1

Acupuncture

CHAPTER MENU

Introduction

Acupuncture has been used in veterinary medicine for almost 3000 years and is defined as the insertion of a needle, or other object, into the skin on a specific area of the body which causes a beneficial response. The stimulation of acupuncture points can cause positive local and systemic effects. Veterinary acupuncture is commonly used to help with the management of anxiety, gastrointestinal disorders, generalized and chronic pain, immune system support and disorders, musculoskeletal disorders, neurologic disorders, reproductive disorders, and respiratory arrest.

The introduction of acupuncture into a veterinary practice can be beneficial for both the patient and the health of the practice. The successful incorporation and utilization of veterinary acupuncture does not end with the veterinaria's training. Support staff training and client education are crucial. This chapter discusses the what, why, and how for effective integration of veterinary acupuncture within your practice.

The What

Word Origin

Acupuncture is derived from the Latin words *acus*, meaning needle, and *pungare*, meaning pierce.

Definition

In its most elemental form, acupuncture is the insertion of a needle, or other object, into the skin on a specific area of the body causing a beneficial response.

Human History

The first recorded use of human acupuncture was in the Neolithic period in China around

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8000 years ago and involved 2-inch-long flat stone needles (called *ban-shie*). The first acupuncture book was inscribed on the inside of tortoise shells during the Xia-Shang Dynasty (2100–1046 BCE) (Xie 2011a,b). The introduction of metal during the Shang Dynasty (1600–1100 BCE) led to the creation of nine types of metal needles used for acupressure, acupuncture, and surgery (Xie 2011a). The study and practice of acupuncture has continued to develop and mature with time.

Acupuncture is considered one of the five branches of medicine within traditional Chinese medicine (TCM): acupuncture, Chinese herbs, Tui-na (massage), Qi-gong, and Chinese dietary therapy. These five branches are used together to restore and maintain a person's health and balance within nature.

The use of acupressure outside China is suspected to have developed independently over 5000 years ago. The best-known example is Ötzi, the Similaun Man. A group of German tourists found an entombed Iceman while hiking off-trail through the Alps in 1991. Little did they know that Ötzi was the oldest naturally preserved human mummy in Europe, who lived between 3400 and 3100 BCE. Ötzi was found with well-preserved clothes, small tools, and weapons. Over three decades of research have been conducted on Ötzi and his belongings. He is believed to have died from trauma and blood loss shortly after being shot with an arrow that shattered his left shoulder blade and punctured his lung (Wikipedia 2018). Figure 1.1 depicts a life-size reconstruction of Ötzi in his Neolithic clothing, with his belongings uncovered near him.

Even more interesting than his preservation and death was the discovery that his body was covered with 61 linear carbon tattoo markings. The use of radiography, computed tomography, and endoscopy revealed the tattoos were located over areas of underlying musculoskeletal abnormalities, such as arthritis and referred nerve (radicular) pain (Kean et al. 2013).

Figure 1.1 Meet Otzi, the over 5000-year-old iceman, whose medicinal tattoos mark regions of local and referred pain. Scientists believe acupressure was used on the carbon tattoos to provide temporary relief. Source: Melotzi/Wikimedia Commons/CC BY-SA 4.0.

Kean et al. (2013) theorized that the markings were a form of "medicinal tattoos," mapping areas of chronic pain on his body. These authors speculated the tattoos were used as landmarks for acupuncture and acupressure treatment to relieve pain. In essence these were ancient "push here when injured" buttons covering his body. The markings would have allowed Ötzi to effectively communicate to other humans where to press, massage, or rub when experiencing pain. Ötzi's medicinal tattoos prove that the beneficial effects of manual therapy and acupuncture were developed and implemented by different cultures independently of each other.

Veterinary History

The development of veterinary acupuncture arose out of necessity to keep working horses healthy. The first recorded use of veterinary acupuncture was performed by Zhao Fu during the Zhou-mu-gong period (947–928 BCE) (Xie 2011a,b). Zhao Fu treated horse diseases through removal of blood (hemoacupuncture) in specific areas on horses' necks (Xie 2011a,b). The first veterinary acupuncture book, *Bole's Canon of Veterinary Acupuncture*, was written by Bo Le during the Qing-mu-gong period (659–621 BCE) (Xie 2011a,b). A more detailed account of the history of veterinary acupuncture can be found in Dr. Xie's book *Chinese Veterinary Herbology* (2011a,b).

The modern use and acceptance of veterinary acupuncture in the United States is largely due to the active efforts and scientific research spearheaded by the veterinarians working with Chi University and the International Veterinary Acupuncture Society (IVAS).

Terminology

The world of traditional Chinese veterinary medicine (TCVM) and acupuncture comes with its own vocabulary. A basic understanding of these terms facilitates effective communication between professionals and clients. A summary of common terms is provided below.

Acupoint: Also known as an acupuncture point. Anatomically, acupoints comprise free nerve endings, small vessels (arteries and veins), and lymphatics (this includes immune cells and channels carrying immune cells) (Clemmons 2007). Most are found along the 14 major meridians, and each channel has its own specific number of points. There are additional acupoints, called classical points, found elsewhere on the body.

Acupressure: The application of fingers and hands to specific acupoints or regions of multiple acupoints.

Acupuncture: The insertion of a sterile needle, or other object, into the skin on a specific area of the body causing a beneficial response.

Aquapuncture: The injection of sterile fluid into acupuncture points.

Bian Zheng: The utilization of one or more of the diagnostic systems to discern a TCVM diagnosis or pattern (Xie and Preast 2007a). The diagnostic systems include Five Element Theory, Yin–Yang Theory, Interior Versus Exterior Patterns, Cold Versus Hot Patterns, Deficiency Versus Excess Patterns, Five Treasures, and Zang-Fu Physiology.

Body Fluid: Fluid found within the body including tears, nasal discharge, sweat, urine, saliva, digestive juices, and joint fluid (Xie and Preast 2007d).

Damp: Used to describe environments and disease conditions. One of the six evils or conditions in TCVM. Represents conditions with excessive moisture, infection, heaviness, and often pain (Xie and Preast 2007b).

Deficiency Pattern: A condition in which the patient is lacking, often due to overwork, blood loss, or chronic illness. A patient can be deficient in one or more of the following: Qi, Blood, Yin, and Yang. Patients are often dry, thin, weak, lethargic, and have a pale tongue and weak pulse (Xie and Preast 2007a).

Drain: To remove from an area. Typically applied to Damp conditions.

Eight Principle Theory: A diagnostic system dividing the natural world into two categories (Yin or Yang) and three pairs (Interior vs. Exterior; Cold vs. Heat; and Deficiency vs. Excess) (Xie and Preast 2007a).

Electroacupuncture: An electric current is applied to pre-placed acupuncture needles using small leads.

The frequency and intensity of the current is controlled by the electroacupuncture unit. Electric stimulation mimics and exceeds repeat manual manipulation of the acupuncture needle (Shmalberg et al. 2014).

Excess Pattern: A condition in which the patient has too much of something. The condition is most often due to an exogenous (outside) pathogen (Wind, Cold, Dampness, Summer Heat, Dryness, and Fire) or secondary to another issue (overeating, blood stagnation, phlegm) (Xie and Preast 2007b). Patients often are excitable, breathe rapidly, and have a fever, distended abdomen, a red tongue with a coating, and surging pulse (Xie and Preast 2007a).

Exogenous pathogens: Also known as the 6 Exogenous Xie Qi or 6 Excessive Qi or 6 Evils. There are six weather changes that normally do not cause disease, but which under the right circumstances (i.e. extreme weather changes and/or preexisting disease) can invade the body causing illness: Wind, Cold, Summer Heat, Damp, Dryness, and Fire (Xie and Preast 2007b).

Exterior Patterns: Issues, typically chronic in nature, associated with organ systems (Xie and Preast 2007a).

Five Element Theory: Everything in the natural world can be broken down into five elements (Wood, Fire, Earth, Metal, and Water) which promote, restrain, and regulate each other, maintaining order (Xie and Preast 2007c).

Five Treasures: The organization of life into five substances: Qi, Shen, Jing, Blood, and Body Fluid (Xie and Preast 2007d).

Fu organs: Yang organs located within the interior of the body. These organs are hollow or tube-like and function to transport or excrete. Examples include the large intestine, stomach, small intestine, triple heater, gallbladder, and urinary bladder (Xie and Preast 2007g).

Interior Patterns: Issues, often acute in nature, affecting the inside of the body (Xie and Preast 2007a).

Jing (aka Essence): There are two forms of Jing: Prenatal and Postnatal Jing. You are born with Prenatal Jing, also known as Kidney Jing or Congenital Jing (Xie and Preast 2007d). Postnatal Jing (aka Zang-Fu jing or Acquired Jing) is acquired through the ingestion of food and stored in each Zang-Fu organ (Xie and Preast 2007d).

Jing Luo: A system of interconnected channels covering the outer surface of the body. The channels function as a conduit through which Qi (energy) and Blood circulate throughout the entire body (Xie and Preast 2007e).

Meridians: A set of 12 paired and two unpaired pathways or channels on the outer surface of the body through which blood and energy (Qi) flow to the main organ systems (Zang-Fu organs), joints, muscles, bone, and brain (Xie and Preast 2007e).

Meridian clock: Also known as the TCM circadian clock. Qi flows through the 12 Zang-Fu organ channels in a specific order: lung → large intestine → stomach → spleen → heart → small intestine → bladder → kidney → pericardium → triple burner → gallbladder → liver. There is a two-hour period during which the passage of qi through each meridian and corresponding organ is greatest (Xie and Preast 2007e).

Phlegm: An abnormal form of body fluid which can accumulate within the body (Xie and Preast 2007d). Often any "strange" condition or illness is due to phlegm.

Qi (Energy): There are eight primary forms of Qi: Yuan Qi, Zong Qi, Gu Qi, Ying Qi, Wei Qi, Zang-Fu Qi, Jing Luo Qi, and Zheng Qi (Xie and Preast 2007d).

Shen (aka Spirit or Affect): An outward expression of an individual's mental state (Xie and Preast 2007d).

TCVM: A Chinese medicine system used to treat animals and comprising four branches: acupuncture, Chinese herbal medicine or therapy, Tui-na, and food therapy.

TCVM therapeutic actions: A beneficial effect associated with a specific TCVM therapy.

Tonify: To increase energy (Qi), blood flow, Yin, Yang, or organ function in an area. A substance which tonifies is often referred to as a "tonic."

Wind: Used to describe environments and disease conditions. One of the six evils or conditions in TCVM. Often considered the primary cause of disease. Wind can invade the body from the outside world (Exogenous Wind) or originate within the body (Internal Wind) (Xie and Preast 2007b). The presence of Wind often allows other pathogens or conditions to develop concurrently.

Yang: Half of the Yin–Yang division. The descriptor can be applied to all manner of items both animate and inanimate. Characteristics considered Yang include day, brightness, summer, hot, fast, male, healthy, strength, birth, top or back, Qi, pungent or bitter, and Fu organs (Xie and Preast 2007f).

Yin: Half of the Yin–Yang division. The descriptor can be applied to all manner of items both animate and inanimate. Characteristics considered yin include night, darkness, winter, cold, slow, female, illness, weakness, death, bottom or belly, blood, salty and sweet, and Zang organs (Xie and Preast 2007f).

Yin–Yang Theory: Divides all things into two halves which oppose, complement, control, create, and transform into each other (Xie and Preast 2007f).

Zang-Fu physiology: The classification of the 12 organs as either Zang or Fu.

Zang organs: Yin organs located within the interior of the body, are solid in structure, and whose primary function is manufacturing and storage: lung, spleen, heart, pericardium, liver, and kidney (Xie and Preast 2007g).

Acupuncture and TCVM

An understanding of TCM and TCVM is crucial to understanding traditional acupuncture techniques. An in-depth discussion of TCVM is beyond the scope of this book, but a very brief introduction to the TCVM theories most applicable to acupuncture is discussed. Additional TCVM concepts are covered in Chapters 2 and 3.

Yin–Yang Theory

A philosophical view dividing all things into two halves which oppose, complement, control, create, and transform into each other (Xie and Preast 2007f). The Tai Ji symbol is a visual representation of Yin–Yang theory. Characteristics of both Yin and Yang are shown in Figure 1.2.

Five Element Theory

The Five Element Theory breaks down everything in the natural world into five elements: Wood, Fire, Earth, Metal, and Water. The five elements promote, restrain, and regulate each other, keeping the natural world in perfect working order and establishing homeostasis (Xie and Preast 2007c). Table 1.1 outlines the characteristics defining each element.

Zang-Fu Physiology

The classification of the 12 organ systems as either solid structures used for storage (Zang) or

Figure 1.2 The Yin and Yang philosophy and archetypal Tai Ji symbol (Xie and Preast 2007f). Source: Lisa P. McFaddin.

hollow tube-like structures used to transmit and excrete (Fu). Zang organs include lung, spleen, heart, pericardium, liver, and kidney. Fu organs include large intestine, stomach, small intestine, triple heater, gallbladder, and urinary bladder.

The Zang-Fu systems are further divided into Yin and Yang organs. Zang or Yin organs are defined as those located within the interior of the body, are solid in structure, and whose primary function is to manufacture and store (Xie and Preast 2007g). Fu or Yang organs are hollow or tube-like and function to transport or excrete (Xie and Preast 2007g). Just as Yin and Yang complement each other, creating two halves of a whole, Zang and Fu are grouped together as wives and husbands. Each pair of Zang-Fu organs are further classified by their relationship to the five elements of the world: Wood, Fire, Earth, Metal, and Water.

Meridians

The Jing Luo is an intricate system of interconnected channels covering the outer surface of the body. The channels function as a conduit through which Qi (energy) and Blood circulate throughout the entire body. There are 14 major meridians which circle the body in specific patterns. The 12 meridians supply blood and energy to the 12 main organ systems, called Zang-Fu organs, as well as joints, muscles, bone, and brain. The Du, or Governing Vessel, is located on the dorsal midline and the Ren, or Conception Vessel, is located on the ventral midline (Xie and Preast 2007e).

The Yin or Zang organ meridians are located more toward the center or inside of the body and limbs; while the Yang or Fu organ meridians are located on the outside of the body and limbs (Xie and Preast 2007). The 12 paired meridians are the most used channels due to their direct communication with the internal organ systems.

Meridians for Veterinarians

The Jing Luo comprises main highways, called Jing Mai, and smaller roads, called Luo Mai (Xie and Preast 2007e). The Jing Mai can be further broken down into 12 paired Regular Channels or meridians and eight unpaired Extraordinary Channels (Xie and Preast 2007e).

The eight extraordinary channels do not pair with internal organs, and many have branches which connect to the 12 regular channels. The Luo Mai are divided into the Branch Collaterals and 12 Muscle and Cutaneous Regions (Xie and Preast 2007e). The Luo Mai are additional subdivisions off the 12 Zang-Fu channels. See Figure 1.3 for a diagram of the Jing Luo.

Qi

Qi continuously runs throughout the body. Once Qi stops flowing the animal dies. Qi flows through the 12 Zang-Fu organ channels in a

Table 1.1 The Five Element Theory breaks down everything in the natural world into five elements: Wood, Fire, Earth, Metal, and Water. The Five Elements promote, restrain, and regulate each other keeping the natural world in perfect working order, establishing homeostasis (Xie and Preast 2007c). An incomplete list of characteristics commonly defining each element is provided.

	Wood	Fire	Earth	Metal	Water
Season	Spring	Summer	Late summer	Fall	Winter
Color	Green	Red	Yellow	White	Black
Orifice	Eyes	Tongue	Mouth	Nose	Ears
Sense	Vision	Speech	Taste	Smell	Hearing
Tissue	Tendons and ligaments	Blood vessels	Muscles	Skin and hair	Bones
Function	Purifying	Circulating	Digesting	Breathing	Excretion
Secretion	Tears	Sweat	Saliva	Nasal fluid	Urine
Zang organ	Liver	Heart and pericardium	Spleen	Lung	Kidney
Fu organ	Gallbladder	Small intestine and triple heater	Stomach	Large intestine	Bladder

Source: Lisa P. McFaddin.

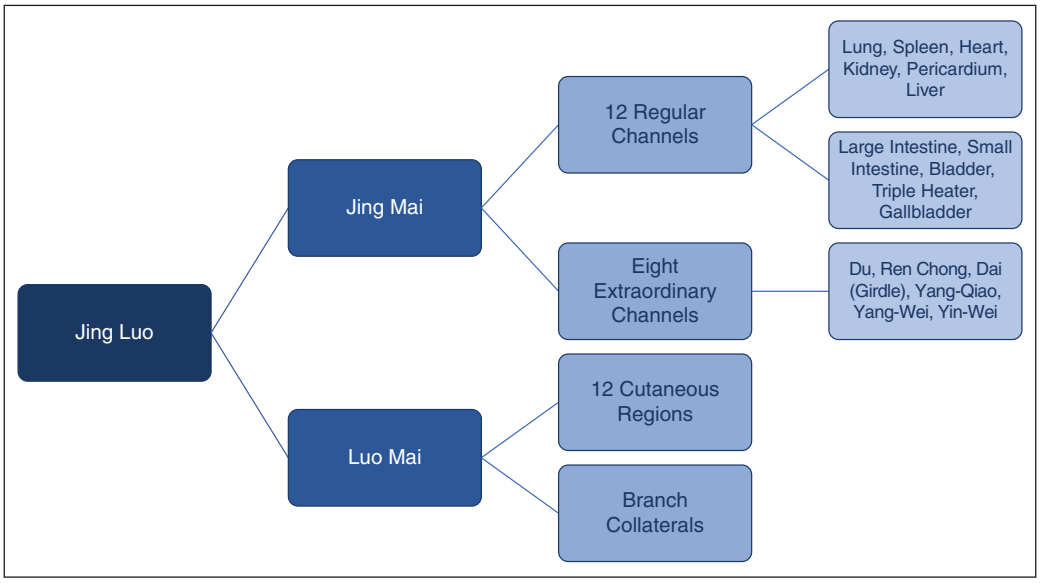


Figure 1.3 A schematic representation of the subdivisions of the Jing Luo (Xie and Preast 2007e). Source: Lisa P. McFaddin.

