

THE FLORIDA STATE UNIVERSITY

SCHOOL OF MUSIC

THE EFFECT OF LIVE MUSIC VIA THE ISO-PRINCIPLE ON PAIN
MANAGEMENT IN PALLIATIVE CARE AS MEASURED BY SELF-REPORT
USING A GRAPHIC RATING SCALE (GRS) AND PULSE RATE

BY

HYO JUNG LEE

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The members of the committee approve the thesis of Hyo Jung Lee defended on
October 10, 2005.

Jayne M. Standley
Professor Directing Thesis

Clifford K. Madsen
Committee Member

Dianne G. Gregory
Committee Member

The Office of Graduate Studies has verified and approved the above mentioned
committee members.

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ABSTRACT

The purpose of this study was to investigate the effect of live music via the iso-principle on pain management in palliative care. A total of forty subjects participated in this study and were evenly divided into two groups: control (recorded classical selections) and experimental (live music via the iso-principle). Groups were matched on the basis of gender and amount of previous music therapy experience. Self-rating of pain using a Graphic Rating Scale (GRS) and pulse rate were measured before music and after music. A univariate analysis of variance was applied to analyze the data obtained from this study. Results from a comparison of pre-test to post-test indicated that there were significant differences between pre-test and post-test on both dependent variables for each group. In other words, both music therapy techniques facilitated subjects' pain relief and relaxation. Besides, results of a univariate analysis of variance showed that there was a statistically significant difference on self-rating of pain between groups. Live music via the iso-principle was more effective than recorded music on pain management. A statistically significant difference in pulse rate between groups by gender also existed. This study supports that the use of live music via the iso-principle is an effective tool for pain management in palliative care.

INTRODUCTION

Although the process of dying and death are a universal part of life, the subject of human reactions to dying and death has rarely been discussed (Kübler-Ross, 1976). In general, an increasing amount of attention has been paid to this topic with changes in sociological and technological conditions. Greater longevity and mobility, induced by advances in medical technology, are primary factors that have influenced attitudes towards death (Gilbert, 1977).

Increased concerns regarding the dying-process and death has produced the belief that dying individuals and their families need physical and psychological support designed to meet their unique needs (Gilbert, 1977). Accordingly, palliative care programs have rapidly increased (Smith, 2001). Services defined as “total care” focus on the physical, emotional, social, and spiritual needs of not only the patients, but also of their families (Gilbert, 1977; National Hospice and Palliative Care Organization, 2005). The main goal of palliative care is to provide for the multidimensional needs of dying patients and their families.

In the palliative care program, various modalities in the treatment process are served to meet the patients’ needs. Music therapy has been theoretically and practically regarded as a great intervention for terminal patients due to the fact that music facilitates positive physical and psychological responses. Despite this fact, quantitative studies that can objectively validate the effects of music in palliative care are lacking. Therefore, this study was conducted to quantitatively examine the effects of music in palliative care.

LITERATURE REVIEW

Cure and Care

Since the beginning of medicine, there have been two overall aims of care: to cure disease and to relieve suffering (Emanuel, von Gunten, & Ferris, 1999). The tendency of medicine in the continuum of care changes based on the relationship between these two aims. Emanuel, von Gunten, and Ferris (1999) historically explain in the Education for Physicians on End-of-life Care (EPEC) curriculum about the models of care in terms of these relationships. While the primary goal of medicine in the last century was to provide comfort, the advanced development of science and technology in the latter half changed this focus. Modern medicine has focused primarily on curing illness and prolonging life in its aggressive fight against death. In the process, the management of symptoms, the relief of suffering, and care of the dying has received less attention.

In the 1960s and 1970s, hospice and palliative care movements were born in the United Kingdom, the United States, and Canada to fill in a growing void and to provide care for the dying (Emanuel et al., 1999; Smith, 2001). Historically, hospice care in the United States has been primarily restricted to the last six months of a person's life by Medicare benefits, and these programs have tended to serve only terminally-ill patients with cancer when a cure was no longer possible.

The TriCentral Palliative Care (TCPC) Toolkit (2003) considers a dichotomous approach as a traditional model of care because the division between goals of care occurs in a dichotomous way. As depicted in Figure 1, curative and life-prolonging therapy is emphasized during the acute and chronic phases of a patient's illness. Palliative care is rarely provided during this period. Not until the very last phase of life when the patient's condition is clearly life-threatening are hospice services offered. By then, it is nearly impossible for the patient and their families to benefit from the comfort

care these programs provide. With this traditional model of care, there is a distinct division between the curative and life-prolonging therapy for patients during the acute and chronic phases of their illness and hospice care during their final stages of life.

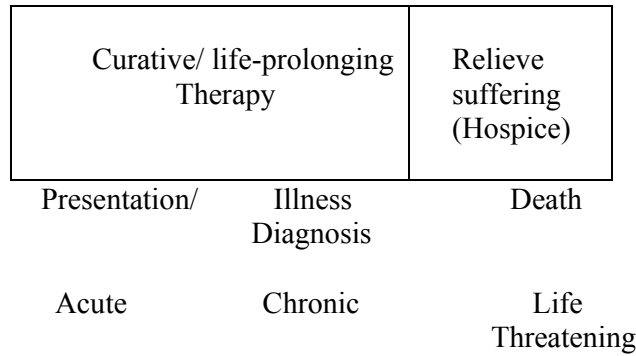


Figure 1: Continuum of Care- Traditional

Note. From “Module 7: Goals of Care,” by L. L. Emanuel, C. F. von Gunten, & F. D. Ferris, 1999, the education for physicians on end-of-life care (EPEC) curriculum, pp. M7-4. Copyright 1999 by the Robert Wood Johnson Foundation.

From this figure, it can be derived that the first focus of therapy is curative, only to change to relieving suffering (hospice) when the cures are no longer effective (Emanuel et al., 1999). However, many patients and their families do not want to give up curative and life-prolonging therapy in order to focus totally on relief of suffering. Therefore, they might choose curative and life-prolonging therapies and relieve suffering therapies to be administered simultaneously. In other words, what they want is palliative care.

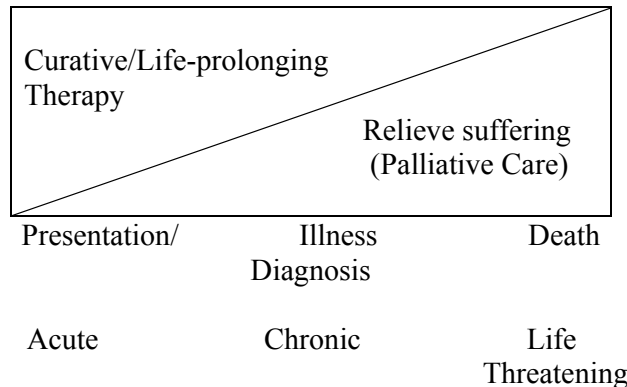


Figure 2: Continuum of Care- Optimal

Note. From “Module 7: Goals of Care,” by L. L. Emanuel, C. F. von Gunten, & F. D. Ferris, 1999, the education for physicians on end-of-life care (EPEC) curriculum, pp. M7-7. Copyright 1999 by the Robert Wood Johnson Foundation.

In contrast to the previous dichotomous model of care, Figure 2 shows how palliative care can integrate into the continuum of overall care desired and needed by the patient and family during an illness (Emanuel et al., 1999; TCPC toolkit, 2003). Since the integrated model merges curative and palliative care continuously across the continuum of care, the TCPC toolkit (2003) considers it as the interrelationship of therapies with curative and palliative intent. With this integrated model of care, patients are offered some degree of palliative care from the time of diagnosis. Initially, the focus is on curative and life-prolonging therapies and palliative services are limited during the acute phases of a patient’s illness. However, if the patient’s disease progresses, then more palliative services are integrated into the patient’s care and curative and life-prolonging therapies are gradually de-emphasized.

Many palliative care programs need to expand the availability of services to fulfill the patients’ and families’ personal hopes and goals for their medical care. By doing so, the interdisciplinary care focusing on symptom control and supportive care that hospice programs provide so well can be made available for all patients with any life-threatening diagnosis at any time during their illness when they have symptom control or supportive care needs and are prepared to accept such care. Most recently, hospice and palliative care programs have been evolving into medical practices and

programs that focus on relieving suffering and improving quality of life for patients through a broader range of prognoses (Emanuel et al., 1999).

Palliative Care

Due to the conversion from the dichotomous models to the integrated model in medical care, the National Hospice and Palliative Care Organization (NHPCO) (2005) cites that the number of hospice and palliative care programs has rapidly increased with the belief that patients with terminal illness have the right to die pain-free and with dignity, and that their families should receive the necessary support to allow them to do so (National Hospice and Palliative Care Organization, 2003). Questions arise regarding what palliative care and hospice are and what kind of services they could provide for the terminally ill. The Center to Advance Palliative Care (CAPC) Manual (2005) explains that hospice care is an organized program for delivering palliative care. Smith (2001) also defined hospice as a special kind of caring when a cure is no longer possible. In 2005, the World Health Organization defined palliative care as:

An approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual (WHO, 2005).

In addition, the NHPCO (2001) described palliative care as:

Treatment that enhances comfort and improves the quality of an individual's life during the last phase of life (NDPCO, 2001).

In many cases, palliative care is often used interchangeably with hospice because the connection between them is quite strong. Hospice and palliative care have common characteristics of involving an interdisciplinary basis for expert medical care, pain management, and emotional and spiritual support that is particularly adapted to the patient's needs and wishes. Support is also provided to the patient's loved ones (NHPCO, 2003; Munro, 1986; Hilliard, 2003). In both hospice and palliative care, the focus is on the quality of life of the patient and their shared goals are to address any

adjustment to illness or end-of-life issues (University of Maryland Medical Center, 2004).

