

## Full-Length Article

**Medicine and Music Therapy and an Anesthesiologist's Journey Along the Way**Fred Schwartz<sup>1</sup>, Sofia A. Shirley<sup>2</sup><sup>1</sup>Piedmont Hospital Atlanta, Georgia, United States<sup>2</sup>Vanderbilt University, Nashville, United States**Abstract**

A new and young anesthesiologist thrown into a large surgical arena once observed that many of the talented experienced successful surgeons, were older doctors who were set in their ways. As such, this often impeded effective communication between the anesthesiologists and surgeons.

The author, among the first to play music in the operating room, reviews his many years of experience as an anesthesiologist using music in his practice. This is followed by a review of his many diverse affiliations and associations with various professionals in music medicine and music therapy.

**Keywords:** *anesthesiologist, music therapy, music medicine*

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**Music in the Operating Room**

I began playing music in the operating room in 1979 at Piedmont Hospital in Atlanta, Georgia. I was a new and young anesthesiologist thrown into a large surgical arena. Many of the talented surgeons were very experienced, successful, older doctors who were set in their ways, which often impeded effective communication between the anesthesiologists and surgeons. A few vascular surgeons, for example, would not communicate when they released the aortic clamp during abdominal aortic aneurysm surgery. This can be disastrous, necessitating a rapid response to profound hypotension and rapid blood loss by the anesthesiologist. Obviously, I needed to get some of these surgeons to both communicate and listen. I asked each surgeon to share with me, what kind of music they liked, and found that if I could get them to respond to music they liked, they would be more communicative and respectful. I played Mozart, Sinatra, George Shearing, Vivaldi, and Ella Fitzgerald, to name a few. I found that the music seemed to improve the surgeons' mood and performance. Sometimes playing new age music specifically helped them relax and become more centered [1].

Initially, I used a portable tape cassette player to play music in the OR. This developed into a CD/tape player car audio system built into a rolling anesthesia cart (see Figure 1).



Dr. Schwartz offers patients "music to relax by" from his portable music cart.

**Figure 1.** Dr. Schwartz with his rolling anesthesia CD/tape player music cart.

In addition to the OR, I would roll this cart into the obstetric (OB) suite and play music to patients having C-Sections under spinal or epidural anesthesia. Giving the patient (and fetus) a choice of music for the C-Section provided a great distraction from worrying about potential pain and obstetrical complications. After delivery, it is common to give intravenous (IV) narcotics and sedatives to keep the patient comfortable. The patients with the music needed lower doses of sedation to reach a very relaxed level and reported lower pain levels overall [2].

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International Association for Music & Medicine (IAMM).

I found that the music made the management easier both when the patient was somewhat sedated during surgery or fully asleep, as well as for sleep induction and emergence from general anesthesia. The music masked some of the normal background noise in the operating room, which can often be quite loud and already have a cacophony of noises overlapping with medical alarms [3]. It seemed as though the patients who were given general anesthetics had a smoother hemodynamic and psychological anesthetic induction and emergence. The most effective music choices had meaning for the patient and facilitated a connection with previous listening experience and associated emotions. This enabled the patients to benefit from previous positive emotions connected with past music listening so they would have a reduced stress reaction [4].

When choosing music for a patient, it helps if they can communicate their musical preferences. Patient-preferred music is overall more effective, as it can connect with past experiences to acoustically paint the patient's environment [5]. It also encourages the possibility of connecting with the patient on other levels. As an anesthesiologist, your first connection to the patient opens up avenues of healing. Intention, eye contact, and talking can all facilitate communication with the patient [6]. Part of this includes being sensitive to the overall "state" of the patient. One of the methods used in music therapy is called entrainment [7]. The music therapist plays music to match the patient's emotional and physical state, and changes the tempo and feeling of the music over time to slow down the patient's rhythms and affect emotional state changes. Similarly, a healer can interact with the patient by sensing the patient's emotional aura and physical state to bring about a shift. The desired changes are usually a reduction in heart rate, which usually signifies an emotional shift away from anxiety/depression and fear. As an anesthesiologist, I have used a number of ways to do this. One is to feel and inhabit the patient's state, using voice as a method to bring about a more meditative state. You can use "healing touch" to feel the patient's pulse or put your hand gently on the shoulder to express caring and empathy with the patient. Once in the surgical arena, whether the patient is nearly awake or deeply sedated, you can play the music chosen by the patient or a piece that relates to the patient's emotional state. One can then change the music material to bring the patient to a more restful/relaxed state. If the patient is about to undergo a general anesthetic, the music can be used during the anesthetic induction. Letting the patient visualize a relaxing place they would like to go is also useful. This can be done by talking to the patient and providing a brief guided visualization.

