

The efficacy of acupuncture in animals – Part 2
Considerations about indications, comparative studies, safety and adverse effects, legal regulations and integration with other complementary therapies

Eficácia da acupuntura em animais – Parte 2
Considerações sobre indicações, estudos comparativos, segurança e efeitos adversos, regulamentações legais e integração com outras terapias complementares

Efectividad de la acupuntura en animales – Parte 2
Consideraciones sobre indicaciones, estudios comparativos, seguridad y efectos adversos, normativa legal e integración con otras terapias complementarias

DOI: 10.34188/bjaerv7n4-049

Submetido: 01/08/2024

Aprovado: 30/09/2024

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ABSTRACT

Acupuncture (AP) is practiced for centuries and involves using needles to stimulate several specific points along pathways, the meridians, to promote healing. AP can restore energy balance, or qi, which flows along meridians. This review aimed to describe evidence-based research in animal health, common indications and conditions threatened, comparative studies of AP and other treatments, safety and adverse effects, regulatory and legal considerations and integration with other complementary and alternative therapies in animals. AP was effective in treating chronic pain, musculoskeletal disorders, arthritis, depression and anxiety. Monitoring response to AP requires collaboration between veterinarian and owners. As veterinary acupuncture (VA) advances, new treatment applications emerges, offering greater benefits for animals' health and well-being. The comparative tests continues to provide compelling evidence for the positive effects on animal health. Non-traditional treatments have the potential to revolutionize the way we approach animal care and management. AP is widely accepted as a generally safe treatment when performed by a qualified veterinarian with the majority of treatments resulting in no adverse effects. With the growing recognition of holistic treatments and the potential benefits for animals, there is a clear need for a unified set of best practices and standards to administer the application of these therapies. Collaboration among veterinary professionals and acupuncturists can facilitate knowledge exchange, continued professional development, and the establishment of best practices to enhancing the care quality provided to patients.

Keywords: alternative medicine, complementary medicine, tradicional Chinese medicine.

RESUMO

A acupuntura (AP) é praticada há séculos e envolve o uso de agulhas para estimular vários pontos específicos ao longo de canais, os meridianos, para promover a cura. AP pode restaurar o equilíbrio energético, ou qi, que flui ao longo dos meridianos. Objetivou-se descrever pesquisas baseadas em evidências em saúde animal, indicações comuns e condições ameaçadas, estudos comparativos de FA e outros tratamentos, segurança e efeitos adversos, considerações regulatórias e legais e integração com outras terapias complementares e alternativas em animais. AP foi eficaz no tratamento de dores crônicas, distúrbios musculoesqueléticos, artrite, depressão e ansiedade. A monitorização da resposta à AP requer colaboração entre veterinário e proprietários. À medida que a acupuntura veterinária (AV) avança, surgem novas aplicações de tratamento, oferecendo maiores benefícios para a saúde e o bem-estar dos animais. Os testes comparativos continuam a fornecer provas convincentes dos efeitos positivos na saúde animal. Os tratamentos não tradicionais têm o potencial de revolucionar a forma como cuidado e manejo dos animais é abordado. A AP é amplamente aceita como tratamento geralmente seguro quando realizada por veterinário qualificado, e a maioria dos tratamentos não resulta em efeitos adversos. Com o crescente reconhecimento dos tratamentos holísticos e dos potenciais benefícios para os animais, existe clara necessidade de unificar as boas práticas e padrões para administrar a aplicação destas terapias. A colaboração entre veterinários e acupunturistas pode facilitar troca de conhecimentos, desenvolvimento profissional e estabelecimento de melhores práticas para aumentar a qualidade dos cuidados prestados aos pacientes.

Palavras-chave: medicina alternativa, medicina complementar, medicina tradicional chinesa.

RESUMEN

La acupuntura (AP) se ha practicado durante siglos e implica el uso de agujas para estimular puntos específicos a lo largo de los canales, los meridianos, para promover la curación. AP puede restaurar el equilibrio energético, o qi, que fluye a lo largo de los meridianos. Esta revisión tuvo como objetivo describir la investigación basada en evidencia en salud animal, indicaciones comunes y condiciones amenazadas, estudios comparativos de AP y otros tratamientos, seguridad y efectos adversos,

consideraciones regulatorias y integración con otras terapias complementarias y alternativas en animales. AP ha sido eficaz en el tratamiento del dolor crónico, trastornos musculoesqueléticos, artritis, depresión y ansiedad. El seguimiento de respuesta a AP requiere la colaboración entre veterinario y propietarios. A medida que avanza la acupuntura veterinaria (VA), están surgiendo nuevas aplicaciones de tratamiento con mayores beneficios para la salud y el bienestar animal. Ensayos comparativos aportan pruebas de los efectos positivos en la salud animal. Tratamientos no tradicionales tienen potencial de revolucionar la forma de abordar el cuidado y manejo animal. La AP es ampliamente aceptada como seguro cuando la realiza un veterinario calificado y la mayoría de los tratamientos no producen efectos adversos. Con el creciente reconocimiento de los tratamientos holísticos y los beneficios potenciales para los animales, existe necesidad de unificar buenas prácticas y estándares para gestionar aplicación de estas terapias. La colaboración entre veterinarios y acupunturistas puede facilitar intercambio de conocimientos, desarrollo profesional y establecimiento de mejores prácticas para aumentar la calidad de la atención brindada a los pacientes.