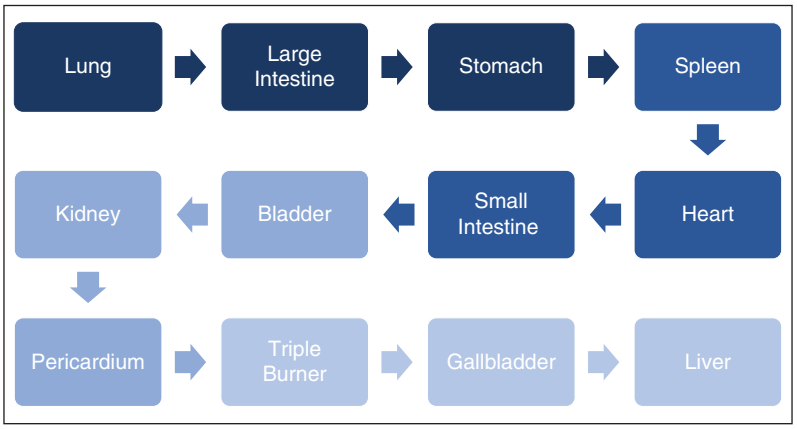


Figure 1.4 The order through which Qi flows through the 12 major meridians. Source: Lisa P. McFaddin.

specific order as depicted in Figure 1.4. There is a two-hour time period during which the passage of Qi through each meridian and corresponding organ is greatest. This is known as the TCM circadian clock, depicted in Figure 1.5.

Acupoints

Most acupuncture points, or acupoints, are found along the 14 major meridians. Each channel has its own specific number of acupoints. Table 1.2 breaks down the acupoints on the 14 major meridians, while Figure 1.6 illustrates the approximate location of each meridian on the dog.

There are additional acupoints, known as Classical Points, not found on the common meridians. Acupoints found on the 14 major meridians are named using the initials of the channel and the number of the acupoint, for example LU-1 is the first acupoint on the lung channel. The total number of acupoints varies

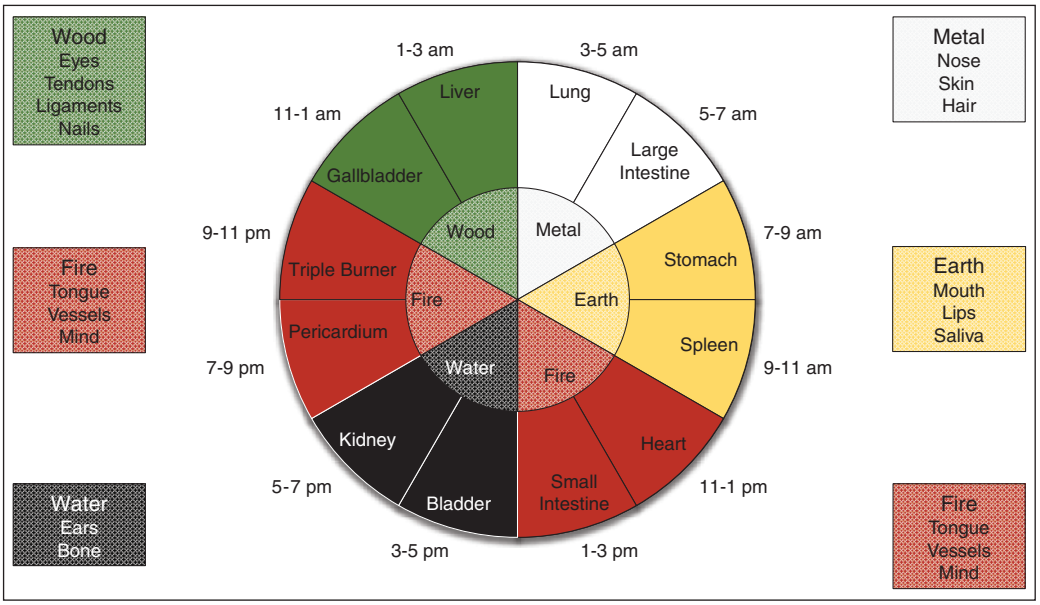


Figure 1.5 A visual representation of the order in which Qi or energy flows throughout the 12 Zang-Fu meridians throughout the day. Source: Lisa P. McFaddin.

Table 1.2 The primary location, origin, termination region, and number of acupoints on the 14 main meridians of the dog (Xie and Preast 2007e).

Channel	Primary location	Starting location	Ending location	Acupoints
Lung (LU)	Thoracic limb	Chest	First digit nail bed	11
Large intestine (LI)	Thoracic limb	Second digit nail bed	Outside of the nostril	20
Stomach (ST)	Pelvic limb	Below the pupil on the orbit	Second digit nail bed	45
Spleen (SP)	Pelvic limb	First or second digit nail bed	Outside of the chest	21
Heart (HT)	Thoracic limb	Center of the armpit	Fifth digit nail bed	9
Small intestine (SI)	Thoracic limb	Fifth digit	Tragus of the ear	19
Bladder (BL)	Pelvic limb	Inside corner of the eye	Fifth digit nail bed	67
Kidney (KID)	Pelvic limb	Behind the pad	Chest	27
Pericardium (PC)	Thoracic limb	Chest	Behind the pad	9
Triple heater (TH)	Thoracic limb	Fourth digit nail bed	Outside of the eyebrow	23
Gallbladder (GB)	Pelvic limb	Outside corner of the eye	Fourth digit nail bed	44
Liver (LIV)	Pelvic limb	First digit nail bed	Chest	14
Governing vessel (GV)	Dorsal midline	Just above the anus	Inside the upper gum	28
Conception vessel (CV)	Ventral midline	Between the anus and genitals	Chin	24

Source: Lisa P. McFaddin.

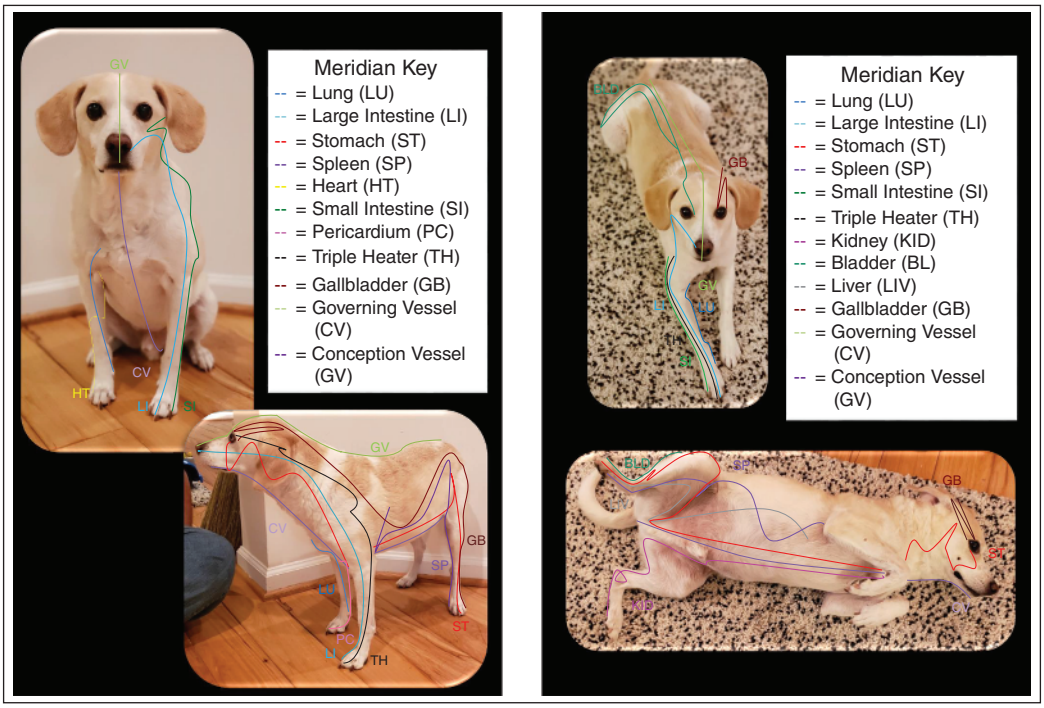


Figure 1.6 Winston modeling the approximate location of the 14 major meridians of the dog. Source: Lisa P. McFaddin.

by species. Depending on the acupuncture technique, humans have between 360 and 2000 acupoints, while dogs and cats have approximately 400 acupoints.

From a TCVM perspective the stimulation of acupoints directly affects the flow of Qi, and subsequently Blood, at the acupoint itself and throughout the meridian. The stimulation of distant body regions and internal organs is explained through the interconnectedness of the meridians.

Techniques

There are multiple forms or techniques used in veterinary acupuncture. Traditional acupuncture is also called dry needling. Other techniques include acupressure, electroacupuncture, aquapuncture, hemoacupuncture, pneumoacupuncture, moxibustion, and laser acupuncture.

Acupressure

The application of fingers and hands to specific acupoints or regions of multiple acupoints. Owners can be taught to perform acupressure at home. Acupressure can be used for most conditions treated with dry needle acupuncture, but it is most commonly implemented for relaxation and the treatment of conditions causing mild pain (Kober et al. 2003; Trentini III et al. 2005; Monson et al. 2019).

Aquapuncture

The injection of sterile fluid into acupuncture points. The most commonly used injectables include saline, vitamin B12, homeopathic remedies, the patient's blood (whole), or local anesthetic. Necessary materials may include 1- or 3-ml syringes, 27g or 25g needles, and sterile injectables. Figure 1.7 depicts materials commonly used during aquapuncture. If using

Figure 1.7 Vitamin B12 aquapuncture materials including multidose sterile bottle of vitamin B12, sterile single-use syringes (1 and 3 ml), and small needles (27g) used for injection. Source: Lisa P. McFaddin.

a multiple-dose syringe the needle should be changed every one to two acupoints.

Aquapuncture is used to lengthen and intensify the effects of traditional acupuncture by causing physical changes within the acupoint and stimulating the nervous system (Chen et al. 2014). This technique is also frequently used in patients who will not tolerate needle placement.

Dry Needle

Also known as traditional needle stimulation, this is the most common technique. A variety of sterile single-use filiform needles are used to puncture the skin at specific acupoints on the body. Needle manufacturer, gauge, and length are based on practitioner preference, patient size, disease condition, and desired treatment effects. Acupoint selection is based on patient presentation. Method of needle insertion (perpendicular, diagonal, or horizontal) is based on acupoint location. The length of time needles remain in place is dependent on patient temperament and disease condition. The frequency of treatment is determined by the practitioner and is generally based on patient condition.

Acupuncture needles must be filiform, sterile, and single use. A variety of gauges (28, 30, 32, 34, 36, 38, and 40) and lengths (¼, ½, 1, 1.5, and 2 inch) are available (Figure 1.8). Dry needle acupuncture can aid in the treatment of numerous conditions including anxiety, cardiopulmonary disorders, cognitive disorders, dermatologic disorders, digestive disorders, hormone disorders, immune support, kidney disorders, liver disorders, metabolic disorders, neurologic disorders, ocular disorders, organ prolapse, pain, performance animals, reproductive disorders, and wound healing (see Table 1.7 for references).

Electroacupuncture

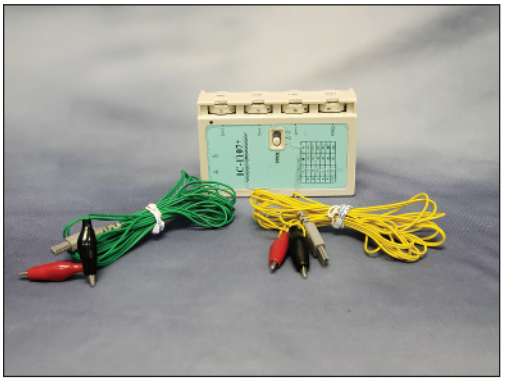
Electric current is applied to pre-placed acupuncture needles using small leads. The frequency and intensity of the current is controlled by the practitioner through the adjustment of the electroacupuncture unit. Electric stimulation mimics and exceeds repeat manual manipulation of the acupuncture needle. Necessary materials include acupuncture needles and an electroacupuncture unit (see Figure 1.9 for examples of two types of electroacupuncture units).

Electroacupuncture is primarily used to treat pain (especially nerve pain), neurologic weakness, and muscle spasms (Cassu et al. 2008; Ren et al. 2012; Shmalberg et al. 2014, 2019; Lewis, et al. 2020). Lower frequencies (5–20 Hz) stimulate local nerves, while higher frequencies (80–120 Hz) reduce muscle spasms and release endorphins prolonging the pain control.

Gold Bead Implantation

Very small 24-karat gold beads, approximately the size of the tip of a ballpoint pen, are inserted into specific acupuncture points. Gold

Figure 1.8 Acupuncture needles of various gauges (sizes) and lengths. All acupuncture needles are sterile, single-use, and filiform in shape with metal or plastic needle handles. Source: Lisa P. McFaddin.



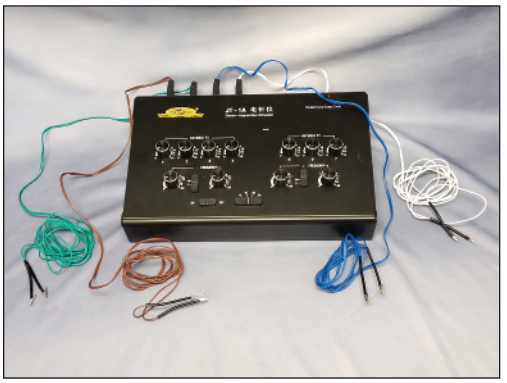


Figure 1.9 Electroacupuncture units and associated leads. Source: Lisa P. McFaddin.

bead implantation (GBI) provides long-term stimulation of acupuncture points. The technique was introduced to the veterinary field by a founding member of the IVAS, Dr. Grady Young, in the 1970s (Ben-Yakir 2009). The technique was later perfected by Dr. Terry Dukes in 1975.

Necessary materials include sterile 24-karat gold beads, sterile gloves, clippers, surgical scrub, alcohol, sterile syringes, and sterile needles for bead insertion.

GBI is primarily used to manage chronic musculoskeletal and neurologic conditions including degenerative joint disease, osteoarthritis, osteochondritis dessicans, vertebral spondylosis, hip dysplasia, urinary and fecal incontinence, lick granulomas, non-healing fractures, traumatic nerve injury, and seizures (Durkes 1992; Jaeger et al. 2006).

Hemoacupuncture

The intentional puncture of a blood vessel with a needle. The amount of blood removed is dependent on the size of the animal, generally only a few drops. Acupuncture needles, sterile single-use

needles (27, 25, 23, or 22 g), and potentially sterile single-use 1-ml syringes are needed. This technique is most used in large animals. Primary indications include fever, infection, and chronic non-healing wounds (Faramarzi et al. 2017).

Laser Acupuncture

Low-power (5–30 mW) cold laser (generally 630–670 nm) applied to acupoints. Best suited for acupoints in areas of thin skin. A class III or IV therapeutic laser with a small head attachment is required. The technique is most often used to treat pain, anxiety, inflammation, and wound healing (Chon et al. 2019). This modality has the added benefit of minimal patient sensation and short duration of treatment, without the risk of infection, trauma or bleeding. Figure 1.10 shows one type of class IV veterinary therapeutic laser with laser acupuncture capabilities. Refer to Chapter 6 for more information on veterinary laser therapy (aka photobiomodulation).

Figure 1.10 A class IV veterinary therapeutic laser with human and animal personal protective eyewear. Source: Lisa P. McFaddin.

Moxibustion

Moxa can be performed directly or indirectly. During direct moxa, uncommonly used in veterinary medicine, the moxa is placed and burned directly on the skin. During indirect moxa the herb is burned without direct skin contact.

For the indirect technique, moxa can be rolled into small balls, attached to the end of the acupuncture needles pre-placed in the skin, and burned. Moxa can also be burned as a pre-rolled stick above the skin over acupoints (Figure 1.11).

Depending on the technique used, moxa (*Artemisia vulgaris*), acupuncture needles, and a lighter are needed. Moxa is used for its warming properties, its ability to eliminate toxins, and its ability to improve peripheral blood flow (Deng and Shen 2013).

Pneumoacupuncture

Injection of air into specific acupoints or larger areas of subcutaneous tissue. Various sizes of sterile syringes and needles and air are required to perform this technique. Pneumoacupuncture is primarily used in large animals to tonify conditions causing weakness, especially focal nerve paralysis (Mittleman and Gaynor 2000; Ferguson 2007).

Figure 1.11 A brand of pre-rolled moxa (*Artemisia vulgaris*) used for moxibustion. Source: Lisa P. McFaddin.

Mechanisms of Action

From a Western medicine perspective, acupuncture results in nerve, blood vessel, lymphatic (immune system), and cellular stimulation that causes an immediate local effect which then spreads systemically (Clemmons 2007; Zhou and Benharash 2014). Unbeknownst to the first acupuncturists, most of the major meridians lay overtop nerve pathways. Before the invention of the microscope and magnetic resonance imaging (MRI), the beneficial effects of acupuncture were described using terms like Qi. With the advent of advanced imaging we can view Qi, at least in part, as the electrical activity transmitted from nerve cell to nerve cell.

