upper extremity active range of motion, strengthening and/or activity tolerance.
- The patient must be able to tolerate a group environment and can follow an exercise program with demonstration cues.

Referral Process

The primary therapist completes the group referral form and turns it into the group leader. The primary therapist must select which upper extremity home exercise program activities are to be performed in the group (arm bike, theraputty, theraband, dowel rod or active range of motion), the number of repetitions, amount cf \." eight and/or amount of rests allovved. !f more than one session is to occur, the primary therapist must indicate a specific goal for discharge from the group. Since the group can last up to 1 hour, the primary therapist must specify if the patient needs to stay in the group for a specific amount of time (usually an issue when building activity tolerance is the focus of the group session).

Format

Each patient participates in the HEP indicated on the referral form. Unless otherwise indicated by the referring therapist, the patient only attends the session for the amount of time it takes to complete the HEP.

Group/Class Staffing and Census

The patient to therapist ratio is 4.1.

Time and Location of the Group/Class

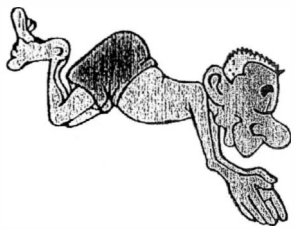
The group occurs daily and is scheduled twice during the day from 10:00a.m. – 11:00a.m. and 11:00a.m. – 12:00p.m. The group is held in the 8th floor.

Clinical Educator OT
Center for Clinical Excellence

Director
Center for Clinical Excellence

Upper Body Endurance Exercises

- I l,i;1d up ..:md down.
- I nok riqht, look left.
- k<111cl, ri; 1ls to both shoulders.
- I,fllll :;i1oulders forward.
- I\oll shoulders back.
- Lill silould to touch ears.
- Circle ;;1rm forward and then back.
- Cl;:1p :1bove your head.
- Touch head, shoulders, knees. Rcper1t.
- Arms out to front, bend to touch sr1oulders.
- "Scarecrow." Hands up, then down.
- "Sr:mecrow." Touch elbows in front.
- Pull fruit from a tree, put it in a basket.
- "Stars." Hand◆-8.D if houlders, then explode thefJl:<?sYt « w ct and up.
- Rowing forw,§(◆JHeo:,,qack.
- Stir the soup tp (!ry◆,\\igt, t, then left.
- "Lawn mower."
- "Hitch hiking."
- Rock the baby to the right and left.
- Lift the bay up to front, then down.
- "Scissors." With straight arms, cross both arms in front of body, then out to sides.
- "Cheerleader." One hand on chest, one arm out to side, straight, then switch.
- Back stroke.
- Front stroke swimming.
- Big arm circles front and back.
- Elbows circles, hands on shoulders.
- Flipping pancakes on the knees.
- "Pump-ups." Bending elbows.
- Frog swimming with arms.
- Rowing forward and back.
- Punch! Punch!
- "Arm kicks." Elbow pointing out, then straighten arm to ceiling.



Work at your own pace. Try tQ (:lo 20 repetitions of each exercise. Never hold you(bre.ath,:;Inhale as your arms leave your body; exhale asJhey <{me back to the center. Remember! S ile':ahcfenjoy yourself!

APPENDIX B

Songs For All Ages

Songs For All Ages

1.	All My Lovin'	40.	Joy to the World
2.	Amazing Grace	41.	Killing Me Softly
3.	America, the Beautiful	42.	King of the Road
4.	And I Love Her	43.	Kumbaya
5.	Annie's Song	44.	Leavin' On a Jet Plane
6.	Are You Sleeping	45.	Let It Be
7.	Aura Lee	46.	Let Me Call You Sweetheart
8.	Bad Bad Leroy Brown	47.	Let There be Peace on Earth
9.	Battle Hymn of the Republic	48.	Love Me Tender
10.	Bill Bailey	49.	Michelle
11.	Bingo	50.	The More We Get Together
12.	Blowin' in the Wind	51.	My Favorite Things
13.	Both sides Now	52.	On the Road Again
14.	Bridge Over Troubled Waters	53.	Proud Mary
15.	Clementine	54.	Puff the Magic Dragon
16.	Country Roads	55.	Raindrops Keep Falling on My Head
17.	Daisy Bell (Bicycle Built for Two)	56.	Red River Valley
18.	Danny's Song	57.	Rock Around the Clock
19.	Do You Want to Know a Secret	58.	The Rose
20.	Don't Think Twice, It's Alright	59.	Scarborough Fair
21.	Edleweiss	60.	Sentimental Journey
22.	Fire and Rain	61.	She Love You
23.	Five Hundred Miles	62.	She'll Be Coming 'Round the Mountain
24.	The Gambler	63.	Shenandoah
25.	Greensleeves	64.	Simple Gifts
26.	Hard Day's Night	65.	Sounds of Silence
27.	He's Got the Whole World in His Hands	66.	Sunshine on My Shoulders
28.	Help	67.	Take it Easy
29.	Home on the Range	68.	The Times They are A-Changin'
30.	House of the Rising Sun	69.	Tennessee Waltz
31.	Hush Little Baby	70.	This Land is Your Land
32.	I Can See Clearly	71.	Turn, Tum, Turn
33.	I Saw Her Standing There	72.	White Corral Bells
34.	I'd Like to Teach the World to Sing	73.	With a Little Help from My Friends
35.	I've Been Working on the Railroad	74.	Yesterday
36.	I've Got a Name	75.	You Are My Sunshine
37.	If I had a Hammer	76.	You Needed Me
38.	In the Good Old Summertime	77.	Your Cheatin' Heart
39.	It's a Small World	78.	You've Got a Friend

APPENDIX C

Exercises for Both Treatment Groups

Exercises for Both Treatment Groups

(In Group B the accompanying song is omitted)

