



# Music Therapy in Medicine

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# Learning Objectives

Get Familiarized with Complementary, Alternative and Integrative Medicine

Differentiate between music and Music Therapy

Understand the Effects of Music Therapy in Various Settings

Assess the impact of Music Therapy in Rare Diseases

# Complementary & Integrative Medicine

NIH NCCIH definitions:

Complementary: Used along with standard of care

Alternative: Nonstandard treatment in lieu of SOC

Integrative: Patient-centered, evidence informed utilizing mind and body practices

# Music Therapy



What is  
**Music**  
Therapy?

# Music Therapy - Definition

Clinical use of music to accomplish individualized goals  
Assess patient's strength and needs in providing treatment  
through  
creating, singing, moving to, and listening to music

Passive: Listening to music before medical intervention

Active: Engaging patient in creation of live music through  
singing, playing instrument, writing lyrics depending on level of  
patient



# Music Therapy - Training/Credentialing

Bachelor degree or higher in Music Therapy

70 or more AMTA approved schools college/university programs

Music Therapists listed on the  
National Music Therapy Registry qualify for practice

Six months of practicum to become board certified

[Cbmt.org/examination/state%E2%80%90licensure](http://Cbmt.org/examination/state%E2%80%90licensure) 2019



# Music Therapy In Action

In Cancer Care, used to:

- Improve Pain, Decrease Muscle Tension, Promote Relaxation
- Improve Anxiety, Depression, Fatigue, QOL
- Across 81 Trials (74 Adult, 7 Children) with 5576 participants:
  - Large effect on Anxiety and Depression
  - Moderate effect Pain and QOL impact on Fatigue



# Music Therapy In Action

- 2017 SIO guideline on integrative therapies during breast cancer treatment endorsed by ASCO Music Therapy:
  - Recommended for reducing Anxiety/Stress Reduction
  - Recommended for improving Mood Disturbance
  - Can be considered for Management of Pain
- 2022 SIO and ASCO joint guideline for integrative approach to cancer pain:
  - May be offered for surgical pain from cancer surgery, but not in other settings





# **Musical Interventions in Medical Settings**



# Indirect Music Therapy Practice and Skill-Sharing in Dementia Care,

*Orii McDermott, Hanne Mette Ridder, Felicity Anne Baker, Thomas Wosch, Kendra Ray, Brynjulf Stige, 2018*

**DOI:** <https://doi.org/10.1093/jmt/thy012>

## Summary

- This study is based on the World Congress of Music Therapy in 2017.
- This study aims to highlight emerging key components of indirect music therapy practice and skill-sharing to show how music therapists may be able to help further development of dementia care.

## Methods

- In 2017, six music therapy researchers from six countries agreed it was timely to organize a roundtable and share their indirect music therapy practice and examples of skill-sharing in dementia care after the world congress of music therapy.
- The interventions were indirect music therapy practice and skill-sharing in dementia care (CNAs) alongside therapeutic songwriting for caretakers.

## Results

- This process highlighted the diversity and complexity of indirect music therapy practice and skill-sharing.
- Caretakers gained clarity about their care journey and fostered inner strength, growth, and clarity about their journey. They shared experiences in their own space without worrying about family.
- This helped **decrease agitation in nursing home residents with moderate dementia.**

# Effects of a music therapy group intervention on enhancing social skills in children with autism,

*A Blythe LaGasse, 2014*

**DOI:** <https://doi.org/10.1093/jmt/thu012>

## Summary

- More research on the use of music therapy interventions for social skills is needed to determine the impact of group music therapy.
- This paper aims to examine the **effects of a music therapy group intervention on eye gaze, joint attention, and communication in children with ASD.**

## Methods

- 17 kids aged 6-9 were randomly assigned to the music therapy group (MTG) or the no-music social skills group (SSG)
- They participated in 10 50-minute group sessions over a period of 5 weeks.
- The Social Responsiveness Scale (SRS), the Autism Treatment Evaluation Checklist (ATEC), and video analysis of sessions were used to evaluate changes in social behavior.

## Results

- **Music therapy increased QOL.**
- There were differences for joint attention with peers and eye gaze in the **MTG demonstrating greater gains.** There were **no differences for initiation of communication, response to communication, or social withdraw/behaviors.**
- There was an **interaction between time and group for SRS score with improvements for MTG but not SSG.** ATEC Scores did not differ between the MTG and SSG.

