

The Effect of Music and Imagery to Induce Relaxation and Reduce Nausea and Emesis in Patients With Cancer Undergoing Chemotherapy Treatment

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Abstract

The purpose of this study was to investigate the effects of music and imagery versus imagery-only interventions on inducing relaxation and reducing nausea and emesis in patients with cancer undergoing chemotherapy treatment. Three dependent measures (heart rate, nausea, and emesis) were collected both before and after each of six intervention sessions. Experimental treatment conditions were guided imagery with music (MI) or without music (IO), alternated across the sessions. As part of the experimental treatment, participants were also encouraged to listen to music at home, that is, to listen twice daily to CD recordings for relaxation. Regression analysis was used to examine factors relating to the frequency of nausea and emesis as well as heart rate. Results indicated a statistically significant decrease on posttreatment heart rate for MI and IO interventions. There was a significant decrease in the frequency of nausea and emesis over time, that is, across the 6 weeks of treatment. Self-reports from the participants indicated that the guided imagery with music, both in the experimental intervention sessions and at home, seemed to be very beneficial in inducing relaxation for these particular cancer patients.

Keywords

patients with cancer, music and imagery, chemotherapy and music therapy, nausea and emesis, Bonny method of guided imagery and music

Review of Literature

Music therapy has been used with patients with cancer in a number of studies demonstrating the specific benefits of music intervention. Some oncology investigators have examined the effects of receptive interventions, such as music listening and music and imagery with patients with cancer (Burns, 2001; Bonde, 2005; Clark et al., 2006; Curtis, 1986; Danahauer et al., 2006; Hammer, 1996; Sabo, & Michael, 1996; Sahler, Hunter, & Liesveld, 2003). In general, they found a decrease in anxiety, pain, and fatigue; improved mood; and an increase in family communication and quality of life.

Surgical, radiotherapy, and chemotherapy treatments are part of conventional treatments given to patients with cancer. Chemotherapy agents produce side effects in varying degrees over the course of treatment. They are varied and range in magnitude from minor to traumatic pain, illness, anxiety, fatigue, and/or psychological morbidity. Research with patients with cancer has shown that approximately 25% to 33% of those receiving chemotherapy will develop moderate to severe posttreatment nausea and/or emesis. The same patients after, three to four cycles of receiving chemotherapy treatment, will have a high probability of also developing anticipatory nausea (Morrow, 1984; Morrow & Dobkin, 1998; Roscoe, Morrow, Hickok, & Stern, 2000).

Patients with cancer who undergo chemotherapy treatment experience side effects from the medication. The most common are fatigue, nausea, vomiting, pain, hair loss, infection, low blood cell counts, skin sensitivity, diarrhea, and constipation (Love, 1995). Approximately 25% of patients experience anticipatory nausea and vomiting by the time of their fourth chemotherapy cycle (Morrow, 1986; Morrow & Dobkin, 1998; Standley, 1992). Anticipatory nausea and vomiting are known as clinical phenomena, which appear to be learned or conditioned responses (Morrow, 1984).

Considering the close relationship between physiological and psychological factors, nonpharmacological interventions have been advocated to ameliorate the stress-related side effects associated with chemotherapy (Clark et al., 2006; Pellietier, 2004; Riley, Reilly, & Doris, 1996; Sabo & Michael, 1996; Spiegel & Moore, 1997; Standley & Hanser, 1995).

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In most of the studies, various degrees of success were achieved in stress reduction and pain relief. Interventions either alone or in combination with antiemetic and anxiolytic medications were reported to have positive effects on patients with cancer (Ezzone, Baker, Rosselet, & Terepka, 1998; King, 1997; Tilch et al., 1999; Waldon, 2001; Weber, Nuessler, & Wilmanns, 1997).

A number of more controlled studies (Achterberg, 1985; Bonny, 2002; Lee, 1999; Lyles, Burish, Krozely, & Oldham, 1982; Nicholson, 2001; Pfaff, Smith, & Gowan, 1989; Tse, Chan, & Benzie, 2005; Tusek, Cwynar, & Cosgrove, 1999) have indicated that nonpharmacological methods, such as music therapy, biofeedback, relaxation, and guided imagery, may have an important impact on the emotional and physical well-being of patients. Tusek et al. stated that when the patient is relaxed, the mind is clear and is able to engage in healing images that enhance both physiological and psychological wellness.

