CE 1.5 Contact Hours
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Vibroacoustic Sound Therapy Improves Pain Management and More

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Vibroacoustic therapy is a new sound technology that uses audible sound vibrations to reduce symptoms, invoke relaxation, and alleviate stress. This technology is developed based on the recognition that external vibration can influence body function. Research demonstrates the effectiveness of vibroacoustic therapy. Implications for nurses include investigating the possibilities of vibroacoustic therapy in various nursing settings to promote patient well-being and improve the therapeutic environment. **KEY WORDS:** *music*, *relaxation*, *sound therapy*, *vibroacoustic*
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Music reduces anxiety, decreases pain, and increases feelings of well-being.[1] Music is a set of vibrations interpreted as sound by the human ear. Vibration can affect bodily functions such as blood pressure, pulse, and respiration. The heart vibrates to pump blood, nerves vibrate to send electrical signals to and from the brain, the gastrointestinal tract vibrates to push food through the intestines, and blood vessels vibrate to promote blood flow throughout the body.

The field of vibroacoustics grew from recognizing the relationship between the body and external vibrations, such as sound. Research has demonstrated that the human body can be attuned to musical vibrations and physical functions may be altered by this interaction.[2,3] External vibrations from certain music and sound can be used to positively affect body function and health.

Vibroacoustic therapy is a relatively new sound technology using audible sound vibrations to promote health and reduce stress. The term *vibroacoustic* comes from the root word *vibro* (to vibrate) and *acoustics* (to hear); vibroacoustic therapy involves music and/or sound that is felt as well heard and used as a medical intervention. Vibroacoustic therapy systems use transducers (speakers) imbedded in tables, mattresses, recliners, or other soft furniture to transmit sound/music vibrations or frequencies directly to the body.

FREQUENCY RANGES IN VIBROACOUSTIC THERAPY

To understand the science underlying vibroacoustic therapy, it is important to know basic principles of sound. Every musical tone vibrates at a different speed or frequency. A high-pitched tone has a higher frequency or vibrational speed while a lower tone vibrates more slowly and has a lower frequency. Vibrations are measured in hertz (Hz). One hertz is equivalent to one cycle of vibration and the term *frequency* refers to the number of cycles per second that a sound wave vibrates. Frequencies above 20,000 Hz are considered ultrasonic, while those below 20 Hz are termed infrasonic. Humans are able to hear frequencies between 20 Hz and 20,000 Hz. Frequencies below 100 Hz are considered to be low frequency and frequencies below 60 Hz are described as a "flutter" rather than a vibration in physiologic terms. In electrical terms, amplitude is a measure of the physical displacement of vibrations, which represents the strength of an electrical signal. Amplitude in audible frequencies corresponds roughly to an increase or decrease in volume of sound.

Vibroacoustic therapy uses frequencies within the range of human hearing. Low frequency ranges are most strongly felt and may contribute to a greater

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experience of relaxation and/or pain and symptom relief.[4] Olav Skille, a Norwegian educator and therapist who developed vibroacoustic equipment, documented that vibratory frequencies between 30 Hz and 120 Hz are therapeutic, with the most beneficial being those between 40 and 80 Hz.[5] Anecdotal data, based upon 40,000 hours of Skille's vibroacoustic therapy, describes these vibratory frequencies as being beneficial in the treatment of autism, migraine, muscle cramps, and cerebral palsy, among other ailments. Petri Lehikoinen, a researcher and lecturer of music therapy and special education at Helsinki University, specified the use of sound frequencies from 27 Hz to 113 Hz in the physioacoustic method he developed.[6]

Kris Chesky, Director of Education and Research of the Texas Center for Music and Medicine at the University of North Texas, found that vibroacoustic frequencies of 60 Hz to 600 Hz provided optimal pain relief at specific amplitudes.[7] It is known that these frequencies have stimulated Pacinian corpuscles,[8,9] nerve endings distributed in the skin that mediate sensations including pain, pressure, and itch. Stimulation with 60 Hz to 600 Hz frequencies precipitates pain reduction, although Chesky found that frequencies in the 60 to 300 Hz range have the greatest ratio of mediation response.[10]