# The effect of music on decreasing arousal due to stress: a meta-analysis,

Cori L. Pelletier, 2004

**DOI:** <https://doi.org/10.1093/jmt/41.3.192>

## Summary

- A meta-analytic review of research articles using music to decrease arousal due to stress.

## Methods

- A total of 22 quantitative studies.
- Relaxation techniques were:
  - Passive music
  - Verbal suggestion with music
  - Music with vibrotactile stimulation

## Results

- Verbal suggestion with music had the greatest effect on level of stress, followed by music with vibrotactile stimulation, music assisted progressive relaxation, a combination of more than two stress techniques with music, and then passive listening to music.
- GIM had the smallest effect for decreasing stress. - studies whose interventions were with individuals benefitted more from music than those studies with subjects in groups.



# Relaxing music prevents stress-induced increases in subjective anxiety, systolic blood pressure, and heart rate in healthy males and females,

*W. E. Knight and N. S. Rickard, 2001*

**DOI:** <https://doi.org/10.1093/jmt/38.4.254>

## Summary

- The effect of **relaxing music** on participants' subjective and physiological response to stress was explored, with attention paid to methodological factors and mediating variables that might have contributed to inconsistencies in previous studies.

## Methods

- Undergraduate students (43 females & 44 males) with ages ranging from 18 years-old to 50 years-old were exposed to a cognitive stressor task involving preparation for an oral presentation.
- The interventions were either listening to classical music (**Pachelbel's Canon in D major**) or doing the task in silence.

## Results

- The stressor caused significant increases in **anxiety, heart rate, and systolic blood pressure** controls. These were each prevented by exposure to music, effect was **gender independent**.
- Music enhanced baseline **salivary IgA** levels in the absence of any stress-induced effects.
- These findings provide experimental support for claims that music is an effective **anxiolytic** treatment.

# Musically adapted social stories to modify behaviors in students with autism: four case studies,

*Mike D. Brownell, 2002*

**DOI:** <https://doi.org/10.1093/jmt/39.2.117>

## Summary

- The purpose of this study is to investigate the effect of a musical presentation of social story information on the behaviors of students with autism.

## Methods

- Participants were four 1st and 2nd grade students with autism who attended an elementary school in eastern Iowa.
- The reading/singing versions of the social stories were alternately presented to the students using the counterbalanced treatment order ABAC/ACAB.
- A unique social story was created for each student that addressed a current behavioral goal. Original music was composed using the text of the social story as lyrics.

## Results

- Results from all four cases indicated that **both the reading condition and the singing condition** were significantly more effective in reducing the target behavior than the no-contact control condition.
- The **singing condition** was significantly more effective than the reading condition only in Case Study III.

# The Neurochemistry of Music,

*Mona Lisa Chanda and Daniel J. Levitin, 2013*

**DOI:** <https://doi.org/10.1016/j.tics.2013.02.007>

## Summary

- The goal of this study is to evaluate the evidence that music improves health and well-being through the engagement of neurochemical systems for (i) reward, motivation, and pleasure; (ii) stress and arousal; (iii) immunity; and (iv) social affiliation.

## Methods

- Used multiple studies.
- The types of interventions were:
  - Pleasant vs unpleasant
  - Passive
  - Group singing
  - Group drumming circles
- Studied:
  - Reward
  - Motivation, and pleasure
  - Stress, arousal, and immunity
  - Social affiliation

## Results

- Pleasant (consonant) and unpleasant (dissonant) music were contrasted. The results confirmed **activation of the ventral striatum** during pleasurable music listening.
- Listening passively to experimenter-selected relaxing music following cardiac surgery was most effective with the largest **decrease in serum cortisol**.
- Stimulating music increased plasma cortisol, ACTH, prolactin, growth hormone, and norepinephrine levels.

# Music interventions for improving psychological and physical outcomes in cancer patients,

*Joke Bradt, Cheryl Dileo, Lucanne Magill, and Aaron Teague, 2016*

**DOI:** <https://doi.org/10.1002/14651858.CD006911.pub3>

## Summary

- The purpose of this systematic review is to assess and compare the effects of music therapy and music medicine interventions for psychological and physical outcomes in people with **cancer**.