Several studies have examined the effects of music therapy to reduce nausea and emesis in patients with cancer (Frank, 1985; Standley, 1992), whereas a few more have investigated the use of the Bonny method of guided imagery and music (Bonde, 2005; Burns, 2001). Standley's data were collected on 15 participants who completed four or more chemotherapy treatments: They listened to preferred music prior to and during chemotherapy treatment for approximately 30 minutes. Data analysis showed that the music groups reported less nausea than did the no-music groups. She found that patients who listened to music during chemotherapy treatments experienced less nausea than the ones who did not and that the length of time before nausea began was longer. Frank reported the advantage of the use of music therapy and guided visual imagery on chemotherapy-induced nausea and emesis.

The Bonny method has been used with patients with cancer to facilitate coping mechanisms that are useful throughout the treatment process; to encourage an active role in treatment; and to facilitate an emotional outlet, providing an avenue for expressing grief and hope. Burns (2001) was the first to do an experimental study on the effect of the Bonny method with patients with cancer. She explored its effectiveness in alleviating mood disturbance and improving quality of life in 8 women with histories of breast or ovarian cancer. Bonde (2005) cited the benefits of the Bonny method with patients with cancer. He explored the interrelationship of music and imagery and identified three categories of music: supportive, mixed, and challenging. Each category displayed specific therapeutic potentials uncovering a close interplay of music with imagery as metaphors. The configuration of the metaphors followed the narrative matrix of the music, proposing a grounded theory on the therapeutic function of music in the Bonny method.

The field of guided imagery and music has expanded since Helen Bonny first discovered it in the early 1970s (Gimeno, 2005). Several authors have reported adaptations of the Bonny method since then (Blake, 1994; Bruscia, 2002; Goldberg, 1998; Pickett, 1997; Short, 1991; Summer, 2002; West 1994; Wigle & Kasayka, 1999). The literature on the adaptations of the Bonny method describes some changes such as duration of the music, selection of the music, and bodily position during

music listening. Goldberg (1994) recommended the use of music with a narrow range to allow a very brief imagery experience without the dynamic unfolding that is characteristic of a standard session. Blake suggested a short duration of music, no longer than 10 minutes, with New Age or classical style. She also recommended having the client in a sitting position rather than lying down on a couch, as is the case of a regular Bonny method session.

Summer (2002) refers in her study to the importance of giving supportive therapy when clients need to be held in order to reinforce any positive feeling that might emerge during the session. In the same study, she encourages the use of task-oriented inductions, as opposed to one induction that encourages exploration. She cites examples where the direction is to create a safe place or to provide a relaxing image that holds the client in a common, positive feeling. Summer states that an induction should clearly present a self-affirmation rather than a conflict. A positive image allows for increased feelings of safety and good self-esteem.

For the purpose of this study, I use the term *music and imagery* to refer to an adaptation of the Bonny method of guided music and imagery. An adaptation is recommended while working with patients with cancer. Burns (2001) states that fatigue, pain, and side effects of medication make it difficult for patients with cancer to hold a standard Bonny method session. Skaggs (1997) supports this view, stating that a terminally ill patient does not necessarily have the emotional and physical energy to work with this method. For the purpose of this research, supportive short-term music and imagery therapy was applied to the participants under study (Summer, 2002).

The criteria of the music and imagery intervention followed the main points described in the above review of literature: (a) the music had short duration, no more than 15 minutes, and was New Age; (b) the participants sat on a chair with their eyes closed during the induction and open during the music travel; (c) the therapeutic approach was supportive, to create a safe and positive experience; (d) music listening included a dialogue between the participant and the therapist; and (e) the session was between 60 and 90 minutes.

The purpose of this study was to examine the effectiveness of music and imagery as an adaptation of the Bonny method in managing acute and delayed postchemotherapy nausea and emesis and reducing anxiety that may be present in patients at the time of chemotherapy, overall with the objective of improving quality of life in patients with cancer. The major research question guiding the study was, What effects do music and imagery have on participant reports of decreasing nausea and emesis with patients with cancer undergoing chemotherapy treatment?

Method

Participants

Twenty ($N = 20$) patients with cancer receiving chemotherapy treatment participated in this study. There were a total of 16 women and 4 men, with a mean age of 55.6 years and standard deviation of 9.34. From the 20 participants, 10 had

breast cancer, 5 nonsmall cell lung cancer, 2 lymphoma, 1 sarcoma, 1 colon cancer, and 1 tongue cancer. Their ethnicity was 9 Caucasians, 7 Hispanics, 2 second-generation Mexican Americans, 1 African American, and 1 Filipino. Approximately 280 patients were interviewed, 20 participated in the study, and 19 were able to complete.