Palabras clave: medicina alternativa, medicina complementaria, medicina tradicional china.

1 INTRODUCTION

1.1 INTRODUCTION TO ACUPUNCTURE (AP) EFFICACY IN VETERINARY MEDICINE (VM)

In order to address various health and welfare condition AP can benefit animals as an effective, safe, and nonspecific therapeutic tool. AP, an ancient Chinese medical practice, involves the insertion of thin needles into specific points on the body to stimulate and improve energy flow. This method is based on the concept of Qi (CHEE), or vital energy, which flows along meridians in the body (Baker-Meuten *et al.*, 2020; Harrison and Churgin, 2022; Kwon *et al.*, 2021; Lee and Kim, 2022; Wu *et al.*, 2021).

By unblocking and balancing the flow of Qi, AP can to restore health and well-being. Veterinary acupuncture (VA) is used to address a wide range of health issues, including pain management, arthritis, digestive disorders, respiratory conditions, and neurological disorders. To promote overall wellness and prevent illness AP is a safe treatment option, used alone or in conjunction with other conventional veterinary treatments to provide a comprehensive approach to animal health care (Cheng *et al.*, 2022; Harrison and Churgin, 2022; Koh and Harrison, 2023; Lai *et al.*, 2020 Lin *et al.*, 2022; Oh and Kim, 2022; Wu *et al.*, 2021).

The use of AP in VM has gained popularity in recent years as more research supports its effectiveness and safety for animals. As understanding of AP increases its applications in VM continues to grow, and it opens up new possibilities for addressing complex health issues in animals and providing comprehensive integrated care (De Bernardinis, 2023; Harrison and Churgin, 2022;

Li *et al.*, 2022a, 2022b and 2022c; Liu *et al.*, 2021; McTiernan, 2022; Thelwall, 2021; Xie and Holyoak, 2020).

This alternative therapy is often used in conjunction with other traditional treatments to provide a multi-faceted approach to care. Additionally, AP have a calming effect on animals, making it a useful technique for reducing stress and anxiety in veterinary patients (Domingues *et al.*, 2022; Koh and Harrison, 2023; Liu *et al.*, 2021; McTiernan, 2022; Sousa *et al.*, 2024; Thelwall, 2021; Xie and Holyoak, 2020). As veterinary professionals continue to explore the benefits of AP, it is becoming increasingly clear that this ancient practice has a valuable role to play in modern VM (Koh and Harrison, 2023; Liu *et al.*, 2021; Thelwall, 2021; Xie e Holyoak, 2020).

The lack of knowledge about AP, especially in western countries, justifies the exploratory researches in this area. Alternative treatments such AP can be cheaper than conventional protocols; consequently, this research may contribute in theoretical and practical ways by discussing the recent literature. Therefore, the purpose of this work is to describe the efficacy of acupuncture in veterinary medicine regarding to: evidence-based research in animal health, common indications and conditions threatred, comparative studies of acupuncture and conventional treatments, safety and adverse effects, regulatory and legal considerations and integration with other complementary and alternative therapies in animals.

2 ACUPUNCTURE IN ANIMAL HEALTH

2.1 EVIDENCE-BASED RESEARCH ON ACUPUNCTURE

It is interesting to note that veterinary species, despite their global significance, economic importance, and relevance as a biomedical model for similar human diseases, rarely receive the same attention in AP clinical studies as their human counterparts. This assumption is surprising considering that the populations of animals in AP trials often surpass those of the largest marketed western pharmaceuticals (De Bernardinis, 2023; Mangan, 2023; Medeiros and Scognamillo-Szabó, 2024; Scanlan, 2024).

The lack of specific VA clinical studies is somewhat unexpected given their potential importance and impact on understanding AP responses in both animals and humans. This scarcity of focus implies an expectation that the responses observed in animals would align with the standards established in human AP studies, without dedicated research and comparison in veterinary settings (Eigenschink *et al.*, 2020; Keller *et al.*, 2021; Medeiros and Scognamillo-Szabó, 2024; Scanlan, 2024).

