Use of Acupuncture in Equine Reproduction

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1. Introduction
Integrating principles of Western medicine and traditional Chinese medicine can provide the best treatment for equine reproductive disorders. Acupuncture is used widely in human infertility clinics. Acupuncture for infertility cases has been cited in literature since 11 A.D.1 Acupuncture is derived from the Latin words acus, meaning needle, and pungare, meaning to pierce or puncture. Acupuncture is defined as a technique of inserting needles into specific locations on the body for treating certain conditions. These specific locations are stimulated and alter various biochemical and physiological parameters to achieve a desired effect. The use of acupuncture for treating ailments in animals is thousands of years old. The first veterinary textbook was written in 650 B.C. and was based on acupuncture. Now, acupuncture is the medical treatment of choice for approximately 30% of the world’s population. There are approximately 5,000 veterinary acupuncturists that practice in the United States today. With current advances in neuroscience, the physiological effects of acupuncture can be more readily studied.

Acupuncture addresses the whole animal and does not simply treat the symptoms. Therefore, treating every animal with the same acupuncture points may not be as successful as treating each individual. The neuroendocrine responses achieved by needle insertion are the same ones that the body uses to regulate normal physiologic processes. Acupuncture stimulates a specific point on a horse’s body to achieve a therapeutic effect. The horse has 361 acupoints. Acupuncture points lie along meridians or pathways of major peripheral nerves. They correspond to known neural structures. The insertion of acupuncture needles causes little or no discomfort to the horse. Acupuncture can be done with tiny needles, hypodermic needles, lasers, electrical devices, moxibustion, or liquids, such as vitamin B12, injected into the acupoint. A veterinarian will perform an acupuncture examination before deciding what points to treat and what modalities to use. This is an extremely important part of the success of the case, and it is often an area that is overlooked.

2. Acupuncture for Mare Infertility
Acupuncture can be useful in most fertility issues, including anestrus, cystic ovaries, retained or cystic corpus luteum, silent heat, pseudopregnancy, impotence, penile paralysis, inflammation of the reproductive tract, retained placenta, uterine prolapse, and prevention of abortion, and parturition induction.2 Acupuncture is also helpful in cases of uterine fluid, urine pooling, or uterine infections.

Acupuncture repairs abnormally functioning tissues and organs by affecting the neurologic and en-
Acupuncture can affect the central and peripheral nervous systems to activate the body's endogenous pain relief mechanisms. This procedure would be indicated in reproductive cases where chronic or low-grade pain is evident and affecting fertility. Acupuncture stimulates increased blood supply, relieves local pain, and relaxes muscles. This process is mediated by calcitonin and bradykinin, a powerful vasodilator. Acupuncture also increases the immunity of local tissue by stimulating the large number of mast cells at each acupoint. All of these factors should facilitate the uterus to be healthier, reduce inflammation, and be more suitable for implantation. They should also help the uterus clear any post-breeding inflammation more readily.

When acupoints are stimulated, sensory receptors stimulate impulses in the afferent nerves that carry information to the central nervous system. The central nervous system then activates the hypothalamic–pituitary axis. Electro-acupuncture has been shown to induce the maturation and exfoliation of vaginal epithelium cells. Electro-acupuncture has been shown to increase circulating levels of adrenocorticotropic hormone (ACTH) among other important humoral substances. Effects are then seen on ovarian, testicular, thyroid, and parathyroid substances. Other substances produced by the body include opioids, serotonin, and cholinergic and adrenergic compounds. Endorphins circulate in the blood for hours after acupuncture. Changes to the central nervous system after acupuncture alter the regulation of blood pressure and blood flow as well as body temperature. Repeated electroacupuncture has been shown to increase blood levels of estrogen in ovariectomized rats. Acupuncture stimulation of certain points associated with reproduction significantly alters plasma levels of hormones including follicle-stimulating hormone (FSH), luteinizing hormone (LH), estradiol, and progesterone. Lin et al. found that the short-term effect of electroacupuncture in sows lowers plasma LH levels in 1–2 h. Also, there is a subsequent increase in the frequency and magnitude of the pulsatile release of LH and an increase in plasma progesterone levels 4–6 h after stimulation. Endorphins can inhibit LH secretion, whereas naloxone can induce a LH surge. Many studies have shown that acupuncture can increase endorphin levels in the hypothalamus, pituitary, brain, spinal cord, and blood. Therefore, it is possible that the acupuncture-induced decrease in LH is mediated by endorphins, and after the period of depression, the pituitary is more responsive to the gonadotropin-releasing hormone. If an imbalance exists in the hypothalamic–pituitary–gonadal axis, the depression of LH release may allow it to regain balance by breaking a vicious cycle. In laboratory animals with chronic fatigue syndrome, the hypothalamus–pituitary–adrenal index and the corticotrophin-releasing hormone mRNA expression have been shown to be higher than normal. Electro-acupuncture was shown to decrease the hypothalamic index significantly in these animals. The pituitary and adrenal index decreased only slightly. Another study showed that electro-acupuncture in stressed laboratory animals decreased cortisol and ACTH in serum as well as medication. There was no change in a control group.