Research has indicated that positive effects for pain relief using vibration technology are more effective over large areas of the body, and pain relief is more significant when applied in close proximity to where the pain is experienced.[11–13]

HISTORY

Sound vibrations are used in many medical applications.[14] Frequencies in the sonic range are used for ultrasound imaging, in lithotripsy to shatter kidney stones, and for the treatment of tissue contractures. Chiropractors use low frequency vibrations for muscle and joint pain; acupuncturists apply pulsed microcurrents to increase effectiveness of treatment. The science of vibroacoustics has expanded many of the principles used in these therapies to produce whole-body sound vibration for health benefits including relaxation and pain management.

The use of sound vibrations for health purposes emerged nearly simultaneously in the United States and Scandinavia between 1970 and the late 1980s. Olav Skille, a Norwegian educator and therapist, developed a vibroacoustic chair in the early 1980s using specific low frequencies for vibroacoustic stimulation. This type of equipment has been categorized as selective low-frequency (SLF).[15] Skille had experimented with vibroacoustics for use in a variety of health issues. Petri Lehikoinen, a researcher and lecturer of music therapy and special education at Helsinki University, designed a SLF vibroacoustic system called psychoacoustics. Psychoacoustics uses a rhythmically pulsed low frequency sound programmed through a computer to resonate in specific areas of the body.[6]

In the United States, Byron Eakin completed development of vibroacoustic equipment in 1985 and continues to successfully distribute many models, including vibroacoustic recliners, mattresses, and mattress overlays. The numerous equipment configurations have made the equipment practical in a variety of medical settings. These designs are full-frequency music (FFM) models using a single sound source and play music using a wide range of frequencies.

Chesky designed a music vibration table in the late 1980s to deliver measured vibrations and monitor the frequencies and amplitudes received at specified areas of the body. Research has been conducted with this quantified mechanical vibration (QMV) design, but it is not available commercially. Additional vibroacoustic models have been developed and new ones are emerging onto the market but, at this time, the Eakin's models are the most widely used and available worldwide.

Research in vibroacoustics and its applications have demonstrated that this nonpharmacological, noninvasive therapy reduces pain and symptoms of disease, induces relaxation, and assists in the rehabilitative processes.

THEORY

Vibroacoustic music uses sound vibration for tactile stimulation and, in some models, for listening. The sound/music is experienced both as physiological vibration and as a psychological event. The conceptual model for music and music vibration for pain relief explains this as the 2-pronged approach: engaging psychological processes (music listening) together with physiological processes (transcutaneously applied music vibration) activates pain-suppressive *e*fferent neural activity as well as pain suppressive *a*fferent neural activity. In conjunction, the 2 prongs also integrate somatic and auditory neural activity that may provide for synergistic mechanisms in the central nervous system.[16]

Currently, no single explanation can prove positive effects from the use of vibroacoustic music in health practices. When considering how and why vibroacoustic therapy works, it is important to recognize that effectiveness may come from both physical and mental stimulation. It may be that the synergy of the two, the mind-body connection, makes this methodology successful in relaxation and pain reduction.

Three possible explanations for the positive effects of vibroacoustics are the following:

1. Vibroacoustic music sessions trigger the relaxation response with benefits for pain and symptom reduction as well as tension, fatigue, headache, nausea, and depression[17]
2. Stimulation of the Pacinian corpuscle at frequencies between 60 Hz and 600 Hz creates neuronal inhibition of pain[10]
3. Vibration may assist in cellular cleansing mechanisms with possible positive effects on health and illness[18]

The relaxation response

A primary outcome of the vibroacoustic experience is the initiation of a state of deep relaxation. Called the *relaxation response*, this mental, physical, and emotional state is characterized by lowered blood pressure and decreased heart, breathing, and metabolic rates.[19] Harvard professor Herbert Benson, the founder of the Mind/Body Medical Institute at Boston's Deaconess Hospital, coined the term *relaxation response* and found that it yields many long-term health benefits in addition to the positive effects elicited during the experience.