Anatomically, acupoints comprise free nerve endings, small vessels (arteries and veins), and lymphatics (this includes immune cells and channels carrying immune cells). Placement of the acupuncture needle punctures the skin causing counter-irritation within the epidermis, dermis and subcutaneous tissues, leading to microtrauma (Clemmons 2007). This tissue disruption directly affects local nerves, blood vessels, and immune cells improving blood flow, immune response, and relaxation of tissues and muscles. Signals carried by the nerve cells spread from the point of impact to the spinal cord and eventually the brain, propagating the beneficial effects of acupuncture throughout the body (Chiu et al. 2001). This expanded description of the mechanism of action brings us back to the original definition of acupuncture: the insertion of a needle into a specific area of the skin causes a beneficial response.

Here we delve deeper into the complexity surrounding acupuncture's mechanisms of action, which is a well-studied and confusing topic in human and veterinary medicine. There are many moving parts occurring instantaneously and simultaneously, making it difficult to concisely break down what is happening and when. As such, there are numerous theories outlining the effect acupuncture has on various body systems. When combined the theories create a cohesive and complex pathophysiology through which acupuncture exerts its effect.

When discussing the science behind acupuncture there are two key questions. What differentiates acupuncture points from "normal" skin? How does placement of a tiny needle through the skin, subcutaneous tissue, and muscle benefit the patient?

Normal Skin Versus Acupoint

From a "western" medicine perspective most acupoints have several common physical characteristics. Acupoints often have a palpably different texture and temperature compared to the surrounding skin. Most acupoints are depressions within the skin, but the points can be turgid swellings.

Needle–Skin Interactions

The local, regional, and systemic effects generated by acupuncture are dependent on several variables: the acupuncture points selected, the method of stimulation, and the length of stimulation (Karavis 1997). Needle placement through the skin causes counter-irritation within the epidermis, dermis, and subcutaneous tissues, leading to microtrauma. This stimulation causes a combination of three potential, and often simultaneously occurring, reactions at the acupoint: nerve stimulation (neuronal reactions), physical changes (biophysical reactions), and chemical changes (biochemical reactions) (Zhu 2014).

Mechanisms for Veterinarians

This section examines the acupoint, neuronal reactions, biophysical reactions, and biochemical reactions in more detail.

Acupoint

Acupuncture points are in areas of the skin with low electrical resistance and high electrical conductance (Mittleman and Gaynor 2000; Longhurst 2010). Small changes in the energy

dynamics of the tissue quickly and easily initiate and then propagate electrical changes to the surrounding tissues.

Acupoints usually contain neurovascular bundles: free nerve endings, small vessels (arterioles and venules), a robust lymphatic supply, and often mast cells (Longhurst 2010). Table 1.3 outlines the common nervous system components found in and around acupuncture points. Figure 1.12 illustrates the approximate location of each receptor within the skin layers. Acupoints can be categorized based on the type of nerves supplying the area (Garcia and Chiang 2007; Ferguson 2011). Table 1.4 summarizes the characteristics of each acupuncture category in more detail.

Meridians follow the peripheral nervous system. For example, the lung and pericardium meridians are found along the musculocutaneous and median nerves, respectively (Clemmons 2007; Longhurst 2010).

Neuronal Reactions

The initial sensation felt by the placement of an acupuncture needle is known as "De Qi" or "arrival of Qi." Acupuncture is the physical stimulus triggering the nervous system response. The intensity of needle placement, duration of stimulation (i.e. how long the needles remain in place), and the speed with which the needles are placed affect the afferent nerves and thus the sensory response (Karavis 1997; Zhao 2008). Given the complex series of events that occur following needle placement, De Qi can be thought of as the sensory results of multiple neuronal reactions.

In general, the acupuncture needle stimulates nociceptors and mechanoreceptors within free nerve endings in the skin, subcutaneous tissue, and muscles. Afferent pain signals are initially transmitted by thin, slow, unmyelinated C fibers (Group IV fibers) and

Table 1.3 The common neuronal receptors found within acupuncture points (Mittleman and Gaynor 2000; Purves et al. 2012b; Zhu 2014).

Receptor type	Location	Function
Free sensory nerve endings	Epidermis Dermis	Nociceptors: respond to damaging stimuli and their activation results in pain Thermoreceptors: respond to temperature changes both hot and cold
Follicular nerve endings	Root hair plexus	Mechanoreceptors: respond to deformation of surrounding tissue including pressure and stretch
Merkel's complexes	Bottom epidermis	Mechanoreceptors: slow adapting and respond to sustained pressure
Meissner's corpuscles	Top dermis	Mechanoreceptors: rapidly adapting and sensitive to fine or light texture and pressure
Ruffini corpuscles	Middle dermis	Mechanoreceptors: slow adapting and responsive to shearing stress and drag
Pacinian corpuscles	Deep dermis or subcutaneous	Mechanoreceptors: rapidly adapting and sensitive to strong pressure, jarring movements, and vibration
Muscle spindle cells	Skeletal muscle	Mechanoreceptors: stretch receptors within muscles assessing muscle length
Golgi tendon organs	Musculotendinous junction	Mechanoreceptors: measure muscle tension at the origin and insertion during concentric contraction

Source: Lisa P. McFaddin.

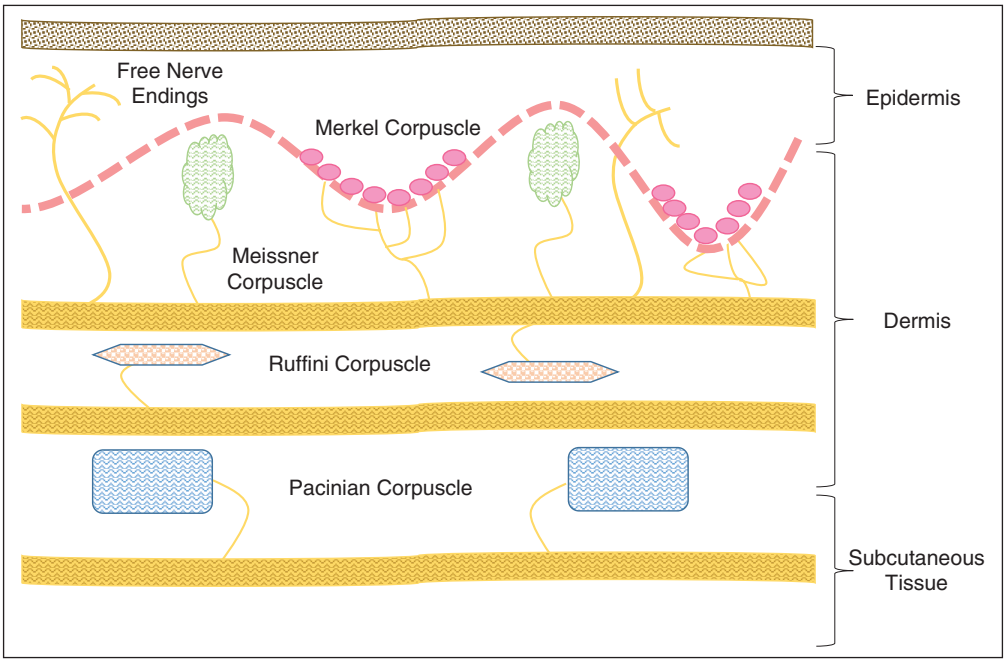


Figure 1.12 Schematic representation of common receptors found within the skin. Source: adapted from Purves et al. (2012b).

Table 1.4 The four types of acupuncture points designated by their neural relationship (Mittleman and Gaynor 2000; Garcia and Chiang 2007).

Name	Classification	Example acupoint
Type I (motor points)	• Found where nerves enter muscle • Minimal stimulation of the nerve causes maximum muscle contraction • Most common acupoint (67%)	LI-4 (dorsal metacarpus at the midpoint between the second and third metacarpal bones)
Type II	• Superficial nerves located along the dorsal and ventral midline	Bai-Hui (dorsal midline between L7 and S1)
Type III	• Associated with high concentrations of superficial nerves and nerve plexi	PC-6 (medial distal antebrachium in the groove between the flexor carpi radialis and superficial digital flexor)
Type IV	• Found on musculotendinous junctions (MCJ), more specifically associated with Golgi tendon organs (GTOs) • GTOs are spindle-shaped receptors located at the MCJ which measure muscle tension at the origin and insertion during concentric contraction	BL-57 (pelvic limb caudal to the tibia halfway between the popliteal crease and calcaneal tuber)

Source: Lisa P. McFaddin.

thin, faster, myelinated Aδ fibers; afferent mechanical signals are primarily transmitted through Aδ fibers (Zhu 2014). The involvement of Aδ and C fibers in the propagation of acupuncture analgesia, by selectively blocking conduction of the afferent fibers, was

proven using the application of capsaicin bilaterally to the sciatic nerves (Okada et al. 1996).

Human experiments discovered the analgesic effects of acupuncture are due to afferent nerve signals from local muscles (Chiang et al. 1973). Specifically, Chiang et al. (1973) demonstrated the analgesic effects induced by the stimulation of LI-4 (located in the fleshy tissue between the thumb and index finger) were not inhibited by vascular occlusion of the forearm or cutaneous procaine injections. However, injections of procaine into the ulnar and median nerves eliminated the analgesic effects of LI-4 stimulation.

The principle of spinal segmental innervation explains the path through which afferent sensory information moves from the point of needle placement to the spinal cord. Groups of afferent sensory nerves in the skin (dermatomes) and muscle (myotomes) transmit information to specific segments of the spinal cord (neurotomes) (Karavis 1997). Once stimulated, the Aδ and C fibers transmit sensory information from their corresponding dermatomes and myotomes to the dorsal horn of the spinal cord, specifically the substantia gelatinosa (Yam et al. 2018).

C fiber first-order neurons terminate in laminae I (marginal zone) and II (substantia gelatinosa) of the dorsal horn of the spinal cord (Yam et al. 2018). Aδ first-order neurons from the periphery enter the spinal cord through Lissauer's tract, travel cranially or caudally for three to four spinal segments and then enter laminae II (substantia gelatinous) connecting to a second-order neuron (Purves et al. 2012a).

Once in the substantia gelatinosa a portion of the sensory information crosses midline below the central canal entering the spinothalamic tract, a set of sensory tracts located in the ventral funiculus of the spinal cord white matter (Purves et al. 2012a,b). Within the substantia gelatinosa inhibitory interneurons are also stimulated, blocking the transmission of nociceptive information to the higher centers of the brain (Mittleman and Gaynor 2000; Purves et al. 2012a,b). This local inhibition of pain is known as Melzack and Wall's gate theory.

Most of the sensory information then travels to the ipsilateral thalamus. The thalamus is a gate through which all sensory information, except olfactory, travels. The spinothalamic tract terminates at a third-order neuron where most information travels to the somatosensory region of the ipsilateral cortex, specifically the parietal lobe (Clemmons 2007; Purves et al. 2012a,b). On the way to the thalamus branches are sent to several connections in the midbrain, especially the periaqueductal gray matter (PAG) and rostral ventral medulla (RVM) (Yam et al. 2018).

The PAG helps regulate the response to nociceptive input by integrating information from the higher brain centers, including the cortex, and the dorsal horn of the spinal cord. The RVM downregulates excitatory information from the dorsal horn of the spinal cord. Both the PAG and RVM express a variety of neurotransmitters (endogenous opioids and cannabinoids, 5-hydroxytryptamine or 5-HT, and norepinephrine or NE) that are heavily involved in the regulation and recognition of pain (Yam et al. 2018). The importance of endogenous opioids in perpetuating the effects of acupuncture is emphasized by the fact that administration of drugs known to inhibit opioid biosynthesis (cycloheximide) or block opioid action (naloxone) reduce the analgesic effects of acupuncture (Mittleman and Gaynor 2000).

The acupuncture–brain connection was confirmed by Chiu et al. (2001). Using manganese-enhanced functional MRI on anesthetized rabbits, the group established that electroacupuncture stimulation of two acupoints, ST-36 and GB-34, resulted in neural activation of specific regions of the brain. Chiu et al. (2001) further discovered the location of this neural activation was dependent on the acupoint being stimulated. Hippocampal activation was seen with the stimulation of ST-36, while stimulation of GB-34 caused activation in the hypothalamus, insula, and motor cortex. The specificity of neural activation was found to be time dependent, with specific brain centers triggered after

5 minutes of electroacupuncture and a more generalized stimulation after 20 minutes.

Numerous studies have confirmed the link between the specific acupoint stimulation and the type of neural activation within the brain. Zhang et al. (2015) demonstrated that acupuncture stimulation of Taichong and Taixi increased neuronal activity in areas relating to vision, emotions, and cognition (cerebral occipital lobe, middle occipital gyrus, inferior occipital gyrus and cuneus) while inhibiting areas related to emotion, attention, phonological and semantic processing, and memory (gyrus rectus of the frontal lobe, inferior frontal gyrus, and center of the posterior lobe of the cerebellum). Alternatively, activation of non-acupoints, or sham points, did not result in specific brain stimulation as demonstrated by Wu et al. (2002) and Zhu et al. (2015). Huang et al. (2012) provided a systematic review and meta-analysis of 34 studies using functional MRI to assess brain response to acupuncture. The study also mentioned the absence of neural response following stimulation of sham acupoints.

Internal organ response following acupuncture needle placement is often the result of afferent sensory information from cutaneous nerves producing patterns of reflex activity in segmentally related visceral structures (Karavis 1997). This cutaneo-visceral reflex occurs without the involvement of higher brain centers. A similar viscero-visceral reflex functions to propagate internal organ response to acupuncture. Figure 1.13 summarizes this information in an algorithmic depiction of the neurophysiology of acupuncture.

Biophysical Reactions

Needle insertion and subsequent adjustment of the needle (twisting, seating, and flicking) causes mechanical pressure and distortion within the connective tissue and muscle (Zhao 2008). Langevin et al. (2007) repeatedly demonstrated that unidirectional and bidirectional acupuncture needle rotation in mouse

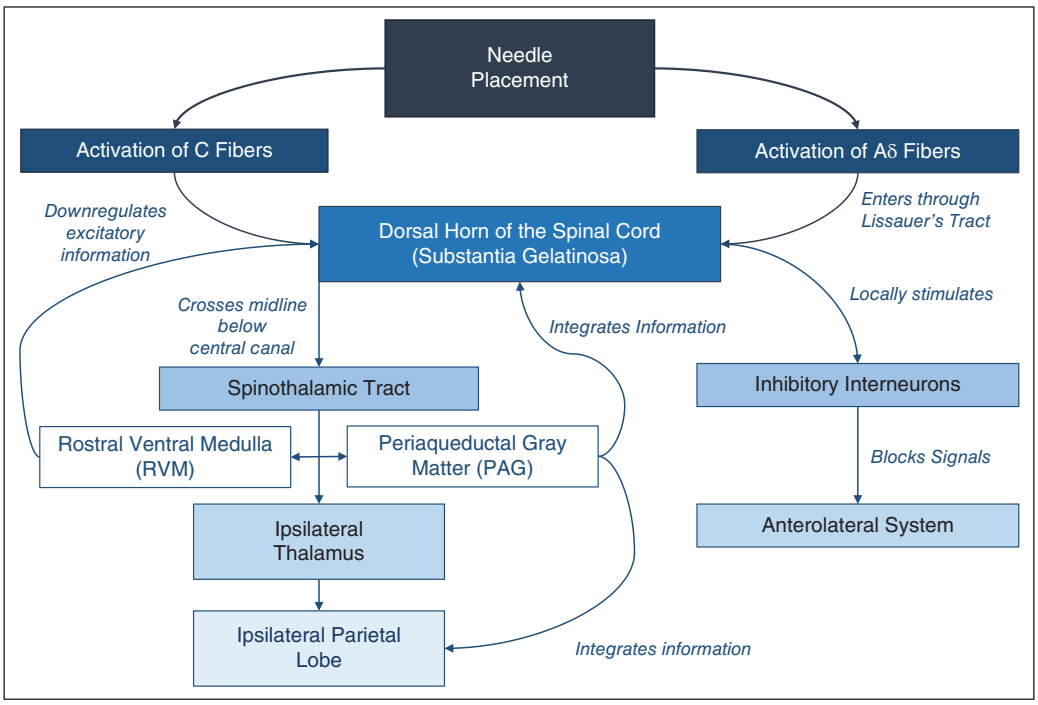


Figure 1.13 Flow diagram of the neurophysiology of acupuncture. Source: Lisa P. McFaddin.

subcutaneous tissue resulted in collagen winding around the needle, activating local connective tissue fibroblasts.

Needle placement and manipulation triggers mechanoreceptors at the level of the skin, muscle, and tendons. The role of skin mechanoreceptors and nociceptors in acupuncture is discussed in the preceding section. The primary mechanoreceptors within striated muscles are muscle spindle cells (MSC) and Golgi tendon organs (GTO).

Two afferent sensory nerves innervate MSC, Group Ia and II, which assess muscle length and, over time, the speed with which muscle moves or contracts. MSC run parallel to muscle fibers and are comprise four to eight specialized intrafusal muscle fibers encased in connective tissue. Activation of Group Ia and II can stimulate both alpha and gamma motor neurons innervating the affected MSC, inhibit MSC in contralateral homologous and antagonistic muscles, and inhibit pain through the spinothalamic tract (Purves et al. 2012a,b).

GTO are collagen bundles with spindle-shaped receptors surrounded by a thin capsule located in the musculotendinous junction. Group Ib afferent sensory nerves within the GTO are responsible for measuring muscle tension at the origin and insertion. Activation of Group Ib nerves inhibits alpha and gamma motor neurons innervating the muscle, as well inhibiting pain through stimulation of interneurons within the dorsal horn of the spinal cord (Purves et al. 2012a,b).

