

The sound of music in veterinary medicine

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Certain musical tones and melodies have proven to elicit calming responses in animals. Learn how music therapy can benefit your pets and patients.



Is it time to prescribe Mozart? According to veterinary neurologist Susan O. Wagner, DVM, MS, DACVIM, an adjunct faculty member at The Ohio State University College of Veterinary Medicine in Columbus and coauthor of *Through a Dog's Ear: Using Sound to Improve the Health & Behavior of Your Canine Companion*, the answer is a resounding yes. At the Fetch dvm360® virtual conference this week, Wagner presented evidence that suggests sound affects animals on a psychological level. She encouraged attendees to utilize particular genres of music to create a more relaxed experience for their patients.

Before delving into the specific benefits of music therapy, Wagner provided a brief overview of some basic tenets of sound measurements, noise toxicity, and the study of bioacoustics versus psychoacoustics.

Acoustic effects

At the most elementary level, sound is waves of energy that affect the nervous system. The 2 terms used to categorize sound are frequency, which is measured in Hertz (Hz), and intensity, which is measured in decibels (dB). Humans hear frequencies of 20 to 20,000 Hz, whereas dogs can hear frequencies between 40 and 45,000 Hz and cats up to 64,000 Hz.

Part of understanding how sound can positively impact a species involves recognizing its adverse effects, Wagner said. For reference, a normal conversation occurs at 50 dB and a lawnmower generally operates at 90 dB. Animal laboratories routinely reach noise levels of 80 dB, with human activity transiently increasing intensity by as much as 40 dB. Hearing damage occurs instantly at 100 dB (think standing next to a jet engine) or when exposed to 80 dB for longer than 15 minutes, which happens more often than one might think, she said.

Although noise levels in a typical veterinary clinic could become detrimental to staff working lots of overtime hours, it is the patients Wagner called attention to. "Researchers have examined the effects of noise toxicity in animals, which expands beyond hearing damage," she said.

For instance, a study published in *Applied Animal Behaviour Science* found that dogs exposed to sound blasts of 85 dB experienced increased heart rates and salivary cortisol levels.¹ The noise also elicited postural signs of anxiety. Birth defects have been documented in mice and rats when the mother was exposed to noise pollution during pregnancy.² Behavioral changes were also detected in their offspring.³

While there is decades-old research on the effect of noise on animals, Wagner said the study of sound in animals historically was categorized through bioacoustics. This places an emphasis on how animals communicate and the positive and negative effects of their environments, but it does not account for psychoacoustics. Typically applied only to humans, psychoacoustics examines the perception of sound, psychological responses, and its impact on the nervous system.

Examining the physiologic effects of sound and music opens the door to understanding how certain melodies can be used to calm anxious pets.

Music and animal welfare

"Music therapy and sound enrichment are low-cost, easy modalities to enrich the lives of captive animals," Wagner said. "Whether it be a short-term stay in a veterinary clinic or shelter, or long-term captivity in a sanctuary or zoo, sound can play a key role in enhancing the welfare of these animals."

Sound therapy research has illustrated music's influence on a variety of species. In 1 study, cows were more likely to come into the milking parlor if signaled by music.⁴ "Behaviorists might say that is classical conditioning, and some of it can be, but it has to start with a pleasant

stimulus,” Wagner said. “You play pleasant music to the cows and then they are adapting to it. It is a combination of classical conditioning and sensory relaxation.”

In a separate study, when chickens listened to music, they had increased growth and reduced stress.⁵ There are also indications that animals may have musical preferences. In the same study, horses showed a decreased appetite when listening to jazz and an increased appetite with country music.⁵ “This is an example of going beyond bioacoustics into psychoacoustics. That makes perfect sense to me,” Wagner said. She surmised that the differing tempos and frequencies in jazz could become uncomfortable to the horses. Sorry, Miles Davis.

Through her research, which became the basis for *Through a Dog’s Ear*, Wagner and coauthor and sound researcher Joshua Leeds examined how music with varying tempos and instruments might elicit favorable responses. More than 150 dogs were observed in home environments and kennels to see if they would sit down, lie down, or even go to sleep when listening to certain music. “We found that the simple piano with low tones and a slow tempo is what made them most calm,” she said. When listening to the piano in the home environment, 85% of the dogs went to sleep, compared with 70% to 75% in a kennel setting.

Clinical applications

When presented with a patient that displays signs of general anxiety or pain, Wagner suggests creating a sound inventory of the home. She encouraged attendees to prompt clients to sit and listen to all of the ambient noise in and around their homes to pinpoint overlooked stressors. This works 2-fold by providing the veterinarian with pertinent information while also conditioning the client to become more perceptive to the noises their pet encounters. “Humans are good at tuning ambient sounds out, be it the TV or something happening outside,” she said. “But animals are not.”

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Once possible noise toxicities are addressed, the right music can create an enhanced, stress-free experience. “To keep animals as calm as possible, instrumental music is best,” she said. Animals do not need the added stimulus of processing voices.

“Music reduces the complexity of the orienting response. As the patient hears the music, the sound will resonate with its brain waves and heart rate,” Wagner explained. “You get a physiologic effect that feeds back to the nervous system. It can be really helpful.”

A study published in the *Journal of Feline Medicine and Surgery* showed that respiratory rates and pupil diameters in cats changed depending on whether classical music, pop, or rock was played during spay procedures. Classical music had the most positive effect, whereas heavy metal caused increased respirations and pupil diameters, indicating a stress response. The response to pop was intermediate.⁶ Research has also shown that cats prefer music with frequencies and tempos similar to what is heard in feline communication.⁷

At home, Wagner said, hearing calming music for as little as 30 to 60 minutes a day will help reduce the sympathetic overdrive from the nervous system in pets. “We cannot teach our patients to meditate, but we can use music to do a very similar thing,” she said.

References

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DR Z NOTES:

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