George Patrick, Chief of Recreation Therapy at the Clinical Medical Center of the National Institutes of Health, suggested that vibroacoustic music sessions aid in the facilitation of the relaxation response and thereby reduced the symptom burden of hospitalized patients by a cumulative average of 54%.[17] Standley[20] discovered that vibrotactile and auditory stimulation increased finger temperatures, an indicator of deeper relaxation. Boyd-Brewer and Coope[15] conducted a program evaluation of vibroacoustic therapy, using 41 observations with 27 patients who experienced 30- to 40-minute vibroacoustic therapy sessions associated with chemotherapy treatment. Results revealed a 61% overall reduction of patient-reported symptoms. Wigram[21] studied 60 hospital staff members who volunteered for a 30-minute vibroacoustic session in a randomized, controlled study. Using low-frequency tones, New-Age music, music-only, and no music, subjects completed the Mood Adjective Checklist to evaluate mood state and changes in tension and arousal. Subjects were hospital staff members, some of whom felt uncomfortable about participating in the study during work time. Wigram concluded that the vibroacoustic music sessions had a positive effect on the state of tension/relaxation regardless of initial state of mind.

Pacinian corpuscle—neuronal inhibition of pain

Chesky theorized that a benefit of vibroacoustic music might result from stimulation of the Pacinian corpuscles, large mechanoreceptors located in the subcutaneous and connective tissues surrounding visceral organs and joints. These bulb-like structures surrounding nerve endings are sensitive to pressure. Chesky and coresearchers Michel and Kondraske contend that the Pacinian corpuscle can react to stimulation by vibroacoustic technology in the 60 to 600 Hz range known to affect these mechanoreceptors. When stimulated, the Pacinian corpuscle sends neurological nonpain messages to the brain that appear to inhibit the pain impulse. Other researchers have documented the effects of stimulation of Pacinian corpuscles at these frequencies.[8,9]

Vibration

One theory refers to the effects of vocalized vibrations upon the brain.[22] This Jindrak postulate theorizes that vibrations felt in the body or initiated by vocalization are conducted via bone and membrane structures within the brain-to-brain cells and assist with diffusion of large molecules and toxins out of the brain. Because the brain has no lymphatic system and the capillary walls are equipped with tight junctions to facilitate a blood-brain barrier, cleansing of cells in the brain requires special adaptation. Diffusion operates to some degree, as does cleansing, by the movement of interstitial fluids across surfaces. In other areas of the body, muscle and organ movement assist these cleansing processes. These pulsations are not available, however, to a sufficient degree to facilitate cleansing in the brain. The Jindrak postulate argues that when we talk, shout, sing, or hum, we create minute vibrations that are transferred to the brain through bone conduction and magnified within resonant cavities and membrane structures. It suggests that vibrations assist with the diffusion of substances through intercellular spaces in the brain in much the

same way that shaking dislodges particles in a rug. This interesting theory has not seen further development but offers an intriguing possibility for vibroacoustic benefits.

RESEARCH

Vibroacoustic research is still in its infancy. More rigorous study is necessary to confirm and elaborate upon the theoretical mechanisms of effect, explain the specifics of benefits, and/or recommend treatment protocols. Still, several studies and program evaluations have presented compelling evidence that vibroacoustic music is a viable pain and symptom management tool and needs further investigation. These studies suggest benefits from vibroacoustic therapy; however, there appear to be many variables in the type of equipment employed, frequencies and/or music used, and session methodology. Continued research is necessary to adequately determine parameters of optimal vibroacoustic use in the healthcare setting.

