



INTEGRATIVE MEDICINE

# Use of Acupuncture for Pain Management

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Successful pain management encompasses pharmacologic and nonpharmacologic interventions. This is especially true for chronic, neuropathic, or persistent pain.<sup>1</sup> While pharmacologic options remain the mainstays, nonpharmacologic interventions are an important part of a comprehensive pain management plan.

Acupuncture is a safe, nonpharmacologic intervention with minimal adverse effects that most animals tolerate well.<sup>2,3</sup> It has become more accepted for pain relief in veterinary medicine. In fact, the pain management guidelines published by the American Animal Hospital Association, American Association of Feline Practitioners, and World Small Animal Veterinary Association endorse acupuncture as a safe adjunct treatment for pain management in dogs and cats that should be strongly considered as a part of a multimodal pain management regimen.<sup>4,5</sup>

Acupuncture can be used independently or integrated into conventional analgesia protocols. It has significant analgesic effects on inflammatory, neuropathic, cancer, and visceral pain states.<sup>6</sup> It can help ease acute pain from neuromusculoskeletal injuries and surgery, as well as chronic spinal and osteoarthritic pain. Veterinary clinical trials also provide evidence for its effectiveness.<sup>2,7-20</sup>

## HOW DOES ACUPUNCTURE WORK?

Acupuncture is the stimulation of certain points on the body that correspond to neurovascular bundles, blood plexuses, sites of nerve branching, and motor endplate zones (**TABLE 1**).<sup>21</sup> Recent evidence suggests that the effects of acupuncture are likely mediated by the nervous system at peripheral, spinal, and supraspinal levels.<sup>6,22</sup> Neurophysiologic effects of analgesia in response to acupoint stimulation include release of endogenous opioids and neurotransmitters (e.g., endorphin/endomorphin, enkephalin, 5-hydroxytryptamine), activation of the descending pain inhibitory pathway, and inhibition of inflammatory mediators (e.g., cyclooxygenase-2, interleukin-1 $\beta$ , interleukin-6).<sup>6,22</sup> Acupuncture also causes micro-trauma and vasodilation to improve local circulation and catalyze healing.<sup>23</sup> Recent evidence suggests inhibition of microglial activation by acupuncture may play a key role in neuropathic pain diseases.<sup>24</sup>

## CLINICAL EFFICACY

In 1 noncontrolled study, acupuncture alone or combined with analgesics reduced chronic pain and improved quality of life in dogs with neurologic and musculoskeletal diseases.<sup>8</sup> Results were similar for acupuncture plus manual therapy in dogs with musculoskeletal pain; the authors found immediate

short-term improvement in comfort level and mobility compared with before treatment.<sup>9</sup>

In 2 controlled studies in dogs with hip dysplasia, a gold bead implanted at acupoints significantly reduced osteoarthritic pain.<sup>10,11</sup> A 2-year follow-up study revealed that gold-bead acupuncture provided long-term pain relief, an effect not observed in dogs receiving placebo.<sup>12</sup>

In another controlled study, neither acupuncture nor carprofen significantly differed from placebo on gait analysis of dogs with hip dysplasia, but only acupuncture was associated with a decrease in validated chronic pain scores.<sup>13</sup> A controlled, blinded study in

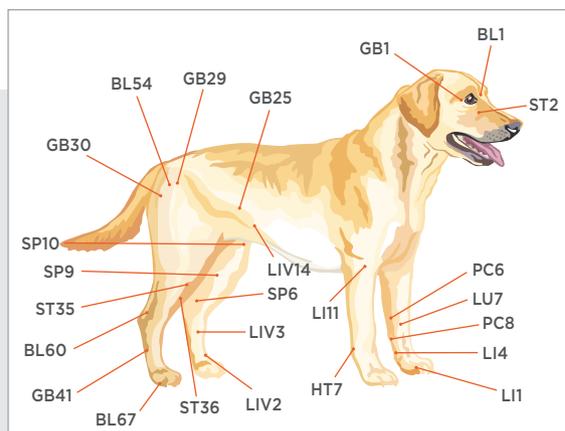
dogs undergoing hemilaminectomy found significantly lower postoperative pain scores in the acupuncture than the control group.<sup>14</sup>