One of the most important things about playing music for patients is that it can be utilized to decrease the stress response. Patients frequently undergo negative psychological experiences including anxiety, depression, isolation, sleep deprivation, and periods of fluctuating consciousness with

loss of orientation. The physiologic consequences include tachycardia, hypertension, decreased immune function, slower healing, increased oxygen consumption, and utilization of higher doses of anxiolytic and narcotic agents, along with potential side effects. In the mid-1980s, Dr. Ralph Spintge conducted the first studies showing that music can blunt the rise in stress hormones during surgical procedures under epidural anesthesia [8]. It is now much easier to measure heart rate variability (HRV) at any point in time by examining the patient's heart rhythm as a measure of stress reaction. HRV is derived by analyzing the heart's normal beat to beat variability. Having a decreased HRV is associated with surgical stress, aging, acute and chronic illness, and cardiac disease [9].

The stress reaction has evolved so we all have a balance between the two sides of the ANS (autonomic nervous system): the SNS (sympathetic nervous system) and the PNS (parasympathetic nervous system). The negative effects of a heightened SNS relative to PNS can be measured showing decreases in HRV (heart rate variability). This is analogous to the Chinese concept that an unbalanced and increased amount of Yin relative to Yang is detrimental to good health. Music has the potential to restore Yin and Yang and ANS balance, and increase HRV in medical patients.

### Development of a Central Hospital-based Music System

Physicians and nurses in Piedmont Hospital strongly supported delivering music to more patients. In the 1990s, the hospital supported building a central music system with ten channels, broadcasted by dedicating a server to each music channel. The music was digitally compressed and sent over the hospital's local area network (LAN), and at each music location housed a small box with channel selection and conversion of the digital signal back to audio output from each unit (see Figure 2).

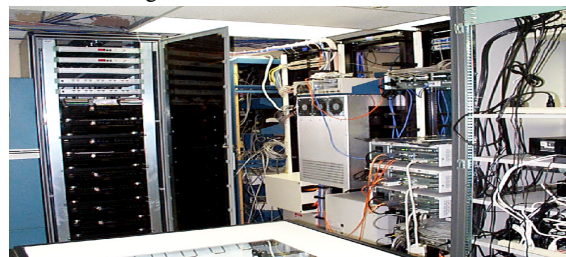


Figure 2. Equipment used to broadcast music channels at Piedmont Hospital 1990

Music could be played in all the operating rooms, pre and postoperative areas, labor/delivery and C-section rooms, GI lab, emergency rooms, intensive care locations for cardiac surgery, surgical and medical ICUs, and the coronary care unit. The music was also delivered to some patients with headphones in open areas such as preoperative and recovery areas. For operating rooms and individual patient rooms the

analog output from the channel converter box was used to deliver the music to wall mounted speakers with subwoofers.

Presently, most OR music choices are made either through streaming or from portable storage devices. While music is often chosen for the benefit of the surgical patient, when the patient is totally asleep the music choice and volume are often selected for the benefit of the surgeon. I have worked with many surgeons who use the music to help themselves and the OR team find a flow and focus on their work. While this can positively affect the OR environment, some surgeons play stimulating music at high volumes to the extent that they mask the sounds of critical patient alarms. The Canary Box is one invention that attempts to mitigate this risk. An intelligent OR music system, the Canary Box helps to automatically control the volume of OR music during a potential emergency. Problematic changes in heart rate, blood pressure, and oxygen saturation trigger the music system to create an environment more conducive to focus in those high-stress situations [10].

### Music and Cardiac Patients

The open heart surgery patients in the ICU appeared to benefit from the headphone music. I set up a small study on recovery of open heart surgery patients as they were waking up in the ICU. If the patient was not yet responsive, we would put the headphone unit on the patient and play the soothing piano channel. When the patients were more awake, the nurses would help them chose a music channel and listening times for the music. We did find that the patients with music had a smoother postoperative course. While the study size was small, it did show a trend for smaller doses of narcotics and sedatives and the patients were able to be discharged slightly earlier from the ICU to the cardiac stepdown unit [11].

