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The Effect of Individual Music Therapy Sessions on Mood and Motivation for Progress in Physical and Occupational Therapies Among Adult Rehabilitation Patients

Sean C. Aultman
THE EFFECT OF INDIVIDUAL MUSIC THERAPY SESSIONS ON MOOD AND
MOTIVATION FOR PROGRESS IN PHYSICAL AND OCCUPATIONAL
THERAPIES AMONG ADULT REHABILITATION PATIENTS

By
SEAN C. AULTMAN

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The members of the committee approve the thesis of Sean C. Aultman defended on May 21, 2009.

__________________________________
Jayne M. Standley
Professor Directing Thesis

___________________________________
Clifford K. Madsen
Outside Committee Member

__________________________________
Dianne Gregory
Outside Committee Member

Approved:

_________________________________
Don Gibson, Dean, College of Music

The Graduate School has verified and approved the above-named committee members.
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ABSTRACT

The purpose of this investigation was to determine if individual music therapy sessions had an effect on state mood levels and motivation to progress in physical and occupational therapies among adult patients in an inpatient rehabilitation facility. Subjects were referred for music therapy by the facility’s rehabilitation therapist or music therapy staff for issues involving depression, anxiety and low motivation in other therapies. All subjects (N=17) served as their own controls and were placed in a pre-test/post-test design with each instance of data collection lasting one week. During the baseline week, the music therapist assessed subjects’ mood on at least three separate days. During the treatment week, subjects received at least three individual music therapy sessions that took place in the patients’ rooms. Goals included increasing mood, coping skills and quality of life measures as well as decreasing depression and anxiety. Mood was assessed immediately upon concluding each session. The Profile of Mood States – Brief Form (POMS-BF) was used to measure mood while physical therapy and occupational therapy weekly progress scores were used to measure patient motivation. Results of a one-tailed repeated-measures t-test revealed significant improvements in subject POMS-BF, PT and OT scores after receiving a week of individual music therapy sessions. Findings and suggestions for future research are discussed.
CHAPTER 1
INTRODUCTION

Recent economical trends in the U.S. have become a source of pressure for healthcare facilities to find ways of reducing costs while continuing to provide high-quality services. Since 2002, inpatient rehabilitation facilities (IRFs) have been given strong incentive by Medicare to help patients make more progress in a shorter period of time. This has made it extremely important for IRFs to find and implement cost-effective interventions. Addressing mood and motivational issues in patients may be one area to consider since it has been suggested in the literature that low mood may prolong rehabilitation via low motivation and reduced participation in therapies thereby negatively impacting functional outcomes (Nelson, Cicchetti, Satz, Sowa, & Mitrushina, 1994; King et al. 2001; Shoemaker, 2001). Music therapy has been used frequently to address psychosocial issues such as mood in many populations including rehabilitation patients. As IRFs strive to contain costs, it should be taken into consideration that music therapy interventions may have the potential to help motivate patients, reduce their length of stay and thus help alleviate some financial pressure.

It has been estimated that 133 million people in the U.S. are living with a disabling condition and this number has also been projected to rise to approximately 157 million over the next decade (Brown, DeLeon, Loftis, & Scherer, 2008). Although there is no single ‘magic bullet,’ this projected increase is partially attributable to several recent national health trends in the U.S. population. The nation’s rapidly growing aging population is one influence since risk of acquiring a disability increases with age. The continually rising rate of obesity is another contributing factor increasing the risk of hypertension, stroke and degenerative joint diseases. Finally, due to medical advances in recent years, more soldiers wounded in Operation Iraqi Freedom and Operation Enduring Freedom are surviving injuries with amputations and neurological conditions. As these health trends continue to expand, more and more individuals will utilize rehabilitation services such as those provided in an IRF.

IRFs are part of the post-acute care services in the rehabilitation continuum of care and serve a variety of injuries and disorders. Orthopedic conditions are the most
prevalent impairment group found in IRFs with knee and hip replacements comprising a large portion of that group (Fiedler, Granger, & Russell, 1998). Increases in this impairment group are expected to occur in upcoming years along with another prevalent impairment group, stroke. Although stroke may be one of the most preventable medical conditions, it is widespread among Americans creating not only a national health issue, but a financial burden as well. Other neurological conditions, such as traumatic brain injury (TBI) and spinal cord injury (SCI), are also quite common in IRFs. IRFs have become an essential portion of the rehabilitation continuum of care and with that increased level of importance has come an increased need to exhibit financial moderation. This pressure began surfacing in recent years past as insurance policy changes were made in order to correct previous reimbursement issues.

Medicare policies have created a system of ‘managed care’ for rehabilitation professionals, which has been the standard for many years. Clinicians have strived to help patients make substantial progress in a relatively short amount of time to contain overall costs. In 2002, IRFs transitioned from a cost-based system of reimbursement to a prospective payment system called the Inpatient Rehabilitation Facility Prospective Payment System (IRF PPS). This new system put the majority of financial burden onto IRFs thus creating even more pressure for facilities to produce greater therapeutic progress in less time. Some studies, done after the IRF PPS was put into place, demonstrated that IRFs have been able to meet this goal of efficiency, although more research is warranted (Sood, Buntin, & Escarce, 2008). As IRFs continue to focus on how to reduce costs, professionals must concern themselves with finding new ways of increasing efficiency. Addressing psychosocial issues in patients such as mood and motivation may be one avenue to pursue when attempting to increase patient functional outcomes and decrease length of stay.

In addition to the physical hurdles patients in rehabilitation must overcome, they must also cope with the psychosocial issues that accompany their injury or illness. In many instances, these issues may prevent patients from making adequate progress in therapies. Mood issues such as anxiety, depression, anger and fatigue have been shown to negatively affect functional outcomes in rehabilitation patients (Lee, Tang, & Cheung, 2008). This would seem to indicate that lower overall levels of mood might also be
related to lower overall levels of motivation in therapy. Although some research argues that patient motivation is completely intrinsic to the patient, it has also been put forth that motivation is determined by many different factors including personality as well as psychological and social influences. This has made it extremely important for rehabilitation facilities to utilize a multi-disciplinary model, wherein all professionals work together for the patient’s psychological and emotional well being in addition to their physical needs. Music therapy (MT) is one profession utilized within multi-disciplinary models quite often. MT has been shown to improve psychological, emotional and functional outcomes across a variety of populations within the general medical as well as rehabilitation settings (Standley, 2000; Staum, 2000).

Although often reported anecdotally, the effect of music therapy on patient motivation has been directly assessed in only one study which utilized group sessions with traumatically brain injured adults (Nayak, Wheeler, Shiflett, Agostinelli, 2000). In that study, motivation was measured by means of a questionnaire for subjects’ therapists to fill out on patients’ participation during therapies. The current investigation seeks to determine if individual music therapy sessions with adult rehabilitation patients can increase mood levels, motivation, and as a result, functional progress in physical and occupational therapies. The possibility of a correlational relationship existing between mood and therapeutic progress is also measured.
CHAPTER II
REVIEW OF LITERATURE

Rising Rates of Disability in the U.S.

The U.S. population is changing with time and as it continues to shift, healthcare professionals will face new challenges in caring for their patients. Almost 50% of the U.S. population is living with a disabling condition and that number is expected to increase by 18% by the year 2020 (Brown, DeLeon, Loftis, & Scherer, 2008). The projected incidence of disability within the population may be traced to several factors arising over recent years.

One such factor is based upon the fact that the population is aging. Brown et al. report that by the year 2050 the number of Americans over the age of 65 will increase from 40 million to 80 million while the number of those over 85 will grow by 350%. Rates of disability increase dramatically with age. This is due to the fact that many chronic conditions associated with aging such as hip fracture, osteoarthritis, COPD, diabetes, heart diseases, stroke, visual and hearing impairments, intermittent claudication, depression and cognitive impairment have been shown to have a strong correlation with disability. In many instances the disability incurred can lead to new chronic conditions that in turn lead to new disabilities, creating an unfortunate cycle for an aging population (Guralnik, Fried, & Salive, 1996). This means that it is likely that there will be more individuals living with age-related physical impairments and disabilities in the near future. As the number of Americans over the age of 65 increases, it has been projected that the number in this demographic with an impairment will reach up to 22.6 million people, almost 5 times the number of individuals over 65 with an impairment in 1986 (Kunkel & Applebaum, 1992). Although this sector of the U.S. population may be contributing to an increase in physical impairments, it is not the only underlying factor.

Results from several national surveys have listed obesity as one of the most critical health issues facing Americans today (Major 2009). It is no secret that the prevalence of this problem has been steadily climbing in the United States over the past several years. In 1995 there were 23 states with an obesity prevalence of 10-14% and 27 states with a prevalence of 15-19%. In contrast to this by 2007 Colorado was the only
state to have an obesity prevalence below 20% while 30 states were shown to have a prevalence equal to or greater than 25% with three of these states exceeding 30% (U. S. Centers for Disease Control and Prevention, 2007). This increase may in part be due to changes in food production, processing and distribution that have lead to the consumption of more energy-dense foods and sugar-sweetened beverages (Pereira, 2006; Popkin, Duffey, & Gordon-Larsen, 2005). Regardless of the etiology, mortality rates in obese individuals are decreasing due to improvements in the treatment of the associated negative effects. Disability rates may increase in this population due to common comorbidities. Obesity severely increases the risk for adverse health conditions such as diabetes, hypertension, stroke, heart disease and even degenerative joint diseases (Flegal, 2005; Pi-Sunyer, 1993). If this sector of the U.S. population continues to grow, there may be an increase in physical impairments associated with these health conditions. Data have shown that obese individuals make up a disproportionately large part of patients having total joint arthroplasty, particularly total knee replacement surgery (Namba, Paxton, Fithian & Stone, 2005). In their study on obesity and joint replacement, Namba, Paxton, Fithian and Stone found that out of 1071 total hip arthroplasty patients, 36% were obese and out of 1813 total knee arthroplasty patients, 52% were obese.

