The Effect of a Cat’s Purr on Health

Purring is a form of vocalization that is unique to cats. Purring is particularly conspicuous in domestic cats when humans provide social contact, such as petting, and is typically thought to reflect an expression of pleasure by the cat. What is not commonly considered, however, is that the purring of the cat can have a beneficial effect on health.

To address the age-old question, “why do cats purr?” we must give consideration to possible physical benefits of purring. Most often, we think of cats purring to express contentment, but cats often purr when in distress as well. Projecting this correlation of purring with distress, some scientists reason that since “an injured animal will generally not expend precious energy needed for healing on an activity that is not directly connected with their survival (Muggenthaler & Wright, 2001),” one might reason that it is quite possible that felines purr as a survival mechanism. “When the felid goes for the all-out chase for a dinner, and comes back with sore muscles and overly-stretched tendons, purring is healing. On your exam table, the sick or injured kitty that purrs is not psychotic, but using the instinctual behavior from wild ancestor that promotes recovery (Hart, 2009).”

Recognizing some potential benefit to purring, the development of a cat’s purr can be considered in terms of natural selection and how all complex behavioral traits come to exist. Natural selection is driven by differential survival and/or reproductive outputs of individuals within a population, and evolution of the purring characteristic likely relates to some favorable impact of this characteristic on either survival or reproductive output of individuals that have this characteristic. By analogy, the saber-tooth tiger likely came to exist by an environment that held a niche for predators that could feed on large mammals, which provided a selective advantage for tigers with relatively larger canines to aid them in hunting their prey. In a background of genetic variation among tigers, caused by random mutation and/or genetic recombination, animals with relatively larger canines would be
more successful in the environment with respect to capturing more prey and thus would have longer lives and more opportunities to reproduce. With a continued selective advantage for tigers with long canine teeth, over thousands of generations, a distinct species, which we know as the saber-tooth tiger, emerged. While the cat purr does not provide such an obvious and dramatic selective advantage as long canine teeth, it seems unlikely that purring would not have been included as a trait with the evolution of modern felines, if purring did not provide a significant benefit to the survival and reproduction of cats.

When comparing cats to other animals, what evidence shows possible benefits of purring? It is known amongst veterinary orthopedic surgeons that cat’s bones heal faster than those of dogs (Muggenthaler, 2001). For example, research published in the Journal of Veterinary Medicine on "high-rise syndrome", which is the phenomenon of cats falling from higher than two stories, showed that in 132 cases of cats falling from on average 5.5 stories, 90% survived. There is also considerable research showing that dogs are more prone to bone-related health problems such as arthritis and lameness (Muggenthaler, 2001). Another interesting fact is that it is rare for cats to get bone cancer, but if they do, it is typically seen in their paws, which is where the vibrational signal from purring is the weakest (von Muggenthaler, 2001). The old veterinary adage “If you put a cat and a bunch of broken bones in a room, the bones will heal (von Muggenthaler, 2001),” may actually have some truth to it.

Of course, simple association of the purring trait with accelerated healing in cats could be circumstantial and does not prove that purring is responsible for the accelerated healing. However, more rigorous evidence also connects purring with physical benefits. For example, Elizabeth von Muggenthaler of Fauna Communications Research Institute in North Carolina and a specialist in the field of bioacoustics, studied this concept and proposed that “nature has endowed all kinds of felines with an evolutionary healing advantage in the simple act of purring.” It cannot just be a coincidence that cats are much less prone to health problems than dogs; according to von Muggenthaler “the odds of it being a coincidence are like three billion to one.” So one might ask themselves why do
felines have this trait but others do not? “Is it possible that evolution has provided felines of this world with a natural healing mechanism for bones and other organs (von Muggenthaler, 2001)?”

To a large extent, the health benefits of purring might be attributable to physical vibration. In her research, von Muggenthaler recorded and measured the vibration frequency of the purr of forty-four felid species including cheetahs, ocelots, pumas, domestic cats, and servals. She was able to do this by gluing accelerometers onto the cats, and “results indicated that, despite size and different genetics, all of the individual cats have strong purr frequencies that fall within the range of a multitude of therapeutic frequencies for promoting bone strength (von Muggenthaler & Wright, 2001).” Von Muggenthaler found that all of the species of cats tested had purr frequencies between 20 Hz and 200 Hz, with the exception of the cheetah. With this data, she then contacted other specialists to compare these frequencies with those being investigated in bone growth research.