Patrick[17] studied a large group with multiple medical conditions using vibroacoustic technology. Patrick had maintained a program of relaxation for pain and symptom-reduction at the National Institute of Health (NIH) for several years. In his program evaluation, Patrick used a Visual Analog Scale and the Poppin Self-Report Rating Scale for Tension and Relaxation to measure presession and postsession intensity of pain and tension. The study included 272 patients with various diagnoses from cancer (97); heart, lung, and blood disorders (55); infectious diseases (54); mood disorders (32); and miscellaneous conditions (34). Patrick determined that an 8-minute presession orientation including a relaxation exercise and a 22-minute vibroacoustic session resulted in a cumulative reduction of pain and symptoms by 53%.

Tension, fatigue, pain, headache, depression, and nausea were reduced in those using the vibroacoustic therapy. While this study did not use a control group, there is evidence that the use of vibroacoustics was helpful to those individuals studied.

Boyd-Brewer[23] followed Patrick's evaluation process with completed data from a convenience sample of 41 patients undergoing chemotherapy at Florida's Jupiter Medical Center in Palm Beach County. Protocol for the study remained the same as Patrick's with the exception that nurses administered the vibroacoustic sessions, but instead of including a relaxation exercise, they used vibroacoustic therapy for approximately 40 minutes (as opposed to Patrick's 22 minutes). Results of this study found a reduction of tension by 34% and a 61% to 74% reduction of pain and symptoms. This study confirmed the hypothesis that a vibroacoustic pain management program could successfully be implemented as part of nursing care.

Skille's experiments with vibroacoustics were based on how sound vibration can relax severely handicapped children and reduce muscle tone.[5] These findings were confirmed by Wigram,[24] with the use of vibroacoustic therapy with cerebral palsy patients to reduce muscle activity and high muscle tone. A pulsed 44 Hz tone was used with prerecorded sedative music for the 30-minute experimental sessions and the same music minus the pulsed tone for the control session. Ten subjects received 6 randomly ordered sessions each. Average range of motion for spinal mobility and limb flexion and extension were measured presessions and postsessions. The study results indicated that subjects with increased muscle tone consistently demonstrated a reduction in muscle tension and improved range of motion with the vibroacoustic-pulsed music sessions over the music-alone group.

A review of the literature has shown that vibroacoustic therapy significantly affects patients undergoing gynecological surgery. Walters[25] conducted a study of 39 women, comparing subjects in an experimental group receiving vibroacoustic music with women receiving music-only or no intervention. Results indicated that the vibroacoustic therapy patients spent less time in surgery and in the postanesthesia care unit, reported less preintervention and postintervention apprehension, received significantly fewer postoperative medications, and demonstrated the least fluctuation in systolic and diastolic blood pressure than did the music-only or control group. Ongoing researchers are investigating the effects of vibroacoustics on the tension level and medication used in women undergoing breast cancer biopsy. Positive responses from patients indicate that vibroacoustics can reduce procedure tension and may reduce medication use, although research data has yet to be analyzed.

A study with gynecological patients explored the potential for vibroacoustics therapy to manage pain in postoperative patients undergoing ovarian, endometrial, or cervical cancer surgery.[26] Twenty women were randomized into control and experimental groups. Physioacoustic treatments were given to the experimental group for a minimum of 15

minutes twice on Day 1 postsurgery, increasing the amount to 3 15-minute sessions on Day 2, and a minimum of 60 minutes on Day 3 (3 20-minute sessions) and each day thereafter until discharge. The McGill Pain Questionnaire (MPQ), the Multiple Affect Adjective Checklists, and the Rhodes Index of Nausea and Vomiting were administered daily staring on the operative day. By post-op Day 3, the experimental group reported a 52% decrease in pain compared to 28% in the control group. By post-op Day 5 the experimental group showed an overall decrease of 74% in the mean maximum dose of IV pain medications, while the control group showed only a 31% decrease. Emotions of anxiety, hostility, and depression were positively influenced by physioacoustic music in the experimental group. Although reports of nausea and vomiting varied, the experimental group used fewer antiemetic doses. Researchers' conclusions indicated that the physioacoustic intervention positively influenced pain perception, narcotics use, and emotional state in postoperative gynecological patients.