Another factor adding to the possibility of a rise in U.S. disabilities in the near future includes the heavy involvement of the U.S. military in the ongoing conflicts in the Middle East. Due to the large amount of progress achieved in acute trauma care and body armor, soldiers sustaining serious injuries are more likely to survive than they would have in decades of the past. According to the U.S. Department of Defense’s online report of American casualties from Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) as of March 13, 2009 there have been 4,259 deaths while the number of soldiers injured has reached 31,102. 10 percent of U.S. soldiers injured in Iraq and Afghanistan have died as contrasted with 24 percent during Vietnam and 30 percent during World War II (Gawande, 2004). This success of medical progress and military technology is encouraging but it means that more and more soldiers are in need of rehabilitation services due to injuries that would have proven fatal during armed conflicts of the past.
Due to the nature of combat in this war, the injury patterns are different as compared to past patterns. Blast injuries, in particular, account for the majority of wounds sustained during combat. They originate from many sources including aerial bombs, booby traps, rocket-propelled grenades (RPGs), artillery, rocket and mortar shells, mines and most notoriously from improvised explosive devices (IEDs). It has been reported that more than 60% of injuries sustained from blasts result in traumatic brain injury, or TBI (Sayer et al., 2008). As of July 2008, the U.S Department of Defense reported a total of 8089 service members suffering from TBI. Blasts have also had an impact on the number soldiers in need of major limb amputations with the IED accounting for almost half of those amputations (Congressional Research Service, 2008). Unfortunately these injuries are usually not experienced as an isolated event, but occur at the same time creating what is known as polytrauma with hearing, vision and spinal cord injuries also arising (Weaver et al., 2009).

As these patterns in the U.S. population continue to develop, a growing number of Americans will be in need of high-quality rehabilitation services. Over the past several years, a continuum of care in the rehabilitation arena has developed in response to the widely varying levels of patient need. On one end of the spectrum is the acute care rehabilitation hospital or unit. These are utilized for patients in need of intensive rehabilitative therapies as well as acute care inpatient services. Patients admitted into this setting require at least 3 hours of physical and/or occupational therapy per day during the week (Murer, 2001). Post-acute care (PAC) services make up the rest of the continuum and may take place in a variety of settings including patient homes, home health agencies (HHA), skilled nursing facilities (SNF), long-term care hospitals (LTCH) or inpatient rehabilitation facilities (IRF) (Buntin, 2007). Recently, hospitals have begun incorporating sub-acute services into their programs in order to provide patients with another level in the rehabilitation continuum to help with their transition back into the community (Haffey & Welsch, 1995). Sub-acute care has emerged in the PAC portion of the continuum for patients who may still require rehabilitative and inpatient services, but may not be appropriate for the intensive therapy schedule in an acute care rehabilitation hospital or ready to transition to a lower level of care such as in a skilled nursing facility (Murer, 2001). As a result of the refining of this continuum of care, patients are able to
appropriately move through the different levels based upon their individual level of functioning. The inpatient rehabilitation facility is one service capable of providing individualized rehabilitative care for patients as they move towards reintegrating back into the community after injury or illness.

The Inpatient Rehabilitation Facility

A variety of injuries and impairments are treated in the inpatient rehabilitation facility. Congenital and acquired musculoskeletal problems including bone fractures, amputation, bone deformities and especially issues involving joint replacement surgery of the knees and hips such as arthritis are quite common. Clinicians also work with individuals recovering from neurological damage or disease including stroke, traumatic brain injury (TBI), spinal cord injury (SCI), muscular dystrophy, Parkinson’s disease, and multiple sclerosis. Patients recovering from severe burn injuries are also among those served in the IRF (Murer, 2001; Keenan & Mehta, 2006). Fiedler, Granger and Russell (1998) analyzed data from the Uniform Data System for Medical Rehabilitation and found five impairment groups with the greatest number of patients. They were orthopedic conditions, stroke, brain dysfunction – non-traumatic and traumatic, spinal cord dysfunction – non-traumatic and traumatic and neurological conditions. Incidence rates and costs involved vary across impairment groups and will continue to shift with the U.S. population.

Out of all of the impairments encountered in the inpatient rehabilitation facility, orthopedic impairments are one of the most prevalent comprising approximately 34% of patients seen in rehabilitation hospitals (Fiedler, et al. 1998). It has been estimated that in the U.S. alone there are 600,000 hip and knee replacement surgeries occurring every year (Paxton, Inacio, Slipchenko, & Fithian, 2007). This number is expected to grow substantially within the next several years. Kurtz, Ong, Lau, Mowat & Halpern (2007) projected that by the year 2030 the demand for total hip replacement (THR) surgeries will increase by 174% to 572,000 while the demand for total knee replacement (TKR) surgeries will increase by a staggering 673% to 3.48 million procedures. In many instances, patients must come back for revision procedures after the first joint replacement. The annual number of these revision surgeries is also expected to increase
substantially by the year 2030 with revision THRs growing by 137% to 97,000 and revision TKRs growing by 601% to 268,000 (Iorio et al., 2008). According to the National Institute of Arthritis and Musculoskeletal and Skin Diseases, osteoarthritis is the leading reason that individuals undergo hip or knee replacement surgery due to it causing a degeneration of joint cartilage. Rheumatoid arthritis, a condition causing painful inflammation of the joint, is also an important culprit (Bren, 2004). In the past these forms of arthritis caused the greater part of joint replacement surgeries to involve adults past retirement age, however, this is beginning to change. There are more and more THRs and TKRs occurring in the below 65 population. In fact, recent studies have revealed that persons under 65 now make up 35-45% of the number of total joint replacement (TJR) procedures in the United States (Khatod et al., 2008; Jain, Higgins, Guller, Pietrobon, & Katz, 2006). These procedures are now becoming preemptive lifestyle choices for middle-aged adults instead of a final option for limited mobility due to end-stage arthritis (Iorio et al., 2008). It has been projected that by 2030 individuals under 65 will make up the majority of patients seen for TJR procedures (Kurtz et al., 2009). As this portion of the United States population creates an increase in TJRs, related annual hospital costs are expected to exceed $65 billion by the year 2015 (Kurtz, Ong, Schmier et al., 2007).

Stroke has become a worldwide health issue on the rise and the United States has been significantly affected by it on many levels. Fiedler, et al. (1998) reported that 27% of patients seen in rehabilitation centers are there for stroke recovery. In the U.S., stroke is the third leading cause of death with an average of approximately 780,000 new or recurrent cases occurring every year (Fedder, 2008). In addition to this, Fedder goes on to say that it is the number one leading cause of adult long-term disability in the U.S. Kirshner (2003) points out that stroke is perhaps one of the most preventable serious medical conditions due to the fact that its’ prevention does not depend solely upon new medical breakthroughs, but instead upon our existing knowledge of its risk factors. Some of these factors include smoking, older age, excessive use of alcohol, poor diet, lack of physical activity, and cardiovascular issues such as hypertension and congestive heart failure (Divanai, Vasquez, Asadallah, Qureshi, & Pullicino 2009; Fatahzadah & Glick 2006). In addition to the catastrophic health consequences, stroke has also had a
substantial financial effect upon the U.S. In 2005 alone, the Agency for Healthcare Research and Quality (2008) found that there were 892,300 hospitalizations for cerebrovascular disease, which made up 3% of the total U.S. hospital expenditures for that year. According to Fedder, as of 2007 the total national estimated cost of stroke was $62.7 billion with a projected cost of $91.8 billion by the year 2015. Related to this, The Center for Disease Control and Prevention stated that the U.S. spends around $51 billion in lost productivity and health costs associated with stroke with nursing home expenses reaching $12 billion.

Traumatic brain injury (TBI) is another impairment frequently treated in the inpatient rehabilitation facility. An estimated 2% of the U.S. population is affected by TBI every year accounting for some 2 million emergency room visits with 15% of those patients in need of hospitalization afterwards and 35% acquiring severe long-term neurological impairments. (Dun, Kim, & Gormley 2009). Studies have shown falls to be the leading cause of all TBIs annually (32%), followed by motor vehicle traffic (19%), struck by/against events (18%) and assaults (10%) (Rutland-Brown, Langlois, Thomas, & Xi 2006). ‘Struck by/against’ events included instances when a person or object, such as falling debris, unintentionally struck another individual. TBI incidence may be much more widespread in reality. Some have pointed out that routinely reported national data such as this might not be providing a complete picture of trends in TBI since patients treated in hospital outpatient settings, physicians’ offices and military facilities in the U.S. and abroad are not included (Langlois, Rutland-Brown, Wald 2006). Out of those affected by TBI, older adults have the highest rates of death and hospitalizations with increased risks for those over 65 (Thomas, Stevens, Sarmiento, & Wald 2008). As mentioned previously, soldiers injured in OIF and OEF are also having an impact on the TBI demographic. Alao and Chung (2009) point out that during times of combat the number of Americans admitted into military and veteran hospitals with TBI increases significantly since TBI may comprise up to 20% of survivor casualties.

Although not as prevalent in IRFs as the previous impairments listed, spinal cord injuries still make up a significant portion of the rehabilitation demographic. In the U.S. there are at least 12,000 new cases of paraplegia and quadriplegia each year (Gorio, Marfia, Bottal, & Di Giullo 2009). Gorio et al. estimate that 1 out of every 1000 people
has experienced a SCI. Although causes vary depending upon demographic characteristics such as age and gender, the most common for SCI are motor vehicle collisions, falls, assaults and sports injuries. Out of those who survive SCIs the majority are left with severe disabilities necessitating intensive rehabilitation, especially when experiencing another common co-occurring injury such as TBI (Macciocchi, Thompson, Byams, & Bowman 2008). On average, hospital and rehabilitation charges are estimated to be $282,245 and these data do not include common home and vehicle modifications that can accumulate up to an additional $86,000 (Priebe et al. 2007).

For patients working towards reintegrating successfully back into the community after injury or illness, the inpatient rehabilitation facility has become a very important tier in their continuum of care. As this importance has increased, so has the need to demonstrate fiscal restraint in delegating services to each patient while at the same time delivering care of the highest quality. This issue began to surface in the late 1980s when reimbursement costs began to increase significantly under a cost-based payment system and led to the development and implementation of a prospective payment system. IRFs became one of the targets of this new system under what was termed the Inpatient Rehabilitation Facility Prospective Payment System.