Of the patients who were interviewed but were not interested in participating, several common themes were noted: (a) language barrier (English as second language), (b) non-musical listeners, (c) strong religious beliefs (e.g., God will take care of everything), (d) feelings of no need for support, (e) inability to tolerate additional stressors or overwhelmed by the chemotherapy treatment, (f) in concurrent study that seemed incompatible with this one.

Participants involved with this study were required to meet the following selection criteria: They (a) are diagnosed with cancer, (b) are undergoing chemotherapy treatment, (c) are between 20 and 70 years of age, (d) are able to read and understand English and/or Spanish, (e) have no history of acute psychiatric illness as determined by a mental status exam, (f) have intact mental/cognitive functioning as determined by interview, (g) have limited alcohol intake (no more than 10 drinks a week) from participant reports, and (h) are able to visualize a safe place.

Common themes also were noted for patients who did not complete at least 4 weeks of interventions. These themes included (a) death, (b) termination from chemotherapy by their physicians due to progression of the illness, (c) feelings that the study was not helpful, (d) not feeling well, (e) difficulties with facing personal problems, (f) needing to work and no time for the study, and (g) being occupied with family affairs.

A nurse practitioner provided a list of patients receiving chemotherapy for the first time or undergoing treatment, making them eligible for possible inclusion in the study. I approached and recruited patients who met the above criteria and informed them of the purpose of the investigation. Those who consented to participate received individual treatment sessions that included guided imagery with and without music.

Research Design

The proposed design for conducting this study used a repeated measures design, with three dependent measures collected both before and after each of six intervention sessions. Experimental treatment conditions, that is, guided imagery with or without music, were alternated across sessions. Participants undergoing chemotherapy treatment received two intervention conditions: music and imagery (MI) and imagery only (IO). These two conditions were administered in an alternating fashion, with the two conditions counterbalanced across participants so that 10 participants began with the MI condition and 10 participants begin with the IO condition. The first condition consisted of MI sessions that used music and verbal suggestion to assist the participants in eliciting visual mental images to enhance relaxation. The second condition consisted of IO sessions that

used verbal suggestion only (without music) to assist the participants in eliciting visual mental images to enhance relaxation.

Procedure

Each participant received a weekly intervention session for a 6-week period. Each session commenced during chemotherapy infusion and continued for the next 5 weeks whether or not chemotherapy was administered weekly. The participants were encouraged to continue using relaxation procedures at home, that is, to listen to compact disc (CD) recordings twice a day. The week after receiving the MI intervention they listened to a recording that included music and a script for relaxation. The week after receiving IO, they listened to a CD recording containing a relaxation script (without music). Each session was expected to be approximately 60 to 90 minutes in duration, with time distributed as follows: (a) 30 minutes of prelude, (b) 5 minutes of induction, (c) 5 to 10 minutes of music listening and dialogue, and (d) 30 minutes of processing.

Structure of the Imagery-Only Sessions

These sessions followed the same structure of the MI sessions. However, during the third phase, the participant was involved in dialogue only; no concurrent music listening occurred.

Interventions/Independent Variables

Music. The music used in each treatment session consisted primarily of selections from the genre of New Age music. The musical elements were slow tempi, repetition of the musical themes, narrow melodic ranges, and regular rhythms, and the music is performed with minimal instrumentation. The length of each musical selection varied between 5 and 10 minutes. I asked the participants to choose the music according to themes of preferences such as nature sounds, guitar and flute, stream of water, ocean waves, solo harp, piano and cello, and solo guitar. The piece was played after the induction, which included a short relaxation and the focus for the session. (See the appendix for the music selection list.)

Imagery. The imagery used during the induction phase of each session consisted of a brief relaxation period and some suggestions to connect the participant with the comments made during the initial phase. I asked the participant to visualize a safe place. With this image in mind, I was involved in a verbal dialogue with the participant in describing and exploring his or her safe place. This dialogue occurred during the third phase (music listening and dialogue, or dialogue only) of each session.

Measurements/Dependent Variables

Physiological measure. I recorded heart rate before and after each treatment session. The participant was seated in a comfortable chair in an individual room, and measurements were

Table 1. Mean Frequency of Nausea Over Time by Week of Intervention

Week	Intervention	
	Music and imagery	Imagery only
1	2.55	3.00
2	1.95	0.95
3	1.58	1.00

taken after the participant had been seated for 2 minutes and again at the end of the treatment session.