Prescribed movement	Number of repetitions	Accompanying Song	Tempo, beats per minute
Pull fruit across from tree right, Put in basket at side of left knee	16	You are My Sunshine-chorus	Quarter note = 80
Pull fruit across from tree left, Put in basket - right knee	16	You are My Sunshine-verse 1	
Pull fruit across from tree right, Put in basket - left knee	16	You are My Sunshine -verse 2	
Pull fruit across from tree left, Put in basket - right knee	16	You are My Sunshine-chorus	
Stars - hands on shoulders then explode them outward and up	16	Battle Hymn of the Republic - verse 1	Quarter note = 80
Clap above your head	8	Battle Hymn of the Republic - chorus	
Stars - hands on shoulders then explode them outward and up	16	Battle Hymn of the Republic - verse 2	
Clap above your head	8	Battle Hymn of the Republic - chorus	
Scarecrow Arms - Hands up then down	16	Let Me Call You Sweetheart -chorus	Dotted quarter note = 58
Scarecrow- Touch elbows in front	16	Let Me Call You Sweetheart - repeat chorus	

Exercises for Both Treatment Groups (continued)

Rowing forward	8	Row Row Your Boat	Quarter note = 80
Rowing backward	8	Row Row Your Boat	
Rowing forward	8	Row Row Your Boat	
Rowing backward	8	Row Row Your Boat	

Large arm circles front (windmill)	16	Home on the Range - verse 1	Eighth note = 126
Elbow circles front (windmill)	16	Home on the Range - chorus	
Large arm circles sides (windmill)	16	Home on the Range - verse 2	
Elbow circles sides (windmill)	16	Home on the Range - chorus	

Hitch hiking thumb right	16	On the Road Again - verse 1	Quarter note = 80
Hitch hiking thumb right	16	On the Road Again - chorus	
Hitch hiking thumb left	16	On the Road Again - bridge	
Hitch hiking thumb left	16	On the Road Again - verse 2	

Rock baby side to side	8 (4 / side)	Hush Little Baby - verse 1 "Hush Little Baby..."	Quarter note = 60
Rock baby side to side	8 (4 / side)	Hush Little Baby - verse 2 "If that diamond ring...	
Lift baby up front and down	8 (4 / position)	Hush Little Baby - verse 3 "If that billy goat...	
Rock baby side to side	8 (4 / side)	Hush Little Baby - verse 4 "If that dog..."	

APPENDIXD

Songs and Song Lyrics

Songs and Song Lyrics

You Are My Sunshine

You are my sunshine, my only sunshine.
You make me happy when skies are gray.
You'll never know dear how much I love you.
Please don't take my sunshine away.

The other night dear as I lay sleeping
I dreamed I held you in my arms
But when I woke dear, I was mistaken
So I hung my head and I cried.

I'll always love you and make you happy
If you will always do the same
But if you leave me for another
You'll regret it all someday.

You are my sunshine, my only sunshine.
You make me happy when skies are gray.
You'll never know dear how much I love you.
Please don't take my sunshine away.

Battle Hymn of the Republic

Mine eyes have seen the glory of the coming of the Lord,
He is trampling out the vintage where the grapes of wrath are stored,
He hath loosed the fateful lightning of His terrible swift sword,
His truth is marching on.

Glory, glory, Hallelujah, Glory, glory. Hallelujah.
Glory, glory hallelujah, His truth is marching on.

I have seen Him in the watch-fires of a hundred circling camps,
They have builded Him an altar in the evening dews and damps.
I have read His righteous sentence by the dim and flaring lamps,
His truth is marching on.

Glory, glory, Hallelujah, Glory, glory. Hallelujah.
Glory, glory hallelujah, His truth is marching on.

Let Me Call You Sweetheart
Let me call you sweetheart, I'm in love with you.
Let me hear you whisper that you love me too.
Keep the lovelight glowing in your eyes so true.
Let me call you sweetheart, I'm in love with you.

(Repeat)

Row, Row, Row Your Boat
Row, row, row your boat
Gently down the stream
Merrily, merrily, merrily, merrily.
Life is but a dream.

(Repeat)

Home On the Range
Oh give me a home where the buffalo roam
Where the dear and the antelope play
Where seldom is heard a discouraging word
And the skies are not cloudy all day.

Home, home on the range.
Where the dear and the antelope play
Where seldom is heard a discouraging word
And the skies are not cloudy all day.

How often at night when the heavens are bright
By the light of the glittering stars
Have I stood there amazed and asked as I gazed
If their glories exceed that of ours.

Home, home on the range
Where the dear and the antelope play
Where seldom is heard a discouraging word
And the skies are not cloudy all day.

On the Road Again

On the road again.
Just can't wait to get on the road again.
The life I love is making music with my friends
I can't wait to get on the road again.

On the road again.
Going places that I've never been.
Seein' things that I may never see again.
I can't wait to get on the road again.

On the road again.
Like a band of gypsies we go down the highway.
We're the best of friends, insisting that the world keep going our way.
And our way,

Is on the road again.
Just can't wait to get on the road again.
The life I love is making music with my friends
I can't wait to get on the road again.

Hush Little Baby

Hush little baby don't say a word.
Poppa's gonna buy you a mocking bird.
And if that mocking bird don't sing
Poppa's gonna buy you a diamond ring.
And if that diamond ring turns brass,
Poppa's gonna buy you a looking glass.
If that looking glass gets broke,
Poppa's gonna buy you a Billy goat.
If that Billy goat won't pull,
Poppa's gonna buy you a cart and bull.
And if that cart and bull fall over,
Poppa's gonna buy you a dog named Rover.
If that dog named Rover won't bark,
Poppa's gonna buy you a horse and cart.
And if that horse and cart fall down,
You'll still be the prettiest little baby in town.

APPENDIXE

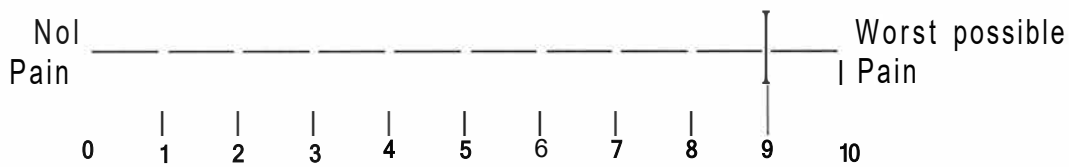
Pretest Self-Report

Pre-test (#: _____)

Do any of these words describe the pain you are feeling?
If so, how much?