Although the term "palliative care" is closely associated with hospice care, this type of care is not solely for the dying. The University of Maryland Medical Center (UMMC) (2004) mentioned that palliative care is sometimes confused with hospice care because one of the main goals of hospice care is comfort, as hospice patients are dying. But the differences between palliative and hospice care are numerous. While hospice focuses on caring, not curing (NHPCO, 2003), palliative care is offered in conjunction with curative and life-prolonging therapies, such as chemotherapy or radiation therapy (WHO, 2005; Hospice of Naples, 2004). The NHPCO (2003) demonstrated that palliative care extends the principles of hospice care to a broader population that could benefit from receiving this type of care earlier in their illness. In other words, terminal diagnosis is not required in palliative care, but hospice care requires terminal diagnosis with a life expectancy of less than six months (UMMC, 2004; Hospice of Naples, 2004). In addition, since the continuum of palliative care services begins in the early stages of the disease, the need for and the types of services change as the disease progresses (Ryan White Comprehensive AIDS Resources Emergency (CARE) Act, 2005). Based on these differences, palliative care could be administered prior to hospice, so it ideally would merge into hospice care as the illness progresses.

A palliative care program is usually delivered in a hospital-based, hospice, assisted living facility, or nursing home environment (Hertzberg Palliative Care Institute, 2005). Because medical needs vary depending on the disease that is leading toward death, specialized palliative care programs exist for common diseases such as cancer, heart failure (CHF/COPD), end-stage diseases (kidney, liver, etc.), autoimmune disorder, respiratory failure, stroke, chronic pain, nausea or fatigue, and AIDS. Specialized caregiving is also needed if organic changes in the brain lead to coma or dementia (UMMC, 2004).

Since the main goal of palliative care is to increase the quality of life, palliative care serves to treat symptoms and provides comfort measures in order to respect the quality of life of the patients and their family (Munro, 1986; Hilliard, 2003). Relief of symptoms is one way to increase the quality of life for patients (Frager, 1996). Nevertheless, since the concept of the approach of palliative care is often called "total

care” (Munro, 1986; Mandel, 1993; Hilliard, 2003), symptom management can be complex in palliative care. Palliative care thus provides an interdisciplinary team to treat the complex symptoms from distress relating to physical, psychological, financial, or spiritual concerns. Interdisciplinary team members include a physician, nurse, social worker, chaplain, personal aid, and complementary therapies such as music therapy, speech therapy, and physical therapy. Among the interdisciplinary team members, music therapy has been used as an important component to enhance total care for a person because music therapy can influence one’s mind, body, and spirit (Munro, 1986; Mandel, 1993; Hilliard, 2003).

Music Therapy in Palliative Care

Many music therapists have worked in in-patient and home-based palliative care teams in the United States, Canada, Australia, Sweden, Germany, and England (Lee, 1995; Martin 1989) since Munro and Mount’s (1978) description of music therapy in palliative care. Palliative care aims to meet the physical, emotional, social, and spiritual needs of terminally-ill people (Munro, 1986), and also focuses on the psychosocial and spiritual needs of the patient’s family during the patient’s illness and during bereavement (West, 1994; Aldridge, 1995; Salmon, 2001). In this environment, music therapy offers a “safe space” for patients to connect with and process their feelings at their own pace (O’Callaghan, 1993, 1996a, 1997; Salmon, 1993, 2001). Music therapy has accordingly been recognized and successfully used as a great intervention to meet multidimensional needs in palliative care (Mandel, 1993; Porchet-Munro, 1993; Hilliard, 2001; Krout, 2003).

Qualitative studies have primarily been used to support the value of music therapy in palliative care (O’Callaghan, 1996b; Hilliard, 2001). Gilbert (1977), O’Callaghan (1993; 1997), Salmon (1993; 2001), West (1994), Porchet-Munro (1993), Mandel (1993), and Aldridge (1995) have theoretically encouraged the use of music therapy intervention in the treatment of various problems of palliative care patients. Gilbert (1977) affirmed that in both theory and practice, music therapy could be a powerfully effective tool in assisting patients and their families to deal with death by

mentioning the needs and characteristics of dying patients and their families as well as Kübler-Ross's five stages in the acceptance of death.

In O'Callaghan's theoretical study (1993), she assented that music therapy could be used as a form of communication for brain-impaired palliative care patients throughout many kinds of music therapy techniques, including musically supported counseling, musically based life review, the encouragement of patient music performance, song writing, and music-based family session. O'Callaghan (1997) also described the origins of song writing in music, and its use in palliative care by suggesting ten therapeutic opportunities associated with song writing in palliative care.

Salmon (1993; 2001) proposed a theoretical framework for understanding how music therapy elicits and supports depth experiences in palliative care. In this theory (1993), music may share certain essential characteristics with emotions, which allow them to resonate with each other based on an emotional experience. These common characteristics in turn facilitate the experience, expression, and working-through of feelings during music therapy in a palliative care setting. The author also emphasized in another study (2001) that the ultimate purpose of music therapy in palliative care is to provide a "safe space" to facilitate the process of connecting to that which is psychologically and spiritually significant for the patient, thereby transforming experiences of suffering into something that holds a greater sense of meaning, integrity, and well-being.

In Aldridge's article (1995), the music-therapeutic relationship is an important one for maintaining interpersonal contact if the progress of a disease causes an increasing personal isolation. Music therapy plays a significant role in fostering hope with its emphasis on personal contact and instilling a sense of worth in the patient as a creative, productive human being. This hope can be transferred to a new consciousness, giving energy to the patients to face their death. The author also assents that as a source of spiritual and psychological support, music therapy could open up a unique possibility for patients to take an initiative in coping with their disease or nearing death, and thereby increasing the quality of life of the patients.

Porchet-Munro (1993) also encouraged the use of music therapy in palliative care as a form of emotional expression because music therapy techniques could facilitate the access to deeper awareness, altered perception, and consciousness. Music

therapy not only calls upon imagination, fantasy and creativity, but also provides a bridge between the rational and the irrational. In other words, since music can be used as a powerful means of expression through nonverbal messages, it offers an exploration of emotional and intangible issues and ventures from cognitive understanding into the depths of emotion. The author pointed out the need for palliative care education focused on emotional and affective issues for patients, their families, and care providers, and suggested that some music therapy techniques and approaches could be considered in the palliative care education of healthcare professionals.

West (1994) created a theoretical idea which supports assessment and treatment of a patient by following their efforts to move through the phases of dying. The author also asserted that music therapists should completely understand the psychological aspects of dying and grief based on the five stages of death and dying proposed by Kübler-Ross. This study suggests the goals and roles for the music therapist and for music with particular attention paid to the changing needs of patients as they move closer to death. The case example illustrated therapist interventions and music used to support improved quality of life and the psychological and spiritual progress of dying patients to a peaceful death.

Like West's study (1994), Mandel (1993) also theoretically described the role of a hospice music therapist in a multidisciplinary team. Providing direct patient music therapy service, training the hospice team in music therapy, developing and maintaining a music therapy resource center, and offering bereavement services were mentioned in this study. Mandel also stated that music therapy promoted the quality of both life and death for the patient as it added a component to palliative care that enhanced caring for an entire person.

With theoretical studies, case studies have shown the effects of music therapy to treat a variety of needs exhibited by palliative care patients. Case studies showed that music therapy was used to gain insight, provide bereavement support, diminish anxiety and pain, increase self-expression, enhance communication between patients' significant others, support spirituality, and modify behaviors (Fagen, 1982; Bailey, 1984; Whittal, 1991; Martin, 1991; Beggs, 1991; Hilliard, 2001; Krout, 2003).

Similar to other qualitative approaches, modified grounded theory (O'Callaghan, 1996a, 2001; O'Callaghan & Colegrove, 1998) stated the use of music therapy in palliative care patients. O'Callaghan (1996a) conducted a study to examine the use of song writing in palliative care. This study investigated the lyrical themes and categories of 64 songs written by 39 palliative care patients, concluding that song writing was a beneficial music therapy technique. The eight themes that emerged in these songs were: self-reflections, compliments, memories, reflection upon significant others, self-expression of adversity, imagery, and prayer. Seven categories most frequently recurring were: compliments, messages of positive feelings, memories of relationships, existing in the future, expressions of the adverse experiences, descriptions of stories and nature imagery, and gratitude.

Another study by O'Callaghan (2001) described a music therapy research study aimed at understanding patients', visitors', and staff members' experiences of a three-month long music therapy program at a cancer hospital over. Respondents' answers to brief open-ended questions, as well as the music therapist researcher's interpretations of the program's relevance, were examined using thematic analysis based on grounded theory. The results showed that virtually all of the 128 patients who participated in this study indicated that music therapy was a positive experience, and benefits to the staff, visitors, and patients who overheard the music therapy were also evident.

O'Callaghan and Colegrove (1998) examined relationships between a music therapy student's styles of music therapy introduction and the engagement of 46 hospitalized cancer patients. They found that most patients initially engaged in therapy when (a) they had heard music therapy before meeting the therapist; (b) they discussed their musical preferences; (c) they listened to live music with no further mention of music therapy; and (d) the patients were rated as experiencing a moderate level of physical discomfort. Conversely, most patients initially refused music therapy when (a) their music preferences were not elicited by the therapist; (b) music therapy methods and benefits were explained; and (c) they had been rated as either being in pain or physically uncomfortable.

Whereas the literature regarding palliative care in music therapy is rich with qualitative approaches, quantitative research is quite limited. Hilliard (2003) investigated the effects of music therapy on quality of life and length of life of people

diagnosed with terminal cancer. Eighty subjects participated in this study and were divided into two groups: an experimental group with routine hospice service and clinical music therapy and a control group with routine hospice services only. Groups were organized according to gender and age. Song choice, music listening, iso-principle, singing, counseling, reminiscence, and lyric analysis were used as the music therapy techniques in this study. The Hospice Quality of Life Index-Revised (HQLI-R), a self-report questionnaire, was used to measure the QOL of the patients. The results showed that regardless of gender or age, the patients who received music therapy appeared to have a higher quality of life than those who did not. This study also found an inverse relationship over time between a patient's physical capabilities and their QOL scores in the experimental group. These results demonstrated the importance of music therapy in increasing the quality of life initially and even more so over time. Hilliard's research supports the use of music therapy in the hospice and palliative care models.

Nguyen's (2003) master's thesis evaluated the effects of music therapy on the quality of life, anxiety level, and the family satisfaction of patients during their end-of-life experience within a medical setting. There were twenty subjects divided into two groups. Music therapy interventions were used for the experimental group (N=10) in two time music therapy sessions, but not for the control group (N=10). Music therapy techniques used in this study included song writing, patient's preferred music, a sing-along, and counseling. Nguyen reported that the anxiety levels of the patients in the experimental group were significantly lower than those of the patients in the control group as evidenced by the Visual Analog Scale used in this study. She concluded that both patients and their family members were highly satisfied with music therapy interventions in a medical setting.