The autonomic nervous system can also be stimulated with acupuncture. This stimulation is referred to as a viscerosomatic response. This response is especially useful in cases where the mare fails to clear uterine fluid and/or has urine pooling. Needling certain points on the body can exert impressive influences on the internal organs, namely the gastrointestinal and reproductive tracts. The autonomic nervous system activates the parasympathetic branch of the autonomic nervous system. This activation is important for maintenance of proper regulation of the internal organs, including the reproductive organs. The change in tone in the uterus can be palpated by the practitioner after acupuncture treatment.

A study from the Christian Lauritzen Institute in Ulm, Germany, showed an increased pregnancy rate in women having in vitro fertilization from 26% to 42% using acupuncture before and after embryo transfer. This study looked at 160 women undergoing in vitro fertilization: 80 with acupuncture treatment and 80 without acupuncture treatment. Furthermore, another study had the same pregnancy rates in women with acupuncture versus hormonal treatment. However, the acupuncture group had fewer side effects and less subsequent infertility. Acupuncture 30 min before and after in vitro fertilization shows an increased chance of embryonic implantation and a decreased chance of miscarriage in women. The study looked at 131 patients in which some did acupuncture and some did not. There was a 51% pregnancy rate in the women treated with acupuncture, and 8% miscarried. The group that did not receive acupuncture had a 36% pregnancy rate, and 20% of those miscarried. In humans, stress and infertility have been strongly linked. It may be that the increase in endogenous endorphins observed after acupuncture treatment improves fertility. Although the exact mechanism of acupuncture in fertility remains to be elucidated, there is certainly plenty of evidence supporting its integration into a reproductive practice.

3. Acupuncture for Stallion Infertility

There is very little information on acupuncture in stallions compared with mares. It has been well-documented that horses with back pain respond well to acupuncture. Stallions with back pain would be good candidates given the nature of their job. Any musculoskeletal pain can reduce a stallion’s libido and ability to breed. Pain during breeding can also affect the behavior of stallions. Behavior issues may or may not be addressed in an acupunc-
tured. If behaviors are hormonally based, acupuncture may address the behavior by its effect on the hypothalamic-pituitary-gonadal axis. For these reasons, a stallion with a history of poor breeding performance should have a thorough lameness and neurologic evaluation. Acupuncture may be a beneficial adjunct to conventional therapy, because it has been shown to relieve myofascial pain, relieve muscle spasms, and reduce inflammation.

There are reports of successful treatment in infertile or subfertile bulls with acupuncture.\textsuperscript{12,13} There are also increasing numbers of studies in men identifying the effects of acupuncture on fertility. A series of acupuncture given to men over 2 wk was shown to increase the mean total motility and mean total vitality of sperm.\textsuperscript{14} Gerhard et al.\textsuperscript{14} also noted that younger men, non-smokers, and men that were varicocele carriers had a greater response to the treatments. A questionnaire returned by 24 of 30 study participants reported that they had increased libido and slept better. In another study, the effect of acupuncture on sperm parameters in a treatment group showed that total functional sperm fraction significantly increased from 20 to 54.\textsuperscript{15} There was no change in a control group. Sperm density has also been shown to improve dramatically after 5 wk of treatment with acupuncture. Azoospermia and genital tract inflammation had the best results.\textsuperscript{16} The studies only looked at the patients for 1–3 mo after the treatment. It may be beneficial to follow patients longer after treatment. More recently, acupuncture has been shown to significantly improve sperm count and quality in men with infertility of unknown cause.\textsuperscript{17} The treatments resulted in an overall higher rate of successful pregnancies. Acupuncture in 28 men for 5 wk increased motility or forward movement of sperm, improved morphology of sperm, and increased the number of sperm per milliliter. Moxabustion has also been used in the acupuncture treatment of men with semen abnormalities.\textsuperscript{18}

4. Conclusion

Studies of the effects of acupuncture are limited in equine reproduction. The concept of traditional Chinese medicine is fundamentally and practically very different from Western medicine. Doing the same acupuncture protocol on a group of animals goes against the methodology of traditional Chinese medicine, where each subject is treated differently based on a complex pattern of pathology. Likewise, doing acupuncture protocols on normal animals may not reveal any valuable information. It is widely agreed that acupuncture has its most beneficial effects in conjunction with Western medicine. Acupuncture is helpful in these cases by increasing endorphins, stabilizing hormone levels, and aiding in the blood flow to the reproductive organs. Reproductive conditions treated commonly with acupuncture include but are not limited to anestrus, retained corpus luteum, urine pooling, uterine fluid, vaginitis, abortion, dystocia, retained placenta, uterine prolapse, cryptorchidism, and decreased libido in stallions.

References