The clinical VA research currently focuses on analgesia and pain modulation. A large body of experimental studies, however, is generated from universities, most addressing basic fundamental

facets of AP in early stages. The specific condition of AP therapeutic investigations relate to veterinary species especially are directed towards commonly troubling or anatomically relevant chronic illness, acute disease pathologies, and the potential impact on overall health and well-being. Researches is vital for understanding the potential benefits and limitations of VA and advancing the field to improve animal's lives. This continued expansion will contribute to the broader knowledge and clinical applications of VA (Abali *et al.*, 2022; Bacarin *et al.*, 2022; De Bernardinis, 2023; Hein, 2022; Machin *et al.*, 2020; McTiernan, 2022; Medina and Goldberg, 2024; Small *et al.*, 2021; Wright, 2021; Yang *et al.*, 2021a).

The body of evidence supporting the health benefits of AP therapy is based on case descriptions, clinical AP results and experimental animal research. This scientific evidence is particularly strong because it confirms clinical observations and supports the concept that traditional meridian AP has developed independently in various cultures for centuries. The extensive research behind AP therapy has uncovered numerous positive effects on different health conditions, reinforcing its efficacy and potential as a treatment option for a wide range of patients (Birch *et al.*, 2020; Lu *et al.*, 2022; Yu *et al.*, 2020; Zhang *et al.*, 2022a and 2022b; Zhu *et al.*, 2021).

Moreover, the growing body of evidence on AP's positive impact on mental health, chronic pain, and overall well-being further strengthens its position as a valuable and effective form of therapy. As more studies become known, the medical community is increasingly recognizing the depth and breadth of AP's benefits, highlighting its potential to significantly enhance patient outcomes and quality of life (Huang *et al.*, 2021; Lin *et al.*, 2022; Lu *et al.*, 2022; Yu *et al.*, 2020; Zhang *et al.*, 2022 a and 2022b).

The integration of AP into conventional medical practices is gaining adhesion, with an increasing number of professionals incorporating AP into their treatment plans, further shaping its acceptance and utilization in modern healthcare systems. As public awareness of the benefits of AP grows, so too does the demand for qualified and skilled AP practitioners, creating new opportunities for those trained in this specialized therapy. As advances in AP research continue to uncover its mechanisms of action and potential applications, the AP integration of into interdisciplinary care approaches is becoming more prevalent (Ho *et al.*, 2021; Huang *et al.*, 2021; Lin *et al.*, 2022; Liu *et al.*, 2021; Lu *et al.*, 2022; Yu *et al.*, 2020; Zhang *et al.*, 2022 a and 2022b).

2.2 COMMON INDICATIONS AND CONDITIONS WITH ACUPUNCTURE

AP were used for many years in various animals, including livestock, poultry, companion and exotic animals. The diseases and problems achieved are numerous. There are differences in animals diseases management, particularly in symptoms, differential diagnosis and species

behaviors when treated with AP. Persistent functional estrus in production animals, debilitation, and certain management diseases in racehorses and other competitive animals may respond to AP (Dewey and Xie, 2021; Holyoak and Ma, 2022; Kwon *et al.*, 2021; Lai *et al.*, 2020; Lee *et al.*, 2020).

With the improvement in animal comfort and welfare, AP became a part of pain controlling in various species. Its non-drug and natural physiological effects in pain control have attracted more veterinarians. AP provides an option for replacing other drugs or reducing medicine use. However, rational prescriptions and synergistic treatment principles are important. The integration of AP with conventional medical treatments, chiropractic manipulation, herbal medicine, homeopathy and other options is important in holistic VM. An appropriate use of AP will help the animal to attain a faster, more complete recovery (Lin *et al.*, 2022; Oh and Kim, 2022; Trento *et al.*, 2021; Zhang *et al.*, 2022a and 2022b).

Chronic pain and osteoarthritis are among the most common conditions treated with AP in animals. Application of evidence-based medicine and comparative research is still suboptimal in VA, and while knowledge of scientific validity and AP treatment in animals will improve and grow, many unanswered questions and necessities for good medical practice. Under specific conditions some of the AP treatment indications, doses and needling site locations may be similar in animals and humans (Baker-Meuten *et al.*, 2020; Huntingford and Petty, 2022; Koh and Harrison, 2023; Li *et al.*, 2020b; Lin *et al.*, 2021; Lin *et al.*, 2022; Tan *et al.*, 2022; Ye *et al.*, 2023; Zhang and Wang, 2020).

AP can be effective in treating various animal's conditions, such as gastrointestinal disorders, neurological, dermatological and behavioral issues, and respiratory problems. As research and evidence continues to accumulate, it is becoming increasingly clear that AP can be a valuable tool in VM. Veterinarians and pet owners are recognizing the benefits of AP in managing pain and promoting overall well-being. With proper training and understanding, the application of AP in VM will undoubtedly continue to evolve and expand in the coming years, providing more options for treating a wide range of conditions (Abali *et al.*, 2022; Bae *et al.*, 2021; Harrison and Churgin, 2022; Holyoak and Ma, 2022; Huang *et al.*, 2021; Koh and Harrison, 2023; Köhn *et al.*, 2023; Oh and Kim, 2022; Park *et al.*, 2021; Tang *et al.*, 2022).

