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**The Affects of Music Therapy on management of Pain and Anxiety during Burn Dressing Changes.**

Kush S. Patel, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In partial Fulfillment of the Requirement for

The Degree of Master of Science

In

Health Sciences – Physician Assistant

Department of Physician Studies  
Philadelphia College of Osteopathic Medicine  
Philadelphia, Pennsylvania

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## **ABSTRACT**

**OBJECTIVE:** The objective of this selective EBM review is to determine whether or not music therapy improves pain management and anxiety during burn dressing changes.

**STUDY DESIGN:** Review of three English languages primary randomized controlled trial studies published from 1992-2010.

**DATA SOURCES:** Three randomized controlled trials studying the affects of music therapy during burn dressing changes were found using PubMed, OVID and Cochrane databases.

**OUTCOMES MEASURES:** Outcomes measured were level of pain and anxiety experienced by the patients. The severities of these symptoms were measured using a numeric scale system. An analyses of anxiety was measured using Spielberger's State-Trait Anxiety Inventory (STAI-Form Y) in one of the studies.

**RESULTS:** Two of the randomized control trials showed that music therapy in adjunct with standard protocols for burn dressing changes improved the level of pain and anxiety in patients. Results from Tan and Miler's study showed significant decrease of pain and anxiety in patients with adjunct music therapy. In the study conducted by Haythornthwaite et al, there was no significant relief of symptoms in patients who received the intervention.

**CONCLUSION:** The trials reviewed, designed to qualify the affects of music therapy on burn patients, demonstrated that there is a significant reduction of pain and anxiety during and after standard dressing change procedure.

**KEY WORDS:** Burn victims, Music Therapy

## INTRODUCTION

It is estimated that approximately one million people in the US are treated for burns each year making it the leading cause of accidental injury and death in the United States.<sup>1</sup> Burns are traumatic injury to the skin and other organs by thermal or other acute exposures. Injury can be caused by heat, cold, electricity, radiation or caustic chemicals, which destroy the cells of the skin and tissue.<sup>5</sup> The most common type of burn in adults is thermal burn from flames while scald injury is the most common cause of burn in children.<sup>5</sup>

The incidence of patients with burn injuries is approximately 7,850 diagnosed cases per 874,380 and its prevalence is approximately 0.90%.<sup>1</sup> Death from burn injuries is the third leading cause of home fatalities in the United States.<sup>1</sup> It is estimated that \$7.5 billion are spent annually on burn injuries.<sup>1</sup> In a 2010 survey, it was reported that there were 40,000 hospitalizations for burn injuries in the United States.<sup>4</sup>

Burns are assessed according to the depth of tissue injury and extent of total percentage of body surface area (TBSA). In 2009, the American Burn Association published a new classification system for burn depth, replacing the traditional first, second, third and fourth degree system with Superficial, Partial-thickness, Full-thickness and fourth degree. Superficial burns involve only the epidermal layer of the skin. These burns are superficial and do not form blister however are very painful, dry, red and blanch with pressure. Partial-thickness burns involve the epidermis and some areas of the dermal layers. These types of burns can either be superficial which form blisters between the epidermis and dermis or they can be deep, burning through the dermal layers damaging hair follicles and always forming blister. The wound is wet having

colorization ranging from white to red. In most cases the deep partial-thickness burns will cause hypertrophic scarring of the skin. Full-thickness burns extend through the dermis, destroying all of its layers extending into the subcutaneous tissue. There is a change in colorization of the skin, which can range from white to leathery gray and charred black. Vesicles and blisters do not develop with this level of injury. Fourth degree burns are life-threatening injuries where damage has extended through the subcutaneous tissue into the muscle and even bone. The TBSA is determined using one of two different methods; Lund-Browder method or the Rule of nines method. The Lund-Browder is the most accurate way of measure TBSA in children and adults.<sup>5</sup>

Injury arises from elevated temperatures, which denature and coagulate protein causing cell and tissue damage. Cytokines and other inflammatory mediators are released at the site of the injury. Secondary to the damage of the skin we see symptoms such as the inability to prevent water loss and control body temperature. Capillary permeability increases leading to loss of fluids and proteins into the interstitial compartments causing edema. If the burn is severe enough patients may present with systemic symptoms. Blood volume loss results in increased cardiac output and tachycardia. There is a non-specific down regulation of immune response. Inflammatory mediators cause bronchoconstriction leading to ARDS in some severe cases.<sup>5</sup>