**Effect of the Inpatient Rehabilitation Facility Prospective Payment System**

Between 1986 and 1994 there was an 87% increase in the number of Medicare-certified rehabilitation hospitals and units in the U.S., which grew from 545 to 1019 (Chan et al. 1997). As a consequence, there were also large increases in the number of patients during this time discharged from rehabilitation hospitals whose care and services had been provided through Medicare reimbursement, hinting that the Medicare program contributed to this growth (Chan et al.). As the number of inpatient rehabilitation admissions grew, so did the annual Medicare payment totals creating a need to reassess the payment system focusing on greater efficiency in care with a reduction in accrued costs.

Prior to 1997, all rehabilitation centers including IRFs were reimbursed for care provided to Medicare patients under regulations set forth in the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 leading to the rise of managed care (Mallison,
Manheim, Almagor, DeMark, & Heinemann 2008). Under this cost-based system, Medicare examined the expenditures of IRFs from the first year of operation to determine the average cost per patient. Facilities were then assigned a reimbursement limit based upon the total of those expenses during the first year and then given financial incentives to reduce costs during subsequent years (Chen et al.). This became problematic in that it provided strong motivation for newly opening facilities to inflate their costs during the base year to achieve a high reimbursement limit and then reduce it during the following years to receive the cost-cutting incentives from Medicare. Even though efforts were made to put caps on the reimbursement given, many facilities would petition and have the caps removed creating large variances in total reimbursement payment limits between facilities (Sood, Buntin, & Escarce 2008). Research on this cost-based system would reveal that although the movement towards managed care was promising, more research and refinement would be needed.

Ottenbacher et al. (2004) analyzed data from inpatient rehabilitation facilities collected between 1994 and 2001 (under the cost-based TEFRA regulations) focusing on total length of stay, functional status, living setting at discharge and follow-up, and mortality after discharge. The data were collected on the five Center for Medicare and Medicaid Services (CMS) impairment groups with the greatest number of patients in the Uniform Data System for Medical Rehabilitation (USDMR), which is the largest database of rehabilitation inpatient information in the United States. The five major groups were orthopedic conditions, stroke, brain dysfunction, spinal cord dysfunction and neurological conditions. Results revealed that length of stay decreased from 20 days in 1994 to 12 days in 2001 while functional status continued to remain stable across the years. This meant that efficiency had improved, in that patients achieved the same functional gains in a shorter amount of time. Other results, specifically an increase in mortality after discharge, prompted the authors to encourage more research to be done after the implementation of the new prospective payment system (PPS) with their findings to serve as a baseline for comparison.

The 1997 Balanced Budget Act introduced the prospective payment system (PPS) to IRFs and significantly changed the way that facilities were paid through Medicare. IRFs began the actual transition from the previous cost-based system to the PPS in 2002
(Mallison et al. 2008). Now patients were assigned to case-mix groups (CMGs) based upon their specific impairment, co-morbidities, functional status and length of stay, and each CMG was assigned a pre-set amount of reimbursement based upon the predicted resources that would be needed for patients in that grouping (Sood et al. 2008). The total amount of money for patients then became based on their CMG and certain aspects of the facility in which they were treated such as geographic wage variation, percentage of lower-income patients and rural location (Center for Medicare and Medicaid Services 2001). This meant that IRFs received payments from Medicare based upon fixed rates instead of the more variable expenditures during the first year of facility operation. As a result, the new payment system shifted the majority of financial risk onto the provider of services. IRFs were given a pre-determined payment per patient discharge and Medicare would not reimburse any expense that exceeded that payment. IRFs now had even more incentive to reduce costs per patient discharge by further increasing efficiency in services.

A recent study (Sood et al. 2008) compared IRF data from the year before the PPS implementation in 2001 with a year and a half afterwards beginning in 2002. Investigators examined data from three impairment groups determined to account for the majority of IRF admissions. These were stroke patients, hip fracture patients and lower extremity joint replacement patients. Results indicated that for IRFs with the lowest pre-PPS payment limits, length of stay decreased by 8% for stroke patients, 4.5% for hip fracture patients and 3.2% for joint replacement patients. For IRFs with the highest pre-PPS payment limits, length of stay decreased even more substantially for stroke, hip fracture and joint replacement patients with reductions of 9.8%, 7.5% and 5.6% respectively. In addition to this, there was a 7-11% reduction in costs associated with changes in marginal reimbursement and mortality was shown to remain stable across all three years. Although there was a reduction in costs immediately after the PPS implementation, growth began again soon thereafter although at much slower rates than the pre-PPS period. The authors pointed out that these findings needed to be assessed within the limitations and context of the study. They drew attention to the fact that although promising, the results were based upon data collected very soon after the
implementation of the PPS and long-term trends would need to be monitored closely in order to accurately assess overall efficiency of the new payment system.

With the new PPS comes increasing pressure for rehabilitation facilities to demonstrate an ability to do more with less. Although reducing costs and length of stay is important, the arguably more important goal is to ensure that patient outcomes do not suffer and ideally, improve. In the past, some have cautioned that a PPS may potentially lead to increased risks of adverse health outcomes (Kahn et al. 1990, Kosecoff et al. 1990). IRFs are trying to ensure this does not happen by meeting the demands of patients and Medicare at the same time although the task is proving to be quite difficult. As IRFs strive for greater efficiency in services, there are several issues to consider when working towards improving the functional outcomes of their patients. One important area shown to have influence upon these outcomes involves the identification and proper treatment of psychosocial issues experienced by rehabilitation patients.

Psychosocial Influence on Functional Outcome: Mood and Motivation

For many patients, admission into a rehabilitation facility may illicit feelings of uncertainty and despair about what the future holds. When treating patients, Kendall et al. (2007) point out that the recovery process involves addressing not only the biomedical concerns, but also the social and psychological factors. Failure to address the psychosocial issues might possibly lead to adverse health outcomes. Some patients may be confronted with such issues as shifting roles within the family structure, not being able to return to work temporarily or even permanently, losing the ability to perform tasks that were once quite simple and facing depression and/or anxiety brought on by neurological damage just to name a few. All of these issues have the potential to hinder the recovery process, which in turn can cause more psychological distress creating an unfortunate cycle. Depression, anxiety, anger, self-esteem and motivation have all been implicated as influences upon recovery and if not treated in conjunction with the patient’s physical and neurological impairments may lead to prolonged length of stays and negative functional status. (Kane, 1997; King et al., 2001; Lee, Tang, Yu, & Cheung, 2008; Nelson, Cicchetti, Satz, Sowa, & Mitrushina, 1994; Orbell, Johnston, Rowley, Espley, & Davey, 1998; Vickery, Sepehri, Evans, & Lee, 2008;).
Mood variables influencing recovery are present in patients affected by both orthopedic and neurological injuries. Depression has been shown to be quite common across neurological impairments in particular (Judd & Kunovac, 1998; Raskind, 2008). Out of all stroke patients, approximately one third develop post-stroke depression (PSD) with symptoms that “adversely affect rehabilitation and significantly increase risk of death in the post-stroke period” (Santos et al., in press, p.1). Santos et al. (in press) report that PSD is most prevalent during the first month after the incident. Thus, this period of heightened depressive symptomatology occurring during the initial rehabilitation process may have an effect on functional outcome. Herrmann, Black, Lawrence, Szekely and Szalai (1998) found that in stroke patients, presence of PSD was strongly predictive of poorer functional recovery.

Although the breadth of research on mood disorders and stroke has focused on PSD, other mood factors have an impact on recovery as well. Post-stroke anxiety (PSA) has recently begun to emerge as a common co-morbidity accompanying PSD. Barker-Collo (2007) examined the prevalence of PSD and PSA in 73 stroke patients and reported findings of PSA consistent with the existing literature with incidence of moderate to severe anxiety in 21.1% of patients. Related to this, Powell, Johnston and Johnston (2008) examined the effects of negative affectivity (NA), which includes depression, anxiety, anger, guilt, disgust and scorn, on stroke patients’ activity level which was defined as walking and standing. They found that higher levels of NA predicted increased activity limitations across three different measures including self-report, proxy-report and observer assessment. Using these three measures demonstrated that NA not only influenced the patient’s perception of activity levels, but also had an influence on the actual activity level.

Patients with traumatic brain injury are also among those with neurological disorders experiencing detrimental mood effects. Estimation of the frequency of depressive disorders among TBI patients has ranged from 6% -77% (Jorge & Starkstein, 2005). Jorge and Starkstein (2005) hypothesize that the wide variance in reported prevalence is most likely due to inconsistent methods of diagnosis in the literature. According to Bay, Haggerty and Williams (2007), depression in TBI patients “occurs regardless of injury severity, has a protracted course, increases suicide potential, limits
rehabilitation potential, and adds to family suffering” (p.2). Bay et al. (2007) stress that early inventions for depression in TBI are critical in ensuring the success of rehabilitation efforts. In addition to depression, TBI patients may also exhibit symptoms associated with anxiety including sleep disturbance, fatigue, increased aggression, mood swings, slowed thinking, attention deficits and problem solving difficulties (Whelan-Goodinson, Ponsford, Schonberger, 2009). All of these factors associated with mood are important when developing an efficient method of treatment for the TBI patient in the rehabilitation setting.

Mood may also be an influence on outcomes for patients with orthopedic impairments. Powell, et al. (2009) examined the effect of negative affectivity (NA) and positive affectivity (PA) on activity levels of joint replacement surgery patients. NA was still defined the same as during the previously mentioned study conducted by Powell et al. (2008). PA was defined as reflecting one’s level of energy, excitement and enthusiasm. Lower levels of NA and higher levels of PA were both found to be strongly correlated with higher activity levels as defined by self-reported walking times. Lenze et al. (2007) studied the effects of depression, amotivation and cognitive impairments on the functional outcomes of elderly hip fracture patients in an inpatient rehabilitation facility. They found that depression and cognitive impairment did not have an effect while amotivation was associated with poorer functional outcome in the overall sample. Previous studies have also found some evidence demonstrating that depression following hip fracture in elderly patients may be associated with poorer functional outcome due in part to lower motivation (Holmes & House, 2000; Mossey, Knott, Kathryn, Craik, 1990). Thus, research shows a link between the patient’s mood and motivation.

