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Popular Article

Acupuncture In Small Animal Pain Management

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Abstract:

Acupuncture is an ancient method of pain-relieving therapy in Traditional Chinese Veterinary Medicine (TCVM) and is been a budding practice among veterinarians of Oriental as well as Western countries. Acupuncture provides local, spinal and supraspinal levels of analgesia. Direct needle and other forms of acupuncture are commonly used as multi-modal pain management therapy in animals both as an adjunct as well as independent procedure. Further research is needed as evidence-based support for establishing concrete scientific basis of this therapy for wider acceptance by practicing vets worldwide. This article deals with the mechanism of analgesia production by acupuncture, its clinical applications and associated precautions and contraindications.

Keywords: TCVM, Acupuncture, Acupoints, Meridians, Animals, Pain, Veterinary medicine.

Introduction:

The application of acupuncture is proliferating among small animal practitioners. Acupuncture is one of the branches of Traditional Chinese Medicine (TCM) and Traditional Chinese Veterinary Medicine (TCVM) which is being practiced for more than 2000 years. It is an effective method of providing analgesia and is based on the philosophy that diseases in an individual are caused by imbalance in body energy (*Life force or Chi or Qi*) of that individual and healthy state is a reflection of balanced energy (Xie and Preast, 2007). It is generally employed as an adjunct therapy or in cases where patients seek a drug-free procedure for pain mitigation (Xie and Wedemeyer, 2012). In recent times, World Small Animal Veterinary Association Global Pain Council has also included acupuncture as a non-pharmaceutical method for analgesia in canine and feline practice guidelines (<https://wsava.org/global-guidelines/global-pain-council-guidelines>, accessed on 25 August, 2024). Evidence based research works are being done on humans and laboratory animals to establish the scientific basis of

acupuncture especially regarding analgesia (Selmer and Shiau, 2019). Recent clinical studies in small animals have provided proven results in the effectiveness of acupuncture as an analgesic therapy (Huntingford & Petty, 2022). Despite being perceived by many veterinarians as an antiquated system of treatment, acupuncture has evolved clinically as scientifically based treatment option in small animal practice.

Meridians and Acupoints:

Acupuncture involves stimulating specified anatomical locations called acupoints. Acupoints are neuro-vascular bundles having highly concentrated mast cells, free nerve endings, lymphatics, minute arteriole and venules. Richly supplied areas of somatic sensory nerves contain various acupoints. There are 4 types of acupoints having the property of high electric conductance and capacitance and low impedance as compared with surrounding tissues (Table 1). Most of these points are located in palpable areas of depression at myofascial trigger points. The stimulation can be achieved through inserting a tiny needle, pressure (acupressure), heat application (moxibustion), using laser light, friction, electricity (electroacupuncture-EA) and cupping (Xie and Wedemeyer, 2012). Acupuncture needles can be manipulated by rotating or twisting manually or by using electric current. EA involves attachment of an electrode to a paired acupoints and flow of a small electric current through them which provides a strong and long-lasting stimulation (Xie and Preast, 2007). The analgesic effects generated by EA are generally more potent and longer-lasting compared to those achieved by direct needle (DN) alone. Low-frequency EA (2–10 Hz) triggers the release of endorphins and enkephalins, which are particularly effective in pain reduction (Chomsiriwat and Ma, 2019). This stimulation causes neuromodulation mediated local, segmental or systemic analgesic effects (Dewey and Xie, 2021). Acupoints are areas of concentrated Qi according to TCVM, the stimulation of which causes a harmonious flow of Qi along the energy channels called as Meridians. These meridians link various acupoints of the body. There are 12 main or principal meridians and 8 extra meridians. Principal meridians are named after Zhang Fu organs (group of organs that regulate flow of Qi). Extra meridians are involved in maintaining homeostatic balance of the body.

Type of acupoint	Anatomical location of the acupoint
Type - I	Areas of motor end plate or neuromuscular junctions (67% of acupoints are motor points)
Type - II	On superficial nerves of dorsal and ventral midlines in sagittal plane
Type - III	At highly dense superficial nerves and nerve plexus areas
Type - IV	At musculotendinous junction (Golgi tendon organs)

Table 1: Types of Acupoints (Schoen et al., 1986)

Mechanism of Action of Acupuncture:

When a needle is inserted, it stimulates an acupoint which activates neural and neuroactive molecules. These activated components are found in the skin, underlying connective tissues and surrounding muscles and are termed as Neural Acupuncture Units (NAUs). Presence of various acupoints makes it important to balance any acupuncture therapy by stimulation of both local and remote acupoints to address different pain sources.

Analgesic Effects of Acupuncture- Include Figure:

Physiological pain pathway consists of transduction (by nociceptors), transmission (through A, B and C sensory afferent nerve fibres), modulation (at the level of dorsal horn of the spinal cord) and perception (by cortical areas of brain) of the pain (Weish and Yaksh, 2015). Acupuncture provides analgesia at local, spinal (segmental) and supraspinal/suprasegmental (descending pain mitigating pathways) levels. The local effects are mediated via the activation of sensory nociceptors, which in turn stimulate the afferent nerve fibers. The cell bodies of these afferent nerves are located in the dorsal root ganglia. Spinal effects are mediated by neurons situated in the dorsal gray matter of the spinal cord. These neurons, classified as second-order neurons, contribute to the formation of ascending nociceptive pathways that transmit signals to the brain. In the brain, a descending pain-modulating system, also known as the suprasegmental system, can be activated to inhibit the pain signals transmitted by second-order neurons, thereby inducing analgesia (Schoen et al., 1986).

Clinical Applications of Acupuncture:

Acupuncture is an effective therapy in the management of chronic pain and decreased joint mobility associated with osteoarthritis (OA) or degenerative joint diseases (DJDs). The spinal effects of acupuncture provide analgesia, improves blood circulation and tissue healing and thereby increases joint mobility (Dewey and Xie, 2021). Pain associated with gonitis, coxo-femoral dysplasia, cranial cruciate rupture in senior dogs (acupuncture therapy duration being 4-8 months) and cervical and thoracic intervertebral disc disease (IVDD) in companion animals has been efficiently treated and managed using acupuncture therapy protocols (Huntingford & Petty, 2022).

Contraindications and Precautions in Acupuncture:

Acupuncture is an effective and safe modality for analgesia in small animal practice. Careful patient selection can prevent adverse events. Needle placement should not be performed in pregnant animals and patients with bleeding disorders. Avoid placing needles over inflamed or infected sites, across tumour sites, across the head of animals having seizure activities, across the chest area of animals with cardiac pacemakers and areas affected from acute injuries and fractures (Xie and Preast, 2007). Migration of broken needles is a rare event yet the possibility of foreign body embolism prevails in adverse events.

Conclusion:

Acupuncture therapy to mitigate pain in small animal practice is in a state of infancy mostly due to unawareness of its scientific basis among practicing veterinarians. Acupuncture has effects both on CNS and PNS. Plenty of research has been done in humans and laboratory animals and various research works are ongoing as far as veterinary practice is concerned. With its proven scientific basis, this therapy will fit best in the multi-modal protocols for mitigating pain in companion animal practice. Future acceptance by practicing vets throughout the world will open wide horizons in the application and evidence-based results of acupuncture.

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