Initial assessment includes the extent of the burn injury based off of total body surface area (rule of nine) and depth of the burn. Included in the assessment is the cause of the burns, i.e. chemical electrical radiation, or thermal.<sup>2</sup> Fluid resuscitation, airway management, antibiotics prophylaxis, tetanus shot, wound and pain management are mainstays of treatment.<sup>6</sup> Conventional pain management consists of analgesics and

anxiolytics. Severe partial-thickness, full-thickness burns need debridement and dressing changes.<sup>5</sup>

## **OBJECTIVE**

The objective of this selective EBM review is to determine whether or not “Does music therapy improve pain management and anxiety during burn dressing changes?”

## **METHODS**

Articles designated for this review include three randomized controlled trials, which meet the requirement to explore the objective. The intervention used was music therapy. The treatment group received music therapy along with standard protocol for burn dressing changes while the control group did not. The population in these studies consisted of males and females from 8 to 71 years old with burn injury. The outcomes measured were those of patient-oriented evidence. The efficacy of the treatment was measured using a numeric scale system rating the pain and anxiety experienced by the patients during and after burns dressing changes. Reduction in severity of these symptoms was specifically evaluated.

The articles were selected using key words: “Burn victims” and “Music Therapy.” The three studies in this review were published in PubMed and Cochrane database, in English peer-reviewed journals and were selected by the author based on their relevance and outcome to the patient. Inclusion criteria’s were: 1) studies had to be randomized, controlled trials, 2) patients with at least 1-week admission in an intensive burn care unit who were suffering from burns ranging in severity from severe partial to full thickness, 3)

patients involving multiple dressing changes to treat. Exclusion criteria's were: 1) patient populations that were psychotic mentally retard or disoriented, 2) children younger than 6 years old. Statistics were reposted using Tukey honest significance test, Wilcoxon sign-ranked test, Fisher exact tests and p-values.

Tan's study was performed over two consecutive days with the patients serving as there own control. They were randomized using blinded envelopes, to receive music therapy on either the first or second day of burn dressing changes however the patient and research nurse were aware of the presence and absence of intervention. The study assessed pain, anxiety and muscle tension before, during and after dressing changes.

In the Miller study, patients were randomly divided into experimental and control groups. Both groups received exactly similar treatment with the exception of music therapy in addition to the dressing changes in the experimental group. The patients in the Miller study were assessed pre and post dressing changes, for pain and anxiety.

Haythornthwaite et al study consisted of 42 patients who were randomly assigned to three groups. One group consisted of invention using visual aid. The second group was intervention using music therapy and the third was the control. For the purposes of this EBM review only results from the experimental group 2 (music therapy) and the control group were used. Patients received 20 minutes of music therapy before the burn dressing procedure. These patients were instructed to pay attention to the melodies, tone, lyrics and different instruments and to constantly recall the music throughout the dressing change. The control group received no pretreatment music therapy. Pain and anxiety were assessed before, during and post procedure.

## **OUTCOMES MEASURED**

The primary efficacy outcomes of the studies were the reduction in severity of pain and anxiety. This was measured through a self-assessment questionnaire with a numeric scale system rating the severity of the symptoms. The change in severity of symptoms between the experimental groups to the control groups determined the success rate of each study.



Table 1: Table of demographics and characteristics of included studies (Table 1)