Kane (1997) states that motivation is one important risk factor to consider in the recovery process for rehabilitation patients, although there are discrepancies in how such a factor should be judged. Some investigators have focused on the intrinsic quality of motivation in patients while others have stressed the importance of the social factors fostering motivation in patients during the rehabilitation process (Kane, 1997). Maclean & Pound (2000) warn against a moralizing approach that places all of the motivational responsibility on the individual characteristics of patients as this has been shown to have negative therapeutic effects upon the recovery process. They instead stress the
importance of an approach that combines all influencing aspects of motivation including individual personality traits, psychological and social factors in particular. Several characteristics of a successful rehabilitation model have been shown to positively affect patient motivation. These include setting clear and revisable goals, attempting to make the patients feel that their views on rehabilitation are valid and welcome, acceptance of the patients’ idiosyncrasies, avoiding clashing actively with patients’ value systems and reminding patients of goals that exist beyond the therapeutic setting (Maclean & Pound, 2000).

In order to effectively foster motivation and as a result, therapeutic progress, rehabilitation hospitals focus on using a multidisciplinary approach in which all clinicians work together for the patients’ physical, psychological and emotional well-being. Keenan and Mehta (2006) state that a successful rehabilitation model focuses on the physical and emotional needs of clients and then go on to say:

The shared goal of team members is to prevent barriers to rehabilitation by (1) diagnosing accurately all current problems in the patient, (2) treating the problems adequately, (3) establishing adequate nutrition, (4) monitoring the patient for any complications that might impede progress in recovery, (5) mobilizing the patient as soon as possible, and (6) restoring function or helping the patient adjust to an altered lifestyle. (p.1)

Clinicians include, but are not limited to doctors, nurses, physical therapists, occupational therapists, speech therapists, recreational therapists and social workers. Having a team comprised of individuals with backgrounds in a broad range of fields allows for each team member to more fully understand the patient as a whole; thus, treatment can then be more efficient. The evidence-based health profession of music therapy has emerged in the multidisciplinary model as another component capable of facilitating the efficient recovery of patients in a variety of clinical environments including medical and rehabilitation settings.

Medical Music Therapy

The use of music as an agent of therapeutic change in the medical arena has occurred for some time now dating back to even ancient times when incantations were
performed for the healing of the ill (Standley, 2000). Today music therapy as an established health care profession is utilized in the medical setting to great effect. Medical music therapy interventions range from decreasing pain and anxiety, to helping patients learn new ways of coping after a traumatic event. Targeted age populations include the elderly, middle-aged adults, teenagers, young children and even premature infants.

Many studies have demonstrated the benefits of using music with premature infants. One study examined the effect of recorded lullaby music on premature infants’ stress response immediately following a heel stick procedure, which is done for blood sampling (Butt & Kisilevsky, 2000). In the presence of music it was found that heart rate, behavioral state and facial expressions of pain all returned to, or below levels at baseline. Thus, the music appeared to have a calming effect upon the infants.

In another study, Standley (1998) paired live lullaby singing with multimodal stimulation and observed responses of premature infants in a Level III Newborn Intensive Care Unit (NBICU). Male and female infants receiving singing and multimodal stimulation gained significantly more weight than the control groups with a mean of 2.2g/day more for the male experimental group and 5.5g/day more for the female experimental group. Both genders also increased their tolerance to stimulation across all stimulation intervals. Music as reinforcement had a greater impact on length of stay for females than males with experimental females leaving 11.9 days sooner on average than their control group counterparts.

Another study (Standley, 2003) researched the effect of music as reinforcement on feeding rates of premature infants deemed to be poor feeders. Infants receiving music as reinforcement showed an increase in afternoon feeding rates after the music intervention as compared to their morning feeding rates before the intervention. Infants in the control group actually showed a slight decrease in afternoon feeding rates as compared to the morning, although not statistically significant. In addition to these benefits, it has also been suggested that music therapy used in the care of premature infants can help to promote bonding with family members, give counseling to parents and provide opportunities for parent education about infant care, pacification and developmental stimulation (Standley, 2002).
Along with infants, music therapy has also been shown to be very effective with other pediatric patients. Research has revealed that children and adolescents respond especially well to music therapy interventions designed to address issues of pain, anxiety and normalization of the hospital environment. Robb (2000) studied the use of music interventions with pediatric oncology patients and results revealed that the music environment possessed a significantly higher frequency of environmental support elements than other activities typically experienced by hospitalized children. Also, the therapeutic music interventions elicited significantly more engaging behaviors from hospitalized children than did other hospital activities. This ability of music to strongly engage and in turn, distract, is supported in other studies on music and hospitalized children as well.

In their study using both qualitative and quantitative measures, Whitehead-Pleaux, Zebrowski, Baryza and Sheridan (2007) found that music therapy interventions were effective in treating issues associated with pain and anxiety in pediatric burn patients undergoing nursing procedures. Results revealed that music therapy reduced self-reported pain levels and also had a positive influence upon subjects’ mood, compliance and relaxation level. In another study, Robb, Nichols and Rutan (1995) examined how Music Assisted Relaxation (MAR) affected preoperative anxiety levels in twenty patients on the reconstructive unit of a pediatric burn hospital. After receiving MAR interventions, including music listening, diaphragmatic breathing and progressive muscle relaxation, patients in the experimental group demonstrated a significant decrease in anxiety scores. Malone (1996) investigated the use of live music as a distraction for pediatric patients during anxiety-provoking hospital procedures including intravenous starts, venipunctures, injections and heel sticks. Those receiving music interventions had significantly shorter periods of distress than those who did not. In addition to the aforementioned physical, psychological and emotional benefits of using music therapy with hospitalized pediatric patients, there are also possibilities for reducing facility costs associated with hospital procedures for patients.

Walworth (2005) analyzed the cost effectiveness of using music therapy as a procedural support option for hospitalized children undergoing echocardiograms (ECGs), computerized topography (CT) scans and other procedures. In order to effectively
distract each subject, music interventions began in the waiting room and then occurred while each procedure took place. Music therapy was 100% successful in eliminating the need for sedation during ECGs, 80.7% successful for CT scans and 94.1% successful for all other procedures. On average, ECG patients finished the procedure in 20 minutes when receiving music therapy as compared to the typical average time of 1 hour. Walworth went on to emphasize that this reduction in time also meant a reduction in projected hospital expenditures. Due to a significant reduction in the sonographer’s time and thus, cost, as well as the elimination of the need for sedation or an RN during the procedure, an average of $76.15 in savings per patient was projected.

Hospitalized adult patients have also benefited from music therapy. Several studies have looked at how music interventions affect stress and anxiety in patients having a surgery or other medical procedure. One particular study measured the physiological responses of 100 hospitalized adult inpatients awaiting surgery to determine if listening to music after being briefed on their upcoming surgery would have a calming effect (Miluk-Kolasa, Matejek, Stupnicki, 1996). After listening to music for 1 hour, the mean physiological parameters of the experimental group returned to initial levels before being told about the surgery, while measures from the control group remained at approximately the same stressor-induced levels. Yung, Kam, Lau and Chan (2003) conducted another study on music therapy and pre-operative stress reduction in adults, but in this investigation the authors sought to find out if the same results could be reproduced across cultural differences. Results were consistent with the findings of Miluk-Kolasa et al., with significant reductions in patients’ blood pressure, heart rate and anxiety state being reported. Palakansik, DeNobile, Sweeney and Blankenship (1994) also found similar results when they investigated how music therapy would affect anxiety levels in adult patients during an actual surgical procedure. After receiving music therapy during a flexible sigmoidoscopy, all measures of anxiety in patients in the experimental group were significantly better than those of the no-music control group. These findings combined with the previously mentioned research on music therapy and pediatric patients have demonstrated that music therapy interventions are very effective in treating anxiety for all age groups in the medical population.
Related to anxiety reduction, music therapy has been shown to improve overall mood levels in cancer patients. Waldon (2001) studied how group music therapy sessions affected adult oncology patients’ mood and level of group cohesiveness. The Profile of Mood States (POMS) was used to measure mood while a content analysis, attendance record and questionnaire were used to measure group cohesiveness. Eleven participants in two groups participated in the study with the experimental group receiving 8 music therapy group sessions over the course of 10 weeks. After data analysis, results showed that self-reported mood scores significantly improved for all patients after receiving music therapy interventions although group cohesiveness remained stable. Also, it was noted that music therapy specifically helped improve the following mood factors for patients: anger-hostility, tension-anxiety, confusion-bewilderment and fatigue-inertia.

In a related study, Cassileth, Vickers and Magill (2003) examined the use of music therapy for improving mood in patients with blood cancer undergoing high-dose therapy with autologous stem cell transplantation (HDT/ASCT). Again, the Profile of Mood States was used to measure mood. Sixty-nine patients took part in the study and were provided with live, individualized sessions that occurred in the patient’s room. Patients receiving these sessions exhibited a 28% improvement on the Anxiety/Depression scale of the POMS and a 37% improvement on the overall Total Mood Disturbance scale.

In a study on patients undergoing elective brain surgery, Walworth, Rumana, Nguyen and Jarred (2008) measured how live music therapy interventions affected quality of life indicators, amount of medications administered and patient length of stay. Six quality of life indicators were examined and were as follows: anxiety, mood, pain, perception of hospitalization or procedure, stress and relaxation. Results revealed that although there was no significant difference in patient length of stay or amount of medications given, there were significant improvements in 4 of the 6 quality of life indicators including anxiety, relaxation, stress and perception of hospitalization or procedure.

As music therapy has gradually become more established in the medical world, it also has become a viable therapeutic option for adults undergoing physical rehabilitation.
This has been in part due to the growing body of research that has demonstrated the effectiveness of using music therapy interventions with adult rehabilitation patients. As this population continues to grow, it will be important for clinicians to continue to conduct scientific investigations in order to build upon the existing literature on music therapy and the physical rehabilitation setting.