Benefits of vibroacoustic therapy with patients following total knee replacement at Duke University Medical Center were examined by Burke and Thomas.[26] In the 1997 research, 18 subjects over the age of 55 completed the study. They were randomized into study groups to investigate the effects of physioacoustic therapy on pain management and physical therapy effectiveness for passive range of motion. The experimental group of 9 patients was provided with physioacoustic music for all physical therapy including passive range of motion exercises. Pain was measured through the use of a visual analog scale and a pain thermometer. The experimental group achieved statistically significant greater passive range of motion. In addition, 66% of the experimental group attained a 90° bend compared to only 44% of the control group with less reported pain during 4 of the 6 physical therapy sessions.

Chesky and Michel studied vibroacoustics with rheumatoid arthritis and found stimulation of the Pacinian corpuscles initiated a physiological process resulting in significant pain relief of 64%.[10] The study was conducted at the internal medicine department of the medical branch of the University of North Texas. Persons ($N = 27$) with rheumatoid arthritis pain were provided music only, music and music vibration, or a placebo. The music used was identical for both music listening and music vibration production. Measurements used were a Visual Analogue Scale (VAS) and MPQ. Analysis of Variance (ANOVA) and posthoc analysis revealed that the music with music vibration condition VAS scores were significantly greater than were the scores for the music alone condition or placebo. The perception of pain reduction indicated greater changes in the music with music vibration condition. The total percentage reduction for music and vibration was 64%, music alone 24%, and placebo 2%.

Heart surgeon Charles Butler, MD, PhD, and Penelope Johnson Butler, MD found significant benefits using physioacoustic vibrations during recovery from cardiovascular surgery. Eight patients were studied. Vibroacoustic intervention promoted the use of shorter-acting anesthetics and resulted in a decrease in the use of sedative and pain medications on these patients. The average ventilator-dependent time was reduced from 17 hours to 7 hours, time spent in the ICU was reduced from 36 hours to 18 hours, and the overall hospital stay was reduced from 9 days to an average of 5 days.[27]

The effects of vibroacoustic music on idiopathic Parkinson's disease were investigated in a single-blind, randomized study in Spain.[28] The results demonstrated that while disease symptoms were not improved, moderate gains were made in motor abilities and daily living tasks. In randomized groups, 60 patients received either vibroacoustic music on a vibroacoustic mattress with a pulsed, low frequency vibration or music-only sessions (control) on the same mattress. Subjects received 25 sessions over 9 months. Physicians unaware of interventions administered the Unified Parkinson's Disease Rating Scale (UPDRS) at the end of the first, third, and sixth months. These evaluations demonstrated improvement in activities of daily living including rolling in bed, bed making, and food chopping. The results showed no enhancement of mental state, mood, or behavior.

In a study of vibroacoustics following the suctioning of neonates, Burke et al[2] found that taped music and vibrotactile stimulation increased the amount of time infants spent in a quiet alert state, increased sleeping time, and improved oxygen saturation levels compared to that of a control group.

EQUIPMENT

There are 3 main vibroacoustic equipment designs;[29] however, for practical purposes the FFM model is the most widely used. This equipment uses one sound and plays prerecorded music designed for vibroacoustic music or music with high vibroacoustic effects and is highly practical because of the simplicity of the

system and consequent ease of use. While future use of vibroacoustics may become quite specific with methods and "doses" unique to individual medical issues, currently, the simple effectiveness of the FFM design makes this the preferred model for use at this time as a nursing intervention.

VIBROACOUSTIC THERAPY

A vibroacoustic session is a simple process in which the patient reclines or sits on the vibroacoustic equipment and experiences vibrations of sound and/or music throughout the body. Dr George Patrick of the National Institutes of Health recommends providing a presession relaxation intervention to assist the patient in entering more deeply into relaxation.[17]

Quiet, lighting, isolation, and comfort are essential elements needed to provide an environment with few distractions. Additional comfort considerations for optimizing a session are the use of a pillow and blanket.