Music therapy interventions are recognized as an important tool for spiritual well-being and growth for patients and their family in hospice and palliative care. Wlodarczyk's thesis (2003) examined the effect of music therapy on spirituality of patients in an in-patient hospice unit. Ten patients with terminal illnesses were involved in her quantitative research. This study used a variety of musical techniques for meeting patients' spiritual needs, including the use of pitched/non-pitched instruments, patient's preferred music, song choice, improvisation, a sing-along among

family members and significant others as well as patients, song writing, and song gift. A total of four music therapy visits with two music and two non-music visits were made for each subject. The results showed that each subject was more likely to express higher scores for spiritual well-being on a music visit as evidenced by a self-report questionnaire. It was also found that the patients requested spiritual music on a music visit to promote enjoyment or interaction between the therapist and the patients themselves. Hence, this study pointed out the fact that music was an effective tool in building a rapport between the patient and therapist.

In another quantitative study, Kerr (2004) studied the effects of music therapy on non-responsive hospice patients as measured by heart and respiratory rate. This study involved ten terminally ill patients diagnosed to be comatose or verbally non-responsive. The subjects were evenly divided into two groups and alternatively received two different types of recorded music, classical and new age music, for the two-day experiment. The results of this study showed that regardless of the genre, after listening to music the subjects' heart and respiratory rates were significantly lowered and more stable. The researcher concluded that for patients in a comatose or non-responsive state, music was a successful method to elicit their inner response and moreover, affect their physical well-being.

Okamoto (2005) evaluated the use of music therapy interventions on grief and spirituality of family members of patients in a hospice setting. The subjects (N=60) were the family members or significant others of hospice patients and divided into a control group (N=30) where family members received no a music therapy visit, and an experimental group (N=30) that received a music therapy visit. A self-report questionnaire including five categories (grief, coping strategies, spirituality, satisfaction with hospice care, and satisfaction with family members) was used for a post-test only. Results of this study showed there was a significant difference in mean scores of quality of life between two groups. Although the mean score of grief and spirituality in the experimental group were higher than the scores of those in the control group, it was not statistically significant. Nevertheless, the researcher demonstrated that there was a tendency for those who received music therapy to show higher scores than those who did not. He also concluded that music had a potential to provide a positive influence for patients and their family members in a hospice setting.

Many of literary resources mentioned above reported a wide range of music therapy methods used to meet the needs of patients and their families. West (1994) documented a variety of music therapy techniques that may be useful in application of dying patients. Possible techniques include singing, patient song selection, song writing, recorded music selection and listening, relaxation with music or nature sounds, music and imagery for relaxation or pain management, instrumental music playing or improvisation with patient or family, live instrumental music for active or passive listening, music with other creative arts media such as art or writing, music background selection for video or audio taped message from the dying to loved ones, music planning for the patient's funeral or memorial service, and Bonny method of Guided Imagery and Music.

According to Krout's review of 88 clinical reports (2000), the integral use of music is to elicit the expression of inner feelings. Many studies state that improvisation plays a great role in allowing individuals to explore their unconscious thoughts and to be aware of their inner feelings. Finally, it is useful for therapists to observe patients' physical or psychological needs and help them find coping strategies through this intervention (Fagen, 1982; Martin, 1989; Bruscia, 1989; West, 1994). Musical improvisation was also used to provide emotional expression, as reported by Salmon (1993) and Porchet-Munro (1993). In addition, in Hartley's (1999) and Neugebauer's (1999) case studies of a patient with HIV, the use of improvisation was encouraged for building rapport between the patient and the therapist, enhancing inner sight, and motivating participation in music therapy session.

Song choice is also used as a great music therapy technique to elicit expressions of inner feelings of patients and their families in palliative care (Martin, 1991; Whittall, 1991; Salmon, 1993). Martin (1989) states that this technique gives both patients and their caregivers a chance to reminisce and help them gain control over their environment, which is a very important issue in terms of well-being. Additionally, singing spiritual music requested by patients or their families encourages them find a source of spiritual well-being and improve their spiritual growth (Munro, 1986; West 1994).

Song writing has been shown to facilitate communication among family member (Slivka & Bailey, 1986; O'Callaghan, 1993; Salmon, 1993), portray patients' feelings

(Fagen, 1982; Bruscia, 1991; Magill-Leverault, 1993; O'Callaghan, 1993), images, dreams, and fantasies (Magill-Leverault, 1993), and presents itself as a gift that creates a lasting memory (Bruscia, 1991; O'Callaghan, 1993). The O'Callaghan studies (1996a, 1997) have proved that this technique is a meaningful aid in meeting patients' physical, psycho-social, and spiritual needs.

Guided Imagery and Music (GIM), developed by Helen Bonny, is one of the techniques successfully used in palliative care (Hogan, 1999; Salmon, 1993). It has been used to help patients gain insight and engage in psychotherapy by using free association and imagery while listening to recorded music (Hilliard, 2001; Skaggs, 1997; Porchet-Munro, 1993; Bruscia, 1991; Fagen, 1982). Bruscia (1991) illustrated the GIM process through the case study of a client with AIDS, and stated that GIM helped a client gain insight into his past life and find strategies to cope with his future life. Hammer (1996) also showed that GIM created a relaxed environment and reduced stress and anxiety levels.

Furthermore, listening to taped music may lessen nausea and vomiting either before, during, or after chemotherapy by reducing anxiety levels (Standley, 1992). Musically based life review, musical performance (Beggs, 1991; O'Callaghan, 1993), musically supported counseling, music-based family sessions (O'Callaghan, 1993), and lyric substitution (Fagen, 1982) were all used as a therapeutic tool in palliative care music therapy.

As is evident from this literature review, music therapy offers significant support for palliative care patients. In summary, music therapy intervention in palliative care affects the interaction between patients and their family members (Beggs, 1991; Martin, 1991; Hilliard 2001; Krout, 2003), anxiety (Gross & Swartz, 1982; Fagen, 1982; Martin, 1991; Hilliard, 2001), quality of life (Hilliard, 2003; Nguyen, 2003), grief and spirituality for both patients and their families (Gilbert, 1977; Martin, 1991; Okamoto, 2005), bereavement support (Bailey, 1984; Beggs, 1991; Whittall, 1991; Hilliard, 2001), and physical pain (Wolf, 1978; Bailey, 1986; Wylie & Blom, 1986; O'Callaghan, 1996b; Colwell, 1997; Rider, 1985; Curtis, 1986; Krout, 2001, 2003; Kerr, 2004). Generally, palliative care aims toward pain management, symptoms management, social, psychological, emotional and spiritual support, and caregiver

support. Pain management is one of the most important aspects of care for terminally-ill persons.

Pain

Pain has been formally defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (International Association for the Study of Pain, 1986, p. 217). The International Association for the Study of Pain (1986) also views pain as being subjective. Likewise, Weisenberg, Wolf, and Raphaeli (1984) have noted that pain is a subjective, psychological state perceived as being unpleasant. As described by Sternbach (1982), there is psychogenic pain when there is a lack of physical stimuli to which the pain may be attributed.

From these definitions, pain is perceived by the mind as pain which can occur in the absence of tissue damage. These definitions of pain avoid the strict association with physical stimuli. The reason for this might be that once a person’s subjective report of perceived pain in absence of tissue damage is accepted, there is no method to distinguish this pain from that reported by another with tissue damage (Eagle & Harsh, 1988; Brown, Chen, & Dworkin, 1989). Hence, the origin of pain can be either physical noxious stimuli or psychosocial disturbance. Brown, Chen, and Dworkin (1989) describe several definitions of pain cited by many experts like biophysicists, sociologists, and psychologists, concluding that although pain is a universal and personal experience, the concept of pain is difficult to explain in a single definition. One reason of this is that many factors, such as psychological, social, cultural, and motivational conditions, comprise to define pain.

Kotarba (1983) divided pain into two types of physical pain: acute and chronic. The author stated that acute pain generally serves as the warning signal of sudden localized injury, and usually ends within a month. The etiology of this pain is interpreted as tissue damage. This pain causes immediate change in the autonomic nervous system (ANS) processes and elicits a reflexive response. On the other hand, chronic pain involves a more complex emotional process, and can persist for six months

or longer. Chronic pain is also linked to pain tolerance which changes according to the individual's past experiences and present state of mind (Wells & Nown, 1998). Thus, this pain elicits little or no reflexive response (Sternbach, 1982).

Selm (1991) described chronic pain and examined three issues related to its treatment: cognitive influence, affective restriction, and the acquisition of self-regulation skills. The author claimed that cognitive processes can affect physiological responses, which may contribute to the development or worsen the condition of chronic pain. Additionally, affective factors including personality type, inhibition of affective verbal expression as a social trait, cultural issues, and family interactions can affect pain perception. Thus, cognitive and affective issues could affect and be affected by the chronic pain experience. Self-regulation skills are also emphasized as a successful method in increasing the patient's ability to control pain and stress through cognitive alterations, physiological changes, or a combination of both. In conclusion, this study emphasized that music therapy could be used to address cognitive and affective treatment issues in combination with various forms of self-regulation skills.

While there are many theories on pain perception, the most influential theory is the Gate Control Theory proposed by Ronald Melzack and Patirck Wall in 1965. They suggested that there is a "gate" found in the dorsal horns of the spinal cord that opens and closes to either pass or block pain messages to the brain. In other words, the transmission of potentially painful impulses could be modulated by a gate. To be more specific in this theory, first, sensory messages travel from stimulated nerves to the spinal cord. Here, they are reprocessed and sent through open gates to the thalamus. Once the nerve signal reaches the brain, the sensory information is processed in the context of the individual's current mood, state of attention, and prior experience. The brain's response to this information will determine the extent to which people receive pain. If the brain sends a message back down to close the gate, the pain signals to the brain are blocked and people experience lower pain. If the brain orders the pain gates to open wider, the pain signal intensifies and people can often feel unbearable pain.