	NONE	MILD	MODERATE	SEVERE
THROBBING	0) __	1) __	2) __	3) __
SHOOTING	0) __	1) __	2) __	3) __
STABBING	0) __	1) __	2) __	3) __
SHARP	0) __	1) __	2) __	3) __
CRAMPING	0) __	1) __	2) __	3) __
GNAWING	0) __	1) __	2) __	3) __
HOT-BURNING	0) __	1) __	2) __	3) __
ACHING	0) __	1) __	2) __	3) __
HEAVY	0) __	1) __	2) __	3) __
TENDER	0) __	1) __	2) __	3) __
SPLITTING	0) __	1) __	2) __	3) __
TIRING-EXHAUSTING	0) __	1) __	2) __	3) __
SICKENING	0) __	1) __	2) __	3) __
FEARFUL	0) __	1) __	2) __	3) __
PUNISHING-CRUEL	0) __	1) __	2) __	3) __

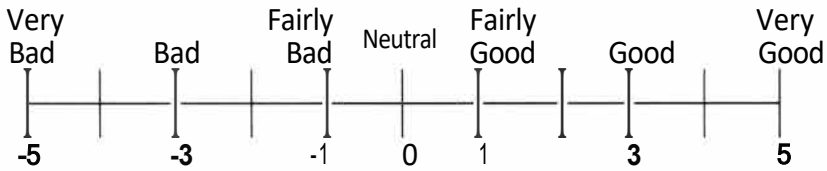
What is the intensity of your pain right now? Circle the number.



How intense is your pain right now?

0 NO PAIN _____
1 MILD _____
2 DISCOMFORTING _____
3 DISTRESSING _____
4 HORRIBLE _____
5 EXCRUTIATING _____

How is your mood right now? Circle the number.



APPENDIXF

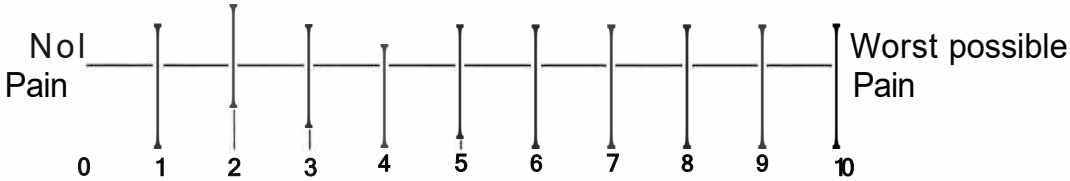
Posttest Self-Report

Post-test (#: _____)

Do any of these words describe the pain you are feeling?
If so, how much?

	NONE	MILD	MODERATE	SEVERE
THROBBING	0) __	1) __	2) __	3) __
SHOOTING	0) __	1) __	2) __	3) __
STABBING	0) __	1) __	2) __	3) __
SHARP	0) __	1) __	2) __	3) __
CRAMPING	0) __	1) __	2) __	3) __
GNAWING	0) __	1) __	2) __	3) __
HOT-BURNING	0) __	1) __	2) __	3) __
ACHING	0) __	1) __	2) __	3) __
HEAVY	0) __	1) __	2) __	3) __
TENDER	0) __	1) __	2) __	3) __
SPLITTING	0) __	1) __	2) __	3) __
TIRING-EXHAUSTING	0) __	1) __	2) __	3) __
SICKENING	0) __	1) __	2) __	3) __
FEARFUL	0) __	1) __	2) __	3) __
PUNISHING-CRUEL	0) __	1) __	2) __	3) __

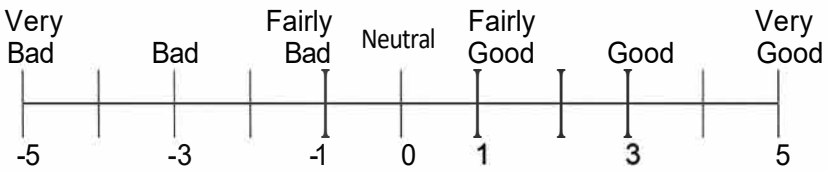
What is the intensity of your pain right now? Circle the number.



How intense is your pain right now?

0 NO PAIN _____
1 MILD _____
2 DISCOMFORTING _____
3 DISTRESSING _____
4 HORRIBLE _____
5 EXCRUTIATING _____

How is your mood right now? Circle the number.



What exertion level was this exercise routine? Circle the number.

6 No exertion at all
7
8 Extremely light
9 Very light
10
11 Light
12
13 Somewhat hard
14
15 Hard (Heavy)
16
17 Very hard
18
19 Extremely hard
20 Maximal exertion

APPENDIX G

Behavior Analysis Form

Behavior Analysis Form	**TRAINED OBSERVER (circle one)** **#1 / #2 / R**

Interval recording of participants not actively engaged during prescribed exercises.

CODE#	Interval recording of amount of time not exercising (hour : minute : second).
(Ex.) 5-10-am-O I	(Example) I0:07:06 - I0:07:56, 10:22:17-10:22:22 10:40:55-10:41:10

APPENDIXH

Participant Coding Form

I Pa,t;dpant Cod;ng Fo,m

Last, First Name	Date of birth	CODE#: (month, date, am/pm, seating location in room L to R)
(Ex.)Smith, John	(Ex.) Oct. I0, 1935	(Ex.) 5-10-am-0I

APPENDIX I

Participant Data Form

Participant Data Form

CODE#:----------

Date of birth: _____ Gender: M/ F _____

Primary dx on admission: _____ Secondary dx: _____

Admission date: _____ Discharge date: _____ _

Medications I day prior to treatment:

Antidepressants	Pain medications

Medications on day of treatment:

Antidepressants	Pain medications

Medications I day after treatment:

Antidepressants	Pain medications

APPENDIXJ

Withdrawal from Study Data

I w;thd,awal from Study Data

CODE#	Reason for withdrawal (refusal, time conflict, etc.)
(Ex.) 5-10-am-O I	(Ex.) Removed for consult by physician.