**Music Therapy in the Rehabilitation Setting**

The therapeutic characteristics of music are becoming increasingly recognized within the field of rehabilitation medicine. Music therapists in the rehabilitation setting often work on goals involving the improvement of fine and gross motor skills, muscle strengthening, sitting and standing balance, communication, cognition, and psychosocial issues (Paul & Ramsey, 2000). In many instances, co-treatment occurs with physical, occupational, and speech therapies so that the music interventions serve as supplemental catalysts for making substantial therapeutic progress quickly. In fact, one study demonstrated that stroke patients achieved significantly better gains in fine and gross motor skills after receiving music-training sessions in addition to conventional therapies (Schneider, Schölne, Altenmüller, & Münte, 2007). Consistent with these findings, Neugebauer, Serghiou, Herndon, Suman (2008) found that pediatric burn patients made significantly better gains in joint range of motion when they received music therapy services in addition to their standard of care. Several other studies on music and rehabilitation have documented similar positive results, helping to more fully realize the potential benefits of utilizing music therapy interventions in rehabilitation practice.

Music interventions have been used to help rehabilitation patients improve their communication skills. Tamplin (2008) conducted a pilot study on singing and dysarthric speech utilizing a multiple case study design with pre, mid and post-treatment assessments. Four patients with dysarthria following a stroke or TBI participated in 24 individual music therapy session over the course of eight weeks. Interventions involved oral motor respiratory exercises, rhythmic and melodic articulation exercises, rhythmic speech cuing, vocal intonation therapy, and therapeutic singing using familiar songs. Assessment measures included speech intelligibility, rate of speech, communication efficiency ratio, speech naturalness, and waveform analysis. Results indicated that
subjects significantly improved in the areas of speech naturalness and functional speech intelligibility. Although not statistically significant, subjects also improved their rate of speech by an average of approximately 10 words per minute.

The use of singing has also been used frequently when working on speech goals with aphasic patients. This has led to the development of Melodic Intonation Therapy (MIT), which is a hierarchically structured treatment program consisting of three linguistic levels aimed at improving speech characteristics of patients with aphasia (Bonakdarpour, Eftekharezadeh, Ashayeri 2003). Generally speaking, the first two levels of MIT have involved the intoning and subsequent singing of multisyllabic words and short, high-probability phrases with the patient. While singing, the syllables for each word or phrase are tapped out by the clinician to provide an additional aural cue. In the third phase, more phonologically complex words and phrases are introduced and the melodic aspect is faded until normal speech is achieved. Although MIT would typically be implemented by a speech pathologist, music therapists have often used the intervention with rehabilitation patients over the years as well. Baker (2000) adapted the technique to be suitable for patients suffering from severe non-fluent aphasia who had not benefited from traditional MIT and termed the technique Modified Melodic Intonation Therapy (MMIT). One difference between the two methods is that MMIT phrases are more melodic than MIT phrases, which tend to resemble more of a speak-singing style. This is done in order to provide a musical structure that is more easily encoded into memory for a more severely affected population. Another key difference is that in MMIT, patients are expected to only sing a target word of a phrase such as “water” instead of “I want a drink of water.” Baker enrolled two aphasic patients in a MMIT program after they had not made progress in a traditional MIT program and found that both patients exhibited substantial gains that led to improved communication and self-esteem.

In addition to the communicative benefits of music therapy, several studies have shown how music therapy can help to improve gait parameters in patients with neurological disorders and injuries. Thaut, McIntosh and Rice (1997) investigated how musical rhythm affected the gait performance in 20 hemiparetic stroke patients. Patients were placed into either a control group who received conventional gait training, or an
experimental group that received gait training with Rhythmic Auditory Stimulation (RAS). RAS involved embedding a metronome beat into instrumental music in order to emphasize the strong beat. Patients in the experimental group listened to the RAS music on headphones while performing gait training in order to provide a strong and regular aural cue for their walking cadence. Experimental patients received this training twice a week for 6 weeks while the control group patients received typical gait training for the duration of the study. Results indicated that patients significantly improved their gait velocity and stride length as compared with gait training without RAS.

A similar study examined how RAS affected the gait performance of 8 traumatically brain injured individuals (Hurt, Rice, McIntosh, Thaut, 1998). All subjects were referred by a physician for significant gait deficiencies in velocity, cadence, stride length, and symmetry. Each participant was asked to perform four different walking tasks; 1) walking at normal pace for baseline measurements, 2) walking on beat to RAS embedded into rhythmically accented music, 3) walking as fast as safely possible without RAS, and 4) walking with RAS and music at a tempo 5% faster than the previous no-RAS fast walk. Researchers found that after 5 weeks of receiving this training, patients made statistically significant improvements in velocity, cadence, and stride length. The study showed that RAS helped to facilitate gait improvement in TBI patients even when progress had ceased in conventional therapy.

In another study on gait performance, Satoh and Kuzuhara (2008) used mental singing to help improve gait disturbances in eight adults with Parkinson’s Disease. Participants were instructed to perform 7 tasks using a CD recording of a well-known nursery song; 1) listen to the nursery song, 2) clap hands while listening, 3) sing song, 4) clap hands while singing song, 5) sing song while walking in place and sitting on a chair, 6) walk while singing the song, 7) walk while singing the song in mind only. Researchers videotaped each subject three times before the first task and three times after the last task. After data analysis, it was found that improvements were made in walking speed, arm swing, knee raising and smoothness of turns. Participants were interviewed a few days later and all reported using mental singing in their day-to-day lives and that it helped them to recover typical pacing.
Related to this study, Hayashi, Nagaoka and Mizuno (2006) looked at how music could help Parkinson’s Disease patients’ gait patterns while also measuring the influence on depression. Subjects included 25 patients with idiopathic Parkinson’s Disease and gait disturbance. All participants were instructed to listen to familiar styles of music embedded with RAS at home for one hour a day for three to four weeks. After completing the requested tasks, results revealed significant improvements in gait speed and stride length. In addition to the physical improvements made, all patients reported significant improvements in self-rated depression scores. The ability of music therapy to improve mood parameters such as depression has been evidenced in other patient groups within the rehabilitation setting as well.

Mood measures have been shown to be quite responsive to music therapy interventions in patients with neurological disorders. Magee and Davidson (2002) measured the effect of individual music therapy sessions on mood in 14 patients with acquired and complex neuro-disabilities including multiple sclerosis, traumatic brain injury and brain damage from stroke or anoxia. After comparing pre-treatment and post-treatment mood scores of the Profile of Mood States – Bipolar Form (POMS-BI), researchers found that significant improvements were made in composed-anxious, energetic-tired and agreeable-hostile mood states. The authors emphasized the fact that these positive changes in mood were made after receiving a relatively short music intervention; an important finding in light of current health care, which has emphasized cost-effectiveness.

Music therapy has been shown to have a positive impact on mood in TBI patients as well. A recent study sought to determine how weekly one-hour music therapy sessions influenced mood, anxiety and depression measurements in 13 patients with TBI (Guetin, Soua, Voirit, Herisson, 2009). Session occurred over the course of 20 weeks and included 30 minutes of receptive music listening through headphones and 30 minutes of active music making usually involving instrument playing, singing, song-writing and the execution of rhythmic movements to musical accompaniment. Beginning with the first session and then every fifth session until week 20, mood was measured using a patient-rated face scale, while anxiety and depression were measured using the Hospital Anxiety and Depression Scale. Data analysis showed that significant improvements were made in
mood from the first session onwards. Reductions in anxiety and depression also reached significance with an improvement of 39% between the first and last weeks. Researchers also reported that this anxiolytic effect was still present in patients one week after sessions had concluded, suggesting that more research could be done on the sustained mood effects of music therapy interventions with this population.

A previous study examined how music therapy affected mood, social interaction and participation in other therapies in 18 stroke and traumatically brain injured adults (Nayak, Wheeler, Shiflett, Agostinelli, 2000). Subjects were assigned to either a control group receiving standard rehabilitation alone, or an experimental group receiving standard rehabilitation along with group music therapy sessions. Experimental group subjects received 2-3 sessions a week during their hospital stays and received up to a maximum of 10 sessions in addition to their other therapies. Music therapy interventions involved activities such as singing, composing, instrument playing, improvisation, performing and music listening. Assessment measures were administered to patients, family members and staff members before treatment began and then again just before patients were discharged from the hospital. Mood was assessed using two similar measurements; 1) the 7-point Faces Scale, which was administered to patients, and 2) a visual analog rating scale for depression, which was filled out on experimental patients by their family members and therapists. In addition to this, one questionnaire was given to family members about observations of social interaction among patients and one questionnaire was administered to therapists about the patients’ participation in therapies. Results indicated a trend suggesting that self-ratings and family ratings of mood showed more improvements in the music group than the control group. Significant improvements in the family ratings of patient social interaction for the experimental group were found as well. Occupational and physical therapists reported that patients were significantly more involved in therapy and tended to be more motivated to participate than the control group.

Statement of Purpose: Do individual music therapy sessions for psychosocial needs improve mood and motivation to progress in therapies?
Although several studies have assessed music and mood in rehabilitation patients (Guetin, Soua, Voirit, Herisson, 2009; Hayashi, Nagaoka and Mizuno, 2006; Magee & Davidson, 2002), only one has included direct measurements of how music therapy interventions affect adult TBI patients’ motivation to participate in therapies (Nayak, Wheeler, Shiflett, Agostinelli, 2000). None were found to have directly measured the effect of individual music therapy sessions on mood and motivation for therapeutic progress in general adult rehabilitation patients. This study sought to answer three general research questions:

• Do individual music therapy sessions have an effect on mood in adult rehabilitation patients?

• Do individual music therapy sessions have an effect on motivation in adult rehabilitation patients to progress in physical and occupational therapy as measured by weekly PT and OT progress scores?

• Is there a correlation between adult rehabilitation patients’ mood and progress made in physical and occupational therapies?
CHAPTER III
METHOD

Setting
This investigation was conducted at the Tallahassee Memorial Rehabilitation Center (TMRC), a 53 bed sub-acute care rehabilitation hospital utilizing both inpatient and outpatient services. TMRC is presently affiliated with Tallahassee Memorial Healthcare (TMH), an acute-care hospital that is located directly across from TMRC. Upon admission, patients admitted to TMRC are assessed by an interdisciplinary team to determine medical and therapeutic needs as well as projected length of stay.