Shear force- and stress-induced tissue displacement, caused by the acupuncture needle, stimulates local MSC and GTO. MSC and GTO activation initially causes muscle contraction around the needle followed by relaxation of the muscle and connective tissue. Continued activation of local MSC and GTO results in propagation of the mechanical signals through the surrounding connective tissue and muscle. Zhang et al. (2012) describe this expanding effect of MSC and GTO stimulation as a vase-like pattern. Figure 1.14 illustrates the location

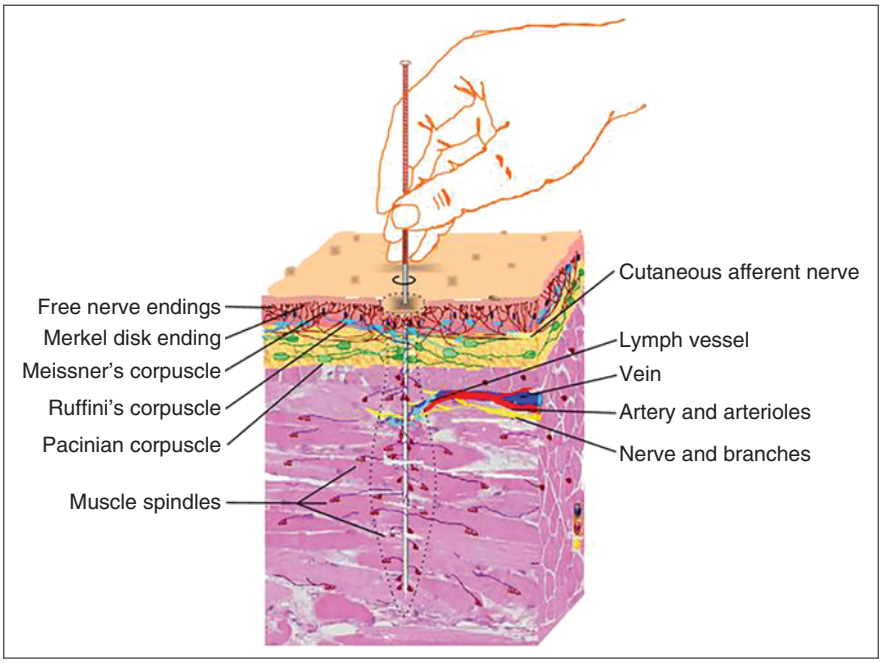


Figure 1.14 The components of the skin, subcutaneous tissue, and muscle layers affected by placement of an acupuncture needle, as well as the vase-like activation of muscle spindle cells caused by twisting and manipulation of the needle (Zhang et al. 2012). Source: Zhang, et al., 2011/Public Domain CC BY 3.0.

and anatomy affected by acupuncture needle placement as well as the proposed vase-like distribution of MSC activation caused by twisting and manipulation of the acupuncture needle (Zhang et al. 2012).

Biochemical Reactions

Needle placement causes local tissue injury and, more importantly, initiates tissue healing. Needle stimulation causes the release of a whole host of neural and nonneuronal bioactive factors (Zhu 2014). These biochemical substances contribute to the local and systemic beneficial effects of acupuncture primarily through regulation of blood and lymphatic flow, as well as stimulation of afferent signals to the central nervous system (Clemmons 2007). Figure 1.15 depicts the most common biochemical reactions and resultant mediators involved in acupuncture.

Opioid peptides, β-endorphins, enkephalins, dynorphins, serotonin, noradrenaline and gamma-aminobutyric acid (GABA) are also released and produced within the central nervous system as a direct result of acupuncture, particularly electroacupuncture (Zhao 2008). The primary function of these biochemical modulators and neurotransmitters is the central inhibition of pain. Table 1.5 outlines the source and primary function of the most common biochemical mediators involved in acupuncture.

Safety

Acupuncture is a very safe and well-tolerated medicinal practice. Like all therapies, there are conditions under which acupuncture should not be used or used with caution, as well as a few mild potential adverse effects. Table 1.6 outlines these cautions, contraindications, and potential adverse effects.

The Why

Applications in Human Medicine

The National Institutes of Health (NIH) issued a consensus statement on the beneficial effects of acupuncture in 1998. The NIH outlined the conditions and diseases for which acupuncture had demonstrated scientifically advantageous effects, including adult postoperative pain, postoperative dental pain, chemotherapy nausea, vomiting, addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia, myofascial pain, osteoarthritis, and asthma (NIH 1998).

Since that time vast research has been completed on the efficacy of acupuncture in human medicine. The NIH National Center for Complementary and Integrative Medicine (NCCIH) website (https://nccih.nih.gov) is an excellent resource to learn more about the effectiveness and usefulness of acupuncture in people.

Applications in Veterinary Medicine

Pain control is the most common reason for which acupuncture is used in veterinary medicine. The American Animal Hospital Association (AAHA) referenced the use of acupuncture for pain control in the 2015 and 2022 Pain Management Guidelines for Dogs and Cats (Epstein et al. 2015; Gruen et al. 2022). Veterinary acupuncture is also commonly used to aid in the treatment of arthritis, degenerative joint disease, gastrointestinal issues (vomiting, diarrhea, and inappetence), hip dysplasia, immune system support (chronic infections, cancer, autoimmune diseases), intervertebral disk disease (IVDD), muscle and tendon injury, oncology, reproductive disorders, and respiratory arrest (Chan et al. 2001; Lana et al. 2006; Xie and Ortiz-Umpierre 2006; Gülanber 2008; Chrisman 2011).

> "Acupuncture offers a compelling and safe method for pain management in veterinary patients and should be strongly considered as part of multimodal pain management plan" (Epstein et al. 2015).

Veterinary Research

Veterinary acupuncture is a well-studied treatment modality (Miscioscia and Repac 2022).

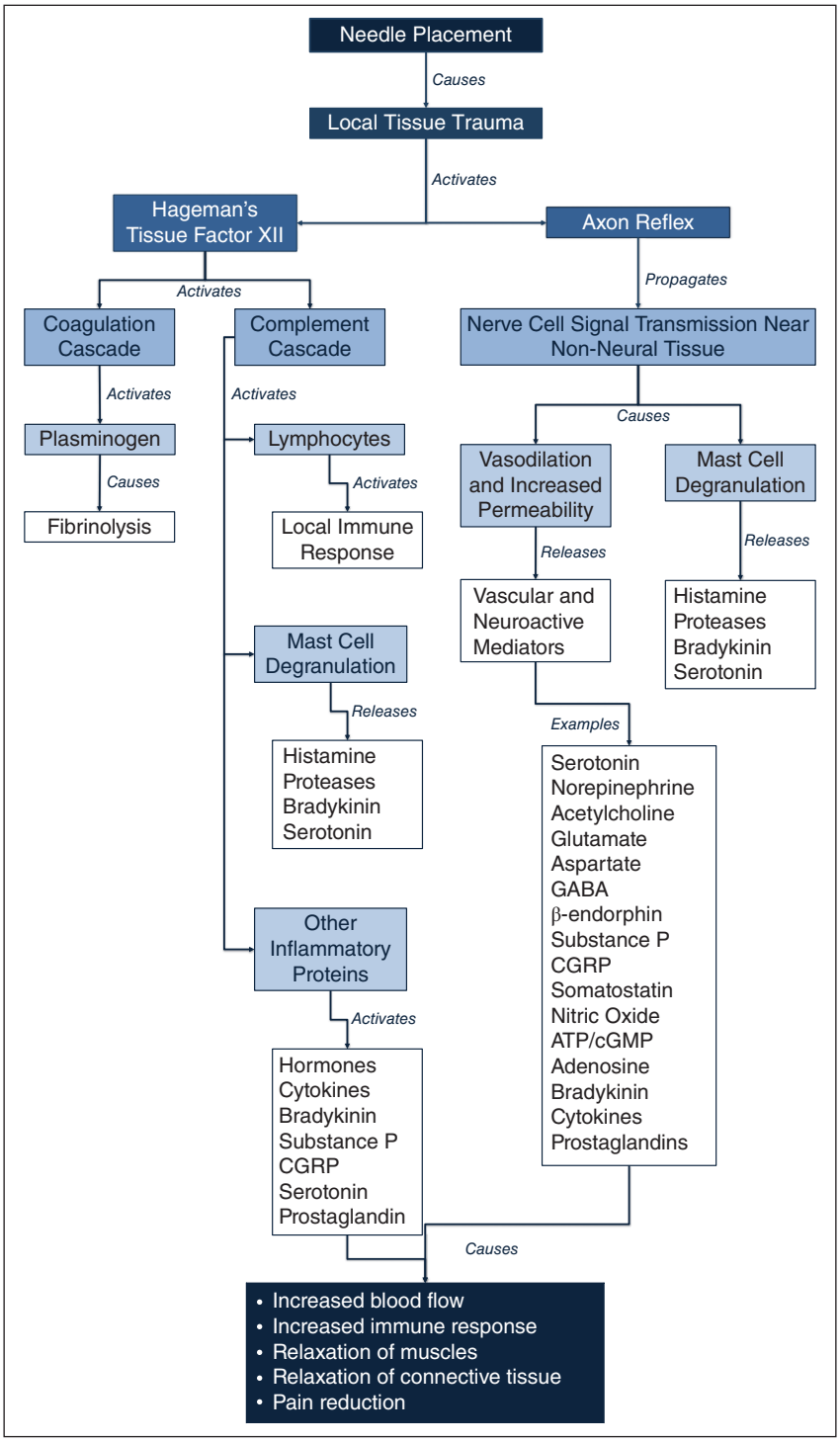


Figure 1.15 Flow chart of the most common biochemical reactions and mediators caused by acupuncture (Clemmons 2007; Zhang et al. 2012; Zhu 2014). ATP, adenosine triphosphate; cGMP, cyclic guanosine monophosphate; CGRP, calcium gene-related peptide. Source: Lisa P. McFaddin.

Table 1.5 The source and primary function of the most common biochemical mediators involved in acupuncture.

Mediator	Source	Function
Acetylcholine	Keratinocytes Injured efferent nerves	Induces muscle contractions and modulates pain
Adenosine	Breakdown product of ATP	Reduces pain through activation of Ia receptors on ascending afferent nerves from muscle spindle cells (Goldman et al. 2010)
ATP and cGMP	Damaged epidermal cells and peripheral nerve tissue	Sensitizes sensory afferent nerves reducing pain sensation (Ren et al. 2012)
β-Endorphin	Keratinocytes Melanocytes Dermal fibroblasts Leukocytes	Opioid peptide reducing pain through stimulation of μ-opiate receptors (Zhang et al. 2012)
Bradykinin	Mast cells Blood vessels	Inflammatory mediator of cardiovascular homeostasis, inflammation, and nociception through activation of bradykinin 1 and 2 receptors (Zhang et al. 2012)
Calcitonin gene-related peptide (CGRP)	Epithelial cells Immune cells	Neuropeptide modulating pain sensation through interaction with an autoreceptor (Zhang et al. 2012)
Cytokines	Epithelial cells Local tissue and cells	Inflammatory proteins which augment afferent sensory nerve response reducing pain sensation and reducing production of additional inflammatory mediators from afferent terminals (Zhang et al. 2012)
GABA	Macrophages Lymphocytes	Inhibitory neurotransmitter affecting autoreceptors within the CNS modulating the pain response (Zhao 2008)

Mediator	Source	Function
Glutamate **Aspartate**	Epithelial cells Macrophages	Excitatory amino acid modulating pain information peripherally and centrally through stimulation of autoreceptors, including *N*-methyl-D-aspartate (NMDA) receptors (Zhao 2008)
Histamine	Mast cells	Stimulation of H_1 receptors causes increased vascular permeability, relaxation of vascular smooth muscle, reduction in pain sensation, and increased concentration of β-endorphin in the cerebrospinal fluid (Huang et al. 2018)
Nitric oxide	Local tissues	Enhances acetylcholine and β-endorphin release while inhibiting release of substance P from primary afferent nerves (Zhang et al. 2012)
Norepinephrine	Sympathetic nerves	Norepinephrine modulates neuropathic pain through spinal α_2 receptors (Zhao 2008)
Plasminogen	Local tissues	Precursor to plasmin involved in fibrinolysis
Prostaglandins	Local tissues	Proinflammatory factor affecting afferent sensory nerve excitability (Zhang et al. 2012)
Protease	Mast cells	Enzyme involved in proteolysis and functions as a proinflammatory mediator
Serotonin (5-hydroxytryptamine)	Platelets Mast cells	Neurotransmitter involved in modulation of nociception through interactions with 5-HT_1 and 5-HT_3 receptors (Zhang et al. 2012)
Somatostatin	Merkel cells Keratinocytes	Endogenous nonopioid neuropeptide which modulates nociception (Zhao 2008)
Substance P	Mast cells Fibroblasts Platelets Keratinocytes Macrophages	Tachykinin neuropeptide involved in peripheral and spinal nociception (Zhao 2008)

Source: Lisa P. McFaddin.

Table 1.6 The conditions under which acupuncture should not be used or should be used with caution. Acupuncture is very safe with minimal and infrequent adverse effects.

Cautions	Contraindications	Adverse effects
• Extra caution should be used when placing needles around the eye • Shorter needles should be used at specific points over the chest • Fewer needles should be used in severely debilitated and geriatric patients • Avoid certain points around the lower back and abdomen during pregnancy • Avoid electroacupuncture on animals with seizures and pacemakers	• Do not needle through skin infections • Do not needle through open wounds • Do not needle through tumors • Avoid moxibustion in the summer • Avoid hemoacupuncture in weak or geriatric patients • Do not needle CV-8	• Bleeding • Bruising • Local irritation • Bent needle • Difficult to remove needle • Needle ingestions

Source: Adapted from Xie and Ortiz-Umpierre (2006).

Randomized Cross-Over Clinical Study Evaluating the Effect of Acupuncture on Blood Pressure, Blood Glucose, and Hematological Parameters in Healthy Dogs

Author: Erol Güçlü Gülanber, DVM, PhD
Journal: *American Journal of Traditional Chinese Veterinary Medicine*
Date: 2018
Study design: Randomized clinical trial
Study hypothesis: Acupuncture of specific known acupuncture points will reduce blood pressure, reduce blood glucose, increase white blood cells, and increase red blood cells in normal canines. Placement of needles in non-acupuncture (sham) points will not have the same effects.
Sample size: 100 companion canines of varying breeds, ages, and sex.
Materials and methods: A normal physical examination and fasted blood work was required to qualify the subjects as normal canines. Dogs were randomly divided into two groups: acupuncture (Group A) versus sham acupuncture (Group B). A fasted blood sample and blood pressure was obtained on the day of the experiment before needle placement. Group A dogs had needles placed by a certified veterinary acupuncturist in four acupuncture points (LI-4, ST-36, GB-34, and SP-6). Needles remained in place for 20 minutes. Blood pressure and blood draw were performed immediately following needle removal, one hour later, and one week later. After the final measurement needles were placed in sham locations for 20 minutes with measurements obtained immediately following needle removal, one hour later, and one week later. Group B underwent the same experimentation with placement of the needles at sham points first, followed by the four acupuncture points. Data was evaluated using one-way analysis of variance (ANOVA).

Results

1. A reduction in blood pressure 20 and 60 minutes after acupuncture was statistically significant in both groups compared to the pre-acupuncture measurement. Blood pressure was slightly higher at 60 minutes compared to 20 minutes but still significantly lower than the pre-acupuncture level.

2. A reduction in blood glucose 20 and 60 minutes after acupuncture was statistically significant in both groups compared to the pre-acupuncture measurement. Blood glucose was slightly higher at 60 minutes compared to 20 minutes but still significantly lower than the pre-acupuncture level.
3. A statistically significant increase in the white blood cell count was noted 20 and 60 minutes after acupuncture compared to pre-acupuncture levels.
4. There was no statistically significant difference in the red blood cell count following acupuncture.
5. No statistically significant difference was noted in blood pressure, blood glucose, white blood cell count, and red blood cell count in the patients receiving sham acupuncture.

Study conclusions

1. Acupuncture effectively reduced blood pressure and blood glucose in normal canines.
2. Acupuncture effectively increased white blood cell counts in normal canines.
3. Acupuncture did not affect red blood cell counts in normal canines.

Study limitations

1. There was no true control group.
2. There was no statistical analysis comparing the acupuncture and sham-acupuncture variable measurements directly.

L.P.M. conclusions

1. Acupuncture reduced blood pressure and blood glucose in normal dogs for up to one hour post needle removal. The true duration of effect is unknown. Acupuncture may be a useful adjunct in the management of canine diabetes mellitus and hypertension, but additional studies are needed.
2. Acupuncture increased the white blood cell count of normal dogs for up to one hour post needle removal. The true duration of effect is unknown. Acupuncture may be a useful adjunct for patients needing immune system support, but additional studies are needed.
3. Acupuncture did not positively or negatively affect the red blood cell count of normal dogs.

Gülanber (2018)

Comparison of Decompressive Surgery, Electroacupuncture, and Decompressive Surgery Followed by Electroacupuncture for the Treatment of Dogs with Intervertebral Disk Disease with Long-Standing Severe Neurologic Deficits

Author(s): Jean G. Joaquim, DVM, PhD; Stelio P. L. Luna, DVM, PhD; Juliana T. Brondani, DVM, PhD; Sandra R. Torelli, DVM, PhD; Shelia C. Rahal, DVM, PhD; and Fernando de Paula Freitas, DVM
Journal: *Journal of the American Veterinary Medical Association*
Date: 2010

Study design: Clinical trial
Study hypothesis: The use of electroacupuncture (EAP) in dogs with severe neurologic deficits, lasting >48 hours after onset of thoracolumbar disk herniation, would result in better clinical improvement compared to those undergoing decompressive surgery (DSX).