Study	Type	#Pts	Age (yrs.)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Miller <sup>4</sup> (1992)	RCT	17	>18 years old	Male or females with at least 1 week admission to burn intensive care unit Total burn surface area between 10-40 %	<ul style="list-style-type: none"> <li>• Substance abuse</li> <li>• Psychotic, Mentally retard or disoriented</li> <li>• Multiple trauma injuries</li> <li>• Under age of 18 or unable to comprehend English</li> </ul>	0	Music therapy was assigned randomly to the experimental group during the second dressing change.
Tan <sup>6</sup> (2010)	RCT	31	> 6 years old	Burn victim's male and female ranging in age from 8 to 71 who require care in burn intensive care unit.	<ul style="list-style-type: none"> <li>• Estimated hospital stay of less than 3 weeks</li> <li>• Age younger than 6 years</li> <li>• Not able to communicate clearly, awake, oriented and alert</li> <li>• Suffering from active psychosis, hallucinations, delusions, Alzheimer's or dementia disorders</li> </ul>	2	Music therapy was applied on the third day of dressing changes and compared to the baseline which was the first two days without the intervention.
Hayth <sup>3</sup> (2001)	RCT	42	All adults avg. age 43 years old	Males and Females requiring hospitalization in regional burn center. Patients suffering from second and third degree burns All patients pre-medicated with morphine prior to burn dressing changes	<ul style="list-style-type: none"> <li>• Under age of 18 or unable to comprehend English</li> <li>• Suffering from active psychosis, hallucinations, delusions, Alzheimer's or dementia disorders</li> </ul>	0	Music Therapy during burn dressing changes.

## RESULTS

This EBM review was done on three randomized controlled trials with results presented as continuous data. Two of the studies administered the intervention during the burn dressing change procedure while the other study administered the intervention just prior to the procedure. In two of the studies the patients served as their own control. The primary efficacy outcome in all studies was reduction in severity of symptoms experienced by the patient. The efficacy was measured via self-assessment questionnaire with a numeric scale system. The data was then analyzed to determine statistical significance.

Tan's study consisted of 31 patients, in whom 29 patients served as both experimental group and their control. Two patients dropped from the study during the second day because of medical emergencies not related to the study. This was an open-designed research study where the music therapist, the patients and the research nurse were fully aware of the presence of the intervention. There was a significant decrease in pain levels experienced by the patients before, during, and after dressing changes on days when they received adjunctive music therapy compared to the control days. The same can be said about the level of anxiety experienced by the patients, which significantly decreased following the intervention. Data was analyzed using the Wilcoxon sign-ranked test for dependent variables. Statistical significance was defined a priori as a *P* value <.05 for pain and anxiety during the procedure and <.025 for pain and anxiety before and after dressing procedure. See table 2.

Table 2 – Wilcoxon's sign-ranked test for depended variable

	Pain	Anxiety
Before Dressing Change	0.017	0.107
During Dressing Change	<0.001	0.017

After Dressing Change	.014	.046
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Table 3 – Effect of music therapy on pain levels.

	Treatment (Avg. pain)	Control (Avg. Pain)
Patient Room Baseline	5/10	5/10
Patient Room Pre Dressing	3/10	5/10
Treatment Room During Change	7/10	9/10
Patient Post Dressing Change	3/10	5/10

Miller’s study consisted of 17 patients serving as their own control. The study determined there was a significant reduction in pain and anxiety in the experimental group compared to the control group. The study measured pain with a pain rating index (PRI) score, and present pain intensity (PPI) score. Anxiety was measured with a STAI (Spielberger’s Sates-Trait Anxiety Inventory) score. All scores were determined using a McGill Pain Questionnaire, which was administered pre and post dressing changes. The data was analyzed for statistical significance using Fisher Exact Test. A fisher score of greater than  $F > 5$  determined statistical significance. All pain and anxiety scores were significantly lower with experimental group compared to the control: Pain rating index =  $F = 8.69$  ( $p = 0.01$ ), Present pain intensity =  $F = 5.57$  ( $p = 0.03$ ), STAI =  $F = 9.10$  ( $p = 0.01$ ).

Haythornthwaite et al study consisted of 42 patients randomly assigned to the experimental group or control group. The data was analyzed using the Tukey honest significance test. With a p value of  $> .05$  for pain this study showed there was no statistical significant in reduction of pain during and after the dressing procedures between the experimental group and control group.