APPENDIXK

Research Protocol

Research Protocol:

1) Presentation by the student investigator will be made in the team meeting for staff and the physicians to inform them study. (See Appendix I for the script for briefing the staff on the procedures and issues that affects them.)
2) Prior to or on the day of treatment, group participants will be informed about and invited to participate in the study by their primary physician. (See Appendix H for the recruitment script.) Patients will be given the Consent Form to review.
3) On the day of the treatment, Group participants will be prompted by the treating Certified Occupational Therapy Assistant (COTA) and arrive in the common area for Upper Extremities Exercise Group.
4) In Group A, the investigator will announce that the group will be doing their exercises to live music for the day, and will be asked to answer some questions about how they are feeling. In Group B, the investigator will announce that the group will be doing their exercises while counting to a steady beat in a certain sequence for the day, and will be asked to answer some questions about how they are feeling. The patients will also be informed that the session will be videotaped. If the patient is willing to participate, the patient will sign the informed consent forms (Appendix U and W). The participant's name and birth-date will then be logged and the participant will be assigned a corresponding code number to be used for all further data collection that is associated with their seating position in the group (Appendix Q). That code will be written on the pretest (Appendix N) and post-test (Appendix 0). Assistance will be given as needed by the investigator or COTA in completing the forms.
5) Once participants have agreed to participate and have completed the pretest, instructions for participation will be given by the COTA as follows:
   A. Group A: "Listen and follow along with the music and my movements. Synchronize your movements with the song and look at me if you get at all confused or feel you are off beat. When you hear me say switch, we'll do a variation on the movement." At the beginning of each exercise set the COTA will review which movements and the number of repetitions to expect.
   B. Group B: "Listen and follow along with my counting and my movements. Synchronize your movements to my counting and look at me if you get at all confused or feel you are off beat. When you hear me say switch, we'll do a variation on the movement". At the beginning of each exercise set the COTA will review which movements and the number of repetitions to expect.
   C. At the conclusion of the prescribed exercises, the participants will be given the post-test to complete and assisted to do so as needed prior to leaving the treatment room. Participants will be thanked for their participation and the post-tests will be collected.
   0. Following the session, the videotape will be viewed by the researcher and two trained observers - data will be collected on the frequency count of each participant resting during exercise (Appendix P).

APPENDIXL

Staff Briefing Script

I Staff Briefing Script

"Over the next 6 weeks or so there will be a research study being done with the patients on this unit. The research protocols will involve the inclusion of rhythm in the Upper Extremities Exercise Group that occurs on Mondays. All patients 65 years of age or older who are referred to this group by their physician will be invited to participate. The sessions will be videotaped and the participants will complete a pretest and posttest designed to evaluate their level of pain and mood before and after the exercise routine. The physicians on the unit will be informing their patients about the study, and each patient will be invited to consider participation and to sign a consent form at the beginning of the group if they want to participate. For those patients who are not legally competent to consent to participate themselves, their family member will be asked to sign the consent form. Those that do not want to be in the study will still attend the group but will not fill out the pre/post tests and will not be videotaped. We would appreciate your cooperation in this study by meeting with your patient either before or after the session. The data for those patients who leave the session for any reason will be discarded, so please do your best to not interrupt the session. Are there any questions?"

IRB APPROVED

APPENDIXM

Subject Recruitment - Physician's Script

EXERCISE AND RHYTHM PROJECT

I Subjttt Re<rumDent - Plry,ici,m Saipt

For patients who are **legally competent** to sign! their own consent form:
'We are doing a research study on this unit around the exercise group that you attend each day. All of the patients will be doing the regular exercises, but the researchers will be videotaping the session. and they will be asking some questions about how each patient is feeling before and after the exercise session. The video tape might be used later to share with other professionals about the results of the study. The session will happen this Monday. You do not need to decide now if you would like to participate, but you will be asked at the beginning of the group. Even if you decide not to participate in the study, you should still plan to attend the group as usual and complete the exercise routine - you can tell the researchers that you do not want to be in the study, and they will show you where to sit so that you are not videotaped and do not answer the questions. I see no medical reason that you should not participate, so it is really up to you. If any problems occur during the study, you can leave the group at any time. If you have any questions about the study, you can contact the researchers directly. Their contact information is in the consent form."

For patients who are **not legally competent** to sign their own consent form:
"We are doing a research study on this unit around the exercise group that your (mother/father/spouse/family member) attends each day. All of the patients will be doing the regular exercises, but the researchers will be videotaping the session. and they will be asking some questions about how each patient is feeling before and after the exercise session. The videotape might be used later to share with other professionals about the results of the study. The session will happen this Monday. You do not need to decide now if you agree to have your family member participate, but you will be asked at the beginning of the group. Even if you decide that your family member should not participate in the study, he/she should still plan to attend the group as usual and complete the exercise routine - you can tell the researchers that you do not want your family member to be in the study, and they will show him/her where to sit so that he/she is not videotaped and does not answer the questions. I see no medical reason that your (mother/father/spouse/family member) should not participate, so it is really up to you. If any problems occur during the study, he/she can leave the group at any time. If you have any questions about the study, you can contact the researchers directly. Their contact infonnation is in this consent form."

The physician will provide the patient/family me ber with a copy of the Consent Form that will be distributed at the beginning of the study for the patient's/family's review.

IRB APPROVED

APPENDIXN

Consent Forms

Rehabilitation Institute of Chicago
Orthopaedic Rehabilitation·Program

NortbwesterJ.university ___

Western Michigan **University**
Department **of Music**

CONSENT FORM

Project Title: Exercise and Rhythm Project

Principal Investigator: Dr. Santiago D. Toledo (312)238-6006

Student Investigator: Victoria Storm, MT-BC, NMT (312)286-6778

Co-Investigator: Brian Wilson, MT-BC, NMT (269)387-4724

Supported by: Northwestern University **and Western Michigan University**

Introduction/Purpose:
You and cbout 60 other participants are being invited to participate in a research study about exercise and rhy"J::m. You are being asked to participate in this study because you are already scheduled for the Upper Extremities Exercise Group on your unit. The purpose of this research sfudy is to look at the effects of rhythm on your experience of exercising. If you do not wish to participate in this study, you may ::xerc:se off-can1era to the side, beyond the view of the videotape, and will not be asked questions about bow you are feeling.