(Continued)

Comparison of Decompressive Surgery, Electroacupuncture, and Decompressive Surgery (Continued)

Sample size: 40 companion dogs between 3 and 6 years of age weighing 10–20 kg with a >48-hour history of severe neurologic deficits due to thoracolumbar IVDD.
Materials and methods: There were three experimental groups:

1. The DSX-only group consisted of 10 dogs retroactively selected from those seen and treated at the teaching hospital from 2003 to 2006.
2. 10 dogs received DSX and EAP between 2006 and 2008.
3. 19 dogs received EAP only between 2006 and 2008.

Dogs were placed in the DSX+EAP and EAP-only groups based on owner preference. IVDD was confirmed using myelography, MRI or CT. EAP was performed at BL-18 to BL-23 (bilaterally) and ST-36 to GB-34 (bilaterally) for 20 minutes at 2 and 15 Hz. Patients received EAP once a week for one to six months. Myelopathy scoring was performed prior to treatment and six months following treatment. Statistical analysis was performed using the Goodman test.

Results

1. The improvement rate in dogs receiving EAP was significantly higher compared to the DSX group.
2. There was no significant difference in improvement between dogs in the EAP group vs. those in the DSX+EAP group.

Study conclusions: EAP is a viable option for dogs experiencing severe neurologic deficits for >48 hours after onset due to thoracolumbar IVDD.

Study limitations

1. There was no control group.
2. Division of patients within the experimental groups was not random nor even.
3. The number of EAP sessions was not standardized.
4. Advancement in IVDD surgery between 2003 and 2008 may have affected patient outcome in the DSX and DSX+EAP groups.

L.P.M. conclusions: Patients with long-standing severe neurologic deficits, especially deep pain negative, historically have a poor outcome. The use of EAP, with or without DSX, appears an effective treatment option, especially when euthanasia is the most common alternative.

Joaquim et al. (2010)

Analgesic Efficacy of Laser Acupuncture and Electroacupuncture in Cats Undergoing Ovariohysterectomy

Authors: Felipe Nascimento, Virginia Marques, Giulianne Crociolli, Gabriel Nicácio, Isabela Nicácio, and Renata Cassu
Journal: *Journal of Veterinary Medical Science*
Date: 2019
Study design: Randomized blinded clinical trial

Study hypothesis: The use of laser acupuncture (LA) and electroacupuncture (EAP) would decrease postoperative pain and the need for rescue analgesics in cats undergoing elective ovariohysterectomy (OHE).
Sample size: 30 companion intact female cats aged six months to five years.

Materials and methods: Cats arrived 36 hours prior to the procedure to acclimate to the environment. Cats were divided randomly and evenly into three groups: control, LA, and EAP. Patients in the LA and EAP group were sedated with ketamine, midazolam, and tramadol. Two acupuncture points (bilaterally) were stimulated in both the EAP and LA groups: ST-36 and SP-6. Acupuncture points were stimulated for 20 minutes with EAP and 9 seconds each with LA. All OHEs were performed by the same surgeon using the same drug protocols. Pain was assessed using the Interactive Visual Analogue Scale and UNESP-Botucatu Multidimensional Composite Pain Scale (MCPS) by a blinded observer two hours prior to surgery and 0.5, 1, 2, 4, 6, 8, 12, 18, and 24 hours after extubation. Patients exhibiting pain received a rescue dose of tramadol followed by a single dose of meloxicam 30 minutes later, if needed. Statistical analysis of the results relied on Kruskal–Wallis test, Friedman test, and Dunn's post hoc test.

Results

1. The number of cats requiring rescue analgesia was not significantly different between the three groups.
2. The number of rescue doses needed was significantly higher in the control group compared to the EAP and LA groups, but not statistically different between the two treatment groups.

Study conclusions: Preoperative EAP and LA reduced postoperative pain lessening the need for rescue analgesia following routine OHE in cats.

Study limitations

1. Relatively small sample size within each group.
2. Opioids and ketamine can interfere with the effectiveness of acupuncture which may have dampened the effects.

L.P.M. Conclusions: EAP and LA reduced postoperative pain in normal feline patients undergoing routine OHE. Pretreatment with EAP and/or LA may be beneficial in reducing postoperative pain for other common surgical procedures.

Nascimento et al. (2019)

As of July 2021 a quick search on PubMed yielded 522 articles for "veterinary acupuncture," 301 articles for "acupuncture canine," and 267 for "acupuncture feline."

Not all studies of veterinary acupuncture present the therapy in a favorable light. Habacher et al. (2006) performed a systematic review of the available research on veterinary acupuncture up to 2004. The group concluded that while many patients benefited from acupuncture, sufficient evidence to support the use of acupuncture for the treatment of various veterinary ailments was lacking. The researchers admitted the existing studies should be repeated, and the lack of evidence of efficacy did not mean acupuncture was not effective (Habacher et al. 2006). More studies were needed to definitively prove acupuncture helped veterinary patients.

Numerous studies supporting the use of veterinary acupuncture have been conducted since 2004. Selmer and Shiau (2019) performed a meta-analysis of 16 human and eight veterinary clinical trials comparing the effectiveness of conventional therapies with those integrating TCM, including acupuncture. The systematic review and meta-analysis demonstrated a statistically significant improvement in patient outcome when both conventional and traditional Chinese medicine was utilized

(Selmer and Shiau 2019). Presented below are the summaries of three veterinary acupuncture studies.

Table 1.7 specifies many of the diseases and conditions for which veterinary acupuncture has shown a scientifically beneficial effect. This list is not all inclusive, as new studies documenting the beneficial effects of acupuncture in veterinary medicine are continually published.

The How

Team Members

This section reviews the potential return on investment (ROI), how to effectively train the entire team, how to promote, and how to integrate the integrative therapy.

Return on Investment

ROI can be determined by evaluating client interest, veterinarian demand, hospital costs, applicability of the service, appointment scheduling, and pricing.

Client Interest

Currently there are no studies documenting client interest or the popularity of acupuncture. By evaluating trends in client opinion and pet health insurance, interest in acupuncture can be inferred.

- *Client opinion*: Table 1.8 summarizes the pet owner demographics and statistics mentioned in the My Lessons section at the beginning of this book. Even if half of those owners are open to acupuncture, that is still 53.1 million potential patients.
- *Pet health insurance*: Many pet insurance plans include coverage for integrative therapies, especially acupuncture (Woodley 2018). The presence of this type of coverage re-emphasizes the mainstream incorporation of these treatment modalities, as well as reflecting client demand.

Veterinarian Demand

The number of certified veterinary acupuncturists (CVAs) has grown exponentially over the past 40 years. The IVAS and Chin University are two of the most recognized organizations in veterinary acupuncture. The IVAS was founded in 1974, with 80 members by 1975. As of January 2021, IVAS has over 1800 members (https://www.ivas.org/about-ivas). Chi University has trained and certified over 7500 veterinarians since 1988 (https://www.chivm.edu). Keep in mind that IVAS members and Chi University graduates are international and these totals reflect veterinarians worldwide.

While the number of CVAs has increased over the time, the upsurge of owned pets, especially those whose owners are interested in integrative therapy, coupled with the shortage of veterinarians (as defined by the veterinary census of Ouedraogo et al. and the 2023 economic report by the American Veterinary Medical Association (AMVA), indicates that there is a need for more integrative practitioners (Ouedraogo et al. 2019; AMVA 2023). The current and projected number of practicing veterinarians does not meet the ever-expanding volume of companion animals (see the Book Structure section at the beginning of this book for further information on the current veterinarian shortage).

While acupuncture certification is highly recommended, it is not required to practice veterinary acupuncture. This makes calculating the exact number of veterinarians currently practicing acupuncture difficult. If we use the IVAS members plus Chi University graduates, round up, and ignore duplicates, there are 6000 veterinarians currently practicing acupuncture in the United States. That represents a little over 5% of the total veterinarian population (AVMA 2018). Using the estimated 45.9 million potential integrative patients that is 7650 patients per veterinary acupuncturist. With these numbers, I would say there is room for more practitioners.

Another way to examine the need in your area is to compare the number of general

Table 1.7 Examples of studies demonstrating the efficacy of veterinary acupuncture in the treatment of multiple diseases and conditions as of 2023.

System category	Disease conditions studied	Studies
Anesthesia	Anxiolytic and sedative	Kim and Nam (2006), Fong and Xie (2019)
	Postoperative recovery and pain management	Lin et al. (2010), Laim et al. (2009), Gakiya et al. (2011), Groppetti et al. (2011), Luna et al. (2015), Marques et al. (2015), Ribeiro et al. (2017), Turner-Knarr (2018), Nascimento et al. (2019), Ferro et al. (2022)
Behavior	Anxiolytic and sedative	Kim and Nam (2006), Mier (2021)
Cardiovascular	Hypertension	Lin et al. (2010), Shengfeng et al. (2018), Gülanber (2018)
Dermatologic	Otitis	Sánchez-Araujo and Puchi (2011)
Endocrine	Cortisol reduction	Koh et al. (2017)
	Glucose reduction	Gülanber (2018)
Gastrointestinal	Enteritis	Gülanber (2008)
	Megaesophagus	Gülanber (2008)
	Vomiting	Koh et al. (2014), Scallan and Simon (2016), Yue et al. (2021)
Immune system	Increase white blood cells	Gülanber (2018)
	Wound healing	Pettermann (2015)
	Neoplasia	Lana et al. (2006), Xie et al. (2017)
	Vaccination	Perdrizet et al. (2019)
Musculoskeletal	Chronic pain	Lane and Hill (2016), Teixeira et al. (2016), Silva et al. (2017)
	Cruciate ligament disease	Shmalberg et al. (2014), Lee (2019)
	Hip dysplasia	Gülanber (2018), Teixeira et al. (2016)
	Myositis	Gülanber (2008)
	Osteoarthritis	Um et al. (2005), Gülanber (2018), Chomsiriwat and Ma (2019)
	Patellar luxations	Fuda et al. (2008)

(Continued)

Table 1.7 (Continued)

System category	Disease conditions studied	Studies
Neurologic	Cervical vertebral instability	Rovnard et al. (2018), Liu et al. (2015), Chen et al. (2019)
	Chronic pain	Silva et al. (2017)
	Congenital abnormalities	Fuda et al. (2008), Liu et al. (2016)
	Horner's syndrome	Cho and Kim (2008)
	Intervertebral disk disease	Hayashi et al. (2007), Gülanber (2018), Han et al. (2010), Chien (2011), Rovnard et al. (2018), Zuo et al. (2019), Dragomir et al. (2021), Sawamura et al. (2022)
	Neck and back pain	Liu et al. (2016), Collins (2021))
	Paresis and paralysis	Liu et al. (2016)
	Seizures	Tangjitjaroen and Mahatnirunkul (2017)
	Viral infections	Tangjitjaroen and Mahatnirunkul (2017)
Ophthalmic	Intraocular pressure reduction	Kim et al. (2005)
Respiratory	Resuscitation (respiratory arrest)	Gülanber (2018)

Source: Lisa P. McFaddin.

Table 1.8 Summary of the 2022 pet ownership and pet health insurance demographics in the United States discussed in the Introduction of the book (Burns 2018; MFAF 2018; Burns 2022; NAPHIA 2023; Nolen 2022; APPA 2022).

• 83% of pets are owned by millennials (32%), generation X (24%), and baby boomers (27%)
• 69 million households owned dogs
• 45.3 million households owned cats
• Estimated over 81.1 million owned dogs
• Estimated over 60.7 million owned cats
• 68% of owners are interested in alternative treatment modalities for their pets
• 4.41 million pets have pet health insurance
• 82% of insurance pets are dogs

Source: Lisa P. McFaddin.

practitioners within a 5-, 10-, or 20-mile radius to the number of advertised veterinary acupuncturists. The search radius is dependent on your hospital's demographics. Most comparisons tend to follow the 5% trend, meaning at least 5% of the surrounding hospitals are currently offering acupuncture. Ensuring your area is not saturated with veterinary acupuncturists prevents introduction of a redundant service.

Hospital Costs

Let's start by reviewing the potential costs associated with introducing and offering acupuncture: veterinarian training, staff training, supplies and equipment, staffing, facilities, and advertising. Tables 1.10 and 1.11 demonstrate varying start-up costs, dependent on the hospital's contribution toward the veterinarian's training and prior utilization of regular all-staff meetings. For more information on potential hospital costs, refer to the Introduction.

Veterinarian Training

Course Costs There are five main training programs in the United States. Each program contains online and on-site training, with an average of three on-site sessions. On-site sessions generally last three to five days. Typical completion time, with certification, is six months. Additional information can be found in the Veterinarian section of this chapter (cost range, $6995–9750).

Textbooks Textbooks may not be required for the certification courses but are often recommended. The price range for one to two books is $200–400 (average cost, $300).

Travel Expenses Travel costs include airfare, lodging, car rental, and meals. The estimated pricing is based on three on-site sessions with four full days of training.

1. *Airfare*: Due to the global effects of the pandemic, the average roundtrip domestic flight within the United States was less expensive in 2021 compared to 2019, $293 versus $359 (Weir 2019; Damodaran 2021). Airfare rose precipitously in June 2022 to an average of $398 for a roundtrip domestic flight and has continued to rise by at least 3.4% in the last eight months to approximately $412 (US Bureau of Labor Statistics 2023; Trcek 2023). The $412 value was used when calculating the cost of airfare for three round-trip flights (total cost, $1236).
2. *Lodging*: As of February 2023 the federal per diem rate for lodging on business trips is $98 per night (FederalPay.org 2023). The federal per diem rate was used for calculations, with four nights of lodging over three sessions (total cost, $1176).

3. *Car rental*: Unfortunately the price of car rentals skyrocketed following the pandemic. First, rental car companies sold most of their inventory at the end of 2020 due to the drop in travel (Fields 2021). Secondly, the demand for car rentals spiked sooner than expected once travel resumed in 2021 (Fields 2021). Finally, there has been a microchip manufacturing shortage, slowing car production. As of January 2023, the average weekly car rental price is $551 (French and Kemmis 2023). Rideshare and cabbing are extremely popular, but the variability in travel distances makes calculating an average cost impractical. It is suspected this cost would be comparable, if not lower, than that of a rental car. The total was calculated using five-day car rentals for three sessions (total cost, $1653).
4. *Meals*: The federal per diem rate for business trip meals from October 2022 through September 2023 is $59 a day (FederalPay.org 2023). Most training programs provide at least one meal, as well as snacks. Meal expenditure is estimated to be $40 per day for a total of 15 days (total cost, $600).
5. *Time off*: Veterinarian paid time-off (PTO) for on-site courses only factors in as an added expense if additional PTO is provided outside of the veterinarian's contractual annual PTO. Clinics offer an average of 4.1 paid continuing education (CE) days per year according to the last AAHA Compensation and Benefits Guide (AAHA 2020). If the total number of CE days exceeds the allotted CE days per year, the hospital can either require the veterinarian use PTO or pay the veterinarian for some or all the remaining CE days. Requiring the use of PTO would not "cost" the hospital anything additional. The clinic accrues an added expense if they agree to pay for the additional CE days. The price range provided represents a clinic offering 5–12 days of additional paid CE leave. The median pay for a full-time veterinarian, calculated by the United States Bureau of Labor Statistics in 2022, was $100 370 or $48.26/hour (BLS 2022a). Each paid CE day was counted as eight hours. The total does not include potential lost revenue due to the veterinarian's absence, nor does it include relief veterinarian expenses. The average number of additional paid CE days was estimated to be 8.5 days (total cost, $3282).

Staff Training Team training expenses are highly variable and dependent on the preexistence staff meetings and use of a staff meeting for training (compared to self-study). Refer to the Introduction of this book for a breakdown of these variables (cost range, $230–1295).

Supplies The quantity and brand of supplies kept on-hand is dependent on practitioner preference and the hospital's goal for consumables on-hand. Given this variability, the expected expenditure for acupuncture supplies is based on the cost per patient. All pricing is current as of February 2023.

- *Acupuncture needles*: The range assumes a cost of $12 for a box of 100 needles with 10–30 needles used per patient (total per patient, $2.50).
- *Moxa:* The average cost of a box of 10 moxa sticks is around $15. Each stick can be used for at least three treatments (total per patient, $0.52).
- *Electroacupuncture*: An electroacupuncture unit, with leads, is not required but very helpful. The average cost is $400 per unit. The price range per patient is based on the frequency of use and the assumptions and calculations presented by a 2015 paper discussing the profitability of veterinary acupuncture (Marks and Shmalberg 2015) (total per patient, $0.76–$4.02).
- *Vitamin B12*: A 100-ml multidose bottle of vitamin B12 costs $8. On average a patient receives 1 ml of vitamin B12 divided into multiple acupoints. The price per bottle is based

on the average price across all major veterinary distributors (total per patient, $0.08).
- *Syringes:* A box of 100 syringes (1 ml with 25g or 3 ml with 22g) costs on average $15 per box. If a separate syringe is used for each 0.1 ml injection of vitamin B12 at most 10 syringes would be used for the aquapuncture session. Generally, a 1-ml syringe is used, unless larger quantities of vitamin B12 are injected, and the needle is changed every one to two injections. The price is based on using 10 syringes per patient (total per patient, $1.50).
- *Needles*: A box of 100 needles (27 or 25g) costs around $8. The presented cost assumes 10 needles are used per patient (total per patient, $0.80).

Staffing Acupuncture appointments range from 30 to 60 minutes depending on the condition(s) being treated. Following the American Animal Hospital Association (AAHA) recommendations a veterinary assistant or licensed technician (VA/LT) should restrain patients for physical examinations and procedures. A VA/LT may be utilized for the length of the entire appointment or only until the needles are placed.