Additionally, AP has shown promise in helping to manage endocrine disorders and autoimmune diseases. The use of AP for musculoskeletal problems, including arthritis and muscle injuries, has also been widely recognized in VM. There is also evidence to suggest that AP can aid in the treatment of certain cardiac conditions in animals. Moreover, AP has been beneficial in improving reproductive health and fertility (Addissouky *et al.*, 2023; Akram *et al.*, 2021; Chen *et*

al., 2020; Chen *et al.*, 2023; Chen *et al.*, 2024; Cui *et al.*, 2024; Gao *et al.*, 2022; Liu *et al.*, 2024; Zhang *et al.*, 2023).

Moreover, AP has shown promising results in addressing musculoskeletal problems and aiding in the rehabilitation of injured animals. In addition to pain management, AP can improve immune system function and support animals undergoing cancer treatments. The versatility of VA as a complementary treatment is recognized, leading to an increase in its integration within traditional methods (Bergh *et al.*, 2021; Koh *et al.*, 2023a and 2023b; Kwon *et al.*, 2021; Lenoir *et al.*, 2020; Lin *et al.*, 2021; Romero-Morales *et al.*, 2021; Xie and Holyoak, 2021; Yang *et al.*, 2021b; Zhang *et al.*, 2022b).

2.3 COMPARATIVE STUDIES OF AP AND CONVENTIONAL TREATMENTS

Proponents of complementary and alternative medicine often cite the success of comparative tests as evidence of the positive effects of non-traditional medical treatments. AP *versus* placebos in test settings provided quick and effective relief for specific health problems, often resulting in overall improved well-being. The rapid response to treatment with AP proven to be effective in treating pain, dealing with environmental suffering, and addressing neuromedical issues. Additionally, AP contribute to the development and overall health of animal populations. The positive effects include improved mental well-being, better reproductive performance, and overall quality of life (Abali *et al.*, 2022; Baker-Meuten *et al.*, 2020; Dewey and Xie, 2021; Huntingford and Petty, 2022; Jang and Park, 2022; Kwon *et al.*, 2021; Lin *et al.*, 2021; Lin *et al.*, 2022; Oh and Kim, 2022; Wu *et al.*, 2021).

Furthermore, the success of AP occurred in wildlife management, particularly in addressing mental and rehabilitation problems in wild animals. This has led to a greater emphasis on the use of wild animals in research and therapeutic AP interventions, with a focus on improving their overall emotional and physical well-being. The growing body of research suggests that the positive impacts of complementary and alternative medicine on animals extend to a wide range of species, from domestic pets to exotic wildlife. By addressing a variety of conditions such as chronic pain, anxiety, and neurobehavioral disorders, it has the potential to enhance significantly the overall welfare and well-being of animals across different environments (Bergh *et al.*, 2021; Benson *et al.*, 2023; Harrison and Churgin, 2022; Koh and Harrison, 2023; Repac *et al.*, 2022; Robinson, 2022; Scanlan, 2024; Xie and Holyoak, 2021).

Additionally, AP treatments contribute to the development and overall health of animal populations and it adds to maintain healthy flocks. The positive effects include improved mental health, enhanced reproductive performance and overall quality of life (De Bernardinis, 2023;

Huntingford e Petty, 2022; Köhn *et al.*, 2023; Kwon *et al.*, 2021; Li *et al.*, 2022d; Lin *et al.*, 2022; McTiernan, 2022; Oh and Kim, 2022; Zhang *et al.*, 2022b; Zuo *et al.*, 2023).

The positive impact of AP treatments in wildlife has been widely recognized and contributed to a more holistic approach to conservation and animal welfare. As a result, there has been growing interest and support for the implementation of these treatments in various wildlife reserves and sanctuaries around the world, ultimately leading to a greater understanding and appreciation of the emotional and physical needs of these animals. This has led to a greater understanding of the effectiveness of AP in treating various medical conditions in animals (Koh *et al.*, 2023b).

The skepticism about efficacy should impulses experiments that compares conventional and AP treatments in animals. However, scarce works suggested that comparison. With the evolution of systematic animal studies resembling clinical research, the future is optimistic regarding the AP treatment of diseases with several modes of therapeutic administration, duration, and especially animal's classes (Bergh *et al.*, 2021; Harrison and Churgin, 2022; Huntingford and Petty, 2022; Jiao *et al.*, 2022; Koh and Harrison, 2023; Lai *et al.*, 2020; Machin *et al.*, 2020).