Remarkably, other scientists contacted by von Muggenthaler found low magnitude vibrations, at frequencies similar to those of a cat’s purr, stimulate bone growth and healing. For instance, Dr. Rubin’s research on non-invasive, non-pharmacological intervention to control osteoporosis (which was referenced in National Geographic’s January 2001 article about surviving space travel) showed that the application of extremely low level strains to animals and humans will increase bone formation, and thus may represent the much sought after “anabolic” stimulus in bone (Rubin, 2001a). In Dr. Rubin’s experiments, chickens that were placed on a vibrating plank – with a frequency similar to that of the cat’s purr – for 20 minutes a day and bone growth in these animals was compared to that in control chickens that did not receive such treatment. The results of these experiments showed remarkably higher levels of bone growth in the chickens that had been exposed to vibration. In other studies, Dr. Rubin found that adult female sheep treated with vibrations for only 20 minutes per day developed significantly greater trabecular bone tissue and stiffness, compared to control sheep (Rubin, 2001b). Rubin’s experiments led him to conclude that “low-level signals will stimulate bone formation... Preliminary studies in children with disabling conditions and post-menopausal women
indicate that such signals can be efficacious in reversing and/or preventing bone loss (Rubin, 2006).” From Rubin’s results, one can conclude that vibration at low levels hold great potential to be a non-pharmacological treatment for osteoporosis, a disease characterized by bone loss and that the vibration of a cat’s purr might provide a similar benefit to bone health in cats.

Other scientists have found similar benefits of low amplitude, low frequency vibration to bone healing. More recently, Shadmehr and co-workers (Shadmehr, 2009) reported that a novel device capable of delivering low-amplitude vibration for 15 minutes per day to a fracture site of tibia bones in rabbits resulted in improved healing as measured both by radiographs and by mechanical testing. Such low amplitude vibrations have also been found to promote healing for muscle, tendon, and ligament injuries, as well as provide benefit for muscle strengthening and toning. For example, in a study conducted by physical therapists and published in the Journal of Physical Therapy Science 2013, vibrational stimulation was found to have a positive effect on recovery of muscle function from delayed onset muscle soreness (DOM) is usually due to excessive use or rigorous exercise of the affected muscles, and as commonly experienced, DOM inflicts pain ranging from stiffness and mild discomfort to incapacitating pain that limits normal activity (Koh, 2013). In Koh’s experiments, a vibration massager was applied for 10 minutes at a frequency of 20 Hz for three days and maximal voluntary isometric contract (MVIC) was measured in three different groups of animals: a vibrational therapy group, an ultrasound group and a control group. After three days of the vibrational therapy, the MVIC animals were capable of applying the most force, that is, the highest level of muscle recovery, implying a more rapid improvement from DOS compared to ultrasound or no treatment. Based on these findings, the authors concluded that, “vibration exercise induces additional neural adaption by stimulating the muscular system and enhances morphological function development of muscular fiber; thereby improving overall muscle function (Koh, 2013).”

In addition to effects on bones, muscles, and tendons, vibration has been shown to relieve pain by about 40% in a study conducted at the University of Florida (Staud, 2011).
In these experiments, researchers first applied pain-inducing heat to the forearms of participants, including one group of participants with fibromyalgia, a second group with head or neck pain, and a third group of people who were otherwise pain free. Next, they used a special motor to deliver high-frequency vibration to the skin and the deep tissues of the arm and found that the vibration did, indeed, relieve the pain caused by the heat. Postulating how vibration might relieve pain, one researcher noted that, “results from various types of animal studies, including brain studies, suggest that vibration might interfere with transmission of pain signals from various parts of the body to the central nervous system (Staud, 2011).” Another hypothesis to explain the attenuation of pain is that the vibration sends endorphins to the brain. Although researchers have been unable to resolve how exactly vibration relieves pain, for people that suffer from chronic pain, the discovery of this phenomenon is a monumental discovery.

Remarkably, the frequencies of vibration for the cat’s purr consistently match the vibration frequencies found to be beneficial for joint injuries, wound healing, and reduction of infection, swelling, and pain relief. As noted above, cats’ purr frequencies can range from anywhere between 20-200 Hz, depending on the species. The frequencies for therapeutic pain relief are from 50-150 Hz while generation of muscle ranges from 2-100 Hz and therapeutic relief for COPD is 100 Hz, and the frequencies that are advantageous for bone growth and fracture healing are around 50 Hz. According to Muggenthaler, the dominant and fundamental frequency for three species of cats is exactly 25 to 50 Hz, corresponding particularly well with frequencies associated with benefits to bone and muscle.

Although scientific data provides some important evidence that the low amplitude, low frequency vibration of the cat’s purr could be beneficial to bone, muscle, and tendon health, these results provide just the beginning to answering the question, “Why do cats purr?” One could reasonably argue that even more rigorous research is needed, investigating effects of devices that more closely mimic the cat’s purr than what has been done in previous experiments. There is still much research to be done, but thanks to research such as that done by Elizabeth von Muggenthaler’s, we have reason to believe the felids’ purr is not just an expression of contentment. As humans, we can potentially benefit
from this discovery, because if these frequencies do help with pain and bone growth, then having a cat on your lap could actually help your healing process and/or relieve your pain. As suggested by Muggenthaler, purring might provide a natural bio-mechanical healing mechanism that can help people who have orthopedic injuries or suffer from chronic pain.
Works Cited


Von Muggenthaler, Elizabeth & Wright, Bill. “Solving the Cat’s Purr Mystery using Accelerometers.” <http://www.bksv.com/newsevents/waves/otherarticles/thecatspurrmystery>