## Methods

- This retrospective study used randomized and quasi-randomized controlled trials of music interventions for improving psychological and physical outcomes in adult and pediatric patients with cancer.
- 52 trials, 3731 total participants.
- We categorized 23 trials as music therapy trials (by trained music therapists) and 29 as music medicine trials (offered by medical staff).

## Results

- Music interventions may have beneficial effects on **anxiety, pain, fatigue and quality of life (QoL)** in people with cancer. It may also have a small effect on heart rate, respiratory rate and blood pressure.
- The results suggest a **large pain-reducing effect** and the effect of music interventions on patients' **QoL**. The results were highly **inconsistent** across studies.
- Most trials were at high risk of bias. These results must be interpreted with caution.



# Development and Validation of the Healthy-Unhealthy Music Scale,

Suvi Sarrikallio, Christian Gold, Katrina McFerran, 2015

**DOI:** <https://doi.org/10.1111/camh.12109>

## Summary

- The authors of this experiment planned to create different instruments with relation to music therapy in hopes of helping participants that were prone to having depression.
- The knowledge gap addressed that there was a lack of musical instruments created to assess the affect on adolescent wellbeing.

## Methods

- Six surveys:
  - 3 with 13-20 year olds.
  - 2 with 13-15 + 13-17 year olds.
  - 1 with 19-20 year olds.
- Active singing and listening through individual music therapy sessions.
  - Healthy-Unhealthy Music Scale (HUMS) measured music engagement.
  - Depression levels were through a 10 question survey called the Mental Health Continuum Short Form (MHC-FS).

## Results

- There were positive correlations between unhealthy and healthy items being measured (ex: emotions self-esteem, identity, etc.)
  - **HUMS could be used to treat depression.**
- HUMS's concurrent validity was questioned.
- Might consider conducting further research with this instrument to ensure consistency.

# Case Study of Early Childhood Trauma using a Neurobiological Approach to Music Therapy,

*Bethany Wentling and Gene Ann Behrens, 2018*

**DOI:** <https://doi.org/10.1093/mtp/miy003>

## Summary

- This experiment wanted to address the knowledge gap regarding children abused at infancy through the usage of music therapy.
- Using a neurobiological approach, music was tested with the idea of providing the brain a way to adapt to negative experiences.

## Methods

- Participant was a nine-year-old that had a history of trauma
- The experiment analyzed data from past and current music therapy sessions.
- Music engagement from using music cues and playing instruments were some methods used.
- The child's self regulation, engagement, and willingness to talk to others was measured.

## Results

- The child portrayed **emotional connections** to the activities exercised in therapy which supported the **neurobiological** approach to the treatment.
- The participant began to predict the rhythmic music cues and used bilateral arm movements while playing instruments.
- This is a start to any future research experiments regarding this approach.

# Music Therapy Practices and Processes with Foster-Care Youth: Formulating an Approach to Clinical Work,

Michael Zanders, 2015

**DOI:** <https://doi.org/10.1093/mtp/miv028>

## Summary

- This experiment wanted to address the knowledge gaps of music therapy on youths
- Music therapy was viewed as a resource to foster stability, find resources and connotations in relation to children.

## Methods

- John, a thirteen-year-old, that death with trauma since the age of seven was the main participant.
- Song composition and body movement in response to music were utilized.
- The social skills, coping mechanisms, and positive/more positive mindsets were measured.
- Deep breathing exercises, playing emotions on instruments, and discussing his creations were practiced in therapy.

## Results

- John seemed happier in the end especially when moving back home with his biological mother and lashing out less.
- A potential positive correlation between music therapy and a young participant was potentially formed.
- There is still not enough research that music therapy is an undoubtable solution that can always be used.

# American Music Therapy Association Member Survey and Workforce Analysis,

American Music Therapy Association , 2018

**Link:** <https://www.musictherapy.org/assets/1/7/18WorkforceAnalysis.pdf>

## Summary

- Music therapy practices are needed in order to address the mental health needs of youth in the foster care system.