Two studies showed that among cats undergoing ovariohysterectomy, the need for rescue analgesia after surgery was lower in the acupuncture than the control group.<sup>15,16</sup> Similar results were found in dogs undergoing mastectomy.<sup>17</sup>

In horses, 2 controlled studies found acupuncture was effective in treating back pain.<sup>18,19</sup> A recent study showed horses with chronic laminitis were improved by acupuncture after receiving 2 acupuncture treatments 1 week apart.<sup>20</sup>

**TABLE 1 Common Acupuncture Points Used for Variable Pain States and Locations**

AFFECTED AREA OR CONDITION	COMMON ACUPOINTS
General pain	LI-4, LIV-3, ST-36, BL-60
Inflammation	LI-4, LI-11, ST-36, GV-14, <i>Er-jian</i>
Calming effect	GV-20, GV-21, <i>An-shen</i> , <i>Bai-hui</i>
Bone and arthritic pain	BL-11, BL-23, KID-3 (combined with local acupoints)
Dental pain	ST-6, ST-7, LI-4, LIV-3, ST-36 EA: LI-4 bilateral, ST-36 bilateral
Otitis and ear pain	TH-21, SI-19, GB-2, ST-36, <i>An-shen</i> EA: ST-36 bilateral, SI-19 to <i>An-Shen</i>
Abdominal or visceral pain	ST-36, LIV-8, BL-24, ST-25, LI-10 EA: ST-36 bilateral, LI-10 bilateral
Neck	GB-20, GB-21, GV-14, SI-3, LU-7, BL-60, <i>Jing-jia-ji</i> EA: GB-20 to GB-21, <i>Jing-jia-ji</i> bilateral
Shoulder	LI-15, TH-14, SI-9, BL-11 EA: LI-15 to SI-9, BL-11 bilateral
Elbow	LI-10, LI-11, LU-5, HT-3, TH-10, SI-9 EA: LI-10 to SI-9, LI-11 to HT-3
Carpus	LI-4, TH-5, HT-7, SI-9 EA: LI-4 to SI-9, TH-5 to HT-7
Coxofemoral	GB-29, GB-30, BL-54, BL-40, ST-41 EA: BL-54 bilateral, GB-29 to GB-30, ST-41 bilateral
Stifle	ST-35a, ST-35b, ST-36, GB-34, BL-40, BL-54 EA: ST-36 bilateral, ST-35a/b to BL-40, BL-54 bilateral
Tarsus	BL-60, KID-3, LIV-3, ST-41, BL-54 EA: ST-41 to KID-3, BL-54 bilateral
Vertebral column (intervertebral disk disease)	GV-14, LI-4, ST-36, LIV-3, <i>Bai-hui</i> , <i>Hua-tuo-jia-ji</i> , <i>Liu-feng</i> (front or hind limbs), PC-8, KID-1 EA: GV-14 to <i>Bai-hui</i> , <i>Hua-tuo-jia-ji</i> bilateral, ST-36 bilateral, KID-1 or PC-8 bilateral
Treatment settings	1. DN: 20 to 30 min 2. EA: 2 to 20 Hz (dense-disperse waves) for 20 to 30 min



**FIGURE 1.** Location of common acupoints on a dog. Acupoints are where nerves and blood vessels converge.

## METHODS OF STIMULATION

Acupoints can be stimulated by dry needle (DN), electroacupuncture (EA), aqua-acupuncture (AQ), laser acupuncture (LA), moxibustion, and material implantation (FIGURE 1).<sup>2,7</sup> Each method traditionally serves a different purpose. DN involves the insertion of fine, sterile needles into acupoints. These needles vary in size (28- to 36-gauge) and length (0.25 to 1.5 inches). The needles are typically left in place for approximately 10 to 30 minutes.