Some practitioners prefer the VA/LT remain in the room following needle placement, ensuring the pet remains calm, is not walking around, and does not attempt to remove the needles. Other practitioners prefer the VA/LT leave the room.

If the VA/LT is only needed for the examination and needle placement there is no difference in staffing cost for an acupuncture appointment compared to a traditional appointment. If the VA/LT is required to stay in the exam room until the needles are removed the staff cost for the additional 15–45 minutes should be considered: $4.43–13.29 per patient. The provided expenses are based on a national average wage of $17.72 an hour for veterinary technologists and technicians as of September 2022 (BLS 2022b).

Facilities Facility expenses represent the costs needed to keep the doors open (aka overhead). Overhead includes rent or mortgage, utilities, administrative costs, and often employee costs divided by the minutes the practice is open (Stevenson 2016). The price per minute equals the amount of revenue needed just to break even. Overhead is extremely hospital specific, but the range tends to be $2–5/minute. The low end of the range in Table 1.9 represents the cost for a 30-minute appointment at a clinic with a $2/minute overhead, while the high end represents the cost for a 60-minute appointment at a clinic with a $5/minute overhead.

Designating a specific room for acupuncture minimizes the chances other associates will need the room for their appointments. However, there is then an added expense for designing the room and potential lost revenue if the room is not used regularly. The absence of a designated room theoretically reduces redecoration costs, but this can be disruptive for appointment flow if the treatment takes longer than the allotted time.

Advertising There are numerous ways to advertise a new service. On average, veterinary hospitals spend 0.7% of revenue on promotion and advertisement (AVMA 2019). Most of the advertisement can be done with little to no additional expenditure. The Promotion section discusses advertising ideas in further detail. The national median gross revenue for companion animal practices was $1.2 million in 2022 (AVMA 2023). Advertising costs are calculated assuming no more than 5% of the current advertising budget would be used for promotion of the new service (estimated maximal cost, $420).

Start-Up Costs Table 1.9 summarizes projected start-up costs for acupuncture. Table 1.10 calculates potential start-up costs based on the degree of hospital contribution toward veterinarian and staff training. Different scenarios are presented in which the hospital covers all, some, or none of the expenses.

Table 1.9 Total potential hospital start-up costs and per-pateint expenses for acupuncture as of 2023.

Category	Subcategories	Projected cost	
Veterinarian training	Course costs	$6995–9750	Average $8373
	Textbooks	$200–400	Average $300
	Travel expenses	$4199	
	Time-off	$1909–4581	Average $3245
Staff training	Variable	$230–1295	
Supplies	Acupuncture needles	$12 per box	$2.50 per patient
	Moxa	$15 per box	$0.52 per patient
	Electroacupuncture unit	$400 per unit	$0.76–4.02 per patient
	Vitamin B12	$8 per bottle	$0.08 per patient
	Syringes (1 and 3 ml)	$15 per box	$1.50 per patient
	Needles (27g and 25g)	$8 per box	$0.80 per patient
Staffing	Variable	≥$0	
Facilities	Overhead	$2–5 per minute for 30–60 minute appointment	$60–300 per patient
Advertising	Variable	≤$420	

Source: Lisa P. McFaddin.

Applicability

As stated earlier, acupuncture is extremely versatile and beneficial for numerous conditions and ailments. Acupuncture is used primarily for painful conditions (musculoskeletal and neurologic). As the clinician becomes more comfortable and confident in their acupuncture skills the variety of cases for which acupuncture is recommended typically increases.

Appointment Scheduling

There are four main factors to consider when planning acupuncture appointment protocols: appointment length, support staff availability, exam room availability, and follow-up appointment scheduling.

There are other issues to consider when scheduling acupuncture appointments. For example, will acupuncture appointments be scheduled separately from traditional Western appointments or will the appointment length be increased to allow time for needle placement? Will vaccinations be given during the acupuncture appointment? Some practitioners prefer to perform vaccines at the time of acupuncture; whiles others prefer to separate vaccine administration from acupuncture sessions by at least 24 hours.

The initial integrative appointment is longer, 60 minutes, compared to follow-up appointments. Follow-up appointments should be scheduled for 30–50 minutes depending on the patient and if additional treatments are performed.

Keep the appointment positive: you want the pet to enjoy the experience. A relaxed pet is more easily treated. Avoid ancillary procedures which may cause stress: nail trims, anal gland expression, sanitary trims, anything with the ears, etc. Additional information on appointment scheduling can be found in the Introduction at the beginning of this book.

Pricing

An in-depth look into appointment pricing can be found in the Introduction. Here I discuss two pricing methods: current market fees and hospital cost-based pricing.

Table 1.10 Projected acupuncture start-up costs for eight hospital scenarios, with varying hospital contributions toward veterinary certification and staff training as of February 2023. The cost of veterinarian training is based on the averages presented in Table 1.9. Staff training costs assume a 1.5-hour long all-staff meeting, using national averages for employee numbers: eight non-DVMs and two DVMs (AVMA 2019, 2023). The cost of office supplies and lunch as estimated based on 10 employees attending the meeting. The overhead is based on an average of $3.5/minute. Missed revenue is calculated using the 2022 national mean revenue per hour for companion animal practices ($567/hour) (AVMA 2023). Advertising includes printed materials, digital advertisement, and community engagement.

Category	Projected expenses	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7	Ex. 8
Veterinarian training	Average course cost	$8378	$8378	$8378	n/a	$8378	$8378	$8378	n/a
	Average textbooks	$300	n/a	n/a	n/a	$300	n/a	n/a	n/a
	Travel expenses	$4665	n/a	n/a	n/a	$4665	n/a	n/a	n/a
	Average time-off	$3283	$3283	n/a	n/a	$3283	$3283	n/a	n/a
Staff training	Office supplies	$30	$30	$30	$30	$30	$30	$30	$30
	Lunch	$200	$200	$200	$200	$200	$200	$200	$200
	Overhead	$315	$315	$315	$315	n/a	n/a	n/a	n/a
	Missed revenue	$851	$851	$851	$851	n/a	n/a	n/a	n/a
Supplies	Five boxes acupuncture needles	$50	$50	$50	$50	$50	$50	$50	$50
	Electroacupuncture unit	$400	$400	$400	$400	$400	$400	$400	$400
	One box of moxa	$15	$15	$15	$15	$15	$15	$15	$15
	One bottle vitamin B12	$6	$6	$6	$6	$6	$6	$6	$6
	One box 1-ml syringes	$12	$12	$12	$12	$12	$12	$12	$12
	One box 27g needles	$6	$6	$6	$6	$6	$6	$6	$6
Advertising		$420	$420	$420	$420	$420	$420	$420	$420
Total		**$18 931**	**$13 966**	**$10 683**	**$2 305**	**$17 765**	**$12 800**	**$9 517**	**$1 139**

Source: Lisa P. McFaddin.

Current Market Fees A study of five general practices within Central Florida found the price of acupuncture appointments ranged from $45–150 with a mean of $95.80 (Shmalberg 2016; Marks and Shmalberg 2015). The average length of these appointments was 47 minutes. According to the Nationwide® Purdue 2019 Veterinary Price Index, veterinary pricing increased by 21.1% between the end of 2014 and the end of 2018 (Purdue University 2019). Presuming services continued to increase by at least 5% annually, a 50-minute session would translate to $130 by January 2023.

Thervo (2019) lists veterinary acupuncture appointments costs at $65–85 a session but do not specify the length of the appointment. Speaking with other certified veterinary acupuncturists the current price range for a 30–60-minute acupuncture appointment is $85–200.

Hospital Cost-Based Pricing Table 1.11 outlines the hospital cost per patient for 30- and 60-minute acupuncture appointments. The veterinarian training amortization per patient was calculated using the following assumptions:

1. The average companion animal practice employees 2.1 full-time veterinarians (AVMA 2023).
2. The average companion animal practice is open for appointments 5.6 days/week (AVMA 2023).
3. The average companion animal veterinarian sees two patients/hour (AVMA 2023).
4. The average companion animal veterinarian works 45 hours a week (AVMA 2023).
5. The average companion animal veterinarian spends 78% of their work week seeing appointments (AVMA 2023).
6. The average companion animal veterinarian receives 21 paid days of vacation and holiday pay annually (iVet360 2023).
7. The average companion animal veterinarian receives 4.1 paid days off for CE per year (AAHA 2019).
8. Acupuncture appointments account for 14% of a veterinarian's appointments (Marks and Shmalberg 2015).

Table 1.11 Estimated hospital costs per patient for 30- and 60-minute acupuncture appointments as of February 2023. Start-up costs are taken from the totals in Table 1.10. Amortization is per patient and is based on the veterinarian seeing 952 acupuncture patients in two years. Overhead is calculated using $3.5/minute in a practice with two veterinarians. Multiple examples are provided with the variance determined by the total cost within each category. The total is rounded to the nearest whole number.

	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7	Ex. 8
30-Minute appointments								
Table 1.9 totals	$18 931	$13 966	$10 683	$2305	$17 765	$12 800	$9517	$1 139
Amortization	$19.80	$14.61	$11.17	$2.41	$18.58	$13.39	$9.96	$1.19
Overhead	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50
Total	**$72**	**$67**	**$64**	**$55**	**$71**	**$66**	**$62**	**$54**
60-Minute appointments								
Table 1.9 totals	$18 931	$13 966	$10 683	$2305	$17 765	$12 800	$9517	$1 139
Amortization	$19.80	$14.61	$11.17	$2.41	$18.58	$13.39	$9.96	$1.19
Overhead	$105	$105	$105	$105	$105	$105	$105	$105
Total	**$125**	**$120**	**$116**	**$107**	**$124**	**$118**	**$115**	**$106**

Source: Lisa P. McFaddin.

9. The amortization is calculated over a two-year period.

Using the above information, the typical companion animal veterinarian sees 3398 patients a year (70 patients a week, working 48.4 weeks a year). At least 476 of these patients would receive acupuncture, for a total of 952 patients in two years.

Supply assumptions were based on the average cost per patient for each supply listed in Table 1.9. Appointments with dry needling only would cost the hospital $5.29 less per patient.

Overhead includes rent or mortgage, utilities, administrative costs, and often employee costs divided by the minutes the practice is open (Stevenson 2016). A $3.5/minute overhead was used. The national average of two DVMs per hospital was used, rounded down from 2.1 (AAHA 2019; AVMA 2023).

The formula to determine service fees is quite simple: service fee = hospital cost + profit. The big question becomes how much profit? Table 1.12 illustrates the potential fee for 30- and 60-minute acupuncture appointments, based on hospital cost and variable markup percentages. It becomes readily apparent that the lower the hospital contribution, the higher the comparative profit.

Additional Considerations

Most of my patients receive other treatments or diagnostics when they come in for their treatments. We often adjust current medication regimens, run diagnostics (blood work, urinalysis, radiographs, etc.), discuss dietary and environmental modifications, and discuss nutrition and nutraceuticals, all of which increase revenue, average transaction charge (ATC), and DVM revenue per hour.

Offering acupuncture also helps improve current client retention and drive new client acquisition. Marks and Shmalberg (2015) found 29% of new acupuncture patients returned for wellness and other services. Improving client retention and new client acquisition helps drive revenue.

Scheduling acupuncture appointments presents a unique opportunity not afforded by traditional Western appointments. Most appointments in veterinary medicine are scheduled linearly: 8 a.m., 8:30 a.m., 9 a.m., etc. With acupuncture appointments the veterinarians may only be in the exam room for the initial history, examination, needle placement and again at the time of needle removal. In a hospital with enough exam rooms and personnel, acupuncture appointments could be staggered very easily. This would in essence double the DVM revenue per half hour to hour. This tactic requires double the exam room capacity, support staff, and requires careful planning when scheduling appointments.

As an additional resource several organizations offer online courses discussing the integration of acupuncture and TCVM into the veterinary practice. The IVAS offers a three-hour online prerecorded webinar series presented by Nell Ostermeier, DVM, CVA, FAAVA called Integrating Acupuncture into Practice. Chi University has a 19-hour online course on discussing TCVM Business Management.

Team Training

The concept of phase training is used when introducing acupuncture to the hospital team. A multimedia approach is used to assist with the training program and is outlined in Table 1.13.

In order for the practice manager to fulfill his or her role in training, they need their own checklist:

- Schedule a date and time for the team training.
- Ensure all information pertaining to the new service is reviewed with the staff.
- Confirm all team members have completed the training.
- Certify all team members understand the information and can successfully educate clients.

Table 1.12 Potential 30- and 60-minute acupuncture appointment prices using hospital costs from Table 1.11 at varying percentage markups as of February 2023.

		Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7	Ex. 8
30-Minute appointments									
Total hospital cost		$72	$67	$64	$55	$71	$66	$62	$54
Potential appointment price	40% Markup	$101	$94	$90	$77	$99	$92	$87	$76
	50% Markup	$108	$101	$96	$83	$107	$99	$93	$81
	60% Markup	$115	$112	$107	$94	$118	$111	$105	$93
	70% Markup	$122	$114	$109	$94	$121	$112	$105	$92
	80% Markup	$130	$121	$115	$99	$128	$119	$112	$97
	90% Markup	$137	$127	$122	$105	$135	$125	$118	$103
	100% Markup	$144	$134	$128	$110	$142	$132	$124	$108
60-Minute appointments									
Total hospital cost		$125	$120	$116	$107	$124	$118	$115	$106
Potential appointment price	40% Markup	$175	$168	$162	$150	$174	$165	$161	$148
	50% Markup	$188	$180	$174	$161	$186	$177	$173	$159
	60% Markup	$200	$112	$107	$94	$118	$111	$105	$93
	70% Markup	$213	$204	$197	$182	$211	$201	$196	$180
	80% Markup	$225	$216	$209	$193	$223	$212	$207	$191
	90% Markup	$238	$228	$220	$203	$236	$224	$219	$201
	100% Markup	$250	$240	$232	$214	$248	$236	$230	$212

Source: Lisa P. McFaddin.

Table 1.13 The breakdown of veterinary acupuncture phase training steps and resources for the entire hospital team.

Phase 1: Background information	
Team training guide	• The handout walks the practice manager and/or veterinarian through Phase 1 of the training • A downloadable and editable copy of the handout is located on the companion website
Training presentation	• The video covers background information on the modality • PowerPoints can be downloaded, edited, and personalized from the companion website • The document can be used as a PowerPoint or saved as an mp4 creating a personalized movie
Team training handout	• The handout provides additional background information for the CSRs, VAs, and LTs to complement the knowledge gained from watching the training presentation • A downloadable and editable copy of the handout is located on the companion website
Phase 2: Knowledge proficiency	
Quiz	• A short quiz to ensure all team members have a good understanding of the service being offered • A downloadable and editable copy of the handout is located on the companion website • A key is provided
Phase 3: Expectations	
Training worksheets	• A training checklist is provided for CSRs and VA/LTs with role-specific expectations and tasks for each staff member • A recommended completion time is provided • A downloadable and editable copy of the handout is located on the companion website
Phase 4: Client education	
Client scripts	• Bullet point information and scripted examples used when discussing acupuncture with clients • A downloadable and editable copy of the handout is located on the companion website
Client education presentation	• A short (five to seven minute) client educational video about the therapeutic modality • PowerPoints can be downloaded, edited, and personalized from the companion website • The document can be used as a PowerPoint or saved as an mp4 creating a personalized movie
Client education handout	• An informational handout about the therapeutic modality written specifically for clients • A downloadable and editable copy of the handout is located on the companion website

CSR, customer service representative; VA, veterinary assistant; LT, licensed technician.
Source: Lisa P. McFaddin.

Promotion

There are six common avenues of promotion for a veterinary integrative medicine (VIM) service: hospital website, social media, email blasts, mailers, in-hospital promotions, and client education.

Hospital Website

Advertise "Acupuncture" in several locations on the website main page, services, veterinarian's biography, and blog page. On the main page create a button or banner stating "Now offering veterinary acupuncture" with a link to success stories or client testimonials. Utilize the hospital website to advertise the VIM treatment under the "Services" section. On the veterinarian's biograph section include a description of the specialized training and professional initials. Create an Acupuncture blog page discussing patient success stories.

Social Media

Utilize Facebook, Instagram, and/or Twitter to post facts, photographs, hashtags, and patient success stories. Include fun and intriguing facts about veterinary acupuncture. Clients love patient photographs, especially when receiving veterinary acupuncture treatments. Create or utilize veterinary acupuncture specific hashtags.

Email Blasts

Send fun mass emails to your clients introducing veterinary acupuncture. Consider monthly case presentations illustrating how the service has benefited patients. Almost everyone has at least one email address these days. Customer service representative should be amassing client emails at the same rate as phone numbers.

Mailers

Mailers can be expensive and are largely unnecessary in this digital age. Mailers can be used to announce the introduction of acupuncture to existing clients. The mailer should include the name of the new service, a brief description of how veterinary acupuncture can help pet patients, the name of the doctor performing the acupuncture, and maybe a brief description of the training the doctor received and a photograph of a pet receiving acupuncture.

In-Hospital Promotions

Advertise veterinary acupuncture within the hospital using small promotional signs, informational signs, invoice teasers, and staff buttons. Small promotional signs can be placed in the waiting room and exam rooms. Include photographs of pets receiving acupuncture. Consider catchphrases such as "Got Acupuncture" or "Veterinary Acupuncture Has a Point."

Informational signs should include a brief description of how veterinary acupuncture can help pet patients, photographs of pets receiving acupuncture, name of the doctor performing acupuncture, and a brief description of the training the doctor received.