**Table 4:** Results on Outcomes Measured by Treatment Condition

	Music Intervention		Usual Care		Range
	Mean	SD	Mean	SD	
Peak Pain During	<b>7.4</b>	2.0	<b>6.6</b>	2.4	1-10

Average Pain During	<b>4.5</b>	2.1	<b>4.8</b>	2.5	0-10
Peak Pain Retrospective	<b>7.9</b>	1.9	<b>7.6</b>	2.1	1-10
Average Pain Retrospective	<b>4.6</b>	2.1	<b>5.1</b>	2.1	0-10

## **DISCUSSION**

Music therapy in adjunct with standard burn dressing procedure provides effective reduction in severity of pain and anxiety when compared to standard care. Music therapy is an effective interventional tool, which can be used to refocus attention from pain to more pleasant stimuli. Some limitations in all the studies are varying range in TBSA injury from patient to patient.

Tan's study concluded that when music therapy is used in addition to dressing changes there is a significant decrease in pain and anxiety experienced by the patient. It was determined in the Tan study that blinding was not practical and an open-ended research design was used. To eliminate bias the research nurse was never involved with the dress changing of the patient nor was the patient's primary care nurse.

Statically significant and similar results were seen in the Miller study as well. A concern in the study is the repeated use of the same music may bore the patients over time. The study states that taking specific requests of the patients could actually create a more profound increase in pain tolerance. Another concern may be seen with repeated administration of the same questionnaire could have somewhat boring effect on the patients. Administering a very concise short questionnaire could avoid this issue.

The Haythornthwaite et al. study concluded there was no significant decrease in pain perception and anxiety. The major limitation of this study was the intervention was not used in adjunct with the dress changes. The experimental group received 20 minutes of music therapy prior to the procedure, which was a major procedural difference to the

other two studies. The patients were then told to recall the music and focus on it during the dressing change. It was noted in this study that the administration of the questionnaire during the dressing procedure might have affected the patients' attempt to recall the music therapy during that period of time. We can conclude from this trial that timing has a significant affect on symptom relief.

## **CONCLUSION**

The trials reviewed, designed to qualify the affects of music therapy on burn patients, demonstrated that there is a significant reduction of pain and anxiety during and after dressing change procedure. Results in two of the studies report significantly lower severity in pain and anxiety when receiving music therapy. We can conclude that music therapy can serve as a proper means of distraction during a very painful period of time for this patient population. The third study did not result in any statistically change however a different method of administering music therapy may have had an overwhelming effect on the results. Regardless of this inconsistency we can conclude that adjunctive music therapy during dressing changes help decrease the severity of pain and anxiety.

## References

1. Finkelstein EA, Corso PS, Miller TR, Associates. Incidence and Economic Burden of Injuries in the United States. New York: Oxford University Press; 2006
2. Gerd, Gauglitz G., Williams, Felicia N. Overview of management of severely burn patients. [http://www.uptodate.com/contents/overview-of-the-management-of-the-severely-burned-patient?source=search\\_result&search=burn+treatment&selectedTitle=2%7E150](http://www.uptodate.com/contents/overview-of-the-management-of-the-severely-burned-patient?source=search_result&search=burn+treatment&selectedTitle=2%7E150). Published Apr. 2, 2013. Accessed on December 1, 2013.
3. Haythornthwaite, J.A., Ph.D., Brief Cognitive Intervention for Burn Pain,. Annals of Behavioral Medicine, Vol. 23, Number 1; 2001.
4. Miller, A.C. MSN, Hickman, L.C., MSN., A Distraction Technique for Control of Pain. Journal of Burn Care & Rehabilitation, Vol. 13, Number 5; 1992.
5. Rice, Phillip Jr., Orgill, Dennis, P. Classification of Burns. [http://www.uptodate.com/contents/classification-of-burns?detectedLanguage=en&source=search\\_result&search=burn+injuries&selectedTitle=2%7E150&provider=noProvider](http://www.uptodate.com/contents/classification-of-burns?detectedLanguage=en&source=search_result&search=burn+injuries&selectedTitle=2%7E150&provider=noProvider). Published Aug, 29, 2012. Accessed on December 1,2013.
6. Tan. Xueli, MM and Charles J. Yowler, MD. The Efficacy of Music Therapy Protocols for Decreasing Pain, Anxiety, and Muscle Tension Levels During Burn Dressing Changes: A Prospective Randomized Crossover Trail, Journal of Burn Care & Research, Vol. 31, Number 4; 2010.