## Methods

- Participants consisted of members and their therapists, specifically with the members being younger.
- A survey was utilized based on old interview sessions in which participants composed music and listened to it with their therapists.
- The main factors being measured were lower depressive symptoms, increased social engagement, and overall uplifted moods.

## Results

- With future experiments and studies, there can be a way to shorten the knowledge gap between children that have experienced sadness and music therapy to help them overcome their **mental boundaries**.



# Music Therapy for Depression,

Sonja Aalbers, Laura Fusar-Poli, Ruth E Freeman, Marinus Spreen, Johannes CF Ket, Annemiek C Vink, Anna Maratos, Mike Crawford, Xi-Jing Chen, Christian Gold, and Cochrane Common Mental Disorders Group, **2017**

**DOI:** <https://doi.org/10.1002/14651858.CD004516.pub3>

## Summary

- Though music therapy has at times relieved signs of depression in the short term, it is not yet proven to be a direct cause or a sustainable long-term solution.
- This review assesses effects of music therapy for depression in people of any age compared with treatment as usual (TAU) and psychological, pharmacological, and/or other therapies.
- It compares effects of different music therapy forms for people with diagnosed depression.

## Methods

- 9 studies with 421 participants that had depressive disorder (symptoms were measured using Hamilton Rating Scale for Depression).
- Participants and the musical therapist spontaneously created music by vocalizing, using their bodies, and any objects they see. (7 studies were in a group setting, 2 were individual).
- Randomized control trials (RCTs) and controlled clinical trials (CCTs).
- Different TAUs (psychological and pharmacological therapy, etc).

## Results

- There are limitations in design.
- There is **not enough evidence** between music therapy and participants' depressive symptoms.
- Further research and experimentation is required to strengthen the bridge between music therapy and its success on effecting depression.

# I will follow you: The combined use of songwriting and art to promote healing in a child who has been traumatized,

Katurah R. Christenbury, 2017

**DOI:** <https://doi.org/10.1093/mtp/miv005>

## Summary

- This experiment mainly aimed to search into the aspects of safety that go into music therapy. Through engaging tactics between the therapist and **traumatized pediatric participants**, different types of **safety** were measured to bridge a relationship between the two.

## Methods

- Studies in individual and group settings with a therapist in the room (10 group, 12 individual).
- Critical Interpretive Synthesis (CIS) was used to answer research questions.
- Song singing, performing, composing, music listening, and drumming was used. Feelings of safety in physical, relational, psychological, environmental were assessed. Participants taking control, feeling comfortable, and engaging were also measured.

## Results

- Though a best way to use music therapy to generate feelings of safety was not found, these three approaches were proven to create safety
  1. engaging strategies
  2. music therapy methods
  3. relationship

# Group music therapy as a preventive intervention for young people at risk: Cluster-randomized trial,

Gold, C., Saarikallio, S., Hew, A., Crooke, D., McFerran, K. S., 2017

**DOI:** <https://doi.org/10.1093/jmt/thx002>

## Summary

- While music can have negative or positive consequences on mental health, it is not proven to completely prevent mental disorders.
- Changes in the Healthy-Unhealthy Music Scale (HUMS), Self-Directed Music Listening (SDML) and mental health factors were measured (over 3 months).

## Methods

- Experiments were conducted in group settings with participants at risk for mental health challenges through randomized trials (100 students).
- During 8 weekly group therapy sessions, **listening to music** in a healthy way was utilized. It included participants creating music using their bodies as well as passively listening to music without composing it themselves.

## Results

- No relationships between group music therapy and SDML,  $p > 0.05$
- **More research and experiments needed** to decide the optimal way music therapy can effect risk of mental health problems.

# Adolescents' evaluation of music therapy in an inpatient psychiatric unit: A quality improvement project. Music Therapy Perspectives,

*Preyde, M., Berends, A., Parehk, S., & Heintzman, J., 2017*

**DOI:** <https://doi.org/10.1093/mtp/miv008>

## Summary

- This experiment sought to examine the ability of music therapy to influence adolescent inpatients with mental health problems.

## Methods

- 64 Adolescents (18+ years old) were the main participants of these experiments.
- Song discussion, listening exercises, and songwriting was used in these group music therapy sessions to generate positive outputs in the context of moods and mindsets.
- increased positive socialization, improved self esteem, and improved self-expression were measured.