Invoice teasers should consist of short phrases reminding and enticing owners regarding a new service offered at the practice. Examples include "Now offering Veterinary Acupuncture," "Curious if acupuncture can help your pet?," "Introducing Veterinary Acupuncture," and "Would your pet benefit from Veterinary Acupuncture?"

Buttons can be made for the staff to wear with kitchy phrases reminding owners, in a fun way, of the new VIM service. Examples include "Got Acupuncture" and "Want to learn more about Veterinary Acupuncture?".

Client Education

Education is crucial to understanding the purpose and importance of any given treatment. The client handouts and videos solidify pet owner knowledge base, reducing concerns and conveying value.

Integration

The key components for proper integration include availability of the service to the right patients, appropriate patient scheduling, appropriate support staff scheduling, and staff buy-in (understanding the benefits of the offered service).

Veterinarians

There are several factors to contemplate when veterinarians are considering, and preparing to incorporate, a VIM in their clinical repertoire: state requirements and restrictions, ROI, course availability, supplies and equipment, veterinary organizations, and continuing education.

State Requirements and Restrictions

Is Acupuncture Considered the Practice of Veterinary Medicine?

Table 1.14 details which states define acupuncture as the practice of veterinary medicine. Some states permit non-veterinarians certified in acupuncture to practice, usually under the supervision of a veterinarian. Table 1.14 also addresses which states allow human acupuncturists to practice on animals. These rules and regulations can change. Check your local state board for further information. Links to each state's veterinary board can be found online.

Does Acupuncture CE Count Toward Licensure CE Requirements?

Currently no states require specific CE hours for veterinary acupuncture. Some states limit the use of integrative medicine CE hours toward the annual CE requirement for license renewal. Most states permit the use of acupuncture CE if the lectures or webinars are performed by an approved provider. Review your specific state's requirements for further details. Table 1.14 outlines those states which permit the use of acupuncture CE toward the annual CE requirement.

Utilizing AVMA (2019) and each state's Board of Veterinary Medicine website, Table 1.14 addresses the following questions: Does the state define acupuncture as the practice of veterinary medicine? Are licensed human acupuncturists certified in animal acupuncture allowed to practice? Are they required to practice under the direct supervision of a veterinarian? Are acupuncture CE hours applicable to the annual or biennial CE requirement? Links to each state veterinary board are provided on the companion website.

Are Your Assets Covered?

Check with your liability insurance to determine if you are covered when practicing veterinary acupuncture. Refer to the Introduction at the beginning of this book for additional information.

Return on Investment

Specifics are discussed in the Team Members section of this chapter.

Course Availability

While certification is not strictly required, formal acupuncture training should be considered a requirement. Training and certification provide the foundation for understanding how acupuncture can best help your veterinary patients. Completion of formal training also helps legitimize the modality. Most training programs involve multiple online and on-site courses. Veterinarians can usually start practicing acupuncture after the first on-site training session. The following initial certification course offerings and pricing are current as of February 2023.

Many of the organizations offering the initial acupuncture certification offer advanced training as well. Board certification in acupuncture is possible through the American Board of Animal Acupuncture (ABAA). ABAA is a nonprofit certification agency dedicated to establishing and promoting standards of care in veterinary acupuncture and Western medicine. Additionally, Chi University offers a Master of Science in Integrative Veterinary Medicine, a Master of Science in Traditional Chinese Veterinary Medicine, and a Graduate Certificate in Veterinary Acupuncture.

Veterinarians who are on the fence about committing to a full training course are encouraged to attend introductory lectures first. Familiarizing yourself with the information is a great way to determine if pursuing this

Table 1.14 The legality of veterinary acupuncture (VA) and applicability of continuing education (CE) hours by state as of 2023. A link to each state's veterinary board can be found on the companion website.

State	PVM	LA	LAE	ACE	References
Alabama	Yes	No	No	Yes	ASBVME (2021)
Alaska	No	No	No	Yes	ADCBPL (2023)
Arizona	Yes	Yes	No	Yes	ASVMEB (2022)
Arkansas	Yes	No	No	≤5 hours/year	ADAVMEB (2008, 2019)
California	No	Yes	No	Yes	CDCAVMB (2022)
Colorado	No	Yes	No	Yes	CDRASBVM (2019)
Connecticut	No	NS	NS	Yes	CBVM (2023)
Delaware	No	NS	NS	Yes	DBVM (2023)
District of Columbia	No	NS	No	Yes	DCVM (2023)
Florida	Yes	No	No	≤5 hours/year	FBVM (2022), eLaws.us (2020)
Georgia	Yes	NS	No	Yes	GSBVM (2022, 2023)
Hawaii	No	Yes	No	Yes	HDCCAPVLDBVM (2010)
Idaho	No	Yes	No	Yes	IBVM (2020)
Illinois	Yes	Yes	No	Yes	IGA (2004)
Indiana	Yes	Yes	No	Yes	IVMB (2019)
Iowa	No	NS	No	Yes	IBVM (2017)
Kansas	Yes	NS	No	Yes	KBVE (2020)
Kentucky	Yes	No	No	Yes	KYBVE (2020)
Louisiana	No	Yes	No	Yes	LBVM (2022)
Maine	Yes	No	No	Yes	MSBVM (2022)
Maryland	No	Yes	No	Yes	MBVME (2019)
Massachusetts	Yes	Yes	No	Yes	MBRVM (2022)
Michigan	Yes	NS	No	Yes	MBVM (2023)
Minnesota	No	NS	No	Yes	MNBVM (2022)
Mississippi	Yes	NS	Yes	Yes	MSBVM (2008)
Missouri	Yes	NS	No	Yes	MOVMB (2022)
Montana	Yes	NS	Yes	Yes	MCA (2021)
Nebraska	No	Yes	No	Yes	NLU (2019)
Nevada	Yes	No	No	Yes	NBVME (2023)
New Hampshire	Yes	No	No	Yes	NHBVM (2020, 2022)
New Jersey	Yes	Yes	No	Yes	NJSBVME (2021)
New Mexico	No	Yes	No	≤7 hours/year	NMBVM (2018), CaseText (2023)
New York	No	Yes	No	Yes	NYSLPV (2023)
North Carolina	No	No	No	Yes	NCVMB (2014)
North Dakota	Yes	NS	No	Yes	NDVBME (2007)

State	PVM	LA	LAE	ACE	References
Ohio	Yes	NS	No	Yes	ORC (2006)
Oklahoma	Yes	Yes	No	Yes	OVB (2022)
Oregon	No	Yes	No	Yes	OL (2021)
Pennsylvania	No	Yes	No	Yes	CP (2022)
Rhode Island	No	NS	No	Yes	RIDH (2006)
South Carolina	Yes	Yes	No	Yes	SCCL (2016)
South Dakota	No	NS	No	Yes	SDL (2023)
Tennessee	Yes	No	No	Yes	TBVME (2014)
Texas	Yes	Yes	No	Yes	TAC (2012)
Utah	No	Yes	No	Yes	UC (2020)
Vermont	No	NS	No	Yes	VGA (2023)
Virginia	Yes	No	No	Yes	DHP (2007)
Washington	No	NS	No	Yes	WSL (2023)
West Virginia	No	NS	No	Yes	WVBVM (2023)
Wisconsin	No	Yes	No	Yes	WVEB (2022)
Wyoming	No	NS	No	Yes	WBVM (2018)

PVM (Practice of Veterinary Medicine): the state board considers VA to be the PVM. 2023
LA (Licensed Acupuncturist): an LA may perform VA under the direct supervision of a veterinarian with an active veterinary–client–patient relationship.
LAE (Licensed Acupuncturist Exemption): an LA is not required to practice under direct veterinary supervision.
ACE (Applicable CE): VA CE is applicable to the state's mandated CE hours assuming approval by the American Association of Veterinary State Boards (AAVSB) Registry of Approved Continuing Education (RACE).
NS, information not specified.
Source: Lisa P. McFaddin.

modality is right for you and your practice. State and national veterinary conferences, as well as many online veterinary educational platforms, for example Veterinary Information Network (VIN), Vetfolio, DVM360 Flex, Vet Girl on the Run, and College of Integrative Veterinary Therapies (CIVT), frequently offer American Association of Veterinary State Boards (AAVSB) Registry of Approved Continuing Education (RACE)-approved lectures on various integrative topics.

Canine Rehabilitation Institute

- **Course name**: Certified Veterinary Acupuncture Therapist Program
- **Prerequisites**: License, in good standing, to practice veterinary medicine or third or fourth year veterinary student.
- **Description**
  - 120-hour AAVSB RACE-approved certification course in small animal veterinary acupuncture, both dry needle and electroacupuncture.
  - The course is accredited by the Association of Veterinary Anesthetists.
  - The course is recognized by the American Academy of Veterinary Acupuncture (AAVA), an affiliate of the IVAS.
  - The course focuses on the neurophysiology of acupuncture (medical acupuncture). TCVM is not discussed.
  - Course comprises three modules: two required and one elective.
  - Certification requirements:
    - Pass all written and practical examinations (score ≥70% required)
    - No internship required
    - No case studies required.

- **Online training**: Three 16-hour online modules (available for 60 days before the on-site portion).
- **On-site training**: Three (three-day) on-site modules in Wheat Ridge, CO. Limited on-site class size of 20 students with five faculty members.
- **Completion time**: Approximately six months.
- **Cost**: $7875.
  - Includes digital copy of the notes.
  - Program is recognized by the AAVA.
- **Contact information**
  - Address: 2137 S. Eastgate Avenue, Springfield, MO 65809
  - Website: www.caninerehabinstitute.com
  - Email: info@caninerehabinstitute.com

Chi University

- **Course name**: Veterinary Small Animal Acupuncture Certification Track
- **Prerequisites**: License, in good standing, to practice veterinary medicine or third or fourth year veterinary student.
- **Description**
  - 142-hour certification course in small animal veterinary acupuncture.
  - 138 hours are AAVSB RACE-approved.
  - The course focuses on:
    - The fundamentals of TCVM as a means of diagnosing and treating patients.
    - Emphasis is placed on the Western understanding of acupuncture's mechanisms of action.
    - Learned acupuncture techniques: dry needle, electroacupuncture, aquapuncture, and moxibustion.
    - The incorporation of acupuncture into daily practice.
  - Students are eligible for the Certified Veterinary Acupuncturist certification endorsed by Chi University and the World Association of Traditional Chinese Veterinary Medicine (WATCVM). Certification requirements include:
    - Successful completion of the program.
    - Pass three online quizzes (score >75% required).
    - Pass the final written on-site exam (score >75% required).
    - Pass the on-site clinical acupoint exam (score >75% required).
    - Submit one case report.
    - Complete 30 hours of advanced TCVM training or internship/observation with a certified veterinary acupuncturist.
  - Chi University is accredited by the Distance Education Accrediting Commission (DEAC).
- **Online training**: Three online sessions
- **On-site training**: Two (four-day) on-site sessions in Reddick, FL. There are live lectures on specific conditions and hands-on small laboratory groups working with live animals. There is now an option to take the program through University of California Davis Veterinary Medicine in which the on-site sessions ae held in Davis, CA.
- **Completion time**: The course takes approximately 6–10 months to complete. Variance in the completion time is due to the time needed for the internship or advanced TCVM training, as well as completion of the case report.
- **Cost**: $7580
  - Canine acupoint chart.
  - 32-hour evidence-based veterinary acupuncture course.
  - One-year membership with the WATCVM.
  - Lifetime case consultation with Chi faculty.
  - Digital class handouts and notes provided.
  - Lunch and snacks provided.
  - Printed binders available for an additional cost.
- **Contact information**
  - Address: 9650 W Hwy 318, Reddick, FL 32686, USA
  - Phone: (800) 860-1543
  - Website: www.chiu.edu
  - Email: register@chiu.edu

College of Integrative Veterinary Therapies

- **Course name**: Certification in Veterinary Acupuncture
- **Prerequisites**: License, in good standing, to practice veterinary medicine or third or fourth year veterinary student.
- **Description**
  - 93-hour RACE interactive distance online only, small animal acupuncture certification course. Quizzes are provided for RACE hours.
  - The course focuses on:
    - The fundamentals of TCVM as a means of diagnosing and treating patients.
    - Emphasis is also placed on the Western understanding of acupuncture's mechanisms of action.
    - Learned acupuncture techniques include dry needle, electroacupuncture, aquapuncture, and moxibustion.
    - The incorporation of acupuncture into daily practice.
  - Requirements for certification include:
    - Completion of all modules.
    - Completion of all module assessments.
    - Case log book with at least 10 cases.
  - Successful completion of the certification is a prerequisite for obtaining a Graduate Diploma of Veterinary Acupuncture, which is nationally accredited under the Australian Qualifications Framework at the postgraduate level.
  - **Online training**: Four online modules taking approximately three months each to complete.
  - **On-site training**: Not applicable.
  - **Completion time:** 12 months.
- **Cost**: $7020
  - Digital copy of the notes.
  - Case support from tutors.
  - Live case forums.
  - One-on-one practical sessions.
  - Virtual assessments using Skype.
- **Contact information:**
  - Address: PO Box 352, Yeppoon, 4703 QLD, Australia
  - Phone: (304) 930-5684
  - Website: www.civtedu.org
  - Email: admin1@civtedu.org

CuraCore

- **Course name**: Medical Acupuncture for Veterinarians (MAV)
- **Prerequisites**: License, in good standing, to practice veterinary medicine or third or fourth year veterinary student.
- **Description**
  - Up to 166 hours of AAVSB RACE-approved small animal acupuncture certification course.
  - The course focuses on medical acupuncture, both dry needle and electroacupuncture, with an emphasis on myofascial palpation. TCVM is not discussed.
  - Requirements for certification include:
    - Completion of all modules.
    - Completion of online interactive sessions.
    - Passing all assessments (score of ≥70% required).
    - Completion of interactive testing.
    - Submission of a case report.
  - Graduates are eligible for the MAV master class, a monthly program of 12 90-minute sessions available online.
- **Online training**: One (five-day) on-site session if the hybrid option is chosen. Hands-on portion takes place at the CuraCore Academy in Fort Collins, CO.
- **On-site training**: 10 online modules. There is an online-only option.
- **Completion time:** One year.
- **Cost**: $9750
  - Interactive group and individual sessions.
  - Technical skills tutorial.
  - Access to MAV private Facebook group.
  - Graduate listing on website.
  - CuraCore MAV acupuncture kit.

- **Contact information**:
  - Address: 4007 Automation Way, Fort Collins, CO 80525, USA
  - Phone: (970) 818-0851
  - Website: www.curacore.org
  - Email: info@curacore.org

International Veterinary Acupuncture Society

- **Course name**: US Certification Course in Veterinary Acupuncture
- **Prerequisites**: License, in good standing, to practice veterinary medicine or third or fourth year veterinary student.
- **Description**
  - 160-hour veterinary acupuncture certification course with the option to focus on small animal, equine, or both.
  - The course focuses on:
    - The fundamentals of TCVM as a means of diagnosing and treating patients.
    - Emphasis is also placed on the Western understanding of acupuncture's mechanisms of action.
    - Learned acupuncture techniques include dry needle, electroacupuncture, aquapuncture, and moxibustion.
    - The incorporation of acupuncture into daily practice.
  - Requirements for certification include:
    - Attendance and completion of all sessions.
    - 16 hour mentored internship.
    - Pass all written and practical examinations (score of ≥70% required).
    - Case log book with at least 10 cases.
    - Submission of a peer-reviewed case report.
- **Online training**: One online session
- **On-site training**: Four (four to five day) on-site sessions whose location changes annually.
- **Completion time**: The course takes approximately six to nine months to complete. Completion time variance is due to the time needed to complete the care report.
- **Cost**: $6995
  - Digital class notes provided.
  - An additional 16 hours of mentored internship provided.
- **Contact information**
  - Address: PO Box 1283, Portland, TX 78374
  - Phone: (970) 266-0666
  - Website: www.ivas.org
  - Email: office@ivas.org

Supplies and Equipment

Recommended starting veterinary acupuncture supplies and suppliers are provided in Tables 1.15 and 1.16. Hospital remodeling and/or redecorating is generally not required when offering veterinary acupuncture. Most traditional exam rooms can be utilized for acupuncture sessions. Some practitioners prefer to have a dedicated acupuncture room while others use existing spaces. Having comfy places for the patient to lie down is highly recommended. This can be accomplished with yoga mats or puzzle floor mats and towels or blankets. Creating a relaxing environment with soft music and diffusors (lavender or pheromones) is also beneficial.

Veterinary Organizations

A description of the most common veterinary organizations with a special interest in acupuncture are provided below. Table 1.17 summarizes the organizations' names, contact information, and membership dues as of February 2023.

American Academy of Veterinary Acupuncture

- **Description**: The AAVA was founded in 1998 and is affiliated with IVAS. The goals of the AAVA are to promote the education, understanding, and professional development of veterinarians practicing veterinary acupuncture, TCVM, and other Eastern medicine practices. There is no annual CE requirement to maintain membership.

Table 1.15 Common veterinary acupuncture starting supplies with approximate costs as of February 2023.

Supplies	Price	Suggested starting quantity
Acupuncture needles	$12 per 100 needles	32g (0.5 and 1 inch) for large dogs = 1 box each 34g (0.5 and 1 inch) for medium dogs = 1 box each 36g (0.5 inch) for small dogs and cats = 1–2 boxes 38g (0.5 inch) for small dogs and cats = 1 box Korean hand needles for small dogs and cats = 1 box
Electroacupuncture unit	$400	One electroacupuncture unit with multiple leads ± carrying case
Moxa	$15	Regular sticks = 1 box Smokeless sticks = ±1 box Mini-sticks = ±1 box
Aquapuncture	$31	Vitamin B12 (100-ml multidose bottle) = 1 bottle 1-ml syringes = 1 box 3-ml syringes = ±1 box 27g needles = 1 box 25g needles = ±1 box

Source: Lisa P. McFaddin.