Clinical assessment of nausea and emesis. A 4-point Likert-type scale from *none* to *extremely* was used to assess the participant’s perception of the frequency and severity of nausea and emesis. Data were collected pre- and post-MI or IO intervention sessions.

At-home assessment. I called the participants each day during the evening hours to collect data on the events of nausea and emesis as well as on the use of the CD recordings. I also asked participants whether antiemetic medication was taken that day and, if so, in what dosage.

Subject Satisfaction Survey. After the 4th and 6th week of intervention, the participants completed the Subject Satisfaction Survey.

Follow-up. All participants for whom data were collected were interviewed by telephone 9 days postintervention to determine if they were continuing to experience nausea and emesis.

Data Collection Process

Data collection took place six times during the study: (a) Prior to and after each of the intervention sessions, I recorded the participant’s heart rate and asked the participant to rate his or her frequency and severity of nausea. I also observed and recorded events of emesis that occurred during each session and determined whether antiemetic medication was taken prior to (the day of) the session. (b) I called the participants each evening during the course of the intervention sessions to collect data on the events of emesis and nausea, as well as on the use of the CD recordings. In the event that I was unable to contact participants by telephone, they were asked to keep a record (which I provided) of their nausea, emesis, antiemetic medication usage, and CD listening. (3) After the 3rd and 6th week of intervention, the participants completed the Subject Satisfaction Survey. (4) All participants for whom data were collected were interviewed by telephone 9 days postintervention to determine if they were continuing to experience nausea and emesis. (5) I collected the demographic data from the participants’ charts.

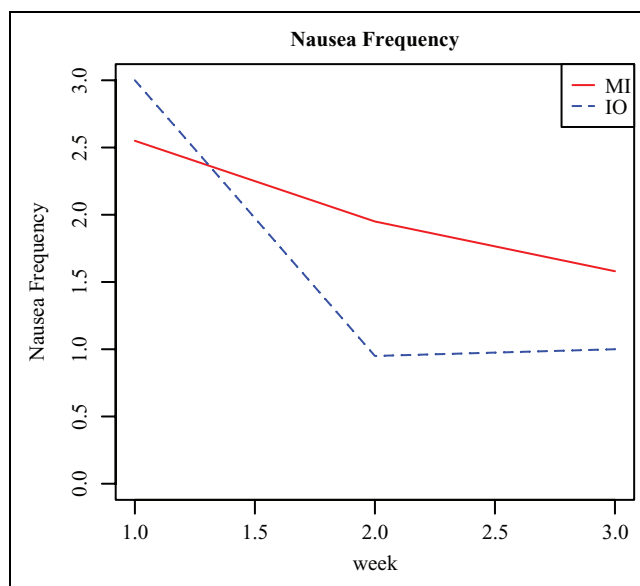


Figure 1. Frequency of nausea over time by week of intervention. Note: MI = music and imagery; IO = imagery only.

Results

The collected data for this study were analyzed using the computer program R and included classical statistical tests based on the ordinary least squares (OLS) model. OLS is a linear model used in regression analysis and was used to examine factors relating to the frequency of nausea and emesis as well as heart rate. The data indicated that neither nausea nor emesis were present just prior to or immediately after the MI or IO interventions. However, the nausea and emesis analyses presented below were collected during the week following the interventions.

Results indicated that in patients with cancer undergoing chemotherapy treatment, the IO intervention was statistically associated with frequency of nausea ($b = -.45, t = -2.42, p = .02$). Whereas when the MI intervention was used, it was not statistically associated with frequency of nausea ($b = -.18, t = -.70, p = .49$). The results display the average frequency of nausea by week of treatment decreasing in the case of either type of intervention. The mean frequency of nausea over time is shown in Table 1 and Figure 1. Mean frequency of emesis over time is shown in Table 2 and Figure 2. The results show that the average frequency of emesis for both types of interventions decreased between Weeks 1 and 2, followed by a rise between Weeks 2 and 3.

Data for the dependent variable of heart rate were collected just before and immediately following the interventions. Paired t tests (one-tailed) were used to examine these effects. Tables 3 and 4 show the heart rate means before and after specific interventions. For each week and each type of intervention, the heart rate decreased, as indicated by the statistically significant t values.