Procedures:
You w:1] ';Je ;.:ed to come to the dining area of the 4th floor of the Rehabilitation Institute of Chicago for your 1.:;;;:-e:- :::xtremities Exercise Group. You will be invited to participate in this group only once (either:::}:: a-:: or 1:30 p.m.) which will last approximately 60 minutes. If you volunteer to pa..-ticipa:e:.:: :!:e sxdy, you will be asked to answer questions about how you are feeling and then complete c ;:¯;es of exe:-cises lead by one of the Occupational Therapy personnel and the Student Investiga:: . - c, -:,:-↓ :;e ,ideotaped. Your medical records will be reviewed by the researchers for your ciiag:::s C.::C :::e.c:catior:s. If you do not wish to participate in this study, you may exercise off-camera to e s: ::e, ·:s:-:::d ,:e view of tbe videotape, and will not be asked questions about how you are feefug.

Study **Treatment Procedures:**
If you participate in this study, you will be assigned to one of two study groups. Which group you are assigned to will depend on when you are participating in the study. All participants at the time you participate i.vill complete the same exercise routine. The same procedures perfonned at your first group will be performed again in all following groups on following weeks with only slight variations. All group's will be videotaped.

Risks:
e this is a study about exercising, you will be actively moving your body. Should you feel any physical or psychological ·stress, you may talk with the Student Researcher after the session, and you may ask questions during the exercises if needed. As in all research, there maybe unforeseen risks to the participant. If an accidental injury occurs, appropriate emergency measures will be taken; however, no compensation or additional treatment will be made available to the participant except as otherwise stated in this consent form. You may receive additional medical and/or psychological attention as soon as possible, and you can spend time with the researchers following the study should you n ed to talk about your experience.

Benefits:
There may be no direct benefit to you by your participation in tins research study. Your participation in this study may aid in our understanding ofhow,exercise is affected by exercising to a rhythmic pulse or beat.

Alternatives:
You have the alternative to choose not to participate in this research study. If you do not wish to participate in this study, you may exercise off-camera to the side, beyond the view of the videotape.

Confidentiality:
Participation in this research study may result in a loss of privacy, since persons other than the investigator(s) might view your study records. Unless required by law, only the study investigator, members of the investigator's staff, representatives of Western Michigan University School of Music, the Western Michigan University Human Subjects Institutional Review Board, and the Northwestern University Institutional Review Board, will have authority to review your study records. They are required to maintain confi.dentiality regarding your identity.

Results of th:s study may be used for publications, or presentations at scientific or educational meetings. If your individual re.."llits are discussed, your identity wilJ be protected by using a study code number rather an your ;;; e or other identifying information.

At the end of this consent form, you will be given thy option of allowing us to make videotape recordings of you, which may be used in medical or scientific publications and presentations. We may publish and present images. or videos of you including your face. No other personal information about you will be included in the presentation.

Financial Information:
You will not be charged any additional costs for any study-related procedures. You or your insurance company will be responsible for the regular payment related to group participation. You will not be paid for your participation in this study.

Subjects' Rights:
Your participation in this study is voluntary and you are free to withdraw at any time. Choosing not to participate or withdrawing from this study will not affect your present or future medical treatment. If you withdraw from the study prior to its completion, you will be asked the reason for your withdrawal so that the researchers can keep track of this information in the final report, but you may decline to answer if you choose.

Any new findings developed during the course of this research that may affect your willingness to continue will be provided to you. Your participation in this study may be discontinued by the investigator without your consent if the researchers believe you are in danger or in.need of medical attention.

Contact Persons:
Any questions you may have about this study may be directed to Victoria Storm, Student Researcher at telephone number (312)286-6778. Questions about your rights as a research subject may be directed to RIC - the Office of the General Counsel of the Rehabilitation Institute of Chicago, (312) 328-6208. If problems arise evenings or weekends, you may call (312)286-6778. The participant may also contact Western Michigan University's Chair, Human Subjects Institutional Review Board at (269)387-8293 or the Vice President for Research (269)3 87-8289, if any questions or problems arise during the course of the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSlRB) of Western Michigan University as indicated by the stamped date and signature of the board chair in the upper right comer. Do not participate in this study if the stamped date is older than one year.

WESTERN MICHIGAN UNIVERSITY
H. S. I. R B
for use for one yea from this date:

JUN I 8 2003

X-M it

'iii:']

Consent to participate:
"I have read this form and the research study has been explained fo me. I have been given the opportunity to ask questions and my questions have been answered to my satisfaction. If I have additional questions, I have been told who to contact. **I agree** to participate in the research study described above and will receive a copy of this consent form. I will receive a copy of this consent form after I sigh it."

Please initial next to one of the following:

__ I agree to be videotaped for research purposes.

_____ I do not agree to be videotaped.

Subject's Signature	Date
Signature of legally authorized representative	Date
Signature of Person Obtaining Consent	Date
Investigator's Signature	Date

Northwestern University
Institutional Review Board
Approval Date 2/9/2004
Approval Expires 10/10/2004

NORTHWESTERN UNIVERSITY
RESEARCH SUBJECT AUTHORIZATION
CONFIDENTIALITY & PRIVACY,RJGHTS

Protocol Title:	*Exercise and Rhythm Project*
Principal Investigator:	*Dr. Santiago D. Toledo* *Rehabilitation Inst/tuts of Chicago* *Physical Medicine and Rehabilitation,* *Orthopaedic Rehabl/ltatlon Program* *345 East Superior* Street, *Chicago, IL 60611* *312-238-6006*
Co-Investigator:	*Brian Wilson, Western Michigan University* *269-387-4724*
Student Investigator:	*Victoria Storm, MT-BC* *312-286-6nB*

You have agreed to participate in the research Study mentioned above and have signed a separate informed consent that explained the procedures of the research Study and the confidentiality of your personal health information. This authorization form gives more detailed information about the following:

- What personal health information about you will be collected in this Study
- Who will use your information within the institution and why
- Who may disd_ose your information and to whom
- Your rights to access your personal health information during the Study
- Your right to withdraw your authorization (approval) for any future use of your personal health information

By signing this document you are permitting your doctors and other health care providers, including the Rehabilitation Institute of Chicago to disclose personal health information collected about you to Northwestern University and the researcher listed above for purposes of the Study. You are also allowing Northwestern University and the researcher to disclose that personal health information to outside organizations or people involved with the processing of this Study, as described in the separate informed consent from.

What personal information is collected and used in this Stady, and might also be shared (disclosed)?