In EA, acupoints are stimulated by applying electricity through needles for 10 to 30 minutes. EA has more profound and prolonged analgesic effects than other techniques.<sup>6</sup> It is useful for neuralgia, nervous system injury, and persistent pain.<sup>6,7</sup> Low-frequency EA (2 to 10 Hz) produces longer-lasting alleviation of inflammatory pain and inhibits nerve injury–related allodynia/hyperalgesia more potently than do higher frequencies (100 Hz).<sup>6</sup>

With AA, 0.1 to 0.5 mL of sterile fluid (e.g., saline, vitamin B<sub>12</sub>) is injected into acupoints. It is commonly used after DN or EA to prolong the effect of acupoint stimulation.

LA, the modern practice of stimulating acupoints using low-level energy of wavelengths (630 to 960 nm), may provide anti-inflammatory and antinociceptive effects.<sup>15</sup>

## HOW IS ACUPUNCTURE INTEGRATED?

Veterinarians who have received formal training can incorporate acupuncture into conventional practice

settings. Basic or advanced veterinary acupuncture courses are available at the Chi Institute of Traditional Chinese Veterinary Medicine, or through the International Veterinary Acupuncture Society.

Before acupuncture, underlying pain or medical conditions are always diagnosed as part of conventional care. Once standard treatment measures are underway, acupuncture can be used as an integrative modality to reduce acute or chronic pain. For outpatients, it can be offered at the clinic, once or twice a week. For inpatients, it can be performed in the hospital, once a day before discharge. Practices that do not offer acupuncture can refer patients to veterinarians with CVA (certified veterinary acupuncturist) credentials.

Veterinarians who perform acupuncture must obtain informed consent beforehand. The discussion of acupuncture in the context of conventional medicine must focus not only on the efficacy of acupuncture but also expectations and potential adverse effects. A multimodal approach with acupuncture may allow for a reduction in dose of conventional analgesics and therefore a decrease in their adverse effects.<sup>6</sup> For patients that are resistant to pain medications or cannot tolerate their side effects, acupuncture can be a reasonable alternative treatment.

As with any therapy, not every patient responds to acupuncture; therefore, realistic expectations need to be set for clients. The author often requires clients to commit to sessions once or twice a week for at least 4 to 6 treatments, especially for chronic conditions. Although many patients may not need even 4 treatments to experience benefits, shorter durations and lower intensities of treatment may result in suboptimal outcomes. Acupuncture has both immediate and cumulative analgesic effects following repeated treatments.<sup>25</sup>

## SAFETY AND CONTRAINDICATIONS

Acupuncture is safe when performed correctly by licensed veterinarians certified in veterinary acupuncture. Common minor adverse effects after acupuncture include tiredness, increased water intake, soreness, muscle spasm, and minor bleeding, which typically resolve quickly.<sup>2,3</sup> Other rare complications include infection, dermatitis, and broken needle fragments. Acupuncture needles should not be placed on infected or inflamed skin, open wounds, or sites of tumor and fractures; around the abdomen of a

pregnant animal; or in specific points that may contribute to premature parturition (i.e., ST-36, SP-6, BL-40, BL-60, and BL-67).<sup>2</sup> Deep needle insertion into acupoints around the lung fields (e.g., SP-21, LIV-13, LIV-14, GB-24, BL-12 to BL-19) is contraindicated. Acupuncture should be used cautiously or avoided in patients with clotting abnormalities. Do not apply EA across the thorax area (heart position) in animals with heart disease or pacemakers.<sup>2</sup> Be cautious when using acupoints around the eyes.

## CASE EXAMPLES

### Case 1: Chronic Pain Associated With Polyarticular Osteoarthritis

A 13-year-old female spayed Weimaraner had osteoarthritis in multiple joints (elbows, carpi, hips, and stifles) and back pain. Despite the combination of firocoxib, gabapentin, tramadol, and glucosamine-chondroitin, her pain was worsening and her mobility was deteriorating. She developed urinary incontinence and was awoken more often during the night.

An internist suggested acupuncture as a last resort before euthanasia. The dog received acupuncture twice weekly for 4 weeks initially, then every 2 to 4 weeks. After 3 treatments, the dog could rise up and walk without assistance and sleep normally. Her urination incontinence was resolved after 6 treatments. She continued to receive acupuncture monthly for pain management. She died at home at age 16.