Table 2. Mean Frequency of Emesis Over Time by Week of Intervention

Week	Intervention	
	Music and imagery	Imagery only
1	0.55	0.80
2	0.45	0.15
3	0.68	0.47

Discussion

The purpose of this study was to investigate the effects of MI versus IO interventions on inducing relaxation and reducing nausea and emesis in patients with cancer undergoing chemotherapy treatment. The outcomes of multiple regression analyses and an overview of the means across sessions indicated that there was a decrease in the frequency of nausea and emesis across weeks. It seemed that the kind of intervention did not matter as much as the interventions themselves. The major issues to consider in the reduction of the occurrences of nausea and emesis across weeks seem to be related to whether or not the decrease in nausea and emesis was due to (a) the MI or IO interventions, (b) the therapeutic relationship that may have developed between the investigator and each participant, and (c) the administration of antiemetic medications throughout the study. The uncontrolled variables of the therapeutic relationship and the use of antiemetic drugs may have confounded these results. Because the study did not include a control condition and the sample size was small ($n = 19$), caution should be taken in generalizing these results to other patients with cancer. However, these results may give an indication of the potential positive use of music and imagery for similar participants or patients in terms of the decrease in nausea over time.

Heart rate measures taken after the intervention were conducted for both conditions, MI and IO, and showed a statistically significant decrease ($p < .01$) from the pre-heart rate data. Findings suggest that the interventions either with MI or IO may have induced relaxation and decreased stress in the participants. The reduction in heart rate that occurred immediately after the MI and IO interventions may suggest that the totality of the interventions, that is, the use of imagery or music or both, and the opportunity for participants to verbally express their concerns may have influenced positive heart rate reduction.

Music and imagery was reported to be beneficial in helping the participants gain a sense of control of the side effects of the chemotherapy treatment. Perhaps the primary basis for the therapeutic value of music is its inherently creative, aesthetic, and expressive characteristics, which can render the cancer experience more meaningful, harmonious, and humanizing for people. Music's unique properties permit it to function as a transitional object (or psychological "container") for emotional experiences (Abram, 2001). This study showed that, over time, listening to 15 minutes of music that included a script for

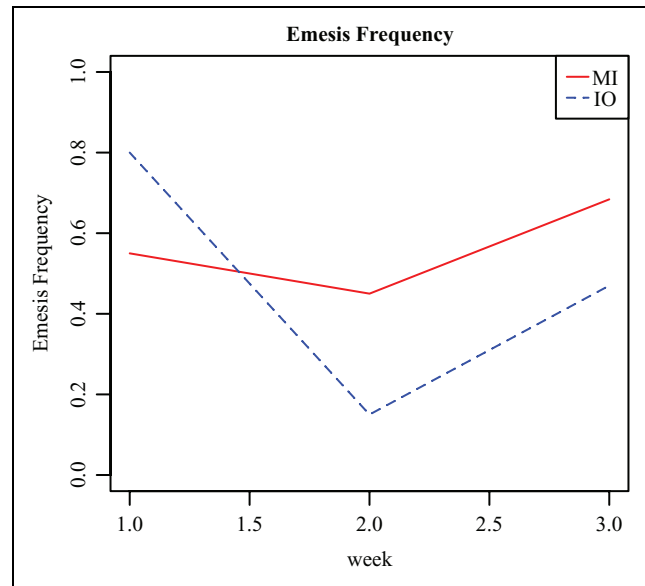


Figure 2. Frequency of emesis over time by week of intervention. Note: MI = music and imagery; IO = imagery only.

relaxation brought about self-reported changes in the outcome of nausea and emesis for these participants.

These preliminary findings indicate that a simple and cost-effective intervention may decrease anxiety and nausea during chemotherapy for patients with cancer. If future findings support these results, an audiotaped message with background music could be a time- and cost-efficient strategy to help patients during a difficult, stressful time. This study also presents a model for exploring the use of music and imagery in the development of an innovative music therapy intervention: the use of music and imagery as an adaptation of the Bonny method. Results from the study can also be used to develop a protocol for music and imagery, as well as a self-protocol for relaxation at home for patients with cancer, to reduce anxiety and the side effects of chemotherapy. Thus, this intervention could be helpful for increasing the quality of life in this clinical population.

This study was a first step in assessing the clinical benefits of the use of music and imagery over the course of patients' chemotherapy. Some of the limitations of this study were the small sample size and the many variables involved. It would also have been desirable to include a music-only condition to this repeated measures study, as well as a control condition in which neither music, imagery, nor imagery with music was included.