Comparative studies were carried out with pain illnesses, neurological, digestive, respiratory and cardiovascular problems treatments, besides lymphatic, urinary and solar issues. Despite positive effects in clinical cases descriptions, usually experimental comparative results do not allow an epidemiological conclusion (Nokay and Shiau, 2022; Ruan *et al.*, 2021; Santos *et al.*, 2022; Velasco, 2022; Yang *et al.*, 2022; Yan *et al.*, 2023; Yu *et al.*, 2020; Zhang *et al.*, 2022a and 2022b).

2.4 SAFETY AND ADVERSE EFFECTS OF ACUPUNCTURE IN VETERINARY PRACTICE

The safety of AP in humans has been demonstrated in large investigations; however, the risk of human-mediated prejudice is not higher because AP treatments are generally conducted in a medical setting and controlled by a physician. Animals are more likely to be seen by an owner for routine management on a farm without the oversight of a veterinarian. Thus, unfairness in questions related to which conditions animals are treated and how effective the treatment is can occur (Bergh *et al.*, 2021; Gilberg *et al.*, 2021; Holyoak and Ma, 2022; Labens *et al.*, 2022; Pérez *et al.*, 2023; Schmid and Aebischer, 2021; Stange *et al.*, 2022).

Multiple studies have examined the efficacy and prevalence of AP treatment of specific conditions, but few have surveyed its safety. A recent study conducted in Switzerland estimated that adverse events are associated with about one fewer in 150 equine AP treatments (2/300) compared with humans. A recurring pattern was that the horse was reactive to the application of the AP needle. Other types of responses were rare and largely involved situations where the animal became scared or sensitive to the needle touch (Pérez *et al.*, 2023).

It is difficult to determine whether efficacy is linked to the adverse events observed, or if these incidents are coincidental. In the human and veterinary literature, it is typical fairly to report some type of "needled." This sensation is described as a dull, aching, or throbbing discomfort felt in the patient's body that coincides with the initiation of AP. Regulatory affairs are concerned, among other issues, with enforcing the application of AP in veterinary practice. The responsibility of ensuring treatment under the guidance by qualified conductors; therefore, it has an interest in treatment's safety. Veterinary law typically mandates that only licensed clinicians can perform AP. Interestingly, a survey demonstrated that veterinarians feel AP as safe treatment when performed correctly and carefully (Bergh *et al.*, 2021; Gilberg *et al.*, 2021; Holyoak and Ma, 2022; Labens *et al.*, 2022; Pérez *et al.*, 2023; Schmid and Aebischer, 2021; Stange *et al.*, 2022).

Despite AP's description as a safe treatment for animals, questions about its safety continue to raise in debates, literature, and overall veterinary practice. This effort to establish effective safety systems is related to the fundamental concern for the animal's wellbeing. Compliance with proper training and misunderstanding is essential to maintain AP safety in VM warrants further investigation and application of measures to enhance its safety (Bergh *et al.*, 2021; Gilberg *et al.*, 2021; Holyoak and Ma, 2022; Labens *et al.*, 2022; Pérez *et al.*, 2023; Schmid and Aebischer, 2021).

There is a growing interest and body of evidence indicating that AP therapy is relatively safe, although risks can be associated with its practice when not handled properly. Nevertheless, the benefits of AP in VM far exceed the risks, leading to the inference that it is a safe and advantageous treatment option. Veterinary practitioners should remain vigilant in adhering to safety guidelines and in monitoring potential adverse events during AP treatments to ensure the continued safety of animals undergoing this therapy. Ongoing research and observation are necessary to continually improve the safety of AP, guaranteeing its ongoing role in animal wellness (Bergh *et al.*, 2021; Gilberg *et al.*, 2021; Holyoak and Ma, 2022; Labens *et al.*, 2022; Pérez *et al.*, 2023; Schmid and Aebischer, 2021; Stange *et al.*, 2022).

The most commonly reported adverse effects of AP in animals are needle-induced injuries and temporary discomfort at the needle insertion sites. While AP can effectively address a wide range of conditions in veterinary patients, it is essential to recognize that its safety. Maintaining open communication with the animal's owner regarding the efficacy and response to AP and closely monitoring the patient during treatment can lead to early identification and management of any adverse effects. Simply removing the AP needle generally corrects any adverse effects and prevents unnecessary complications (Bergh *et al.*, 2021; Dragomir *et al.*, 2021; Harrison and Churgin, 2022; Huntingford and Petty, 2022; Koh and Harrison, 2023).