## Results

- A survey was used to determine the effectiveness of the targets being measured. There was a positive feedback with the effect of the group therapy assessment but **further research needs** to be conducted to ensure validity in the experiment and idea.



# Our Mission

Children's Music Fund provides children affected by chronic conditions or life-altering illnesses Music Therapy to help them on their journey towards a better quality of life

# Music Therapy Makes Kids Better

- Children's Music Fund is a 501(c)(3) nonprofit
- Music Therapy
  - Fully-funded for all eligible children and young adults
  - Services provided in 11 states to date
- Gift Instruments
  - Supports independent continuation of child's therapy journey
- Research and publish
  - Improve treatment options and establish as a standard of care
- Advocate for financial support
  - Insurance coverage, access

# Impact Spans Over 23 Years

- It all started with one kid – Justin  
Our daily inspiration
- Founded in 2002
- Over 10,000 hours of Music Therapy
  - 0-26 years of age
  - Available in any state
- Working with disease specific organizations and hospitals
  - Autism, Cancer, Rare Diseases, etc.
- Sponsor Music Therapist practicum hours
  - 1080 hours of training required to become board certified
- Publish research – effects of Music Therapy
  - Rich database from encounter notes



# Why Music In Medicine

Music Therapy is as old as medicine itself, dating back to biblical times

History of music in medicine parallels the history of medicine itself

Effect rooted in normal biological rhythms for life

In vitro human cancer cells show differential growth rates depending on type of music (hard rock vs. melodic)



# Clinical Program – Neonatal Intensive Care Unit (NICU)

NICU infants experience Pain and Anxiety during multiple procedures in the first 2 weeks of life

↓ Oxygen Saturation↑, Heart Rate↑, Blood Pressure↑, Pain Scores

Few Research teams have studied non-intubated NICU patients and rare use of standardized pain scales like Face Legs Activity Cry Consolability (FLACC) Scale or Neonatal Infant Pain Scale (NIPS) to determine results

Journal of Neonatal Perinatal Med 6(4):295-301

Anderson DE. Dev Med Child Neurol 60(3):256-266

Maitre NL. J Perinatol 40(12):1734-1735

# Clinical Program – Neonatal Intensive Care Unit (NICU)

We sponsored Music Therapy sessions in a level 3 NICU

94 infants aged zero days to 36 weeks (2017-2020)

48% decrease in Pain (mild/moderate to mild)

13% reduction in Heart Rate

Blood Oxygen Saturation Rate higher in females (6%) than males

Previously only seen in intubated neonates

Impact on pain in first 5 days, but diminishing number of

Brown S. Acad J Ped Neonatol 11, 3(2022)



# Clinical Program – Hereditary Angioedema (HAE)

Genetic Disease Hallmarked by Unpredictable Bouts of Swelling

Bradykinin 2 Receptor modulates Pain and Swelling

Stress and anxiety are key symptoms and experiences in patients with HAE

Up to 12 weekly tele-sessions by 5 Music Therapists  
our duration, following AMTA guidelines

Savarese L. Orphanet J Rare Dis 16, 23 (2021)