Melzack and Wall (1965) have also suggested that the activity of large diameter sensory nerve fibers compared to small diameter sensory nerve fibers may determine the degree to which the gate increases or decreases sensory information. Small diameter nerve fibers carry pain stimuli through a gate mechanism, but larger diameter nerve

fibers going through the same gate can inhibit the transmission of the smaller nerves carrying the pain signal. Because increased activity of larger fibers can inhibit the passage of pain-related information, people can perceive partial or total decrease in pain. The resultant physiological balance between the nerve fiber types is only one aspect of the modulating pain process. They also suggested that pain experience consists of three major psychological dimensions: sensory-discriminative, motivational-affective, and cognitive-evaluative. According to the gate control theory of pain, people's thoughts, beliefs, and emotions may affect how much pain they feel from a given physical sensation. The fundamental basis for this theory is the belief that psychological, as well as physical factors, guide the brain's interpretation of painful sensations and the following response (Brown, Chen, & Dworkin, 1989).

There are many different kinds of pain management techniques for pain relief. Interventions include drug therapy, surgical intervention, hypnosis, biofeedback, guided imagery, and several methods of relaxation like breathing exercises, attention diversion, and biofeedback (Brown, Chen, & Dworkin, 1989; Davis, 1992). Turner and Chapman (1982) categorized psychological intervention for chronic pain under three approaches: physiological, operant conditioning, and cognitive-behavioral. In their first approach to pain management, the psychological treatment goal is to control the physiological factors involved in the pain experience. Biofeedback, muscle relaxation training, and the Lamaze childbirth method are examples of this approach. The goal of the operant conditioning model is to decrease operant or learned pain behavior, and to replace them with positive and healthy behaviors. The cognitive-behavioral approach to pain management points out the role of cognitive factors and their relationship to pain behaviors emphasizing the subjective state of pain. This method might be more similar to the Gate Control Theory of pain than the other two interventions because they put emphasis on the fact that both physical and psychological factors can have an effect on pain perception. Turner and Chapman (1982) also mentioned that cognitive-behavioral therapies have the potential to address a wider range of chronic problems in a more comprehensive manner. Accordingly, the use of music as a cognitive strategy may have the potential of being an influence on pain perception (Brown, Chen, & Dworkin, 1989).

Music and Pain

The use of music as a nonpharmacologic method (Bailey, 1986; Magill-Levreault, 1993) for treating pain has been incorporated into the practice of music therapy over the past several years. One of the most widely known applications of music in the medical field has been audioanalgesia, and many studies have shown it to work as an analgesic agent (Robson & Harold, 1962; Hanser, Larson, & O'connell, 1983; Curtis, 1986; Brown, Chen, & Dworkin, 1989; O'Callaghan, 1996b; Colwell, 1997). Standley (1986) reviewed studies of music in medicine and reported that music facilitated pain relief in studies involving dentistry, podiatry, terminal cancer, respiratory care, obstetrics, spinal fusion, cardiac care, post-operative care, and kidney dialysis. These modifications may be achieved through distraction, suggestion, relaxation, or masking effects (Curtis, 1986; Sedei-Godley, 1987; Brown, Chen, & Dworkin, 1989; Davis, 1992; Magill-Levreault, 1993, 2001; O'Callaghan, 1996b; Colwell, 1997).

Many studies have made theoretical explanations for the mechanisms involved in the interactions between music and pain. Eagle and Harsh (1988) claimed that music and pain have similar ancient roots in that both are derived from the same word "aio." They also pointed out the similarity between psychoneurological and psychoacoustical processing for both pain and music. The first psychoneurological similarity between pain and music is that both pain and music can be classified as a sensory input. This indicates that when music is heard, the sensory signals sent to the brain are similar to those sent to the brain when pain is felt. The second similarity lies in the output from the limbic system. The fact that the limbic system is primarily responsible for emotional output indicates that emotions are tightly interlinked with pain as they are with music. In the psychoacoustical dimension, both music and pain have similar psychological parameters, including frequencies/pitches, intensities/loudness, wave forms/tone qualities, durations/times, and locations/localizations. In other words, the five elements of music composed of these parameters can physically and psychologically affect the body. They concluded that based on the similarities between pain and music, there is a potential for one to affect the other.

Brown, Chen, and Dworkin (1989) regarded the use of music as a cognitive strategy on pain management by acting along all three psychological dimensions

involved in the pain experience as described by Melzack and Wall (1965): sensory-discriminative, motivational-affective, and cognitive-evaluation. Since people can control the sensory-discriminative component of pain as a means of physical and mental relaxation, music facilitates this relaxation by providing reinforcing cues such as slow tempos and constant rhythmic patterns. The motivational-affective component of the pain experience includes the emotional feelings. Because music can be played as a distraction or as an elicitation of pleasurable emotional states induced by the rhythms and melodies being presented, music changes emotional feelings the subject feels during pain experience. Last, the goal of the cognitive-evaluative dimension is to reconceptualize the painful experience by altering one's expectations. The use of music as a cognitive strategy allows people to reconceptualize a previously painful experience to one that they can control.

They also affirmed that two qualities of music may be useful for developing effective pain coping skills: an attention-distraction dimension and an affect dimension. In the attention-distraction dimension, as music is time-ordered, it can hold one's attention, modify one's emotional state, and alter one's perception of time, regardless of musical preference or knowledge. In addition, in the affect dimension, music arouses emotional experiences by providing meaning to a situation, evoking religious beliefs, stirring past memories, and allowing for self-catharsis.

Similarly, Magill-Levreault (1993) suggested three possible pathways by which music may modify pain: affective, cognitive, and sensory. In the affective aspect, music may change mood disturbances such as anxiety, depression, fear, anger, and sadness. Music can, therefore, alter one's mood and promote relaxation. Music as the cognitive dimension can distract attention away from pain and improve one's sense of control, by providing a mean for creating images. Last in the sensory pathway, the sensory component of music may affect the sensory component of pain through center-stimulation of the afferent fibers. The author concluded that music may alter pain through these interactive pathways that stimulate the endogenous system of pain modulation, and thus facilitate a change in the overall perception of pain.

Another study by O'Callaghan (1996b) found these four theoretical perspectives: psychological relationship between pain and music, cognitive coping strategies, spinal mechanisms involved in the modulation of pain, and role of

endorphins, support why patients report reduced pain sensation after music involvement. In the perspective of the psychological relationship between pain and music as described by Melzack (1973), cortical processes influence the intensity and quality of the pain experienced through psychological variables like memories of previous experiences, cultural factors, anxiety, personality variables, and expectations. Therefore, music can be used as a distraction to reduce pain intensity, decrease anxiety, aid in relaxation, or be used as a vehicle for supportive psychotherapy. As cited by Magill-Levreault (1993) and Melzack and Wall (1965), music as a cognitive coping strategies can distract one's attention away from pain perception by offering a chance to create a pleasant image. As a third perspective, there are spinal mechanisms involved in the modulation of pain based on the Gate Control Theory (Melzack, 1973). In this perspective, it is possible for music to stimulate brain stem centers either directly via auditory pathways or indirectly by cortical mechanisms which include psychological/cognitive processes. This in turn can activate descending inhibitory pathways, thus reducing pain transmission. Finally, like Magill-Levreault's (1993) study, listening to music might cause the body to release endorphins into the bloodstream, so resulting in reduced pain perception.

Many of the theoretical studies described above concluded that pain is subjective and personal (Brown, Chen, & Dworkin, 1989; Davis, 1992; O'Callaghan, 1996b; Weisenberg, Wolf, & Raphaeli, 1984). Hence, music therapy techniques should be individually designed with an understanding of the total pain experience by working with the affective, cognitive, and sensory aspects of pain (Bailey, 1986; Magill-Levreault, 1993). Bailey (1986) emphasized that music therapy techniques should be individually devised with consideration given to a patient's physical, emotional, and psychological needs, coping abilities, and prior musical experiences. She also advocated active engagement in order to facilitate cognitive and emotional expression as well as involvement in pain management. Likewise, a patient's prior music experience offers an opportunity to regain a sense of identity and sense of control, and the importance of song selection is based on the patient's physical and psychological assessment on a day-to-day basis, as mentioned in the Magill-Levreault's (1993) study.

Many studies illuminate a variety of music therapy techniques used for the alleviation of pain and the effect of those techniques. These techniques include

listening to familiar or unfamiliar music, composing instrumental and lyrical music, breathing times to music, the Bonny Method of Guided Imagery and Music (GIM), the Music Vibration Table, biofeedback with music, and progressive muscle relaxation with music (Rider, Floyd, & Kirkpatrick, 1985; Sedei-Godley, 1987; Chesky & Michel, 1991; Colwell, 1997).

Music Therapy on Pain Management in Palliative Care

Since pain is certainly a multidimensional phenomenon and palliative care patients need multidimensional care, music as a multidimensional approach can be a perfect treatment intervention for pain management in a palliative setting. However, research concerning music therapy in pain management for the terminally ill is limited to philosophical treatises and narrative reports of case studies (Curtis, 1986; Brown, Chen, & Dworkin, 1989). Krout's (2001) study presented the possible reason of this. A controlled study that qualifies as experimental research is difficult to conduct as the needs of dying patients are often rapidly changing. Therefore, many published reports of palliative care music therapy have been in the form of philosophical articles and case studies.

In support of music therapy for pain control of patients in palliative care, Magill-Levreault (1993) documented the use of music therapy in pain and symptom management in care of patients with long-term and life-threatening illnesses, and also stated the theoretical framework for the use of music therapy in pain management. This author also affirmed that in music therapy used for pain and symptom management, the dynamic and multidimensional qualities of music can restore and refresh, soothe and energize, and create an atmosphere of order and peace. In another case study (2001), the "lifting," "transporting," and "bringing of peace" characteristics of music could facilitate pain relief. Techniques such as singing, playing, creating, and listening were used to provide meaningful opportunities for reflection and relaxation in this case study.

Further support of palliative music therapy's role in pain reduction was noted by O'Callaghan (1996b). In her case study, O'Callaghan offered guidelines for music therapists to follow in assisting in pain management. The guidelines included music

selection based on the patient's condition, volume settings, observations of aggressive uses, consideration of patient's attention spans and energy levels when music and relaxation, or pain distraction techniques are used, patient choice, and assessment of adverse effects.