Although the current lack of large-scale studies on the safety of AP in animals, the relatively low risk of adverse effects in thousands of clinical AP treatments administered to animals annually worldwide warrants further investigation into this topic. Within the last decade, numerous national and international VA associations have conducted surveys on the prevalence of AP use in VM. The overwhelming majority of responses indicate that more than 90% of horse owners who choose for AP treatments are satisfied with the results. When performed by a qualified veterinarian and done with proper monitoring, AP can be a beneficial and relatively low-risk therapy option for many conditions affecting animals (Machin *et al.*, 2020; McTiernan, 2022; Medina and Goldberg, 2024; Sohlberg *et al.*, 2021; Srionrod, 2021).

2.5 REGULATORY AND LEGAL CONSIDERATIONS FOR ACUPUNCTURE IN VETERINARY MEDICINE

Local, national, and international organizations are interested in regulating AP in VM. There are international VA organizations that set standards for the practice and thereby contribute to its proper use. Additionally, pharmacovigilance, or the continuing identification and evaluation of adverse events, and the implementation of measures to prevent shortcomings, is an integral aspect of ensuring VA practice (Bergh *et al.*, 2021; Gilberg *et al.*, 2021; Holyoak and Ma, 2022; Labens *et al.*, 2022; Pérez *et al.*, 2023; Schmid and Aebischer, 2021; Stange *et al.*, 2022).

Veterinarians are licensed professionals under state laws and regulations of each country that establish required coursework, internships, externships, and passing state and national examinations in order to achieve the credentials and experiences necessary to be considered competent and able to bear the responsibility of practice. Varying numbers of hours and hands-on clinical experiences, levels of detailed coursework, and graded case management experiences are required to achieve recognition as a successful graduate or veterinary student before a VA license is finally granted (Harrington, 2024; Heather *et al.*, 2023; Raghavan, 2023; Raghavan, 2023; Stockdale *et al.*, 2023; Whitaker and Croft, 2020).

The recognized by major professional examination organizations is need to be accepted from or with visiting status in other foreign VM teaching facilities. The admission requirements, course modality, dispute resolutions, formal guidelines for arbitration, and level of involvement established for appointment of either local or out-of-state regulatory, cooperation or adjunct capability is prerequisite to establish for the administrative process guidelines. The validation of student educational experiences and assessments, procedures around the required grade point average, and standardized forms for Internship, Residency, and Space considerations need to be discussed too

(Harrington, 2024; Heather *et al.*, 2023; Raghavan, 2023; Raghavan, 2023; Stockdale *et al.*, 2023; Whitaker and Croft, 2020).

Veterinary students must also contribute in real-life, practical experiences in the field under the watchful guidance of experienced professionals to ensure their proficiency before being granted a license to practice VM independently. Additionally, undergraduates may have the opportunity to study at foreign veterinary schools to broaden their knowledge and experience, subject to approval and recognition by relevant professional examination organizations. Furthermore, evaluation of student educational experiences, standards for grade point averages and VA protocols are thoroughly discuss and establish (Harrington, 2024; Heather *et al.*, 2023; Raghavan, 2023; Raghavan, 2023; Stockdale *et al.*, 2023; Whitaker and Croft, 2020).

The challenges facing of VM practice are the need for state or federal licensure in order to be able to practice AP legally. Definitions of what constitutes the practice of AP in VM, the requirements for the licensure of acupuncturists, and legislative regulations in those countries that have specific laws that set the requirements of coursework, training and regular examinations. Other issues address the professional courtesy that veterinarians may choose to offer to animal acupuncturists and whether accredited schools of AP have formal and organized training programs available for both the veterinary students and for veterinary continuing education (Domingues *et al.*, 2022; Harrison and Churgin, 2022; Holyoak and Ma, 2022; Koh and Harrison, 2023; Medeiros and Scognamillo-Szabó, 2024).

Key considerations for the successful integration of AP into VM to avoid medical negligence and malpractice litigation are standards of care and malpractice issues, stringent requirements of necessity, and informed consent for treating animals. Therefore, it is essential for all parties involved, including veterinarians, acupuncturists, governing bodies, and educational institutions, to work together collaboratively to address the complexities that arise in VA practice and to ensure the highest care standards and ethical practice for animal's treatment (Koh and Harrison, 2023; Medeiros and Scognamillo-Szabó, 2024; Memon *et al.*, 2021; Scanlan, 2024).

Actions necessary to foster a professional environment and ensure the well-being and health of animals in need of veterinary care incorporating AP treatment are multifactorial. The integration of AP into VM can lead to improved outcomes and better animal welfare, as well as contribute to the overall advancement of VM. This requires a collective effort from all stakeholders to develop and implement coherent frameworks that prioritize ethical practice, uphold professional standards, and ensure the safety and effectiveness of AP treatment (Medeiros and Scognamillo-Szabó, 2024; Memon *et al.*, 2021; Scanlan, 2024; Stanossek and Wehrend, 2022; Stanossek and Wehrend, 2023).