# Clinical Program – Hereditary Angioedema (HAE)

7 patients participants, all with type 1 HAE, 1 with additional GAD

Mean pre-session VAS score 5.7

Mean post- session VAS score 1.3

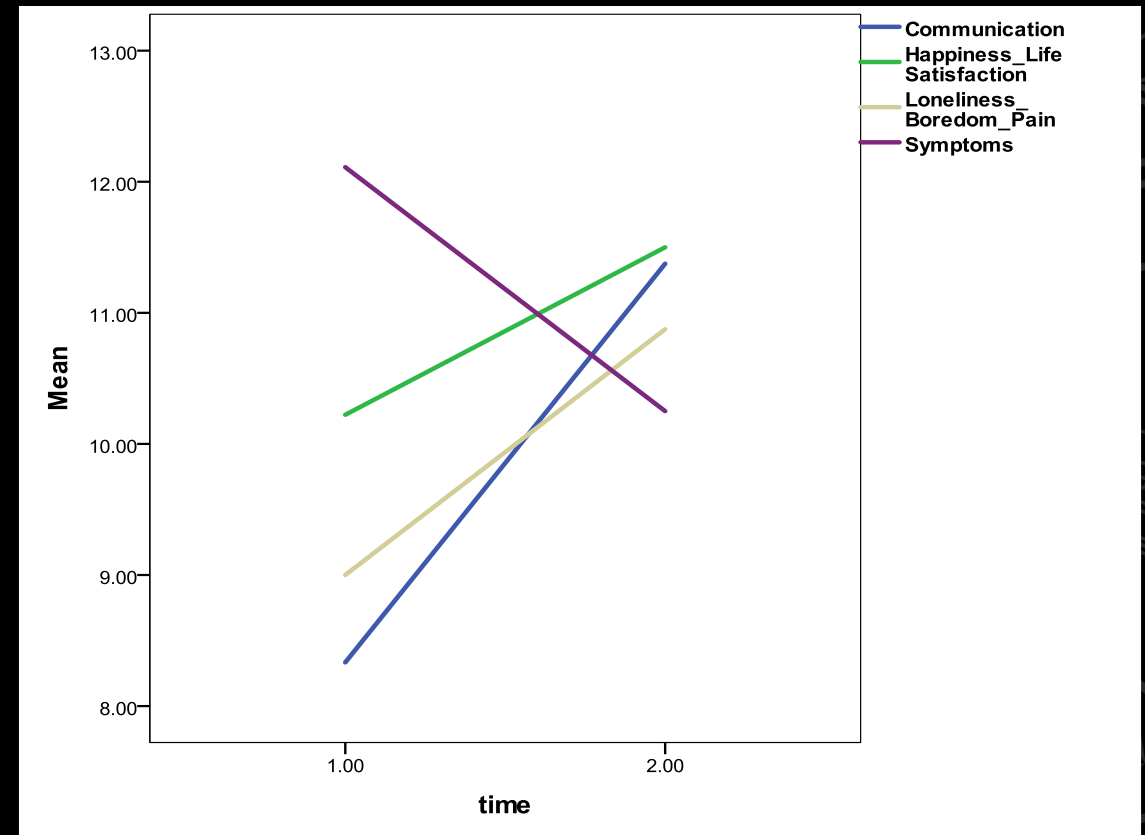
Mean 77% VAS score reduction per session

Furthermore, subjective improvements observed in anxiety, pain, socialization, coping skills, self-expression, and fear

Music Therapy can provide HAE patients with improvement in VAS scores even on non-swelling days

# Clinical Program – Autism

- Spectral and temporal information Processing in 12 adolescents with ASD and 15 age-matched controls.
- Impaired frequency discrimination at highest standard frequency in ASD group; no overall difference between groups.
- However, when groups defined by auditory hyper-sensitivity, group difference arose.
- For gap detection task, ASD group demonstrated elevated thresholds.
- Supports previous research demonstrating deficit in ASD in temporal perception and suggests connection between hyper-frequency discrimination



# Our Next Projects – Immune Deficiency

- Immune Deficiency remains grossly underdiagnosed as a chronic disease in children and adults
- Over 400 IEI exist and more being discovered
- Patients with IEI often require painful procedures both diagnostically and therapeutically
- No cure for many IEI
- Immune deficiency patients more prone to mental health issues
  - anxiety, depression, and behavioral disorders
  - No research yet to support Music Therapy in IEI

# Our Next Projects – Juvenile Diabetes

- Type 1 diabetes is one of the most common childhood chronic diseases
- 1 in 400 children, teenagers and young adults under 20
- 352,000 US kids under age 20 diagnosed
- No cure for Type 1 diabetes
- Juvenile Diabetes patients more prone to mental health issues
  - Anxiety, depression and eating and behavioral disorders
- Research on adults shows benefits of Music Therapy for diabetes

Research yet to support Juvenile Diabetes

Logenberg SJ. J Hypertens Jan 25 2007

# Our Next Projects – Juvenile Diabetes

- Funding research for Music Therapy benefits for Juvenile Diabetes
- 12 weeks of Music Therapy sessions
- Measuring:
  - quality of life scores
  - vitals signs
  - oxygenation
  - HgbA1c
  - Music Therapy Targeting Dietary, Exercise, Medication Compliance







# Thank you!





**Thank you for  
listening!**

