

# **USE OF PHYSIOACOUSTIC THERAPY TO REDUCE PAIN DURING PHYSICAL THERAPY IN TOTAL KNEE REPLACEMENT IN PATIENTS OVER THE AGE OF 55 YEARS**

*PRINCIPAL INVESTIGATOR: Martha A Burke RMT BC*

## **BACKGROUND:**

Elderly patients requiring total knee replacements must go through a period of physical rehabilitation, which may exacerbate post-surgical pain and anxiety related to that pain. Patients who are in a great deal of pain may not be willing or able to tolerate the necessary range of motion (ROM) exercises necessary to assist them in regaining maximum use of their knee. If pain inhibits a patient from being able to progress to an acceptable level of functioning necessary for discharge, additional physical therapy sessions may be required. It is also possible that patient's hospital stay may be extended in order for that patient to reach the desired level of functioning.

Music, combined with low frequency sound waves has the potential to promote muscular relaxation, offer distraction, provide rhythmic motivation, and reduce the perception of pain by providing auditory stimulation. This may directly mediate the body's own pain regulating system (possibly by interfering with the pain pathways described in the gate control theory. (S.Yegele, 1974).

## **PURPOSE OF THE STUDY:**

The purpose of this study is to examine the effects of music used in conjunction with low frequency sound waves on pain and ability to tolerate physical therapy exercises in patients over the age of 55 who have had a total knee replacement.

## **HYPOTHESES:**

It is hypothesized that music, because of its ability to distract, motivate, energise and facilitate positive emotional states, will promote healing by

- (1) reducing the perception of pain, thereby contributing to the efficacy of physical therapy protocols,
- (2) providing a pleasurable experience which may assist in reducing the anxiety associated with expected pain,
- (3) facilitating the rehabilitation process, possibly decreasing the number of sessions or the amount of time necessary to accomplish medical/rehabilitation goals, thereby hastening a patient's discharge.

## **DESIGN:**

A randomised, clinical trial comparing a control group with a group of patients receiving music and low frequency sound waves during their physical therapy sessions will be carried out. There will be a minimum of 30 patients in each group.

## **SUBJECTS:**

Patients over the age of 55 years who have had total knee replacements and who are receiving physical therapy to assist them in regaining maximum functioning will be eligible for the study. Exclusion criteria include age less than 55, presence of a pacemaker, and expected hospital stay less than 6 days.

## **PROCEDURE:**

After informed consent is obtained, patients will be randomised into either the control group or the experimental group. During the first physical therapy session following surgery, patients will choose one of two cards placed face down on a table. The card labelled 'M' will indicate that the patient will receive music and low frequency sound during physical therapy sessions, via the Physioacoustic table, beginning on the third day of physical therapy. If a patient chooses the card with 'C', he will be placed in the control group and will receive normal physical therapy exercises each day following surgery.

The music therapy intervention will be co-ordinated by a board certified music therapist and will consist of having the patient lie on Physioacoustic table (a specially designed, commercially available table which has speakers installed throughout the length of the table and which produces specific low frequency sound waves in addition to music) during his /her range of motion and other physical therapy exercises music and vibration have been shown to be effective in reducing the perception of pain (Bailey, 1986; Chesky & Michel 1991) .

Subjects randomised to the music condition will spend the first 10 minutes of their physical therapy session lying on the Physioacoustic table, listening to the music and experiencing the vibrations produced by the table. Following a 10 minute relaxation time, the physical therapist will provide the regular physical therapy exercises. The music and low frequency sound waves will continue throughout the duration of the physical therapy session or as long as the patient is required to remain on the physical therapy table (approximately 15 - 30 minutes) . Data collection, co-ordinated by the music therapist or research assistant, will be collected at baseline and each day during the physical therapy session.

Data collected at baseline will include baseline range of motion (passive and active) and a pre and post physical therapy session pain rating scale, including the Pain Thermometer rating scale and a Visual Analogue Scale.

Each day, the physical therapist will document the patient's passive and active range of motion in degrees, as well as a pre and post session pain rating scale. Data will be collected on the total number of sessions required to reach the target goal required for discharge, the total number of days in the hospital, pain scores, and daily range of motion scores.

### **INSTRUMENTS:**

Pain Thermometer rating scale, Visual Analogue Scale .

### **EQUIPMENT:**

A Physioacoustic Table will be used to provide the low frequency sound waves for the experimental group. A high quality tape player/CD player will be used to provide the music. All equipment will be inspected for safety by the clinical engineering department.

### **RISKS:**

There are minimal risks to the subjects in this study. In the literature, only a very few subjects reported slight vertigo or dizziness associated with the Physioacoustic intervention. These were temporary and short-lasting.

### **BENEFITS:**

Benefits may include increased muscular relaxation, reduced perception of pain, greater tolerance of physical therapy exercises, and a more positive rehabilitation experience.