The following personal contact and personal health information will be collected, used for this research Study and may be disclosed or released during your involvement with this research Study:

- *Name*
- *Date of birth*
- *Gender*
- *Primary and secondary diagnosis on admission*
- *Admission date*
- *Discharge date*
- *Medication prior to, during, and after the study*
- *Video image Including body and face*

Other tests and procedures that will be performed in the Study include:

- *Questionnaires about how you are feeling today*

Why is your personal infonnation being used?

Your personal contact information is important for Northwestern University research team to contact you during the Study. Your personal health information (including the results of tests and procedures) are being collected during this research Study for purposes of the Study. The Principal Investigator may also use the results of these tests and procedures to treat you.

Who within Northwestern University may use or disclose your personal health infonnation?

The following individuals and organizations within Northwestern University may use or disclose your personal health information for this research project:

- *The Principal Investigator and the Investigator's Study team (other University staff associated with the Study)*
- *The Northwestern University Institutional Review Boards (the committees charged with overseeing research on human subjects)*
- *The Northwestern University Office for the Protection of Research Subjects (the office which monitors research studies)*
- *Authorized members of the Northwestern University workforce who may need to ai:cess your information in the performance of their duties (for example: to make sure the research is being done correctly).*

Who, outside of Northwestern University might receive your personal health information?

As part of the Study the Principal Investigator, Study team and others listed above, may disclose your personal health information, including the results of the research study tests and procedures to the following:

- *The* Western *Michigan University Human Subjects Institutional Review Board (the committees charged with overseeing research on human subjects)*
- *Authorized* members *of the Western Michigan University workforce who may need to* access *your information in the performance of their duties (for example: to make sure the research is being done correctly).*

The personal information of yours that is disclosed in connection with the Study may no longer be protected by the federal privacy protection regulations.

- *In records and Information disclosed outside of Northwestern University, you will be assigned a unique code number. The Principal Investigator will* ensure *that the key to the code will* be *kept in a Jocked file. The key to the code will be destroyed at the end of the research Study.*

How long will Northwestern University be able to use or disclose your personal health infonnation?

Your authorization for use of your personal health information for this specific Study does not expire. This information may be maintained in a research repository (database). However, Northwestern University may not re-use or re-disclose your personal health information collected in this Study for another purpose other than the research Study described in this document unless it obtains permission to do so from the Northwestern University Institutional Review Board.

Will you be able to access your records?

Results of all tests and procedures done solely for this research Study and not as part of your regular care will not be included in your medical record. You will be able to request access to your medical record when the Study is completed.

During your participation in this Study, you will not be able to access the medical .records that have been·

created as a result of your participation in the Study. This will be done to prevent the knowledge of Study results from affecting the reliability of the Study. Your information will be available should an emergency arise that would require your treating physician to know this information to best treat you. You will have access to your medical record and any Study information that is part of that medical record when the Study is over or earlier, if possible. The investigator is not required to release to you information in the research records.

can you change your mind?

You may withdraw your permission for the use and disclosure of any of your personal information for research, but you must do so in writing to the Principal Investigator at the address on the first page. Even if you withdraw your permission, the Principal Investigator for the research Study may still use your personal information that was collected prior to your withdrawal of permission if that information is necessary to the integrity of the Study. If you withdraw your permission to use your personal health information that means you will also be withdrawn from the research Study.

You are not required to sign this authorization. If you decide not to sign the authorization:

It will not affect your treatment by health care providers, or the payment or enrollment in any health plans, or affect your eligibility for benefits. However, you may not be allowed to participate in the research Study.

You will be given a copy of this Research Subject Authorization Form describing your confidentiality and privacy rights for this Study.

By signing this document you are permitting your doctors and other health care providers to disclose your personal health information to Northwestern University and permitting Northwestern University to use and disclose personal health information collected about you for research purposes as described above.

Subject's Name [print]	Subject's Signature	Date
Person obtaining authorization [print]	Person obtaining authorization Signature	Date

For subjects unable to give authorization, the authorization is given by the following authorized subject representative:

Authoiized subject repies.entative Iprint]	Authorized subject represeniative Signature	Date

Provide a brief description of above person authority to serve as the subject's authorized representative.

Nocthmester:n 1'ni'<oi:sity
Institutional Review Board
IRB APPROVED
12/10/2003 BB

APPENDIXO

HSIRB Approval Letter

WESTERN MICHIGAN UNIVERSITY
Human Subjects Institutional Review Board

Centennial
1903-2003 Celebration

\\1rRi\

Date: January 16, 2004

To: Brian Wilson, Principal Investigator
Victoria Storm, Student Investigator for thesis

From: Macy Lagmvey, Ph.D., Chai, (Y/ I ;;1

Re: HSIRB Project Number: 03-06-06

This letter will serve as confirmation that your research project entitled "The Effect of Live Music on Pain, Mood, and Exercise Adherence with Rehabilitation Patients" has been **approved** under the **full** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: June 18, *2004*

Walwood Hall, Kalamazoo. MI 49008-5456
PHONE: 12691 387-8293 fAX: (2691 387-8276

BIBILIOGRAPHY

Arathuzik, D. (1994). Effects of cognitive-behavioral strategies on pain in cancer patients. Cancer Nursing, 17, 207-214.

Bailey, L. M. (1983). The effects of live music versus tape-recorded music on hospitalized cancer patients. Music Therapy, 3 (1), 17-28.

Barnason, S., Zimmerman, L., & Nieveen, J. (1995). The effects of music interventions on anxiety in the patient after coronary artery bypass grafting. Heart and Lung, 24 (2), 124-132.

Boldt, S. (1996). The effects of music therapy on motivation, psychological well-being, physical comfort, and exercise endurance of bone marrow transplant patients. Journal of Music Therapy, 33 (3), 164-188.

Bonny, H. L. (1983). Music listening for intensive coronary care units: A pilot project. Music Therapy, 3 (1), 4-16.

Borg, G. (1985). An introduction to Borg's RPE-scale. New York: Movement Publications.

Briggs, E. (2002) The nursing management of pain in older people. Nursing Older People. 14, (7), 23-29.

Brown, CJ. (1991). The use of music in the management of postoperative pain (pain management). Dissertation Abstracts InternationaL 52 (lOA), 3470.

Buckelew, SP., & Frank, R. G. (1989). Psychological Factors & Treatment of Pain. In Kaplan, P.E. & Tanner, E.D, (Eds.), Musculoskeletal Pain and Disability, Appleton & Lange, CN.