Table 1.16 The most used veterinary acupuncture suppliers.

Jing Tang Herbal	A Time to Heal	Lhasa Oms
9700 West Hwy 318, Reddick FL 32686	140 Webster Road, Shelburne, VT 05482	230 Libbey Parkway, Weymouth, MA 02189
(352) 591-2141 (800) 891-1986	(802) 497-2375	(800) 722-8775
https://store.tcvmherbal.com	https://atimetohealherbs.com	https://www.lhasaoms.com

Source: Lisa P. McFaddin.

- **Membership benefits**
  - Free subscription to the *American Journal of Traditional Chinese Veterinary Medicine*, a peer-reviewed journal.
  - Searchable member directory.
  - Help advance integrative medicine through the AAVA's seat on the AVMA House of Delegates.
  - Access to the career center with open positions and potential candidates.
  - Option to advance the veterinarian's acupuncture development through completion of the Fellows of American Academy of Veterinary Acupuncturists (FAAVA) certification process.
  - The AAVA hosts an annual CE.

American Holistic Veterinary Medical Association

- **Description**: The American Holistic Veterinary Medical Association (AHVMA) was founded in 1982 at the Western States Veterinary Conference with the goal of advancing integrative medicine through the education of integrative and non-integrative veterinarians, the introduction of integrative medicine to

Table 1.17 Veterinary associations and organizations with a special interest in acupuncture as of February 2023.

Organization	Contact information	Membership dues
American Academy of Veterinary Acupuncture (AAVA)	PO Box 803, Fayetteville, TN 37334 (931) 438-0238 office@aava.org	$150/year
American Holistic Veterinary Medical Association (AHVMA)	PO Box 630, Abingdon, MD 21009 (410) 569-0795 office@ahvma.org	$300/year
College of Integrative Veterinary Therapies (CIVT)	PO Box 352, Yeppoon, 4703 QLD, Australia (303) 800-5460 membership@civtedu.org	$185/year
International Veterinary Academy of Pain Management (IVAPM)	PO Box 1868, Mt Juliet, TN 371211 info@ivapm.org	$150/year
International Veterinary Acupuncture Society (IVAS)	PO Box 1283, Portland, TX 78374 (970) 266-0666 office@ivas.org	$110/year
World Association of Traditional Chinese Veterinary Medicine (WATCVM)	WATCVM and AATCVM PO Box 141324, Gainesville, FL 32614 (844) 422-8286 support@aatcvm.org	$85/year

Source: Lisa P. McFaddin.

veterinary students, the promotion of research, and representation in the AVMA House of Delegates. There is no annual CE requirement to maintain membership.

- **Membership benefits**
  - Free subscription to the *AHVMA Journal*, a peer-reviewed journal.
  - Online resources for client education.
  - Searchable member directory.
  - Discounted vaccination titers through Kansas State University (KSU) Diagnostic Lab.
  - Free access to the Natural Medicines Database, an online resource for supplements, natural medicines, and integrative therapies.
  - Reduced cost for the AHVMA annual conference.

College of Integrative Veterinary Therapies

- **Description**: An online organization open to all licensed animal health providers interested in integrative medicine. There are two membership options: full membership for veterinarians and associate membership for registered animal health professionals. CIVT strives to promote all aspects of evidence-based integrative medicine through online education and discussion forums. CIVT provides financial support to veterinary students interested in studying integrative medicine. CIVT also helps fund integrative medicine research. There is no annual CE requirement to maintain membership.
- **Membership benefits**
  - Access to the online electronic library.
  - Access to the electronic *Journal of Integrative Veterinary Therapies*.
  - Three free CE webinars annually.
  - 20% discount on all webinars.
  - Discounts on specific CIVT courses.
  - Searchable member directory.

- Access to the Natural Medicines Databases and the American Botanical Council Library.

International Veterinary Academy of Pain Management

- **Description**: Originally known as the Companion Animal Pain Management Consortium, then the Academy of Pain Management Interest Group, and finally the International Veterinary Academy of Pain Management (IVAPM). Founded in 2001 to provide pain management education and certification programs. The organization's goal is to provide acute and chronic pain relief for veterinary patients. Both traditional and alternative therapies are embraced, including acupuncture and rehabilitation and physical therapy.
- **Membership benefits**
  - Members can become Certified Veterinary Pain Practitioners (CVPP).
  - Access to member's only Facebook group offering case consultations and questions.
  - Reduced subscription rate for IVAPM's journal *Veterinary Anaesthesia and Analgesia*.
  - Reduced registration fee for the International Veterinary Emergency and Critical Care conference.
  - Reduced registration for all IVAPM CE events (online and on-site).
  - Complimentary World Small Animal Veterinary Association membership.

International Veterinary Acupuncture Society

- **Description**: IVAS was founded in 1974 to promote and educate veterinarians and non-veterinarians on the subject of veterinary acupuncture. IVAS held the first veterinary acupuncture course in 1974 in Cincinnati, Ohio. Current membership numbers are over 1800 veterinarians. IVAS helps promote, educate, and set the global standards for veterinary acupuncture. Certified Veterinary Acupuncturists (CVA) are required to have 10 hours of acupuncture CE every two years.
- **Membership benefits**
  - Searchable member directory.
  - Access to IVAS member-only publications: *The Point* published quarterly and *The Flashpoint* published monthly.
  - Discounted IVAS events and seminars.
  - Online access to IVAS Congress Proceedings.
  - Free digital subscription to the *American Journal of Traditional Chinese Veterinary Medicine*, a peer-reviewed journal.
  - Access to the in-print and online IVAS classifieds.
  - Access to online forums with other IVAS members.
  - Access to veterinary acupuncture templates for in-hospital promotion.
  - Access to veterinary acupuncture educational materials.
  - IVAS has multiple CE events annually.

World Association of Traditional Chinese Veterinary Medicine

- **Description**: The WATCVM promotes the education, research, and practice of TCVM throughout the world. The WATCVM provides financial support to veterinary students interested in studying TCVM as well as establishing student organizations within veterinary schools. The WATCVM funds TCVM research programs. There is no annual CE requirement to maintain membership.
- **Membership benefits**
  - Access to online case discussion forums.
  - Free subscription to the *American Journal of Traditional Chinese Veterinary Medicine*, a peer-reviewed journal.
  - Access to the quarterly online TCVM newsletter.
  - Access to the online TCVM library.
  - Discounted TCVM conferences.
  - Access to the online classified ads.
  - Assistance with scientific writing as well as research design of grant proposals.

- Dual membership in WATCVM and American Association of TCVM (AATCVM).
- The WATCVM and AATCVM offer an annual International Conference on TCVM.

Reference Books

The following is a list of my recommended TCVM and veterinary acupuncture books as of February 2023. A summary of each book is provided.

Acu-Cat: A Guide to Feline Acupressure

- Authors: Nancy Zidonis and Amy Snow
- Summary: An introduction to TCVM theory, the location of feline acupuncture points (acupoints), practical tips for performing acupressure, and suggested acupressure acupoints by disease condition. This book can be utilized by veterinarians, non-veterinarians working in the animal health field, and owners.

Acu-Dog: A Guide to Canine Acupressure

- Authors: Amy Snow and Nancy Zidonis
- Summary: A introduction to TCVM theory, the location of canine acupoints, practical tips for performing acupressure, and suggested acupressure acupoints by disease condition. This book can be utilized by veterinarians, non-veterinarians working in the animal health field, and owners.

Acupuncture for Dogs and Cats: A Pocket Atlas

- Author: Christina Matern, DVM
- Summary: A quick reference pocket guide introducing the basic concepts of TCVM and veterinary acupuncture. A brief outline of the location, indication, systemic effect, and technique for each canine acupoint is discussed.

Application of Traditional Chinese Veterinary Medicine in Exotic Animals

- Authors: Zhiqiang Yang and Huisheng Xie, DVM, MS, PhD
- Summary: Proceedings from the 13th Annual International TCVM Conference discussing the introduction and implementation of TCVM therapies for exotic animals.

Clinical Application of Different TCM Schools and Thoughts in Veterinary Practice

- Authors: Huisheng Xie, DVM, MS, PhD and Aituan Ma, DVM, PhD, MS
- Summary: Proceedings from the 18th Annual International TCVM Conference discussing the different TCVM schools and theories and TCVM therapy for infectious and inflammatory diseases, behavioral disorders, and other conditions.

Clinician's Guide to Canine Acupuncture

- Authors: Curtis Wells Dewey, DVM, MS, DACVIM (Neurology), DACVS and Huisheng Xie, DVM, MS, PhD
- Summary: An in-depth discussion of canine acupuncture focusing on the anatomic location of acupoints. A summary of the Western and Eastern indications for each acupoint is provided.

Essentials of Western Veterinary Acupuncture

- Authors: Samantha Lindley, BVSc, MRCVS and Mike Cummings, DVM
- Summary: A discussion of the history, mechanisms of action, safety, and practical uses of veterinary acupuncture from a Western medicine perspective.

Four Paws Five Directions: A Guide to Chinese Medicine for Cats and Dogs

- Author: Cheryl Schwartz, DVM
- Summary: An introduction to TCVM in veterinary medicine focusing on TCVM theory and acupuncture. Additional therapies are briefly covered: food therapy, herbal supplements, nutritional supplements, environmental modifications. The disease processes are organized by body system and the Five Element Theory.

Integrating Complementary Medicine into Veterinary Practice

- Authors: Robert S. Goldstein, VMD, Paula Jo Broadfoot, DVM, Richard E. Plamquist, DVM, Karen Johnstons, DVM, Jiu Jia Wen,

DVM, Barbara Fougère, BSc, BVMS (Hons), BHSc (comp Med), MODT, MHSc (Herb Med), CVA (IVAs), CVBM, CVCP, and Margo Roman, DVM
- Summary: A comprehensive review of multiple integrative therapies including Chinese herbal medicine, acupuncture, homotoxicology, nano-pharmacology, and therapeutic nutrition. The book aims to educate veterinary practitioners on the validity, effectiveness, and incorporation of each modality within daily practice.

Interactive Medical Acupuncture Anatomy
- Author: Narda G. Robinson, DO, DVM, MS, FAAMA
- Summary: A combination book and CD set providing detailed anatomic locations for human acupoints.

Manual of Natural Veterinary Medicine: Science and Tradition
- Authors: Susan G. Wynn, DVM and Steve Marsden, DVM, ND, MSOM, Lac, Dipl. CH., RH(AHG)
- Summary: A quick reference book discussing the integrative therapy options for numerous diseases in veterinary medicine. The book is organized by Western conditions. For each category the potential TCVM diagnoses and treatment options are reviewed in succinct detail. A must have for all integrative veterinarians.

Practical Guide to Traditional Chinese Veterinary Medicine: Emergencies and Five Element Syndromes
- Authors: Huisheng Xie, DVM, MS, PhD, Lindsey Wedemeyer, MA, VetMB, MRCVS, and Cheryl L Chrisman, DVM, MS, EdS, DACVIM (Neurology)
- Summary: The first of a four-volume series discussing the practical use of TCVM in veterinary medicine. The book breaks down the TCVM pattern diagnosis and treatment options (acupuncture, Chinese herbal formulas, Tui-na, food therapy, and environmental changes) for common small animal emergencies. The book is organized using the Five Element Theory of disease as it relates to emergent disorders.

Practical Guide to Traditional Chinese Veterinary Medicine: Exotic, Zoo, and Farm Animals
- Authors: Huisheng Xie, DVM, MS, PhD and Harvey E Ramirez
- Summary: The final book of a four-volume series discussing the practical use of TCVM in veterinary medicine. The book breaks down the TCVM pattern diagnosis and treatment options (acupuncture, Chinese herbal formulas, Tui-na, food therapy, and environmental changes) for exotic, zoo, and farm animals.

Practical Guide to Traditional Chinese Veterinary Medicine: Small Animal Practice
- Authors: Huisheng Xie, DVM, MS, PhD, Lindsey Wedemeyer, MA, VetMB, MRCVS, Cheryl L Chrisman, DVM, MS, EdS, DACVIM (Neurology), and Lisa Trevisanellow, DrMEDVET
- Summary: The second of a four-volume series discussing the practical use of TCVM in veterinary medicine. The book breaks down the TCVM pattern diagnosis and treatment options (acupuncture, Chinese herbal formulas, Tui-na, food therapy, and environmental changes) for common small animal diseases. The book is organized by Western medical diagnoses and then further divided into the possible TCVM diagnoses for each disease process.

Spark in the Machine: How the Science of Acupuncture Explains the Mysteries of Western Medicine
- Author: Daniel Keown
- Summary: A discussion of how Western medicine can be used to validate Chinese medicine theories.

Traditional Chinese Veterinary Medicine Approach to Gastrointestinal and Hepatobiliary Diseases
- Authors: Liting Cao, DVM, PhD and Huisheng Xie, DVM, PhD

- Summary: Proceedings from the 22nd Annual International TCVM Conference discussing the use of TCVM for the treatment of gastrointestinal and hepatobiliary diseases.

Traditional Chinese Veterinary Medicine Approach to Veterinary Dermatological and Immune-Mediated Diseases

- Authors: Aituan Ma, DVM, PhD, MS, Cui Liu, DVM, PhD, Chang Yu, DVM, MS, and Huisheng Xie, DVM, MS, PhD
- Summary: Proceedings from the 21st Annual International TCVM Conference discussing the use of TCVM for the treatment of dermatologic and immune-mediated diseases.

Traditional Chinese Veterinary Medicine Empirical Technique to Scientific Validation

- Authors: Zhiqiang Yang and Huisheng Xie, DVM, MS, PhD
- Summary: Proceedings from the 1st Annual International TCVM Conference discussing the scientific study of TCVM including basic scientific research, small animal specific studies, exotic animal specific studies, large animal specific studies, and pediatric and geriatric medicine.

Traditional Chinese Veterinary Medicine for the Diagnosis and Treatment of Kidney and Water Element Disorders

- Authors: Aituan Ma, DVM, PhD, MS and Huisheng Xie, DVM, MS, PhD
- Summary: Proceedings from the 23rd Annual International TCVM Conference discussing the use of TCVM for the treatment of kidney and water element disorders.

Traditional Chinese Veterinary Medicine for Geriatric Medicine and Palliative Care

- Authors: Huisheng Xie, DVM, MS, PhD and Aituan Ma, DVM, PhD, MS
- Summary: Proceedings from the 19th Annual International TCVM Conference discussing the use of TCVM for geriatric medicine and palliative care.

Traditional Chinese Veterinary Medicine for Neurologic Diseases

- Authors: Huisheng Xie, DVM, MS, PhD, Cheryl L Chrisman, DVM, MS, EdS, DACVIM (Neurology), and Lisa Trevisanellow, DrMEDVET
- Summary: Proceedings from the 13th Annual International TCVM Conference discussing the use of TCVM for a variety of neurologic conditions.

Traditional Chinese Veterinary Medicine from Dragon Legend to Modern Practice

- Authors: Xiuhuii Zhong, Aituan Ma, DVM, PhD, MS, Lisa Trevisanellow, DrMEDVET, and Qingbo Wang
- Summary: Proceedings of the 14th Annual International TCVM Conference discussing the use of TCVM for the treatment of liver, gastrointestinal, equine specific, and exotic animal specific diseases. A variety of other topics are also covered including the longitudinal muscle system, platelet-rich plasma in aquapuncture, and the adverse effects of Chinese herbal medicine and acupuncture.

Traditional Chinese Veterinary Medicine: Fundamental Principles

- Authors: Huisheng Xie, DVM, MS, PhD and Vanessa Preast, DVM, CVA
- Summary: The quintessential introduction to TCVM theory with self-study quizzes, case examples, and practical application of TCVM therapies for small animal and equine patients.

Traditional Chinese Veterinary Medicine for Pain, Lameness, Neurological and Endocrine Disorders

- Authors: Huisheng Xie, DVM, MS, PhD and Aituan Ma, DVM, PhD, MS
- Summary: Proceedings from the 20th Annual International TCVM Conference discussing the use of TCVM for the treatment of pain, lameness, neurologic disorders, endocrine disorders, infertility, and other conditions.

Veterinary Acupuncture

- Author: Allen M. Schoen, DVM, MS
- Summary: A detailed discussion of the history, anatomy, neurophysiologic mechanisms of action, scientific research, techniques, and practical application of veterinary acupuncture for small and large animals.

Promotion

Information regarding the hospital's promotion of acupuncture can be found in the Team Members section.

Integration

Key components for proper integration include availability, scheduling, and staff buy-in. Availability means offering the service to the right patient. Scheduling refers to appropriate patient and support staff scheduling. Staff buy-in ensures all team members understand the benefits of the offered service.

Conclusion

Veterinary acupuncture is a well-studied and broadly accepted therapeutic modality. Acupuncture offers a multitude of beneficial effects for veterinary patients. This chapter and online resources describe in detail how veterinary acupuncture can be successfully introduced into daily practice, as well as provide practical tools for implementation.

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I would like to thank Dr. Nell Ostermeier for the reviewing this chapter for content. Nell Ostermeier, DVM, CVA, FAAVA is a certified veterinary acupuncturist and fellow of the American Academy of Veterinary Acupuncture. Dr. Ostermeier wears many hats. She is an integrative veterinarian practicing at Lombard Animal Hospital in Portland, Oregon; an educator for the IVAS; a well-known lecturer within the United States and internationally; and founder of People + Pet Integrative Therapies providing consultation and education to veterinarians and owners on different aspects of integrative medicine.

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