It was through our mutual interests in music and the heart that I was invited to visit Dr. Thanassis Dritsas, a cardiologist and composer at the Onassis Cardiac Surgery hospital in Athens, Greece. Thanassis was doing work using music therapy with patients in the congestive heart failure clinic and in the EP (electrophysiology lab). It is not uncommon for there to be music performances in the hospital atrium for patients and staff.

### Pregnancy, Childbirth and Music

When my wife was pregnant with our first child, I became interested in the fetal sensory environment. I read some of the work of Dr. Lee Salk, a prominent child psychologist at the time. Dr. Salk theorized that the fetus is attracted to the sound of the mother's heartbeat in the womb. In the early 1960s, Dr.

Salk noticed that mothers usually hold their newborns on the left side of the chest over the heart. He conducted a study in the nursery of a New York City hospital that showed 80% of mothers do this, regardless of left or right sided hand dominance. He then went on to show that the mother's heartbeat rhythm soothed newborns and helped them gain weight faster. He theorized that the rhythms of the womb have a major effect on perception of music and music preferences. Salk analyzed 4 popular books at that time containing a large number of photographs and artistic representations of infants and adults. Almost 80% of these showed mothers holding their infants on the left side of their chests [12].

There were already some commercial tape recordings utilizing the sounds and rhythm of mother's placental blood flow, notably *Lullaby from the Womb* by Japanese obstetrician Dr. Hajime Murooka [13]. I became fascinated in the concept of creating a musical recording for newborn babies. If there was something significant in what the fetus perceives from these sounds, then it was probably based on the contour of the pulsating sound wave and the heart rate rhythm as well as the biologic rhythmic variability present in a healthy person. It was important to get a real-time recording that encompassed all of this. Together with my musician friends, brothers Burt and Joe Wolff, we used a doppler to record a representation of the rhythm and dynamics of maternal/fetal blood flow. We combined the recording with a musical rendition of what it might sound like to the unborn fetus to hear mother singing, as well as some soft, ethereal sounds [14].

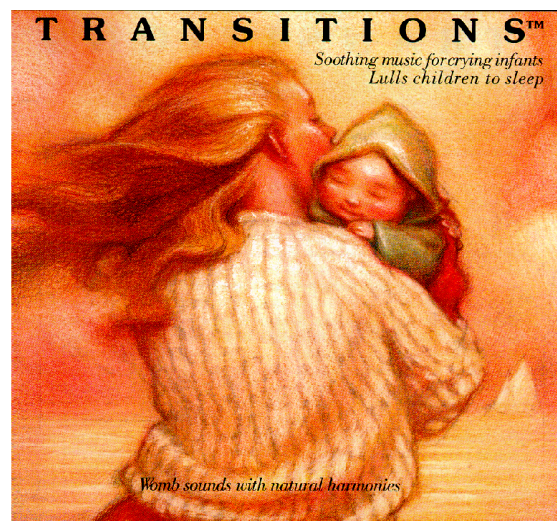


Figure 3. *Transitions* CD <https://www.youtube.com/watch?v=ect7Ofza13I>

The musical recording “Transitions” seemed to have a dramatic effect on some newborn babies. It seemed like this might be effective with premature babies, who lose the acoustical and other benefits of the womb early. I brought the “Transitions” recording to two neonatal nurses at NICU at Atlanta Medical Center. They conducted a study that showed the recording did have benefits for premature, agitated preterm infants with low oxygen levels who were being ventilated for premature lung disease. This was the first study to show a connection between playing music and raising blood oxygen levels [15].

I encouraged our hospital to deliver music in our neonatal ICU (NICU) at Piedmont Hospital. This involved installing CD players at 16 NICU locations rotating a sequence of 5 CDs. By this time, my interests had brought me to network with music therapists, physicians and healers. One of the first events for me was the 1998 meeting of the International Society for Music in medicine (ISMM) in Rancho Mirage, California. ISMM had been founded in 1982 by the anesthesiologists Roland Droh and Ralph Spintge. It was there that I met Ralph and we discovered our many shared interests. Following the ISMM meeting in San Antonio in 1996, Ralph and I were invited by Professor Roberta Kagin, the head of the music therapy program at Augsburg College in Minneapolis, to lead a Music Medicine Symposium. There, I met music therapist Ruthann Ritchie, who later collaborated on a study of possible benefits of music in the NICU at Piedmont Hospital in Atlanta [16].