Subjects
Subjects (N = 17) were any rehabilitation patients referred to the TMH Music Therapy Department for mood issues specifically including depression, anxiety and/or low motivation during physical and occupational therapies. Patients were referred to the department by either the TMRC recreational therapist or by TMH music therapists based upon observations and/or assessment of patients’ medical history including any history of depression or anxiety. In total there were 12 females and 5 males. Ages ranged from 36-80 years of age with a mean age of 61.8 and standard deviation of 13.9. Subjects fell into two impairment groups; orthopedic (14) or stroke (3). Table 1 displays individual patient classification by gender, age and ICD-9-CM impairment diagnosis. Written consent was obtained from all participants before any data collection began.

Exclusion Criteria
Criteria for exclusion of subjects from the current study included:
- Any patient not cognitively appropriate for the POMS-B
- Any patient discharged before at least 3 days of data could be collected during baseline and treatment weeks
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**Outcome Measures**

The Brief form of the Profile of Mood States (POMS-B) was administered to assess state mood level in subjects (See Appendices). The POMS-B is an authorized shortened version of the classic POMS tool that was specifically developed for use in situations in which “patients are under stress or in pain, so that normally easy tasks become difficult and time-consuming.” (McNair & Heucher, 2003, p. 17) The POMS tool has been used in several other studies involving the effect of music therapy interventions on mood in medical and rehabilitation settings (Cardigan et al., 2001; Chlan, 1995; Davis & Thaut, 1989; Hanser & Thompson, 1994; Magee & Davidson, 2002; Waldon, 2001). The POMS-B is a 30-item form measuring six clearly defined mood sub-categories including tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment. Each item is rated from 0 (not at all) to 4 (extremely). For the purposes of this study, subjects were asked to choose the number that best described how they were feeling at the moment of administration. The sum of scores across all mood sub-categories was calculated into a Total Mood Disturbance (TMD) score. Higher TMD scores indicated higher levels of overall mood disturbance in subjects.

Patients at the Tallahassee Memorial Rehabilitation Center receive physical therapy and occupational therapy weekly progress notes starting one week after admission to monitor therapeutic progress. Items assessed include ambulation, stair
negotiation, pain management, range of motion, upper and lower extremity strength, sitting and standing balance, endurance, bed mobility, transfers, wheel chair management, feeding, grooming, dressing, toileting and home management. Some of these items are assessed using differing forms of measurement. For example, upper and lower extremity strength are rated using the Functional Independent Measure which is a 7-point Likert scale with 1 meaning the patient is totally dependent upon others for task completion, and 7 meaning the patient is completely independent. In contrast, range of motion is measured using the total degrees of joint motion that a patient is capable of performing. Because this study sought to look at total weekly therapeutic progress, each of the aforementioned items was assigned a number of points in order to convert all of the items into one total score for physical therapy weekly progress and one total score for occupational therapy weekly progress (Scoring Formula in Appendices). Higher scores indicated higher functional outcome in each therapy.

Procedure

All subjects served as their own controls within a pretest/posttest design with one week of baseline data collection and one week of treatment data collection. During the baseline week, subjects were administered the POMS-B form for at least 3 days out of the week. The weekly average of the POMS-B scores was then recorded along with the subjects’ physical therapy weekly progress score and their occupational therapy weekly progress score for the baseline week. During the treatment week, subjects received music therapy sessions for at least 3 days out of the week. These sessions occurred one-on-one in the subject’s room between the hours of 1 and 5 PM and typically lasted for 30-45 minutes. Common goals included increasing mood, coping skills and quality of life measures as well as decreasing depression and anxiety. At the conclusion of each music therapy session subjects were immediately administered the POMS-B form. The weekly average of the POMS-B score was then recorded along with the subjects’ physical and occupational therapy weekly progress scores for the treatment week.
CHAPTER IV
RESULTS

The mean Total Mood Disturbance (TMD) score for subjects (N=17) during the baseline week was 23.6 (SD 20.2) while mean TMD during the treatment week was 12.8 (SD 16.7) with a mean difference of 10.8 points. Table 3 gives the mean scores for the POMS-B mood sub-categories for baseline and treatment weeks.

A one-tailed repeated-measures t-test was used to determine if any significant difference existed between baseline and treatment TMD scores. Table 2 gives the results of the test. There was a significant difference between subjects’ TMD scores during baseline and treatment weeks with treatment week TMD scores being significantly lower.

Table 2. t-Test Results on Mean TMD Scores for Baseline and Treatment Weeks

<table>
<thead>
<tr>
<th>Week</th>
<th>N</th>
<th>M-TMD</th>
<th>t value</th>
<th>df</th>
<th>1-tailed sig. (p ≥ .01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>17</td>
<td>23.6</td>
<td>2.54</td>
<td>16</td>
<td>0.01</td>
</tr>
<tr>
<td>Treatment</td>
<td>17</td>
<td>12.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Mean Scores of POMS-B Mood Sub-categories for Baseline and Treatment Weeks

<table>
<thead>
<tr>
<th>Week</th>
<th>T</th>
<th>D</th>
<th>A</th>
<th>V</th>
<th>F</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>5.2</td>
<td>4</td>
<td>3.6</td>
<td>7.1</td>
<td>11</td>
<td>5.8</td>
</tr>
<tr>
<td>Treatment</td>
<td>3</td>
<td>2.2</td>
<td>1.4</td>
<td>5.83</td>
<td>6.4</td>
<td>5.7</td>
</tr>
</tbody>
</table>

T – Tension/Anxiety; D – Depression/Dejection; A – Anger/Hostility; V – Vigor/Inertia; C – Confusion/Bewilderment
The mean physical therapy weekly progress score for subjects during the baseline week was 69.8 (SD 24.3) while during treatment week it was 95 (SD 25.5) with a mean difference of 25.2 points. A one-tailed repeated-measures t-test was used to determine if any difference existed between baseline and treatment scores. Table 4 displays the results. There was a significant difference between baseline scores and treatment scores with physical therapy weekly progress scores during treatment weeks being significantly higher.

<table>
<thead>
<tr>
<th>Week</th>
<th>N</th>
<th>M-PT</th>
<th>t value</th>
<th>df</th>
<th>1-tailed sig. (p &gt; .001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>17</td>
<td>69.8</td>
<td>4.41</td>
<td>16</td>
<td>0.0002</td>
</tr>
<tr>
<td>Treatment</td>
<td>17</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean occupational therapy weekly progress score for subjects during the baseline week was 73.2 (SD 16.8) while during treatment weeks the mean score was 109.2 (SD 54.8) with a mean difference of 36 points. Again, a one-tailed repeated measures t-test was used in order to verify if any significant difference existed between baseline and treatment week scores. Table 5 gives the results of the test. There was a significant difference between subjects’ occupational therapy weekly progress scores during baseline and treatment weeks with treatment week scores being significantly higher.
Table 5. *t*-Test Results on Mean Occupational Therapy Weekly Progress Scores for Baseline and Treatment Weeks

<table>
<thead>
<tr>
<th>Week</th>
<th>N</th>
<th>M-OT</th>
<th>t value</th>
<th>df</th>
<th>1-tailed sig. (p ≥ .01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>17</td>
<td>73.2</td>
<td>2.86</td>
<td>16</td>
<td>0.005</td>
</tr>
<tr>
<td>Treatment</td>
<td>17</td>
<td>109.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition to the previous tests, a one-tailed Pearson’s product-moment correlation test was used to determine the correlational relationship between TMD scores and PT/OT scores. Table 6 gives the results of the test. There was a negative correlational relationship between TMD and PT scores as well as between TMD and OT scores. Higher TMD scores, meaning lower overall mood, were correlated with lower PT and OT scores.

Table 6. *Pearson’s Product-Moment Correlation Results on Mean TMD scores and Mean Physical/Occupational Therapy Weekly Progress Scores*

<table>
<thead>
<tr>
<th>Scores compared</th>
<th>r</th>
<th>r²</th>
<th>t</th>
<th>df</th>
<th>1-tailed sig. (p ≥ .01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMD and PT</td>
<td>-0.51</td>
<td>0.26</td>
<td>-3.39</td>
<td>32</td>
<td>0.0009 (p ≥ .001)</td>
</tr>
<tr>
<td>TMD and OT</td>
<td>-0.39</td>
<td>0.15</td>
<td>-2.41</td>
<td>32</td>
<td>0.01 (p ≥ .05)</td>
</tr>
</tbody>
</table>

**Summary**

The study attempted to measure how individual music therapy sessions affected mood and therapeutic motivation in adult rehabilitation patients. After receiving a week
of music therapy, subjects showed significant decrease in TMD scores indicating improved levels of mood. Physical therapy and occupational therapy progress scores also significantly improved during treatment weeks. Results suggest that a strong correlational relationship existed between mood and PT/OT progress with lower mood associated with decreased therapeutic progress scores.
CHAPTER V
DISCUSSION

This study sought to determine if individual music therapy sessions had any influence upon mood and motivation to make therapeutic progress in adult rehabilitation patients. Data analysis revealed significant differences between comparisons of experimental and control data. Upon completing a week of music therapy services, all patients showed improvements across all measures of mood and motivation.

After receiving music therapy, subjects exhibited a 54% improvement in average Total Mood Disturbance scores, supporting the idea that music therapy had a significant and positive influence upon mood state in patients. This finding is consistent with other studies on music therapy and mood with rehabilitation patients (Guetin, Soua, Voirit, Herisson, 2009; Magee & Davidson, 2002; Nagaoka & Mizuno, 2006). In addition to the quantitative support found, self-report from patients indicated a positive effect with statements such as “I’m so glad you came today, I really needed it,” “The music made me feel better,” and “I can’t believe how much this has helped me.” One interesting finding was that the mean score for the mood sub-category of fatigue decreased by almost half during the music week. This might suggest that the music interventions had an invigorating effect upon patients, which in turn could potentially be carried over into other therapies during the day.