Her acupuncture treatment consisted of the following:

- 1. DN:** GV-20, TH-5, SI-9, GB-34, BL-40, LIV-3, Bai-hui
- 2. EA:** LI-4 to LI-11, ST-36 to ST-41, BL-11 bilaterally, BL-23 to *Shen-shu* (crossing), BL-54 bilaterally; 2 to 20 Hz for 20 minutes
- 3. AA:** TH-4, LU-5, LI-10, SI-9, BL-23, BL-54, ST-36, BL-39, KID-3; 0.1 to 0.2 mL per acupoint

### Case 2: Pain and Neurologic Deficits Associated With Meningoencephalitis of Unknown Cause

A 4-year-old male neutered Yorkshire terrier was diagnosed with meningoencephalitis of unknown cause at the cervical region. He had nonambulatory tetraparesis with severe cervical pain and was hospitalized. He received IV fluids, immunosuppressive



## Glossary

<b>BL</b>	bladder
<b>GB</b>	gallbladder
<b>GV</b>	governing vessel
<b>HT</b>	heart
<b>KID</b>	kidney
<b>LI</b>	large intestine
<b>LIV</b>	liver
<b>LU</b>	lung
<b>PC</b>	pericardium
<b>SI</b>	small intestine
<b>SP</b>	spleen
<b>ST</b>	stomach
<b>TH</b>	triple heater

doses of dexamethasone, fentanyl constant rate infusion, cytosine arabinoside, and gabapentin. On day 4 of hospitalization, he was referred for acupuncture treatment. Despite medications, his neck was still severely painful on manipulation and he continued to have nonambulatory tetraparesis.

Shortly after his first acupuncture treatment, he could stand on his own unassisted and his cervical pain was markedly improved—he could move his neck without yelping. His fentanyl was discontinued the next day because of an improved pain level. The next day, after his second acupuncture, he became ambulatory on 4 limbs with minimal assistance. He continued to make significant progress over the next 3 days with daily acupuncture. On day 7, he had full range of motion of his neck and was ambulatory with mild ataxia.

His acupuncture treatment consisted of the following:

- 1. DN:** GV-20, LU-7, SI-3, LI-4, LIV-3, ST-36, *Jing-jia-ji*
- 2. EA:** GV-16 to *Bai-hui*, GB-20 to GB-21 (crossing), BL-23 bilaterally, PC-8 bilaterally, KID-1 bilaterally; 2 to 20 Hz for 20 minutes
- 3. AA:** *Jing-jia-ji*, GV-14, *Liu-feng*; 0.1-0.2cc per acupoint

## SUMMARY

Given the low risk for adverse effects and observed benefits for acute and chronic pain, acupuncture can

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play a large role in pain management and can be incorporated into veterinary practice as part of a multimodal approach. With the increasing number of clinical trials and laboratory research, we better understand the mechanism of action and therapeutic effects of acupuncture. Nonetheless, larger randomized controlled trials are needed to verify its efficacy in veterinary medicine. **TVP**

## ACUPUNCTURE RESOURCES

- World Association of Traditional Chinese Veterinary Medicine (AATCVM): [watcvm.org](http://watcvm.org)
- American Academy of Veterinary Acupuncture (AAVA): [aava.org](http://aava.org)
- American Holistic Veterinary Medical Association (AHVMA): [ahvma.org](http://ahvma.org)
- National Center for Complementary and Integrative Health (NCCIH): [nccih.nih.gov](http://nccih.nih.gov)
- *Xie's Veterinary Acupuncture*, 1<sup>st</sup> ed.
- *Veterinary Acupuncture: Ancient Art to Modern Medicine*, 2<sup>nd</sup> ed.

### Ronald Koh

An assistant professor and section chief of the Integrative Medicine and Rehabilitation Service at the Louisiana State University School of Veterinary Medicine, Ronald Koh received his veterinary degree in Taiwan and completed a specialty internship and master's program in acupuncture at University of Florida College of Veterinary Medicine in 2010 and 2012, respectively. He will be finishing his residency in Veterinary Sports Medicine and Rehabilitation in 2019. His clinical interests include using acupuncture, integrative therapies, rehabilitation, nutrition, and supplements for pain management, neurological disorders, geriatric conditions, and palliative and hospice care.



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