With the help of Dr. Cheryl Dileo, a mentor and friend since the 1980s, our pilot study was published in her book *Music Listening in the Neonatal Intensive Care Unit* [17]. I also met Dr. Monika Nocker-Ribaupierre in Munich where I observed some of her work using music therapy with mother's voice in the ICU [18] and contributed a chapter to her book *Music Therapy for Premature Infants* [19].

A number of esteemed music therapists worldwide were also conducting studies in the 1990s on premature babies in the NICU. Dr. Joanne Loewy, for example, established the Louis Armstrong Music Therapy program at Beth Israel Hospital in New York City in 1994. It was a full-scale music therapy department that, along with other hospital areas, offered services to the NICU, consisting of real-time music interaction with music therapists. It evolved into a fellowship training program whose graduates would go all over the world to start their own NICU music therapy programs [20]. Joanne and I shared a fascination with the elements involved in playing various incarnations of womb sounds to newborns. She incorporated some of these concepts in developing the Gato Box™. The Gato Box is a small 2-toned wooden box, that when tapped with a finger, creates a soft rhythm in a timbre meant to mimic the mother's heartbeat (see Figure 4). The breathing regulation technique utilizes a round instrument filled with tiny metal balls which when played skillfully rotate softly on a thick leather canvas. This instrument is known as

the Ocean Disc™, is meant to replicate the whoosh of the womb. (Figure 4). Rotating it simulates the variable rhythms present in the womb. This has become a popular tool used by music therapists to interact and entrain with NICU babies [21].



Figure 4. Remo Gato Box and Lullaby Ocean Disc.

Increasingly, NICU music therapy has been incorporated worldwide. This was accelerated by the development of music therapy NICU fellowship training centers, founded in the 1980s by music therapy pioneers Helen Shoemark from Melbourne, Australia, Rosalie Pratt from Provo, Utah, Jayne Standley from Tallahassee, Florida, Joanne Loewy from New York City, and Monika Nocker-Ribaupierre from Munich, Germany. All of them have been instrumental in encouraging a healthy international dialog between music therapists, physicians, and other music healers.

### Beginnings of International Association for Music & Medicine (IAMM)

The second Mozart & Science meeting, held in Vienna, Austria in 2008 and hosted by Vera Brandes, Roland Haas, and Gerhard Tucek, brought together experts from around the world to share insights on music in therapy and medicine. There, David Aldridge and Joanne Loewy stirred up interest in bringing together founding members to start IAMM. It germinated into the Music and Medicine journal in 2009 where they were the original co-editors. Ralph Spintge replaced David Aldridge as co-editor the following year.

The first inaugural meeting of IAMM was at the University of Limerick, Ireland in 2009, hosted by Jane Edwards and the graduate music therapy department at the University of Limerick (figure 5). Jane served as the first president of IAMM for 5 years, followed by Patravoot Vatanasapt. IAMM began with Founding Members from around the globe (figure 5) --doctors, nurses, music therapists and musicians, all of whom had experience and interest in building a world community of music and medicine.



Figure 5. IAMM Founding Members at the Inaugural Ireland Conference in 2009.

The goals for IAMM were clearly provided by Joanne and David in the first volume of *Music and Medicine*: "Our intention is to provide a venue for the development of theory based on practice, and we will draw on specific research in music and medicine. We invite participation through dialogue about the impact that music has on the brain, for human physiology, and in developing unique clinical areas, such as sleep investigations and pain management. Topics such as these are being addressed today but are published diversely in other journals. This means that we have a scattered body of knowledge, which we hope to unify within these pages. Although the fields of medicine, nursing, music, and music therapy have developed several venues for sharing clinical activity and research trials, there is currently no distinct journal devoted to the fields that integrate medical music therapy, and music and medicine. These individual disciplines are growing internationally but each separate from the other. Our intention is to bring that knowledge together" [22].

Looking back over the last 10 years, I believe that those goals have been culminated. As an anesthesiologist it has been remarkable seeing IAMM and the journal grow and become important vehicles for the sharing of research and ideas, and to be part of a healthy, cutting-edge dialog between divergent groups of professionals. It is by crossing borders that we can

collectively increase the worldwide consciousness of the broad healing benefits of music.

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