Additionally ongoing research, education, and communication initiatives are essential in promoting a comprehensive understanding of VA and its role within the broader context of animal healthcare. In doing so, veterinary and AP practitioners can collaborate to address emerging challenges, share clinical insights, and advance the field to extend the positive impact of AP on animal health and wellness. This underscores the need for a coordinated approach that harnesses the collective expertise and resources of diverse stakeholders to further the integration of AP into veterinary practice. Thereby promoting the well-being and health of animals in need of holistic care (Domingues *et al.*, 2022; Harrison and Churgin, 2022; Medeiros and Scognamillo-Szabó, 2024; Scanlan, 2024; Stanossek and Wehrend, 2022; Stanossek and Wehrend, 2023).

Legislative value and recognition by the Brazilian College of Animal Experimentation (COBEA) ensure AP practice and exceeds understanding by ethics and welfare. This has created an increased need for comprehensive guidelines and protocols for the application of AP in VM, in order to ensure efficacy and ethical treatment of animals. As AP in VM continues to expand, the development of guidelines has been a priority for professional organizations and governing bodies recently (Bergh *et al.*, 2021; Hein, 2022; Holyoak and Ma, 2022; Machin *et al.*, 2020; Moré *et al.*, 2021; Romsland and Shiau, 2020; Xie and Holyoak, 2020 and 2021).

The continued exploration of AP and other alternative therapies in animals has the potential to have ripple effects across both human and VM. The evolving field of animal AP seeks to bridge the gap between human and VM. It could potentially revolutionize the field by establishing a set of unified best practices and promoting the ethical and effective treatment (Baker-Meuten *et al.*, 2020; Dewey and Xie, 2021; Harrison and Churgin, 2022; Holyoak and Ma, 2022; Huntingford and Petty, 2022; Koh and Harrison, 2023; McTiernan, 2022; Mier, 2021; Stanossek and Wehrend, 2022).

2.6 INTEGRATION OF ACUPUNCTURE WITH OTHER COMPLEMENTARY AND ALTERNATIVE THERAPIES

Animals receiving AP therapy that received facilitated training and specific exercises aided and supported by the use of manipulative therapies during rehabilitation improve their recovery. It is also crucial that as the animal ages, continued support can be given to the cronical diseases that are carrying out their designated roles of nourishing them and providing functional strength (Baker-Meuten *et al.*, 2020; Huntingford and Petty, 2022; Jang *et al.*, 2021; Lin *et al.*, 2021; Lin *et al.*, 2022; Wu *et al.*, 2021).

AP works through named pathways and points and nutritional support for these named pathways can be catered for by tailoring the animal's diet to its specific needs. AP positively influences the named pathways by unclogging or unblocking the build-up of waste associated with

illnesses and injuries that lie in the named pathways. The named pathways were connected to the positive effects AP has on the field (Lin *et al.*, 2021; Lin *et al.*, 2022; Wu *et al.*, 2021).

In addition to AP, other manipulative therapies, such as massage and chiropractic care were used to support an animal's rehabilitation. These methods can help to improve mobility, reduce pain, and enhance overall well-being. Besides, holistic approach may involve dietary changes, supplements, and ongoing therapy to help maintain the health and function of the pathways or meridians. With the right combination of treatments and support, animals can continue to enjoy a high quality of life as they age. AP provides relief for animals with chronic pain, arthritis, and anxiety (Berger *et al.*, 2021; Dewey and Xie, 2021; Jang *et al.*, 2021; Lin *et al.*, 2022; Wu *et al.*, 2021).

Conventional, complementary and alternative therapies were AP associated to facilitate healing in animals. Manipulative therapies can help to address various causes of blockages within the named pathways, including scar tissue, muscle spasm, and lameness. Dietary considerations, use of herbal remedies, and other integrative therapies can provide additional supportive treatment and enhance the benefits of AP when factors such as malnutrition, overnutrition, weak immune system, or emotional disturbances hinder the optimization of physical health (Dewey and Xie, 2021; Huntingford and Petty, 2022; Sousa *et al.*, 2024).

Bodywork therapies used for the detection and treatment of areas of muscle stiffness or spasm are auxiliary to AP. Toxicity can occur and is a potential issue especially with herbal protocols. Therefore, it would be advisable for pre-treatment blood analysis. Liver and renal functional detoxification capacity must be gauged (Baker-Meuten *et al.*, 2020; Berger *et al.*, 2021; Jang *et al.*, 2021; Lin *et al.*, 2021; Lin *et al.*, 2022; Wu *et al.*, 2021).