Munro and Mount (1978) discussed six of their own case studies to illustrate the benefits of music therapy in relieving intractable pain with the terminally ill. Likewise, numerous case studies give evidence to decreased pain and increased relaxation through various music interventions (Fagen 1982; Wylie & Blom, 1986; Starr, 1999; Mramor, 2001; Krout, 2003).

While the effect of music on pain in palliative care was generally documented in case studies, some authors reported the results of quantitative studies in hospice and palliative music therapy. One such report described the results of a study that used listening to patient-preferred instrumental music in affecting a total of nine terminally-ill patients' self-reported perception of pain relief, physical comfort, relaxation, and contentment. Although the results were not statistically significant, contentment scores during the music listening were higher than during control and background hospital noise conditions. In addition, graphic analysis of individual responses indicated that music may facilitate pain relief and relaxation in palliative care patients (Curtis, 1986).

In a pilot study, Whittall (1989) found a decrease in heart and respiration rates among eight palliative care patients receiving music therapy interventions, which included guided imagery, deep breathing and progressive relaxation exercises. These results also supported the fact that music therapy interventions decrease the anxiety state and increase relaxation in patients.

Krout (2001) evaluated the effectiveness of single-session music therapy interventions with hospice patients in patients' three problem areas: pain control, physical comfort, and relaxation. By way of behavioral observation and subject's self-reporting, data from a total of 90 sessions was collected from a total of 80 subjects. Results indicated that patients exhibited increased control over pain, more physical comfort and increased relaxation. The researcher concluded that single-session music therapy appeared highly successful in the study.

Martin (1989) described numerous techniques that could be used to aid in pain management and relaxation of palliative care patients. These techniques included the

use of music and autogenic and progressive relaxation techniques, the use of imagery and instrumental music, and the use of musical improvisation by the therapist to describe an image reported by the patient. Guided imagery and music techniques have also been used to facilitate pain relief and relaxation in cancer and terminally ill patients (Wylie & Blom, 1986; Skaggs, 1997). Magill-Levreault (2001) suggested two kinds of music therapy techniques for advanced cancer pain management: vocal techniques and instrumental and listening techniques. The iso-principle is also one of useful music therapy techniques used for pain management.

Iso-Principle in Music therapy

Entrainment has been used as a music therapy intervention for pain management. The principle of entrainment is directly related to the Greek word “isomorphic,” commonly referred to as the iso principle. Isomorphic means “same form or appearance” (Cottrell, 2000). Cottrell (2000) explained the entrainment being a powerful tool in behavior modification. Musical entrainment is a process of connecting together the feelings conveyed through the music and feeling a sense of commonality with it. One might also have a feeling of connection with the composer or performer by sharing the emotions and feelings conveyed in the music, either through its creation or through the performance itself. In this sense, music can be a powerful tool in both positive and negative ways to the listener. Music entrainment, however, is more than just a tool to be used for behavior modification. The author concluded that by allowing profound healing on many levels, music has the power to integrate the whole person.

One of the first to implement this technique was psychiatrist Ira Altschuler (1948). He found that playing music that first matched the mood of the patient could easily alter the patient’s depressed or anxious state. Later, he would change the mood of the music to entrain the patient in the desired direction. Altschuler (1948) invented the phrase “iso-moodic” to describe this mood-changing principle.

Later, Nordoff and Robbins (1977) extensively used this principle in their highly innovative improvisational music. Improvised music was used to match moods, vocal

pitches, and behavioral rhythms of developmentally disabled children to result in fascinating learning abilities. It was found to bring about significant increases in language and adaptive behavior. No other therapeutic modality had been found to be as successful with these individuals as the musical approach.

Rider (1997a, b) considered the iso-principle as a music therapy technique that could promote the healing process with a search into “homeodynamic” theory. Rider (1997a) explained the mechanisms of the bodymind, suggesting that not only does the body affect the mind, but the mind can also control the body. Thus, “homeodynamic” was coined to refer to the bodymind’s requirement for maintenance of health and pain management. Many studies showed this theory to be valid by using the relationship between the EEG shifts and optimum health and pain control. The wide variability of the EEG in a greater balance among the four brainwave bands (beta, alpha, theta, and delta) was affirmed to be important to health in this study.

In Rider’s (1997a) study, while the “dynamic” refers to the bodymind shifts necessary for optimum health, the “homeo” refers to the reason that the body and mind can communicate because they share many similarities, including identical chemical communication channels, identical electrical communication, and identical harmonic organization. The mind-brain, immune system and pain system (body) are inter-related, as they all use the same direct neural connections. They communicate through chemical messengers like neurotransmitters and endorphins. Therefore, because music therapy stimulates these chemical messengers, it can be effective in altering mood and pain. The mind, immune and pain system also utilize the same chemical communication channel. In an integrated univariate circuit of direct electrical current activity, the mind is a direct manifestation of the waxing and waning of direct currents which form the baseline of the EEG. These same direct currents in the body also directly affect pain perceptions and physical healing. Consequently, music therapy is one of the homeodynamic treatments which affect the direct current fields of the body. Finally, all electrical and chemical activity in the bodymind oscillates in rhythms, a source of harmonics, because brainwaves are organized harmonically and many hormones, neurotransmitters, and the immune system have circadian rhythms and faster and slower rhythms, creating a harmonic organization. The purpose of this harmonic organization is to provide an analog communication system that is more accurate in sending detailed

information than the faster, but less precise, central nervous systems. Hence, the highlight of this study is that the ultimate language of the bodymind is musical. The fact that all the systems in our body have rhythms support the reality that people are easily entrained or changed through the iso-principle process.

Another study (1997b) stated basic ideas, such as the fact that emotional expression as a homeodynamic phenomenon needs to be stimulated in order to promote healing processes, so music that produces several different types of shifts in the brain should be used. The author also noted five mechanisms involved in the effects of music on physical healing: the emotional response to music; cognitive response to music; the thalamic response in which musical rhythms entrain rhythmic movements within the body; the direct stimulation by sound of peripheral; and cutaneous nerves and spiritual or psychosocial mechanisms in group music-making. Entrainment is certainly involved in the first three levels, but research on the latter two has only scratched the surface.

There are a few research papers that examine the effect of music via the iso-principle in the medical arena in terms of cognitive mechanism reported by Rider's (1997b) study. In the first publication of this technique, Rider (1985) examined the effect of different types of music-mediated imagery on pain reduction, EMG tension reduction, and imagery vividness and activity in a group of 23 spinal pain patients. Two minimalist selections, two conventional relaxing selections, one entrainment selection, and two control conditions- one with no music and one with no imagery induction- were involved in music conditions. Subjects were instructed to imagine their endorphin system suppressing their pain. It was found that patients who participated in music enhanced entrainment exercises experienced a reduction in psychological and physiological pain. Modulation of endorphinergic mechanisms possibly allowed for both tension and pain to be released (Rider, 1997b).

Rider, Floyd, and Kirkpatrick (1985) conducted the research to measure the effects of music, guided imagery (GI), and progressive muscle relaxation (PMR) on the adrenal corticosteroids. This study made hypotheses to evaluate the effect of a taped instruction of music/GI/PMR on the mean level, circadian amplitude, and circadian re-entrainment with body temperature. Twelve-hour shift nurses collected urine and recorded body temperature as physiological measurements during three 4 to 5 intervals over one month. They were divided into two groups: the no-tape group with music only

and the tape group with music and verbal induction. Results showed the tape group to have significantly decreased circadian amplitude, and that corticosteroid and temperature rhythms were significantly more entrained. In other words, the combined intervention of music/GI/PMR was found to decrease levels of urinary corticosteroids and increase entrainment of biological circadian rhythms. The authors concluded that due to the close relationship between corticosteroids and the immune system, the results suggested a relationship between music/relaxation techniques and physical health.

Similarly, the next two studies examined the effects of the entrainment music with imagery upon the immune system activity. The entrainment music was characterized first by sounds that were nonrhythmic similar to immune system activity, after which the music was gradually built to a coordinated rhythmic improvisation. Results showed the entrainment music to influence differential cellular immune system activity (Rider & Achterburg, 1989). In a follow-up study, salivary immunoglobulin A (IgA) was found to be increased significantly with entrainment music alone, but even more so when combined with immune system imagery (Rider, Achterburg, Gowen, Lawlis, Toledo, & Butler, 1990). From these findings, the music via the iso-principle stimulated significant immunological changes; thus, the spontaneous imaginable shifts created by the music induced immunological enhancement by homeodynamic mechanisms (Rider, 1997b).

A review by Maslar (1986) cited numerous studies supporting the use of music or auditory stimulation as an analgesic to reduce pain. The authors in this review explained the use of the iso-principle for mood changes. The principle of pain management was based on the fact that music focuses attention away from the pain stimulus. The physiological implication is that when presented with two stimuli, the nervous system will only receive and send signals of the one that is most persistent. The iso-principle also psychologically implies that music therapists have the power to reinforce or gradually change moods.

Based on the fact that music affects physical healing or health, entrainment is regarded as an effective method in music therapy to elicit physical and psychological changes in a positive way. However, a few case studies have shown the effect of the iso-principle in a music therapy setting for the terminally ill, which had focused on pain management. Hilliard (2001) explained through his case study that music via the iso-

principle was successfully used to decrease a patient's physical distress and to provide comfort in a hospice setting. In music therapy, the iso-principle refers to matching the patient's mood or pain level with the musical elements of tempo and dynamics (Hilliard, 2001). To be more specific, in the beginning the music is loud and fast to match the patient's unbearable pain. After a few verses or songs, the therapist begins to gradually soften and slow the music while assessing the patient by observing behavioral changes in the patient's affect and respiration. While Rider (1985) and Hilliard (2001) pointed out the effect of the iso-principle when using music for pain reduction either alone or in combination with relaxation and imagery techniques, more empirical investigations in palliative care population appear to be in order.

The purpose of the study

The purpose of this study was to evaluate the effect of live music via the iso-principle on pain management in palliative care patients. This study asked: Is there a difference on self-rating of pain and pulse rate between before music therapy and after music therapy? Additionally, it was asked if there was a difference on self-rating of pain and pulse rate between subjects who listened to recorded music verses those who listened to live music via the iso-principle. Is there a difference on self-rating of pain and pulse rate by gender or amount of previous music therapy? Does self-rating of pain (psychological measurement) correlate with pulse rate (physiological measurement)?

