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Original Research

The Influence of a Soft Touch Therapy Flowtrition on Heart Rate, Surface Temperature, and Behavior in Horses

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ABSTRACT

This study tested Flowtrition, a noninvasive soft touch therapy, on the mean and maximum heart rate (HR_{avg} and HR_{max}, respectively), surface temperature in three body quadrants, and eight stress-related behaviors in horses. Fourteen gelded horses were randomly assigned to a control (CON, n = 5) group or a Flowtrition (treatment, TRT, n = 9) group. Each horse underwent four sessions with each session split into three 20-minute stages: Pre, During, and Post. At the end of the Pre stage in which neither group received any intervention, baseline heart rate, temperature, and behaviors were recorded. A During stage followed in which the TRT group received therapy, and the CON group was monitored and received no treatment. Within the Post period, both groups were monitored and response variables were recorded. The TRT group experienced a decrease ($P < .05$) of 10 ± 2.7 bpm in HR_{max} and 4.7 ± 0.8 bpm in HR_{avg} between Pre and Post stages compared to the CON group, which experienced no shifts in heart rate. The group receiving therapy showed an increase ($P < .05$) in occurrence frequency and total duration of head lowering, licking and chewing, and yawning between Pre and Post stages; the CON group showed no behavioral shifts. The results show that Flowtrition induces a more relaxed state in horses as evidenced by a decrease in HR and increase in occurrence and duration of relaxation-related behaviors.

1. Introduction

In horses, manual massage therapies have been promoted to improve behavior, performance, and well-being, as well as enhancing the relationship between the horse and the rider. However, very few controlled studies exist to support these claims [1]. Manual therapies involve the placement of the therapist's hands on the body of the horse to influence reparative or healing processes within the various muscles and tissues [2]. Therapeutic effects of manual techniques may be localized to specific tissues and cellular responses such as the increase of spinal mechanical nociceptive thresholds. When these thresholds are high, they are indicative of less pain [3]. Other responses may include changes in regional pain perception or neuromuscular control, or generalized changes in the whole animal such as relaxation or altered behavior [2]. Several studies have shown that massage may have effects on stress-related emotions and hormones in humans [4–6] and changes in autonomic signaling such as heart rate (HR) in humans, horses, and other species [7–9].

Massage is a widely used manual therapy that has been described as a manipulation of body tissue using repetitive pressure to provoke a positive physiological or psychological response [4]. Morhenn et al [6] reported significant shifts in oxytocin and several adrenocorticotropin hormone levels associated with the application of massage in humans. McBride et al [8] used a targeted approach to investigate whether horses were more sensitive to massage

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when performed at preferred sites of allogrooming, a form of grooming associated with social interaction. When massage was applied to preferred sites, midneck and withers, there was an increase in responses indicative of stress relief including decreased HR and behavioral score compared to nonpreferred sites (forearms) [8]. Feh and Mazieres [10] performed an experimental imitation of allogrooming at preferred versus nonpreferred sites and HR decreased when the preferred site was touched. Controlled studies evaluating the effect of touch therapies on physiological and behavioral variables show promising results, but more are needed to define clinical applications and elucidate the physiological mechanisms involved [11,12].

Massage and other touch therapies that were developed for treatment of humans have been applied to horses based on the assumption that horses respond similarly to humans [2]. Most vertebrate behavior is the result of physiological conditions [12,13], which are in part affected by the introduction of external stressors present in the environment [14–16]. The autonomic nervous system (ANS), via activation of parasympathetic or sympathetic neurons, controls the body's natural tendency to respond to stress and return to a nonstressed state [13,17]. Sympathetic activations include increased HR and physical ability as well as increased mental awareness to allow the individual to respond to a stressor. Once the stressor is removed, a parasympathetic response induces a state of relaxation to return the individual to homeostasis [9]. Though acute stress can be healthy, chronic stress may have negative health consequences and change social and sexual behavior [18,19]. For example, Thayer et al [20] reported that human patients with chronic anxiety (panic disorder) exhibit increased levels of mean HR compared to their controls, suggesting sympathetic dominance.

Physiological stress responses, including elevated HR, have also been described in horses [21]. Heart rate is a common variable measured to evaluate stress as it represents the net effect of parasympathetic signals that work to decrease HR and sympathetic signals that accelerate HR [22]. Body surface temperature (ST) may also indicate how an animal is being affected by its environment [23], as sympathetic or parasympathetic responses affect vasoconstriction and vasodilation altering blood flow to the skin, changing the animal's thermal profile [24–27]. Nakayama et al [25] reported that the introduction of a presumably threatening individual resulted in thermal loss to the nasal regions of apes. The nasal regions became significantly cooler than the baseline measurements taken during the prestimulation period. Further studies on the physiological response to manual therapies can better elucidate how these therapies affect the subject's physiology as it pertains to well-being.

Research on the effects of manual therapies on behavior is limited [8]. Behaviors are the outward expression of physiological, hormonal, and neurologic influences [17–19,28,29]. In animal management situations and especially for animals with large body size such as horses, inappropriate behavior can be costly and dangerous, whereas positive behavior can result in improved management for performance or health [30–34]. Pigs injected with the hormone porcine anxiety-inducing corticotropin-releasing factor showed increases in fear-related freezing and sham chewing behaviors [35]. For example in horses, a horse that is introduced to a novel object or environment has been shown to cause an increase in HR, which is a proven indirect measurement of shifts in the ANS. This horse will then express these internal shifts outwardly as behaviors. The behavioral response will be different depending on how that horse neurologically interprets the object or environment [36]. Behaviors that have been associated with stressful stimuli in horses, such as novel item introduction and training, include tail swishing, rising of the head, and pawing [30,36,37]. On the other hand, behaviors associated with relaxation measured in control horses that were not introduced to novel objects or training were lowering of the head, licking and chewing, yawning, and relaxation of the tail [18,30,36,37]. In performance animals such as horses, environmental stressors such as training, diet composition, transport, and stabling can cause shifts in behaviors that may affect the health of the animal. Leiner and Fendt [18] used habituation tests to correlate behavior and physiological fear responses in horses.

Flowtrition is a manual therapy technique developed by Dr Lance Wright, in 1985. The technique seeks to improve well-being in the subject by the restoration of musculoskeletal function [38]. The application of this therapy as it pertains to the study involved light, specifically placed touches applied to the muscles located along the head, neck, back, and legs of the horses. The specificity of the touches lies in their location, pressure, and duration [38]. The location of the touch is determined by lightly tracing the muscles of the individual with one's fingertips to detect rapport sites: small to large depressions in the muscle tissue created by lack of tension [38]. The precise pressure is found by watching the individual's body for indicators of relaxation [36–38]. Once the behaviors are observed, the practitioner issued a deep breath and the pressure is released in one of two ways: a sudden release is used to bring the body's attention to that site or a slow sustained release is used when the subject is on edge or hypersensitive to quick movements [38]. It is hypothesized in this study that the practitioner's attention to the subject's behavior and the physical touch will cause the subject to relax, lowering HR and increasing behaviors associated with relaxation. The Flowtrition therapy is also expected to cause a local response at the rapport site, increasing blood circulation. The objectives of this study were to evaluate the effects of the soft touch therapy Flowtrition on HR, ST, and eight specific behaviors associated with sympathetic and parasympathetic activity.

2. Materials and Methods

All experimental protocols involving animals were approved by the Texas A&M AgriLife Research Institutional Agricultural Animal Care and Use Committee.

2.1. Location, Animals, and Experimental Design

The study used fourteen American Quarter Horse geldings from the Tarleton State University Equine Center