Vibroacoustic sessions can vary in length depending on the equipment used, the effectiveness of the music, and the patient's medical condition. Researchers have experimented with and recommended time lengths of 10 minutes to 45 minutes.[5,6,15,26,30,31] The characteristics of a patient's body are also important to consider in determining the length of the session. Frail and small-bodied people may require shorter sessions than larger individuals though no conclusive research has been conducted to validate this theory.

Dr George Patrick[17] used guided relaxation exercises with vibroacoustic sessions to enhance the relaxation response and overall effectiveness. In a program evaluation at the National Institutes of Health, Patrick used 22-minute music sessions with an 8-minute introduction that included relaxation induction. He reported cumulative symptom reduction of 54%. In a similar evaluation with fewer subjects, Boyd-Brewer and Coope[15] noted 61% to 74% relief of patient-reported pain and symptoms using a 30- to 40-minute session with no relaxation induction. It may be possible that longer music use can substitute for relaxation inductions in terms of overall effectiveness or, conversely, that shorter music sessions with a guided relaxation exercise can produce the same results.

The length of time that the effects of a vibroacoustic session will last has not been specifically studied and offers an important research opportunity. Studying the effects of vibroacoustics with rheumatoid arthritic patients, Chesky noted that pain relief from these sessions would last up to 8 hours.[7]

In general, vibroacoustic sessions follow standard protocol steps. These include explaining the session to the patient, putting the patient on the equipment and at ease, starting the vibroacoustic session, monitoring of the music/vibration session, ending the music/vibration and bringing the patient out of the session, and assisting the patient off of the equipment.

While there have been no reports of patient accidents during a session, patient safety may include having easy access to a call button during the session if the patient is not in full view of nurses. It is important to instruct patients in how to stop the session or get up from the equipment if they desire or need to end the session.

No instances of negative or harmful effects on single-input vibroacoustics have been reported. Dr George Patrick of the NIH has worked with this equipment since 1992 and has found no instances in which it could not be used. In the approximately 15,000 sessions that his program has administered, Patrick reports only 2 were ended by patient request.

Some side effects have been reported in the physioacoustic treatment method, including slight drowsiness, vertigo, or feelings of nausea during or after the first treatment. One possible reason for these side effects is the recumbent position of the patient during vibroacoustic therapy sessions. Adjusting the chair to a more upright position and decreasing the volume reduce these symptoms.

Conditions in which practitioners have hesitated to recommend treatment are in the presence of severe acute inflammations (excluding normal flu), major external or internal bleeding, and in cases of severe heart disease. Patients should consult with their physician before undergoing vibroacoustic therapy especially if they are at risk of heart attack or have a pacemaker.[21]

Research at the Institute for Occupational Health in Helsinki found that frequencies of 10 Hz and 900 to 1000 Hz could be harmful if a patient is exposed to thousands of hours of therapy at these frequencies.[32] However, further research has not been conducted to substantiate this and it is unlikely that any patient would ever reach this level of vibroacoustic use.

MUSIC AND SOUND

Music designed for vibroacoustic therapy creates an optimal vibrational experience by using specific

frequencies and timbres; sound textures created by use of different instruments or simulated instrument sounds. Some of the companies that sell the vibroacoustic products have created CDs appropriate for use in vibroacoustic therapy. Vibroacoustic sounds use dynamic accents, strategic pitch changes, and changes in volume levels to create vibrationally tactile sensations. Through these and other creative composition techniques, the vibrational qualities of music can be used to facilitate physiologic responses. Vibrational effects may be obtained by recording the sound so it shifts from speaker to speaker, creating the sensation of waves of vibration moving back and forth in a sound massage. The technique of pulsation or the slow rotation of vibration interspersed with no vibration keeps the patient from experiencing numbness or muscle contraction and enhances the relaxation response.