METHOD

Subjects

Forty three subjects were selected for this study from referrals made by social workers and resident nurses (RN) in Tallahassee Memorial Hospital where the study was conducted. Of original subjects, three were eliminated due to refusing music therapy during the experiment, excessive interruptions from medical environment, and inappropriate qualification for this study. The subjects matched for gender and amount of previous music therapy experience were alternatively assigned to either the control (recorded music) or experimental (live music via the iso-principle) group.

There were criteria for subjects in this study. First, the subjects were diagnosed with life-threatening illness, advanced and complex illness, chronic illness, or frail elderly. Secondly, the subjects needed palliative care. Third, the subjects were sufficiently alert to answer questions regarding perceived pain. Fourth, the subjects were adults. Last, the subjects who had reported at least “Mild Pain” on pain measurement scale were needed. If permission to participate was refused, potential subjects received routine music therapy service provided by the hospital. However, those refusing participation for this study were no longer contacted regarding the study.

Informed consent (see Appendix C, D, & E) was obtained by the experimenter upon the visit to the subjects, and subjects or their legal guardians signed the consent form which was approved by the Florida State University Human Subjects Committee (see Appendix A) and the Institutional Review Board (IRB) of Tallahassee Memorial Hospital (see Appendix B).

Design

The research design included control and experimental groups with pre-test, and post-test data collection. Subjects were divided into experimental (N=20) and control groups (N=20) with equal numbers of males (N=10) and females (N=10) and subjects who had not had music therapy before (N=10), and those who had received some music therapy before (N=10). The independent variables were recorded music and live music via the iso-principle and the dependent variables were self-rating of pain and pulse rate.

The control group consisted of 20 subjects who listened to recorded music for 20 minutes, and the experimental group consisted of 20 subjects who listened to live music via the iso-principle for 20 minutes. Recorded music included classical excerpts: (a) Mozart, W. A., “Andante from Piano Concerto N. 21,” (b) Bach, J. S., “Air On The G-String,” (c) Bach, J. S., “Arioso from Cantata N. 156,” (d) and Morisod, A. “Et Les Oiseaux Chantaient.” These selections were recommended as relaxing music because these are based on slow and steady rhythm, long phrases, little dynamic variation, and emotional components (Munro, 1986). Live music was selected from the 20s’-80s’ contemporary selections (See Appendix H).

Null hypotheses

The following null hypotheses will be investigated in this study:

1. There will be no statistically significant difference between the experimental and control groups on self-rating of pain and pulse rate on post-tests.
2. There will be no statistically significant difference between two groups by gender or the amount of previous music therapy on self-rating of pain and pulse rate on post-tests.

Measurement

The results were calculated using a univariate Analysis of Variance (ANOVA) to investigate the effect of each music therapy technique on perceived pain and pulse rate within each group and to examine if there was a significant difference on perceived pain and pulse rate between the two groups. Pearson’s Correlations Test was used to recognize possible correlations between self-rating of pain and pulse rate.

Materials

Equipment used during this study included an acoustic guitar, portable CD player, CD, and various contemporary popular songs. In addition, a pen and GRS forms were needed for self-report, and a finger pulse monitor (58 GBP) was used for pulse rate.

Procedure

As each patient was admitted to the unit in the hospital, the head nurses, resident nurses, or social workers were consulted to assess physical condition and to ascertain whether the criteria for participating in the experiment were met. Music therapy referral forms the experimenter made were used to select the subjects (See Appendix G). If candidates were able to meet the criteria for participation and agreed to volunteer for the study throughout the informed consent, they were assigned to one of the two groups according to matching research design.

Both groups received one music therapy session. At the beginning of the session, the experimenter explained the nature of the study, and assisted the subject in understanding the informed consent. Upon permission for participation from the subjects, the subjects were asked if they were experiencing pain and asked if they took pain medication or had a shot around the time of music therapy session. At the start of the music therapy intervention (recorded music or live music), the subject's self-rating of pain and pulse rate were taken. As recommended by Scott and Huskisson (1979), Graphic Rating Scale (GRS) (see Appendix F) was used for self-rating of pain. GRS consisted of a 10-centimeter horizontal line having the words "no pain," at the end, "unbearable pain," at the other, and "mild," "moderate," and "severe" between the extreme terms. Pulse rate was measured by a finger pulse monitor. Then, recorded music for the control group and live music via the iso-principle for the experimental group was played for 20-30 minutes. At the end of the session, the subject's self-rating of pain and pulse rate were taken again. There were no changes in the procedure between two groups with the exception of two different music therapy techniques: recorded music and live music.

RESULT

Statistical analysis was calculated using a univariate analysis of variance for both self-rating of pain and pulse rate. Results of a comparison of pretest-to-posttest means from Table 1 showed that subjects' self-rating of pain and pulse rate were significantly lowered after either recorded or live music in each group.

Table 1
Pretest/Posttest Mean Comparisons for two dependent variables in each group.

Group	Dependent Variables	Mean	N
Control	Self-rating of pain in pre-test	6.505	20
	Self-rating of pain in post-test	4.630	20
	Pulse rate in pre-test	86.10	20
	Pulse rate in post-test	81.45	20
Experimental	Self-rating of pain in pre-test	6.530	20
	Self-rating of pain in post-test	3.020	20
	Pulse rate in pre-test	84.40	20
	Pulse rate in post-test	79.60	20

A univariate analysis of variance examining pre-test scores across all trials revealed no statistically significant differences for self-rating pain (Table 2) and pulse rate (Table 3) because all p values of self-rating pain and pulse rate in pre-test were more than $\alpha = .05$. These results presented pre-test homogeneity in all trials, so a univariate analysis of variance was again performed to examine post-test scores across trials for two dependent variables.

Table 2

Results for univariate analysis of variance for self-rating of pain in pre-test.

Source	Mean Square	df	F	P
Group	.006	1	.002	.966
Gender	1.260	1	.367	.549
Group X Gender	.090	1	.026	.872
Group	.006	1	.002	.966
Amount of MT	2.352	1	.690	.411
Group X Amount of MT	.132	1	.039	.845
Gender	1.260	1	.374	.545
Amount of MT	2.352	1	.698	.409
Gender X Amount of MT	.132	1	.039	.844

Table 3

Results for univariate analysis of variance for pulse rate in pre-test.

Source	Mean Square	df	F	P
Group	28.900	1	.083	.775
Gender	792.100	1	2.278	.140
Group X Gender	1276.900	1	3.672	.063
Group	28.900	1	.076	.784
Amount of MT	902.500	1	2.376	.132
Group X Amount of MT	12.100	1	.032	.856
Gender	792.100	1	2.344	.135
Amount of MT	902.500	1	2.671	.111
Gender X Amount of MT	756.900	1	2.241	.143

Table 4

Results for univariate analysis of variance for self-rating of pain in post-test by group, gender, and group x gender.

Source	Mean Square	df	F	P
Group	25.921	1	5.488	.025
Gender	.100	1	.021	.885
Group X Gender	.100	1	.021	.885

Table 5

Means for self-rating of pain in post-test by group, gender, and group x gender.

			Mean	Std. Deviation	N
Group 1. Control	Gender	1. Male	4.630	2.3357	10
		2. Female	4.630	2.4743	10
		Total	4.630	2.3419	20
2. Experimental	Gender	1. Male	2.920	2.1285	10
		2. Female	3.120	1.6685	10
		Total	3.020	1.8642	20
Total	Gender	1. Male	3.775	2.3452	20
		2. Female	3.875	2.1952	20
		Total	3.825	2.2427	40

As seen in Table 4, there was a statistically significant difference between groups due to the fact that p value was less than $\alpha = .05$. However, significant differences were not found for gender or group by gender ($p = .885 \geq \alpha = .05$; $p = .885 \geq \alpha = .05$). Table 5 shows that the total mean of control group (4.630) was larger than total mean of experimental group (3.020), and subjects' pain in experimental group was reduced more than in control group.

Table 6

Results for univariate analysis of variance for pulse rate in post-test by group, gender, and group x gender.

Source	Mean Square	df	F	P
Group	34.225	1	.096	.758
Gender	893.025	1	2.514	.122
Group X Gender	1525.225	1	4.293	.045

Table 7

Means for pulse rate in post-test by group, gender, and group x gender.

				Mean	Std. Deviation	N
Group 1. Control	Gender	1. Male		80.00	20.769	10
		2. Female		82.90	23.788	10
		Total		81.45	21.785	20
2. Experimental	Gender	1. Male		90.50	17.772	10
		2. Female		68.70	10.393	10
		Total		79.60	18.051	20
Total	Gender	1. Male		85.25	19.569	20
		2. Female		75.80	19.294	20
		Total		80.53	19.769	40

There was a statistically significant difference on pulse rate in post-test between groups by genders ($p = .045 \leq \alpha = .05$), but not in other comparisons ($p = .758 \geq \alpha = .05$; $p = .122 \geq \alpha = .05$) from Table 6. According to Table 7, the mean (90.50) of males' pulse rate in the experimental group was higher than the mean (80) of control males' pulse rate, but the opposite result happened in females: the mean (68.70) in the experimental group was lower than the mean (82.90) in the control group.

Results from Table 8 were the same as Table 4: there was a significant difference between groups ($p = .024 \leq \alpha = .05$), but not in the other two comparisons ($p = .486 \geq \alpha = .05$; $p = .705 \geq \alpha = .05$). Furthermore, like Table 5 the mean (4.63) of subjects' self-rating of pain in the experimental group was more than the mean (3.02) of control subject's rating of pain (Table 9).

Table 8

Results for univariate analysis of variance for self-rating of pain in post-test by group, amount of music therapy, and group x amount of MT

Source	Mean Square	df	F	P
Group	25.921	1	.5488	.025
Amount of MT	.100	1	.021	.885
Group X Amount of MT	.100	1	.021	.885

Table 9

Means for self-rating of pain in post-test by group, amount of MT, and group x amount of MT

			Mean	Std. Deviation	N
Group 1. Control	Amount of MT	1. Yes	4.740	2.5847	10
		2. No	4.520	2.2070	10
		Total	4.630	2.3419	20
2. Experimental	Amount of MT	1. Yes	3.390	1.2351	10
		2. No	2.650	2.3467	10
		Total	3.020	1.8642	20
Total	Amount of MT	1. Yes	4.065	2.0896	20
		2. No	3.585	2.4158	20
		Total	3.825	2.2427	40

No significant differences were observed in a univariate analysis of variance performed on pulse rate in post-test by group ($p = .771 \geq \alpha = .05$), amount of MT ($p = .134 \geq \alpha = .05$), and group by amount of MT ($p = .931 \geq \alpha = .05$) (Table 10).