Byrne, A., & Byrne, D. G. (1993). The effect of exercise on depression, anxiety, and other mood states: A review. Journal of Psychosomatic Research, 37, 565-574.

Cepeda, M.S., Diaz, J.E., Hernandez, V., Daza, E., & Carr, D.B. (1998). Music does not reduce alfentanil requirement during patient-controlled analgesia (PCA) use in extracorporeal shock wave lithotripsy for renal stones. Journal of Pain and Symptom Management, 16 (6), 382-387.

Chesky, K. S., & Michel, D. E. (1991). The Music Vibration Table (MVTO): Developing a technology and conceptual model for pain relief. Music Therapy Perspectives, (9), 32-38.

Closs, S. J. (1994). Pain in elderly patients: A neglected phenomena? Journal of Advanced Nursing, 19, 1072-1081.

Craig, J.C. & Rollman, G. B. (1999). Somethesis. Annual Review of Psychology, (50), 305-331.

Craig, K.D. & Prkachin, K.M. (1983). Non-verbal measures of pain. In Melzack, R. (Ed.) Pain Measurement and Assessment," 173-178. New York, Raven.

Curtis, S. L. (1986). The effect of music on pain relief and relaxation of the terminally ill. Journal of Music Therapy, 23 (1), 10-24.

Dileo, C., & Bradt, J. (1999). Entrainment, resonance, and pain-related suffering. In Dileo, C. (Ed.), Music therapy and medicine: Theoretical and clinical applications (pp. 181-188). Silver Springs, MD: AMTA.

Eimer, D. N., & Freeman, A. (1998). Pain management psychotherapy: a practical guide. New York: John Wiley & Sons, Inc.

Ferrell, B. A., Ferrell, B.R., & Rivera, L. (1995). Pain in cognitively impaired nursing home patients. Journal of Pain and Symptom Management, 10, 8, 591-598.

Friija, N. H. (1988). The laws of emotion. American Psychologist, 43, 349-358.

Gfeller, K. E. (1992). Music therapy in the treatment of medical conditions. In Davis, W. B., Gfeller, K. E., & Thaut, M. H. (eds.), An Introduction to Music Therapy Theory and Practice (234-250). Dubuque, IA: Brown.

Gloth, F. M. (2000). Geriatric pain: Factors that limit pain relief and increase complications. Geriatrics, 55, (10), 46-52.

Goloff, M. S. (1981). The responses of hospitalized medical patients to music therapy. Music Therapy, I, (1), 51-56.

Good, M. (1995). A comparison of the effects of jaw relaxation and music on postoperative pain. Nursing Research, 44. (1), 52-57.

Good, M., Stanton-Hicks, M., Grass, J.A., Anderson, G. C., Choi, C., Schoolmeesters, L. J., & Salman, A. (1999). Relief of postoperative pain with jaw relaxation, music and their combination. Pain. 81, 163-172.

Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Lai, H.L., Roykulcharoen, V., & Adler, P.A. (2001). Relaxation and music to reduce postsurgical pain. Journal of Advanced Nursing, 33, (2), 208-215.

Grove, N. C., & Spier, B. E. (1999). Motivating the well elderly to exercise. Journal of Community Health Nursing, 16, (3), 179-189.

Hadjistavropoulos, T. & Craig, K. D. (2002). _A theoretical framework for understanding self-report and observational measures of pain: A communications model. Behaviour Research & Therapy, 40, 5, 551 [Abstract].

Hamil, R.J. (1994). The physiologic and metabolic response to pain and stress. In Hamil, R.J., & Rowlingson, J.C. (eds.) Handbook of Critical Care Pain Management. New York, McGrawDraw.

Haneishi, E. (2001). Effects of a music therapy voice protocol on speech intelligibility, vocal acoustic measures, and mood of individuals with Parkinson's disease. Journal of Music Therapy, 38, (4), 273-90.

Hardy, C. J., & Rejeski, J. W. (1989). Not what, but how one feels: the measurement of affect during exercise. Journal of Sport and Exercise Psychology, 11, 304-317.

Jensen, M. P., & Karoly, P. (1996). Self-report scales and procedures for assessing pain in adults. In R. Gatchel and D. Turk, (Eds.), Psychological approaches to pain management; A practitioner's handbook, 135-151. New York: Guilford Press.

Johnson, G., Otto, D., & Clair, A. (2001). The effect of instrumental and vocal music on adherence to a physical rehabilitation exercise program with persons who are elderly. Journal of Music Therapy, 39, (2), 82-96.

Kain, H.B. (2000). Care of the older adult following hip fracture. Holistic Nursing Practice, 14 (4), 24-39.

Kim, S. J., & Koh, I. (2005). The effects of music on pain perception of stroke patients during upper extremity joint exercises. Journal of Music Therapy, 1 b (1), 81-92.

Klepac, R. K., Dowling, J., Rokke, P., Dodge, L., & Schafer, L. (1981). Interview vs. paper-and-pencil administration of the McGill Pain Questionnaire. Pain, 11, 241-246.

Linton, S. J., Melin, J., & Stjernkof, K. (1985). The effects of applied relaxation and operant activity training on chronic pain. Behavioural Psychotherapy, 13, 363-375.

Loeser, J. D. & Melzack, R. (1999). Pain: An overview. Lancet, 353 (9164), 1607-1609.

MacNay, S. K. (1995). The influence of preferred music on the perceived exertion, mood, and time estimation scores of patients participating in a cardiac rehabilitation exercise program. Music Therapy Perspectives, (13), 91-96.

Malone, A. B. (1996). The effects of live music on distress of pediatric patients receiving intravenous starts, venipunctures, injections, and heel sticks. Journal of Music Therapy, 33 (]), 19-33.

McIntosh, G. C., Brown, S. H., Rice, R.R., & Thaut, M.H. (1997). Rhythmic auditory motor facilitation of gait patterns in patients with Parkinson's disease. Journal of Neurology, Neurosurgery, and Psychiatry, 62, 22-26.

McIntosh, G.C, Thaut, M.H., Rice, R.R., Miller, R.A., Rathbun, J., & Brault, J. A. (1995). Rhythmic facilitation in gait training of Parkinson's disease. Annals of Neurology, 398, 331-339.