Another limitation of this study was the method by which the data were collected. It appeared that the participants tended to experience the effects of nausea or emesis from one week to another, depending on whether they had received chemotherapy that week. Because nausea is expected to occur only for the first 48 to 72 hours after chemotherapy, it might have been better to take data only during the week after the chemotherapy infusion instead of every week. This observation may provide

Table 3. Heart Rate Means at Pre- and Post-Music and Imagery Interventions Across Sessions

Session	Pre		Post		t
	M	SD	M	SD	
1	87.74	12.69	77.58	8.70	4.84*
2	85.63	15.94	75.16	14.04	5.96*
3	89.58	17.32	78.84	13.46	5.93*

* $p < .01$, one-tailed.

Table 4. Heart Rate Means at Pre- and Post-Imagery Only Interventions Across Sessions

Session	Pre		Post		t
	M	SD	M	SD	
1	79.00	11.33	70.16	7.59	4.47*
2	87.00	11.87	77.21	9.24	5.79*
3	93.31	15.76	81.05	13.96	5.26*

* $p < .01$, one-tailed.

an explanation for the frequency of nausea or emesis for both types of treatments decreasing between Weeks 1 and 2 followed by a rise between Weeks 2 and 3. Perhaps it only has to do with whether the participant had chemotherapy.

Clearly, music and imagery may benefit people with cancer in a number of ways. Music carries with it a host of unique properties that promote well-being at many levels. Jacobi and Eisemberg (2001-2002) stated that the mind-body connection provides the foundation for the understanding of health and disease. Additional research is needed to attain clearer and more complete understanding of specific relationships between music experiences and the promotion of good health. Further investigation into the effects of music and imagery on health outcomes specific to patients with cancer is also needed.

Bonny (1994) reported to be amazed, inspired, and continually challenged by the therapeutic effects of music. In her words,

While at one time we feel confident that we understand its apparent and hidden qualities to heal, at other times we are totally puzzled by the depth and enormity of its influence. The deep spaces of the self open to new understanding through music, which has a way of approaching, evoking, drawing out, untangling, gently touching, acknowledging, affirming, and finally, integrating changes in feelings in the psyche. (p. 73)

The studies reviewed report that the Bonny method and adaptations of the model have been used in all phases of cancer care with good results (Burns, 2001). The adaptation used in this study has shown a potential in reducing levels of stress (via a reduction in heart rate), promoting relaxation, and reducing nausea and emesis. Therefore, the use of imagery with music as a therapeutic intervention might be a good channel for increasing the quality of life of patients with cancer undergoing

chemotherapy treatment. Results may help the medical community understand the need for including music therapy as a support service for patients with cancer undergoing chemotherapy treatment.

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Appendix

Music Selection List

The music for the sessions was selected from the list below. Items on the list are arranged as follows: name of the selection, duration (minutes.seconds), artist, album title, genre.

- “Al Amor de la Lumbre,” 7.34, Luciani, *Passion Latina*, Latin
- “Bright Angel,” 4.56, Orange Tree Productions, *The Sounds of the Grand Canyon*, New Age
- “Dream Catcher,” 4.26, National Parks Series, *Native Lands*, pop
- “Estes Moon,” 5.55, Jimmie Pinkstaff, *Sounds of the Rocky Mountains*, New Age
- “Faces of Earth,” 5.45, Jimmie Pinkstaff, *Sounds of the Rocky Mountains*, New Age
- “Gatekeeper,” 4.37, National Parks Series, *Native Lands*, pop
- “La Brisa Calida,” 9.33, Luciani, *Passion Latina*, Latin
- “Lotus Reflection,” 10.14, Erik Berglund, *Harp of the Healing Waters*, New Age
- “Loving Touch,” 10.10, C. G. Deuter, *Reiki Hands of Light*, New Age
- “Memory of Monet,” 6.32, Dean Evenson, *Sound Healing*, New Age
- “Rondo,” 6.11, Beethoven, *Beethoven Violin Concerto*, classical
- “Red Clay,” 5.36, Orange Tree Productions, *The Sounds of the Grand Canyon*, New Age
- “Spiegel Im Spiegel,” 10.39, Arvo Pärt, *Alina*, classical
- “The Beckoning Sea,” 10.13, Pachelbel, *Forever by the Sea*, New Age
- “The Cross of Love,” 5.22, Rufino Zaragoza, *A Sacred Place*, gospel and religious

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