Table 10

Results for univariate analysis of variance for pulse rate in post-test by group, amount of music therapy, and group x amount of MT

Source	Mean Square	df	F	P
Group	34.225	1	.814	.771
Amount of MT	931.225	1	2.346	.134
Group X Amount of MT	3.025	1	.008	.931

Table 11

Means for pulse rate in post-test by group, amount of MT, and group x amount of MT

			Mean	Std. Deviation	N
Group 1. Control	Amount of MT	1. Yes	76.90	26.249	10
		2. No	86.00	16.337	10
		Total	81.45	21.785	20
2. Experimental	Amount of MT	1. Yes	74.50	16.126	10
		2. No	84.70	19.236	10
		Total	79.60	18.051	20
Total	Amount of MT	1. Yes	75.70	21.238	20
		2. No	85.35	17.382	20
		Total	80.53	19.769	40

Likewise, the results from Table 12 to Table 15 indicated that there were no statistically significant differences on both self-rating of pain and pulse rate in post-test by gender ($p = .892 \geq \alpha = .05$; $p = .120 \geq \alpha = .05$), amount of MT ($p = .515 \geq \alpha = .05$; $p = .113 \geq \alpha = .05$), and gender by amount of MT ($p = .597 \geq \alpha = .05$; $p = .153 \geq \alpha = .05$).

Table 12

Results for univariate analysis of variance for self-rating of pain in post-test by gender, amount of music therapy, and gender by amount of MT

Source	Mean Square	df	F	P
Gender	.100	1	.019	.892
Amount of MT	2.304	1	.431	.515
Gender X Amount of MT	1.521	1	.285	.597

Table 13

Means for self-rating of pain in post-test by gender, amount of MT, and gender by amount of MT

				Mean	Std. Deviation	N
Gender 1. Male	Amount of MT	1. Yes		4.210	1.4325	10
		2. No		3.340	3.0229	10
		Total		3.775	2.3452	20
2. Female	Amount of MT	1. Yes		3.920	2.6682	10
		2. No		3.830	1.7461	10
		Total		3.875	2.1952	20
Total	Amount of MT	1. Yes		4.065	2.0896	20
		2. No		3.585	2.4158	20
		Total		3.825	2.2427	40

Table 14

Results for univariate analysis of variance for pulse rate in post-test by gender, amount of music therapy, and gender by amount of MT

Source	Mean Square	df	F	P
Gender	893.025	1	2.538	.120
Amount of MT	931.225	1	2.646	.113
Gender X Amount of MT	748.225	1	2.126	.153

Table 15

Means for pulse rate in post-test by gender, amount of MT, and gender by amount of MT

				Mean	Std. Deviation	N
Gender 1. Male	Amount of MT	1. Yes		76.10	26.249	10
		2. No		94.40	16.337	10
		Total		95.25	21.785	20
2. Female	Amount of MT	1. Yes		75.30	16.126	10
		2. No		76.30	19.236	10
		Total		75.80	18.051	20
Total	Amount of MT	1. Yes		75.70	21.238	20
		2. No		85.35	17.382	20
		Total		80.53	19.769	40

Table 16

Correlation between two dependent variables

		Self-pain report pretest	Self-pain report posttest	Pulse rate pretest	Pulse rate posttest
Self-pain report pretest	Pearson Correlation	1	.747	.046	.096
	Sig. (2-tailed)		.000	.778	.557
	N	40	40	40	40
Self-pain report posttest	Pearson Correlation	.747	1	.056	.122
	Sig. (2-tailed)	.000		.729	.454
	N	40	40	40	40
Pulse rate pretest	Pearson Correlation	.046	.056	1	.982
	Sig. (2-tailed)	.778	.729		.000
	N	40	40	40	40
Pulse rate posttest	Pearson Correlation	.096	.122	.982	1
	Sig. (2-tailed)	.557	.454	.000	
	N	40	40	40	40

There was no statistically significant correlation between self-rating of pain and pulse rate in Table 6.

DISCUSSION

The purpose of this study was to ascertain the effect of live music via the iso-principle on pain management in palliative care. Both music therapy techniques, recorded selections and live music via the iso-principle had an effect on pain relief because the means of both self-rating of pain as a psychological factor and pulse rate as a physical response in post-test were lower than those in the pre-test (Table 1). Many research papers validated that the use of recorded music and live music via the iso-principle were an effective tool for pain perception in terminally ill (Rider, 1985; Maslar, 1986; Magill-Levreault, 1993, 2001; Hilliard, 2001)

In a comparison of the effects of two kinds of music therapy techniques on self-rating of pain and pulse rate, results documented that live music via the iso-principle was more effective than recorded music on only self-rating of pain (Table 4; Table 8). These results support Standley's (2000) and Bailey's (1983) studies that live music has a much greater effect than dose tape-recorded music. Bailey (1983) stated three reasons why live music was a more effective form of presentation than recorded music. First, since live music presentation features the presence of a human being as an originator of the musical sounds, then, as a result, there is close contact with another person for the listener. Such contact could play a meaningful role in diminishing a patient's isolation, thus affecting change of mood for the better. Secondly, the live form of music presentation has an energizing element because it provides a flow of energy from the source in close contact. This energizing element could facilitate patient's ability to control pain perception. Live music also includes as an element the subtle communication of thoughts and feelings that exist when persons are within each other's presence. In this presentation, very real, basic, and important thoughts and feelings are expressed to the listener through live music through the voice, body language, and facial expressions. The listener, in turn, feels, perceives, and expresses.

While there was a significant difference between two groups on self-rating of pain, there was no statistically significant difference on pulse rate (Table, 6). Statistical analysis evaluated the effects of gender and amount of previous music therapy experience on self-rating of pain and pulse rate. There were no statistically significant differences on self-rating of pain and pulse rate regarding subjects' gender except that there was a significant difference on only pulse rate as a physical measurement in post-test between groups by gender (Table, 6). Table 7 shows that while males in the control group were more physically relaxed than those in the experimental group, females in the experimental group appeared to be more physically relaxed than those in the control group. However, results on self-rating of pain as a psychological measurement in Table 5 were different from those on pulse rate as a physical measurement in Table 7. Table 5 illustrated that both males and females in the experimental group were more relaxed than those in the control group. Therefore, this different result, especially males, from Table 5 and Table 7 demonstrated that other variables like anxiety which elicit physical responses might be related to pain perception.

Subjects were also divided into two groups based on amount of previous music therapy experience: those who had some music therapy experience and those who did not. Even though building rapport and trust or a relationship between the therapist and the patient is a very important part of palliative care (Sedei-Godley, 1987; West, 1994; O'Callaghan & Colegrove, 1998), amount of previous music therapy experience played no role in subject's perceived pain in this study. In other words, regardless of amount of music therapy experience, both groups benefited equally from music therapy to reduce pain perception.

Results of Pearson Correlation in Table 16 show that there was no significant correlation between self-rating of pain and pulse rate. Even though pain perception consists of the relationship between physical and psychological factors (both mind and body affect each others), the results did not produce any significant correlation. The main reason might be that there are individual differences in pain perception. Physiological responses may also be affected by an individual's constitution, age, sex, lifestyle, culture, and temporary conditions. In addition, the individual's attitudes toward the stimulus that are influenced by extramusical associations, preference, and the testing situation influence physiological responses (Davis & Thaut, 1989). Therefore,

even if the subject feels relaxed by music, pulse rate or respiratory rate may still be high due to anxiety.

This research study had some limitations. This study was limited by the size of its sample. In addition, even though it was designed to be a one-to-one environment that the music therapist attempted to maintain during each session of music, an environment that prevented as much as possible the intrusion of interfering events, it was very hard to control the environments equally.

There are suggestions for further studies. First of all, psychological components common to all pain types include cultural and social factors, age, race, marital status, religious beliefs, and emotional states (Curtis, 1986; Selm, 1991). Anxiety, as one of the emotional states, highly relates to pain perception (Davis, 1992; Salmon, 1993). Thus, further research on the use of music in pain management could examine the relationship between anxiety level and pain relief.

Understandably, the hospice experience is a difficult arena in which to conduct controlled studies because interruptions by staff, visitors, and the competing sound environment can provide a challenge for experimental research (Munro, 1986; Brown, Chen, & Dworkin, 1989). Nevertheless, more objectively controlled studies in this area are needed to validate the positive effects of music on pain perception in palliative care. In addition, many studies affirm that certain traits of personality could have an influence on pain perception (Curtis, 1986; Brown, Chen, & Dworkin, 1989; Selm, 1991; Aldridge, 1995; Rider, 1997b), so the next study could investigate what personality trait variables correlate with the use of music for pain management in palliative care.

Since there is a dearth of quantitative studies regarding music therapy techniques in palliative care, more quantitative research needs to be employed in determining the efficacy of the music therapy in pain management. Future research needs to investigate the issue of which music therapy techniques most effectively apply to various pain problems. In addition, future studies in this area should expand the application of a greater number of patients and discover the effect of music in pain level.

Music therapy in palliative care is a relatively new area in what has become a rapidly expanding profession. Its contribution lies in a clinical practice that incorporates many different music therapy approaches. However, much more still needs to be explored to support the use of music therapy in palliative care because

palliative care administrators, physicians, and funding sources require empirical evidence in order to support the use of music therapy in palliative care settings. Finally, more people who are suffering during the dying process can have more opportunities for accessing palliative care music therapy.