2.7 FUTURE DIRECTIONS AND INNOVATIONS IN ACUPUNCTURE RESEARCH

Transcutaneous, pharmacological, electrical, moxabustion or physical electrostimulation AP methods provide substantial evidence that animals are capable of acquiring cognitive information on a noxious stimulus ceased and training to accept AP also occurs frequently in animals. The positive effects observed of AP arise through induction of a descending pain inhibitory effect, improvements in blood flow and acceleration of healing through reduction in inflammation (Ballon *et al.*, 2020; Duan-Mu *et al.*, 2021; Ferreira *et al.*, 2022; Hou *et al.*, 2020; Ma *et al.*, 2023; Wang *et al.*, 2022; Zhou *et al.*, 2023; Zheng *et al.*, 2020).

Efficacy of electroacupuncture compared to transcutaneous nerve stimulation employed to stimulate AP points used for treatment of animal disease could result in superior analgesic and therapeutic electrophysiological activity. This demonstrates the potential for remarkable

advancements in VM that could significantly improve the quality of animals' lives. This has clear implications for the welfare of animals across a wide spectrum of species. AP has the potential to revolutionize VM approach, providing better care, longer lives, and improved well-being for animals (Ballon *et al.*, 2020; Duan-Mu *et al.*, 2021; Ferreira *et al.*, 2022; Hou *et al.*, 2020; Ma *et al.*, 2023; Wang *et al.*, 2022; Zhou *et al.*, 2023; Zheng *et al.*, 2020).

Future research topics and suggestions to guide the development and evaluation of the evolving AP paradigm for animal health have been proposed. It is important to consider potential limitations and ethical considerations in conducting AP research for animal health. Specifically, exploring the impact of AP on different species, evaluating long-term effects and addressing any potential biases (Elliott-Sale *et al.*, 2021; Gopalan *et al.*, 2020; Kraus *et al.*, 2021; Tomaszewski *et al.*, 2020; Uffelman *et al.*, 2021).

Furthermore, researches aimed at standardizing treatment protocols, training researchers, and establishing rigorous evaluation methods is essential to ensure the credibility and effectiveness of AP in promoting animal health. Overall, the future of AP research in the territory of animal health is full of potential for positive impact. Overall, it is clear that AP for animal health has a truly promising future that can bring about benefits to animals (Tomaszewski *et al.*, 2020; Uffelman *et al.*, 2021).

With more in-depth and thorough research, it is likely that the potential of AP as a treatment modality for various animal health concerns will continue to be unlocked, contributing to the overall well-being and quality of life for animals around the world. It is imperative to maintain a strong focus on the ethical considerations and potential limitations, ensuring that the well-being and safety of animals remains at the forefront of studies and practices (Gopalan *et al.*, 2020; Kraus *et al.*, 2021).

By exploring the impact of AP on different species and evaluating any long-term effects, a comprehensive understanding of the benefits, risks, and potential biases associated with AP in animal health increases. Moreover, the standardization of treatment protocols, training for researchers, and rigorous evaluation methods will be crucial in validating the credibility and effectiveness of AP in promoting animal health. Through these measures and a continued dedication to research and development, the future of AP in animal health will undoubtedly continue to arise, offering hope and healing to countless animals in need (Elliott-Sale *et al.*, 2021; Gopalan *et al.*, 2020; Kraus *et al.*, 2021; Tomaszewski *et al.*, 2020; Uffelman *et al.*, 2021).

3 CONCLUSION

The rapid response to treatment with AP, which has proven to be very effective in treating pain, dealing with environmental suffering, and addressing neurological issues. Ongoing research

in this field will lead to the development of more effective treatment protocols and a deeper understanding of the underlying mechanisms of VA. This will be crucial for optimizing AP use to alleviate distress and improve the quality of life for animals suffering from a wide range of medical conditions. Furthermore, the insights gained from VA research may also have implications for different species, opening up new avenues for exploring the potential benefits of AP in the wider medical community. In the context of a rapidly evolving field, the expansion of VA research will play a significant role in shaping the future of VM and enhancing the care provided to animals around the world.

Basic principles of VA are similar to those utilized in humans as cited in several papers. Based on the literature consulted, AP in animals is generally an effective, safe and non-painful procedure. Works aimed to disseminate and homogenize knowledge about AP should be stimulated especially in development areas, because the treatment cost could be lower than conventional drug protocols. Furthermore, AP has the appeal of being a doping-free treatment, pleasing to sports animals' owners that have concerns about animal wellbeing and the narrow therapeutic drugs classes allowed in athletes treatments.

Several researchers are skeptic about holistic therapies and in this literature review AP were discussed to contribute with researchers interested in this topic by organizing several recent references. Animals are not suggestioned by expecting treatment effect as can occur in human beings, so if AP is effective in veterinary practice it is a crucial favorable point to indorse this method. Even the alopatic clinicians not understand completely the action mechanisms involved in this millenar wisdom effectiveness, this subject needs to be more studied and publicized with future studies comparing approaches especially with conventional treatment to improve studies in AP treatment effectiveness.

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