McNair, D. M., & Droppleman, L.F. (1981). Profile of Mood States. San Diego, CA : Educational and Industrial Service.

Melzack, R., & Katz, J. (1994). Pain measurement in persons in pain. In Wall, P.D., & Melzack R. (Eds.): Textbook of Pain. (3rd ed.), p. 337-351. Edinburgh, UK: Churchill Livingstone.

Melzack, R., & Wall, P.D. (1965). Pain mechanisms: A new theory. Science, (150), 971-979.

Melzack, R. (1975a). The McGill Pain Questionnaire. In R. Melzack (Ed.), Pain measurement and assessment, (41-47). New York: Raven Press.

Melzack, R. (1987). The Short Form McGill Pain Questionnaire. Pain, 30, 191-197.

Mersky, H. (1986). International Association for the Study of Pain terms: A list with definitions and notes on usage. Pain, 3 (supplement), S1-S225.

Michel, D. E., & Chesky, K. S. (1995). A survey of music therapists using music for pain relief. Arts in Psychotherapy, 22 (1), 49-51.

Myers, B. J. (1995). Proprioceptive Neuromusicular Facilitation (PNF) Approach. In Trombly, C. A (Ed). Occupational Therapy for Physical Dysfunction, 4th Ed. New York, Williams & Wilkins.

Myers, B. J. (1981). Assisting to posture and application in occupational therapy activities. Videotape. Chicago: Rehabilitation Institute of Chicago.

Mornhinweg, G. C. (1992). Effects of music preference and selection on stress reduction. Journal Of Holistic Nursing, 10 (2), 101-9.

Moore, R. S., Staum, M. J., & Brotons, M. (1992). Music preferences of the elderly: Repertoir, vocal ranges, tempos, and accompaniments for singing. Journal of Music Therapy, 29, 236-252.

Music Educators National Conference. (1996). Get America Singing... Again!. Milwaukee: Hal Leonard.

The Integrated Approach to the Management of Pain. NIH Concensus Statement Online 1986 May Online 19-21 2003, April 24; 6(3): 1-8.

Nichols, P.R. (2000). The effects of music on pain and anxiety during intravenous insertion in the emergency department. Masters Abstracts International, 39, (1), 196.

Pellino, T.A., Gordon, D. B., Engelke, Z. K., Bisse, K. L., Collins, M.A., Silver, C. E., Norcross, & N. J. (2005). Use of nonpharmalogic interventions for pain and anxiety after total hip and total knee arthroplasty. Orthopaedic Nursing, (3), 182-90.

Rejeski, W. J., Best, D.L., Griffith, P., & Kenney, E. (1987). Sex-role orientation and the responses of men to exercise stress. Research Quarterly for Exercise and Sport, 58, 260-264.

Rejeski, W. J., Gauvin, L., Hobson, M. L., & Norris, J. L (1995). Effects of baseline responses, in-task feelings, and duration of activity on exercise-induced feeling states in women. Health Psychology, 14, 4, 350-359.

Rider, M. S. (1985). Entrainment mechanisms are involved in pain reduction, muscle relaxation, and music-mediated imagery. Journal of Music Therapy, 22 (4), 183-192.

Rider, M. S. (1987). Treating chronic disease and pain with music-mediated imagery. The Arts in Psychotherapy, 14, 113-120.

Ruud, E. (1997). Music and the quality of life. Nordic Journal of Music Therapy, 6 (2), 86-97.

Sedei-Godley, C. A. (1987). The use of music therapy in pain clinics. Music Therapy Perspectives, 4, 24-28.

Sheikh, J. I., & Yesavage, J. A. (1986). Geriatric Depression Scale: Recent evidence and development of a shorter version. Clinical Gerontology, 5, 165-172.

Simons, W., & Malabar, R. (1995). Assessing pain in elderly patients who cannot respond verbally. Journal of Advanced Nursing, 22, 663-669.

Speilberger, G.D., Gorusch, R. L., Lushene, R., Vagg, P., & Jacobs, G. A. (1983). Manual for the State-Trait Anxiety Inventory (Form Y Self Evaluation Questionnaire). Palo Alto, CA: Consulting Psychologists Press.

Standley, J. (1986). Music research in medical/dental treatment: Meta-analysis and clinical application. Journal of Music Therapy, 23 (2), 56-122.

Tanabe, P., Thomas, R., Paice, J., Spiller, M., & Marcantonio, R. (2001). The effect of standard care, ibuprofen, and music on pain relief and patient satisfaction in adults with musculoskeletal trauma. Journal of Emergency Nursing, 27, (2), 124-131.

Thaut, M. H. (1999). Training manual for neurologic music therapy center for biomedical research in music, Unpublished manuscript, Colorado State University.

Thaut, M. H., Kenyon, G. P., Schauer, M. L., & McIntosh, G. C. (1999). Rhythmicity and brain function: Implications for therapy of movement disorders. IEEE Engineering in Medicine and Biology, (18), 101-108.

Thaut, M. H., & McIntosh, G. C. (1992). Effect of auditory rhythm on temporal stride parameters and EMG patterns in normal and hemiparetic gait. Neurology, 42, (Suppl. 3), 208-211.

Thaut, M. H,. Rathburn, J. A., & Miller, R. A. (1997). Music versus metronome timekeeper in a rhythmic motor task. International Journal of Arts Medicine, 5, (1), 4-12.

Turk, D. C. (1996) Biopsychosocial perspective on chronic pain. In Gatchel, R. J., & Turk, D. C. (Eds.), Psychological Approaches to Pain Management; A Practitioner's Handbook (pp. 3-5). New York, NY: Guilford Press.

Wolfe, D. E. (1978). Pain rehabilitation and music therapy. Journal of Music Therapy, 15 (4), 162-178.

Zimmerman, L., Nieveen, J., Bamason, S., & Schmaderer, M. (1996). The effects of music interventions on postoperative pain and sleep in coronary artery bypass graft (CABG) patients. Scholarly Inquiry For Nursing Practice. 10 (2), 153-70.

Zuckerman, M., & Lubin, B. (1965). Manual for the Multiple Affect Adjective Check List. San Diego, CA: Educational and Industrial Testing Service.