APPENDIX A
HUMAN SUBJECTS COMMITTEE APPROVAL



Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2763
(850) 644-8633 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 4/27/2005

To:
Hyo Jung Lee
3700 Capital Circle SE #1117
Tallahassee FL 32311

Dept.: **MUSIC SCHOOL**

From: **Thomas L. Jacobson, Chair**

Re: **Use of Human Subjects in Research**
The effect of live music via iso-principle on pain management in palliative care patients as measured by self-report using Graphic Rating Scale (GRA) and pulse rate

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Human Subjects Committee at its meeting on **4/13/2005**. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If the project has not been completed by **4/12/2006** you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Jayne Standley
HSC No. 2005.245



Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2763
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol)

Date: 5/18/2005

To:
Hyo Jung Lee
3700 Capital Circle SE #1117
Tallahassee FL 32311

Dept: MUSIC SCHOOL

From: Thomas L. Jacobson, Chair

Re: Use of Human subjects in Research
Project entitled: The effect of live music via iso-principle on pain management in palliative care patients as measured by self-report using Graphic Rating Scale (GRA) and pulse rate

The memorandum that you submitted to this office in regard to the requested change in your research protocol for the above-referenced project have been reviewed and approved. Thank you for informing the Committee of this change.

A reminder that if the project has not been completed by 4/12/2006, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446..

cc: Jayne Standley
APPLICATION NO. 2005.245

APPENDIX B
IRB APPROVAL



Tallahassee Memorial
HealthCare

Institutional Review Board 1300 Miccosukee Road
Tallahassee, Florida 32308
850 431-5122
850 431-6489 Fax

March 16, 2005

Hyo Jung Lee
3700 Capital Circle SE, #1117
Tallahassee, FL 32311

Dear Ms. Lee:

I have reviewed your research proposal entitled "The Effect of Live Music Via Iso-Principle On Pain Management In Palliative Care Patients As Measured Self-Report Using Graphic Rating Scale (GRS) And Pulse Rate".

This proposal meets the criteria for an Exempt Review and you are hereby notified that you may proceed with a selection of patients and their evaluation.

Please provide a copy of your results to the Medical Staff Office at Tallahassee Memorial HealthCare so that the results can be archived and presented to the Institutional Review Board.

Sincerely,

Richard T. MacArthur, M.D., MS
Vice President/Chief Medical Officer
Administrative Liaison/IRB

VHA
Member of the Voluntary
Hospitals of America (VHA)
System

APPENDIX C
PATIENT INFORMED CONSENT FORM

Informed Consent Form for Patient

I, _____, freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled: "The effect of live music via Iso-principle on pain management in palliative care patients as measured by self report using Graphic Rating Scale (GRA) and pulse rate."

Hyo Jung Lee, a music therapy graduate student of Florida State University, is conducting this research to complete requirements of a Masters Thesis, under the supervision of Jayne Standley, PhD, MT-BC. I understand the purpose of her research project is to determine if live music via iso-principle affects pain management.

My participation will involve engaging in a twenty-minute individual live or recorded music listening. The total time commitment would be about 40 minutes. I understand I will be asked to mark the current pain scale on Graphic Rating Scale (GRS), and taken pulse rate by the researcher. I will be also asked about general individual information such as gender, amount of previous music therapy experience, and if I have taken pain medication around the time of music therapy session.

I understand my participation is completely voluntary and I may stop participation at any time. All my answers to the questions will be kept confidential and identified by subject code number. My name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. Group results will be sent to me upon my request. All information obtained during the course of this study will and be kept in a locked filing cabinet and remain confidential to the extent allowed by law. Only the researcher will have access to all information. Any identifying information will be destroyed by August 31, 2005.

I understand there are no foreseeable risks or discomforts if I agree to the participation in this study.

I understand there is a direct benefit for participating in this research project. I may experience emotional or physical comfort through pain relief while or after listening to music selections. However, if there is no direct benefit, the possible benefit of participation in this study would be to increase research done in a palliative care setting.

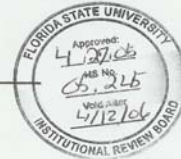
I understand this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Hyo Jung Lee at (850) 942-2551 or Dr. Jayne Standley for the office of the music therapy department at (850) 644-4565. If I have any questions about my rights as a participant in this research, or I feel I have been placed at risk, I may contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

I have read and understand this consent form.

Patient: _____

Date: _____



APPENDIX D
LEGAL GUARDIAN INFORMED CONSENT FORM

Informed Consent Form for Legal Guardian



I, _____, the Legal Guardian of _____, freely and voluntarily and without element of force or coercion, give consent for him/her to participate in the research project entitled: "The effect of live music via Iso-principle on pain management in palliative care patients as measured by self report using Graphic Rating Scale (GRA) and pulse rate."

Hyo Jung Lee, a music therapy graduate student of Florida State University, is conducting this research to complete requirements of a Masters Thesis, under the supervision of Jayne Standley, PhD, MT-BC. I understand the purpose of her research project is to determine if live music via iso-principle affects pain management.

I understand that the participant will involve engaging in a twenty-minute individual live or recorded music listening. The total time commitment would be about 40 minutes. I understand the participant will be asked to mark the current pain scale on Graphic Rating Scale (GRS), and taken pulse rate by the researcher. I understand the participant will be also asked about general individual information such as gender, amount of previous music therapy experience, and if the participant has taken pain medication around the time of music therapy session.

I understand that the participant's participation is completely voluntary and I or the participant may stop participation at any time. All participant's answers to the questions will be kept confidential and identified by subject code number. The participant or my name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. Group results will be sent to me upon the participant or my request. All information obtained during the course of this study will be kept in a locked filing cabinet and remain confidential to the extent allowed by law. Only the researcher will have access to all information. Any identifying information will be destroyed by August 31, 2005.

I understand the participant will have no foreseeable risks or discomforts if I agree to his/her participation in this study.

I understand there is a direct benefit for participating in this research project. The participant may experience emotional or physical comfort through pain relief while or after listening to music selections. However, if there is no direct benefit, the possible benefit of participation in this study would be to increase research done in a palliative care setting.

I understand this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which the participant is otherwise entitled. I or the participant has been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Hyo Jung Lee at (850) 942-2551 or Dr. Jayne Standley for the office of the music therapy department at (850) 644-4565. If I have any questions about my rights as a guardian of the participant in this research, or I feel the participant has been placed at risk, I may contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

I have read and understand this consent form.

Legal Guardian: _____

Date: _____

APPENDIX E
PATIENT ASSENT FORM

Patient Assent Form

I have been informed that my legal guardian has given permission for me to participate, if I want to, in a study concerning the effect of live music via Iso-principle on pain management in palliative care patients as measured by self report using Graphic Rating Scale (GRA) and pulse rate.

My participation in this project is voluntary and I have been told that I may stop my participation in this study at any time without prejudice or penalty of benefits. Even though I choose not to participate, I would remain in the palliative care program and receive palliative care, including access to music therapy.

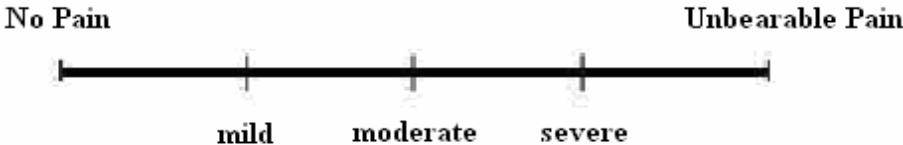
Name: _____



APPENDIX F
GRAPHIC RATING SCALE

Graphic Rating Scale- GRS

Mark an X on the scale below that describes how much pain you have at this moment:



APPENDIX G
REFERRAL FORM

APPENDIX H
LIVE MUSIC SELECTIONS

- I got rhythm
- The glory of love
- Let it be
- Fly me to the moon
- Today
- Wind beneath my wing
- The rose
- Moon river
- Over the rainbow
- You are my sunshine

APPENDIX I
RAW DATA

Control	Gender M/F	Amount of MT Experience Y/N	Medication Y/N	Self-pain report		Pulse rate	
				Pro	Post	Pro	Post
2	M	Y	N	4.2	2.5	108	97
4	F	Y	Y	10	5.2	55	50
5	F	Y	Y	10	10	136	138
6	F	Y	Y	5	1.3	87	84
8	F	N	Y	4.7	4.1	105	99
9	M	N	Y	10	10	104	104
15	F	N	N	8.3	4.2	74	74
17	M	N	Y	5.2	3.7	91	87
18	F	N	N	5.5	4.5	60	59
19	M	N	N	6.2	3.2	122	109
23	M	N	Y	5.3	4.1	71	68
24	M	N	Y	4.7	2.6	99	96
31	F	Y	Y	7	5.9	83	80
32	M	Y	Y	4.6	2.7	67	65
34	F	Y	N	3.5	2.3	85	81
35	F	N	Y	6.9	6.3	96	87
36	M	Y	Y	7.4	5.5	68	63
37	F	N	Y	6.4	2.5	92	77
40	M	Y	N	7.4	6.3	59	53
42	M	Y	Y	7.8	5.7	60	58
Experimental							
1	M	Y	Y	7.9	3.8	112	111
3	M	N	Y	4.9	2.4	78	71
7	F	Y	Y	6.3	2.5	72	60
10	M	N	Y	5.1	0	96	87
11	F	N	N	2.9	0	62	59
13	F	Y	Y	7.2	4.5	61	55
14	F	N	N	7.1	2.5	83	77
16	F	Y	Y	7.6	2.6	72	63
20	M	N	Y	7.3	0.9	122	121
22	M	N	N	8.4	6.3	94	92
25	F	Y	Y	5.4	1.1	81	74
26	F	N	N	7.1	4.6	68	67
27	M	N	N	3.3	0.2	111	109
28	M	Y	Y	7.9	5.1	91	86
29	F	N	Y	8.9	4.8	92	90
33	F	N	Y	7.3	4.8	80	74
38	M	Y	N	4.9	2.2	81	74
39	F	Y	Y	6.8	3.8	72	68
41	M	Y	Y	6.4	4.1	74	70
43	M	Y	Y	7.9	4.2	86	84

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BIOGRAPHICAL SKETCH

Name: Hyo Jung Lee
Date of Birth: November 27, 1974
Place: Busan in Korea
Education: The Kyung Hee University
Seoul, Korea
Major: Voice
Degree: Bachelor of Music (1999)

The State University of New York, New Paltz
New Paltz, New York
Major: Music Therapy
Degree: Bachelor of Science (2002)

The Florida State University
Tallahassee, Florida
Major: Music Therapy
Degree: Master of Music (2005)