Recordings not specifically designed for vibroacoustic equipment may still have value in vibroacoustic therapy. Since low bass tones are especially tactile in vibroacoustic therapy, commercial, nonvibroacoustic recordings that have strong bass lines or use many low frequencies will provide some vibroacoustic effects. Recordings without a prominent bass line will not create a high intensity vibrational response but if the music is anxiolytic it may stimulate relaxation. Music therapy research indicates that there are benefits to the use of familiar music.[33,34] In vibroacoustics, familiar music may not stimulate the body physically as much as the specially designed vibroacoustic music, but it may still produce beneficial psychological effects.

Many medical facilities use familiar, nonvibroacoustic music with vibroacoustic technology. At the Clifton Springs Hospital, recreation therapists use Big Band era music with Alzheimer's and geriatric patients. These nonvibroacoustic sessions assist patients with circulation and behavior management. Patients love the music and experience beneficial responses from the vibrational effects.

THE FUTURE FOR VIBROACOUSTICS

Vibroacoustics therapy is a noninvasive, safe therapy that has demonstrated ability to decrease pain, reduce anxiety, reduce the symptoms of illness, and generally promotes health in many patients. Nurses should be aware of the benefits vibroacoustic therapy can provide. In areas where pain and symptom management is a challenge, these simple devices have demonstrated the ability to improve patient outcomes and provide the patient with a sense of well-being.

Nurses are responsible for providing a healing environment. The vibroacoustic therapy environment uses sound and vibration to create a restful surrounding that can distract patients from the discomfort of their illnesses. In addition, vibroacoustic music therapy engages the mind and may change internal vibratory mechanisms such as blood pressure, breathing rate, and heart rate, with benefits to patients' physical and emotional state. Nurses can advocate for the introduction of vibroacoustic therapy in areas where this type of therapy might be useful for patients.

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CE Enrollment Form

Holistic Nursing Practice, May/June 2004: Vibroacoustic Sound Therapy Improves Pain Management and More

A Registration information:

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Address_____
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❑ LPN ❑ RN ❑ CNS ❑ NP ❑ CRNA ❑ CNM ❑ Other_____
Job Title_____ Specialty_____
Type of facility_____
Are you certified? ❑ Yes ❑ No
Certified by_____
State of License (1)_____ License#_____
State of License (2)_____ License#_____
Social Security_____
❑ From time to time we make our mailing list available to outside organizations to announce special offers. Please check here if you do not wish us to release your name and address.

B Test Answers: Darken one for your answer to each question.

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1.	❍	❍	❍	❍	5.	❍	❍	❍	❍	9.	❍	❍	❍	❍	12.	❍	❍	❍	❍	15.	❍	❍	❍	❍
2.	❍	❍	❍	❍	6.	❍	❍	❍	❍	10.	❍	❍	❍	❍	13.	❍	❍	❍	❍	16.	❍	❍	❍	❍
3.	❍	❍	❍	❍	7.	❍	❍	❍	❍	11.	❍	❍	❍	❍	14.	❍	❍	❍	❍	17.	❍	❍	❍	❍
4.	❍	❍	❍	❍	8.	❍	❍	❍	❍															

C Course Evaluation*

	A	B
1. Did this CE activity's learning objectives relate to its general purpose?	❑ Yes	❑ No
2. Was the journal home-study format an effective way to present the material?	❑ Yes	❑ No
3. Was the content relevant to your nursing practice?	❑ Yes	❑ No

4. How long did it take you to complete this CE activity? ____hours____minutes
5. Suggestion for future topics_____

D Two Easy Ways to Pay:

❑ Check or money order enclosed
(Payable to Lippincott Williams & Wilkins)
❑ Charge my ❑ Mastercard ❑ Visa ❑ American Express
Card #_____ Exp. Date_____
Signature_____

*In accordance with the Iowa Board of Nursing Administrative rules governing grievances, a copy of your evaluation of the CE offering may be submitted directly to the Iowa Board of Nursing.