For the purposes of this study, patient motivation was ascertained by measuring the amount of improvement made in weekly progress scores for physical and occupational therapy from one week to the next. As with mood, patients also made significant improvements in weekly physical therapy and occupational therapy progress after music therapy services were provided for one week. This finding provides support for utilizing music therapy interventions to increase motivation in patients who may not be making substantial progress in other therapies due to depression, anxiety, apathy and/or amotivation. This also seems to be in congruence with the findings of Nayak, Wheeler, Shiflett and Agostinelli (2000), in which traumatically brain injured patients who received music therapy were rated as being more motivated to participate in therapies by their physical and occupational therapists.
This study also looked at the relationship between mood and motivation. There was a negative correlation between TMD and PT/OT weekly progress scores, meaning that patients tended to make improvements in physical and occupational therapy progress when improvements in overall mood were achieved as well. This finding supports the idea of an established link between mood and motivation. It would seem to make logical sense that a patient might progress better in therapy when experiencing a positive mood state. In clinical practice it would therefore make sense to consider improving psychosocial issues such as mood when faced with the dilemma of a seemingly unmotivated patient. The findings from this study implicate music therapy as one option for intervention. Music therapists are in a unique position to provide services that can positively alter patient mood states thereby increasing the likeliness that they will make improvements in other therapies.

**Limitations**

As with many research endeavors, there were some important limitations to consider when interpreting the findings of this investigation. The study was a pre-test/post-test design with one week of baseline data and one week of treatment data. Although patients made significant improvements in therapeutic progress at the end of the music week as compared with the no-music week, it was not completely clear whether or not music therapy was the agent of change for increased mood and progress in PT and OT. In order to strengthen the notion that music therapy was the variable responsible for the difference, a complete reversal design would have been a more appropriate study design. By adding a week of return to baseline data collection, it could be determined whether or not patient mood and progress would decrease upon cessation of music therapy services, thereby adding more support for music therapy being responsible. Unfortunately this was not possible since subjects in this investigation were discharged from the rehabilitation facility before a third week of return to baseline data could be completed.

Sample limitations were also present. First, it should be taken into account that approximately 70% of subjects were female. There may be gender differences in mood and motivational effects. Also, during the 5 months of data collection 17 subjects in total
consented to be in this study and complete data were obtained. A larger sample size would have been preferable. Despite this, it’s important to note that all patients in this investigation fell into two general impairment groups; stroke and orthopedic conditions. This is consistent with the existing literature in which these impairment groups have accounted for the largest groups of patients utilizing inpatient rehabilitation services (Sood, Buntin, & Escarce 2008).

**Suggestions for Future Research**

Although all subjects were seen between the afternoon hours of 1-5, individual sessions did not occur at the same time each day for each patient. In some instances sessions occurred soon before they had PT and OT while in other instances sessions occurred directly afterwards. Although patient therapy schedules were made daily, the large number of fluctuating variables typical to patients in an inpatient rehabilitation facility created high variability in those schedules making it difficult to schedule sessions beforehand. For example, patient A might have spoken with the music therapist and agreed to have a session at 2 in the afternoon on the following day between physical therapy at 1 and occupational therapy at 3. On that next day, patient B, who has been scheduled to have physical therapy at 2, might have an urgent medical need that arises creating a need to push therapy back until 3. In order to fill the now vacant 2 o’clock time, patient A’s occupational therapy at 3 might then be changed to 2; the same time during which the music therapy visit was scheduled to occur.

Future research could attempt to control this variable to determine how the specific time during which music therapy sessions occur affects patient motivation. Perhaps having music therapy sessions directly before going into physical and occupational therapies would serve as an energy ‘fueling-up’ factor for patients. For those patients identified as having low motivation, the goal before PT and OT would then be to increase mood measures so that patients go into therapy with an overall increase in mood. It would also be interesting to see how the combination of these individual music therapy sessions and co-treatment sessions with PT and OT affect outcome measures. The music therapist would then be able to help the patient transfer any skills, information, or coping strategies discussed during individual sessions directly to the co-treatment
sessions and perhaps increase patient progress over a shorter period of time. If music therapy can help to achieve this increase in efficiency, future studies might also attempt to determine the cost-effectiveness of including MT in a rehabilitation program.

**Conclusions**

Brown et al. (2008) say that “As demand soars, rehabilitation must keep pace with both standards of care and the unrelenting cost-containment pressures of today’s healthcare environment.” (p. 112). As this pressure to reduce expenditures remains present, it also remains to be important that music therapy professionals investigate how the field can provide aid. Clinicians must continue to conduct research in this area, educate others on the benefits of using music therapy with rehabilitation patients and share research findings as well as clinical techniques with other music therapy professionals. This study demonstrates that music therapy interventions have the potential to increase adult rehabilitation patients’ mood and motivation to progress in physical and occupational therapies. As a result, music therapy may also have the potential to provide relief from some of the ever-growing financial pressures faced by rehabilitation facilities of today.
APPENDIX A

NON-MUSIC THERAPY BASELINE WEEK RAW DATA
### Baseline Week Raw Data

<table>
<thead>
<tr>
<th>Patient</th>
<th>Mean TMDS</th>
<th>Mean PTPS</th>
<th>Mean OTPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-1</td>
<td>94</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>69</td>
<td>77</td>
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<td>3</td>
<td>56</td>
<td>44</td>
<td>39</td>
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<td>4</td>
<td>5.7</td>
<td>73</td>
<td>76</td>
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<td>5</td>
<td>19</td>
<td>85</td>
<td>83</td>
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<td>6</td>
<td>28</td>
<td>94</td>
<td>81</td>
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<td>7</td>
<td>63</td>
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<td>73</td>
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<tr>
<td>17</td>
<td>25</td>
<td>60</td>
<td>52</td>
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</tbody>
</table>

**TMDS** – Total Mood Disturbance Score  
**PTPS** – Physical Therapy Progress Score  
**OTPS** – Occupational Therapy Progress Score
## Treatment Week Raw Data

<table>
<thead>
<tr>
<th>Patient</th>
<th>Mean TMD</th>
<th>Mean PTPS</th>
<th>Mean OTPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
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<td>-10</td>
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<tr>
<td>17</td>
<td>20</td>
<td>50</td>
<td>45</td>
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</tbody>
</table>

**TMDS** – Total Mood Disturbance Score  
**PTPS** – Physical Therapy Progress Score  
**OTPS** – Occupational Therapy Progress Score
APPENDIX C

FSU IRB APPROVAL
APPROVAL MEMORANDUM

Date: //

To: Sean Aultman  
591 Blairestone Rd. Apt. 1723  
Tallahassee, FL 32301

Dept.: MUSIC SCHOOL

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research  
The Effect of Individual Music Therapy Sessions on Mood and Weekly Progress in  
Physical and Occupational Therapies in Adult Rehabilitation Patients

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 8/6/2008.  
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 8/5/2009 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. 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  
sure 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 Human Research Protection. The  
Assurance Number is IRB00000446.

cc: Jayne Standley  
HSC No. 2008.0412
October 7, 2008

Sean C. Aultman
501 Blainstone Road, Apt. 1723
Tallahassee, FL 32301

Dear Mr. Aultman:

Your study IRB # 2008-19 Title: The Effect of Individual Music Therapy Sessions on Mood and Weekly Progress in Physical and Occupational Therapies in Adult Rehabilitation Patients, Version 1, Date: 10-2-08, met the criteria for an Expedited Review. Larry C. Deeb, MD, Chairperson, Institutional Review Board (IRB) at Tallahassee Memorial HealthCare, Inc. (TMH) reviewed and approved the study on October 3, 2008 for one year. The expiration date of this approval is October 2, 2009.

IRB # 2008-19

The Effect of Individual Music Therapy Sessions on Mood and Weekly Progress in Physical and Occupational Therapies in Adult Rehabilitation Patients, Version 1, Date: 10-2-08

Principal Investigator: Sean C. Aultman
Informed Consent: Approved as is.
Protocol: Version 1, Date: 10-2-08

List materials reviewed by the Board:
- Profile of Mood States Short Form

Reporting Requirements:
- Report to the IRB any planned change in the study or informed consent and do not implement any change without receiving prior approval, except to eliminate immediate hazard;
- Report to the IRB any unanticipated problems involving risks to subjects;
- Report to the IRB any new information on the project that adversely influences the risk/benefit ratio;
- Report to the IRB any serious or unexpected adverse events;

VHA
Member of the Voluntary Hospitals of America (VHA) System
• Report to the IRB any major protocol violations with in ten days. Minor protocol deviations may be reported at the time of the Study Progress Report (Application for Renewal). Maintain a log throughout the year and establish a plan of correction to minimize the deviations.

Please request approval for advertising copy, recruitment flyers, publications, that appear in any medium prior to use.

**Supplemental Reporting Requirements:** None  
**Expiration Date:** October 2, 2009  
**Continuation Review Date:** October 2, 2009  
**Continuation Review Requirements:** The investigator must submit a Study Progress Report and supporting documentation packet to apply for continuing review approval of the study four (4) weeks in advance of the expiration of the study renewal date. You will also need to request approval throughout this study to make any modifications/amendments to either the study protocol or the informed consent.

The study Informed Consent and Profile of Mood States Short Form with the IRB approval stamp for this year are enclosed. As the principal investigator, you are responsible for ensuring compliance with the study protocol, the applicable IRB at TMH Guidelines and Code of Federal Regulations set forth by the Department of Health and Human Services. The IRB Guidelines and forms required to comply with reporting requirements are available on the TMH Intranet.

At the time of renewal please check the Office of Research/IRB intranet site to ensure that you have the most current edition of the IRB Forms. If you have any questions about the forms or submitting them, please feel free to contact Mary Sandell, Regulatory Readiness Coordinator, or me at (850) 431-5676.

Sincerely,

Cynthia Blair  
Administrative Liaison/IRB
APPENDIX E

INFORMED CONSENT FORM
Consent for Research Template

Title of Project: The Effect of Individual Music Therapy Sessions on Mood and Weekly Progress in Physical and Occupational Therapies in Adult Rehabilitation Patients

Principal Investigator: Sean Aulman

Other Investigators:

Participant's Printed Name: __________________________

This is a research study. Research studies include only people who want to take part. This form gives you information about this research, which will be discussed with you. It may contain words or procedures that you do not understand. Please ask questions about anything that is unclear to you. Discuss it with your family and friends and take your time to make your decision.

1. Purpose of the Research
   The purpose of this study is to determine if music therapy sessions have an effect on mood and progress made in physical and occupational therapy of adult rehabilitation patients. Music therapy services are already available at the Tallahassee Memorial Rehabilitation Center and this research will only look at what is already being done in order to determine how music therapy can best address patient needs. You are being offered the opportunity to participate in this study because you have been given a music therapy referral for services at the Tallahassee Memorial Rehabilitation Center. About 30 other individuals in the Tallahassee Memorial Rehabilitation Center will take part in this study.

2. Procedures to Be Followed
   If you agree to participate in this study, you will be given a form called the Profile of Mood States – Short Form each day in order to assess your daily mood. During this first week you will only complete the mood form each day without receiving music therapy services. During the second week you will receive a thirty-minute music therapy session as well as the mood form each day of the week. If you have not been discharged after these two weeks you will again fill out the mood form each day for a third week while not receiving music therapy. After this final week you will still have the option of receiving music therapy services but your participation in this study will have concluded. The mood scores will be combined with your weekly therapy progress information in order to determine if any difference exists between the 'music' week and the 'no-music' weeks. Because you have been referred to the music therapy department, you will still have the option of receiving music therapy services even if you choose not to participate in this study.

3. Discomforts and Risks:
   If you choose to participate in this study, one possible risk would be a decrease in mood during weeks that you would not be receiving music therapy. In order to eliminate the possibility of any unforeseen discomfort, you have the right to refuse music therapy services even if you agree to participate in the study. For example, if you’ve been experiencing pain to the degree that you feel that music would make it worse, you have the right to refuse
music therapy services. You are also free to skip any questions on the Profile of Mood States – Short Form that you do not wish to answer.

4. Possible Benefits:
   a. Possible benefits to the participant:
      The possible benefits you may experience from receiving music therapy services include increased mood and motivation. There is no guarantee that you will benefit from being in this research.

   b. Possible benefits to others:
      The information gathered from this study may help to determine other ways that music therapy can help patients within the rehabilitation setting. If music therapy does have a positive effect on progress made in other therapies, that information could help to support music therapy being more integrated into the Tallahassee Memorial Rehabilitation Center thus providing more opportunities for patients to receive an added benefit.

5. Other Options that Could be Used Instead of this Research:
   You do not have to participate in this research study. If you do not want to participate in the study, you may still choose to receive music therapy services.

6. Time and Duration of the Procedures and Study:
   If you agree to participate in this study, it will take approximately 15 minutes to fill out the mood form each day. Music therapy sessions will last approximately 30 minutes and will only occur once a day for one week. Your involvement in this study will last for up to three weeks.

7. Statement of Confidentiality:
   a. Privacy and confidentiality measures
      Your weekly therapy progress notes that are reviewed, stored and analyzed at TMH will be kept in a secured area in the Principal Investigator’s office. Information collected from your progress chart will be labeled with a code number, and the list that matches your name with the code number assigned to your record will be kept in a locked box in the Principal Investigator’s office. In the event of any publication or presentation from the research, no personally identifiable information will be shared.

   7b. The use of private health information:
      Health information about you will be collected if you choose to be part of this research study. Health information is protected by law. Your information will only be used or shared as explained and authorized in this consent form or when required by law. It is possible that some of the other people/groups who receive your health information may not be required by Federal privacy laws to protect your information and may share it without your permission.

      To participate in this research you must allow the research team to use your health information. If you do not want us to use your protected health information, you may not participate in this research.
Your permission for the use, retention, and sharing of your identifiable health information will continue until the completion of the research study. At that time the research information not already in your medical record will be destroyed. Any research information in your medical record will be kept indefinitely.

If you choose to participate, you are free to withdraw your permission for the use and sharing of your health information at any time. You must do this in writing. Write to Sean Aultman and let him know that you are withdrawing from the research study. His mailing address is 1331 East Sixth Avenue, Tallahassee, FL 32303.

If you withdraw your permission:
- We will no longer use or share medical information about you for this research study, except when the law allows us to do so.
- We are unable to take back anything we have already done or any information we have already shared with your permission.
- We may continue using and sharing the information obtained prior to your withdrawal if it is necessary for the soundness of the overall research.
- We will keep our records of the care that we provided to you as long as the law requires.

The research team may use the following sources of health information:
- Your medical history from the time of admission to TMH until time of discharge as it relates to this study.

Representatives of the following people/groups may use your health information and share it with other specific groups in connection with this research study:
- The principal investigator, Sean Aultman
- The Institutional Review Board at Tallahassee Memorial HealthCare (A group of people who perform independent review of research as required by federal regulations.)
- The Florida State Human Subjects Committee
- The TMH Music Therapy Research Team

The above people/groups may share your health information with the following people/groups outside TMH for their use in connection with this research study. These groups, while monitoring the research study, may also review and/or copy your original TMH records.
- The Office of Human Research Protections in the U. S. Department of Health and Human Services

We will do our best to make sure that the personal information in your medical record will be kept private. However, because of the need to release information to the above parties, absolute confidentiality cannot be guaranteed. Once your personal health information is released, it may be redisclosed and no longer protected by federal privacy regulations. Your personal information may also be given out if required by law and in rare circumstances may be subpoenaed by a court.

8. Costs for Participation:
There is no additional cost to you for participating in this study.

9. Compensation for Participation:
You will not receive any compensation for being in this research study.

10. Research Funding:
The institution and investigators are not receiving any funds to support this research study.

11. Voluntary Participation:
Taking part in this research study is voluntary. If you choose to take part in this research, your major responsibilities will include filling out the Profile of Mood States when the Principal Investigator brings it to you. You do not have to participate in this research. If you choose to take part, you have the right to stop at any time. If you decide not to participate or if you decide to stop taking part in the research at a later date, there will be no penalty or loss of benefits to which you are entitled. The Principal Investigator may take you out of the research study without your permission. One possible reason for this would be if you are discharged before completing the second week of the study. The second week of the study is the first week during which you would receive music therapy services and without completing this week there wouldn't be enough data to measure.

12. Contact Information for Questions or Concerns:
You have the right to ask any questions you may have about this research. If you have questions, complaints or concerns or believe you may have developed an injury related to this research, contact Sean Aultman at (850) 431-7468. If you have questions regarding your rights as a research participant or you have concerns or general questions about the research or about your privacy and the use of your personal health information, contact the research protection advocate Cynthia Blair, Administrative Liaison/IRB, Tallahassee Memorial HealthCare, 850-431-5676. You may also call this number if you cannot reach the research team or wish to talk to someone else.

Signature and Consent/Permission to be in the Research
Before making the decision regarding enrollment in this research you should have:
• Discussed this study with an investigator.
• Reviewed the information in this form, and
• Had the opportunity to ask any questions you may have.
Your signature below means that you have received this information, have asked the questions you currently have about the research and those questions have been answered. You will receive a copy of the signed and dated form to keep for future reference.

Participant: By signing this consent form, you indicate that you are voluntarily choosing to take part in this research.

__________________________________________________________________________
Signature of Participant

__________________________________________________________________________
Date

__________________________________________________________________________
Time

__________________________________________________________________________
Printed Name

Institutional Review Board

DEC 23 2008

APPROVED

AT TMH

Page 4 of 5
**Participant's Legally Authorized Representative:** By signing below, you indicate that you give permission for the participant to take part in this research.

<table>
<thead>
<tr>
<th>Signature of Participant's Legally Authorized Representative</th>
<th>Date</th>
<th>Time</th>
<th>Printed Name</th>
</tr>
</thead>
</table>

(Signature of Participant's Legally Authorized Representative is required for people unable to give consent for themselves.)

**Description of the Legally Authorized Representative's Authority to Act for Participant**

**Person Explaining the Research:** Your signature below means that you have explained the research to the participant/participant representative and have answered any questions he/she has about the research.

<table>
<thead>
<tr>
<th>Signature of person who explained this research</th>
<th>Date</th>
<th>Time</th>
<th>Printed Name</th>
</tr>
</thead>
</table>

(Only approved investigators/research coordinators and those trained in obtaining research informed consent and familiar with this research may explain the research and obtain informed consent.)

*A witness or witness/translator is required when the participant cannot read the consent document, so it can be read or translated.*
APPENDIX G

PHYSICAL / OCCUPATIONAL THERAPY WEEKLY PROGRESS SCORE

CONVERSION FORMULA
Physical / Occupational Therapy Weekly Progress Score Conversion Formula

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<th>FIM score</th>
<th>Pts</th>
<th>LES score</th>
<th>Pts</th>
<th>Endurance score</th>
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<th>ROM score</th>
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<td>1 pt / 10 degrees</td>
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<table>
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<tr>
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<th>SN score</th>
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</thead>
<tbody>
<tr>
<td>- 1 pt / 1pt</td>
<td>1 pt / step + FIM pts</td>
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</tbody>
</table>

FIM – Functional Independent Measure
LES - Lower Extremity Strength
S/SB – Sitting/Standing Balance
A/W – Ambulation/Wheelchair
ROM – Range of Motion
PM – Pain Management
SN – Stair Negotiation
REFERENCES


Santos, M., Kovari, E., Gold, G., Bozikas, V. P., Hof, P. R., Bouras, C., et al. (in press). The neuroanatomical model of post-stroke depression: Towards a change of focus? *Journal of Neurological Sciences*.


BIOGRAPHICAL SKETCH

Sean C. Aultman graduated from the University of Alabama in 2006 with a Bachelor of Music degree in Music Therapy. After subsequently becoming a Board Certified Music Therapist he went on to work as a music therapist in Tallahassee, Florida gaining experience with populations including special needs children, NICU, adult psychiatric, hospice, and rehabilitation patients. He enrolled in the Florida State University Graduate Music Therapy Program in the Fall of 2007.