

Clinical Corner

Acupuncture Treatment for Headshaking in A Sport Horse with Poor Performance: A Case Report

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ABSTRACT

A nine-year-old Warmblood gelding was presented with a clinical history of irritable behavior when being ridden, tic-like movements of the head, and laryngeal hemiplegia. It was noted that clinical signs were exacerbated by intense exercise and sun exposure. Due to the clinical signs observed and exclusion of other etiologies, a suspected conventional diagnosis of trigeminal-mediated headshaking (TMHS) was made. A traditional Chinese veterinary medicine (TCVM) clinical exam was performed. The horse had a Wood personality with a slight dry tongue and deep strong pulse. Palpation of the head and multiple acupoints demonstrated sensitivity. The TCVM pattern diagnosis was Liver *Qi* Stagnation with Liver Heat, Stagnation of *Qi* in the Upper Burner (*Shang Jiao*) and Wind-Heat. Electro-acupuncture treatment was considered but due to safety concerns associated with the horse's Wood personality, dry needle acupuncture (DNAP) was instituted instead. Acupoints stimulated included: LIV-3, GB-41, BL-18, *Da-feng-men*, BL-12, GB-20 and BL-17. Treatment also included food therapy (i.e. green vegetables) and a face mask was introduced. Marked clinical improvement was reported by the owner after the first DNAP treatment. One week later, a second DNAP treatment was performed using LIV-3, GB-41, BL-18, *Da-feng-men* and GB-20. A Spleen *Qi* Deficiency was diagnosed 3 weeks after the second acupuncture session. This was successfully treated with DNAP at ST-36, BL-20, SI-9 and GB-20. The horse received a total of three acupuncture treatments over the course of a month and then successfully maintained on low stress handling/training practices, along with external protection (i.e. face-nose mask); which has allowed this sport horse to currently train and compete on a regular basis at expected levels.

Keywords: acupuncture, equine, headshaking syndrome, Liver *Qi* Stagnation, poor performance, trigeminal-mediated headshaking

ABBREVIATIONS: DNAP: dry needle acupuncture; EAP: electro-acupuncture; PENS: percutaneous electrical nerve stimulation; TCVM: traditional Chinese veterinary medicine; TMHS: trigeminal-mediated headshaking

A nine-year-old Warmblood gelding was presented with a history of irritable behavior of one-month duration. The horse's owner reported a continuous defensive, out of control attitude of the horse when being ridden. The medical history included worsening of the clinical signs in the spring and exposure to sunlight (e.g. increased nasal/ocular secretions, excessive sweating). The horse had been purchased at the end of winter and the referral veterinarian had recently performed a pre-purchase examination on the horse. This had included a physical exam, as well as radiographs of the limbs and neck. The horse had a previous history of laryngeal hemiplegia. Other than that, no significant abnormalities were detected during the veterinary exam. History from the previous owner hinted there had been some persistent behavioral issues with the horse that had not improved with training.

A conventional physical examination was conducted by the author (MRZ) upon referral. The horse was properly dewormed and vaccinated. His diet was based on forage and high-yield concentrate feed. He had a great appetite,

dry stools and slightly increased water consumption. The physical included visual inspection and palpation of each body region, behavioral assessment through observation, and a dynamic assessment. A careful examination of the head was performed, including the eyes, ears, nostrils, and oral cavity, followed by an evaluation of the neck, back, forelimbs, and hindlimbs. The dynamic assessment involved visual gait analysis in a straight line at walk and trot, as well as lunging at walk, trot, and canter in both directions, with and without the rider. Additionally, the dynamic examination at lunge was conducted in a sunny environment since the owner had noted worsening behavior as the winter season had turned to the spring/summer season.

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The main clinical findings included marked sensitivity in the facial region, an excessive tendency to sweat, and slight ocular/nasal discharge with continuous blinking following sun exposure. Respiratory noises consistent with grade 4 laryngeal hemiplegia were noted during work, and the horse sneezed at the start of training. No lameness was observed in any phase of the dynamic examination and no pain or other musculoskeletal abnormalities were noted. Behavior was normal at rest; however, the horse was difficult and dangerous to ride in sunny areas and during intense exercise. He exhibited tic-like movements of the head both while being ridden and lunged; and he dug his nostrils into the ground while lunging. The headshaking behavior was graded for severity. The horse met grade 4/5 on Newton's scale, 3/3 on Talbot's scale, and 2/3 on Roberts' scale.¹⁻³

TRADITIONAL CHINESE VETERINARY MEDICINE ASSESSMENT AND TREATMENT

TCVM Exam and Pattern Diagnosis

The horse was presented for an initial traditional Chinese veterinary medicine (TCVM) evaluation 2 months post-purchase, as the referring veterinarian could not reach a definitive diagnosis using conventional methods. The TCVM clinical exam performed was based on application of the four fundamentals of a TCVM (*Si-zhen*) exam: interrogation, inspection, listening/smelling and palpation.⁴ Medical history and owner description of the problem was collected during the conventional exam. Following interrogation, the TCVM clinical inspection included assessment of the horse's constitution/*Shen*, tongue/pulse diagnosis, general body condition, and haircoat quality. Palpation included acupoint sensitivity scan and during his conventional physical, careful examination of the head, (including nostrils, mouth, ears) was performed.

A number of TCVM clinical findings were recorded during the initial session. The horse had a Wood personality and liked to dominate other horses. His tongue was normal size, pink, slightly dry and had a thin whitish coating. The haircoat was glossy. The thermal sensation, through palpation of all body areas (head, neck, back, limbs) was noted to be slightly warmer compared to normal conditions. The pulse was taken at the common carotid artery bilaterally. It was deep and strong on both sides with normal rhythm. Acupoint scan sensitivity was found suggesting musculoskeletal pain (hoof, stifle, hip) accompanied by imbalances of the Wood and Earth elements (Table 1).

Liver *Qi* Stagnation that had transformed into Liver Heat, Stagnation of *Qi* in the Upper Burner (*Shang Jiao*) due to the laryngeal hemiplegia and Wind-Heat were diagnosed as the main TCVM patterns. The *Qi* Stagnation was evidenced by painful diagnostic acupoints, irritability, increased ocular secretions and a body thermal sensation higher than normal. The suspicion of indiscriminate drug use and a stressful work and management style, both of which can adversely affect the Liver, were considered in this diagnosis. The strong pulse, discomfort in the eyes,

sensitivity, and tic-like movements of the head, exacerbated by sun exposure, spring climate conditions, and exercise, indicated Liver Heat. The Wind-Heat pattern was diagnosed because Wind, an external manifestation of Liver imbalance, typically affects the upper parts of the body and is particularly associated with springtime. Wind in the body resembles the wind in nature; thus, it generates movement. Its symptoms often appear and disappear suddenly, similar to the tic-like movements of the head.

TCVM Treatment and Clinical Outcome

During the first session, the treatment strategies included resolving both Liver *Qi* Stagnation and Upper Burner *Qi* Stagnation (*Shang Jiao*), along with moving the Blood to disperse the Wind. Dry needle acupuncture (DNAP) treatment was chosen over electro-acupuncture (EAP) due to the irritability and high sensitivity of the horse. The TCVM treatment consisted of three DNAP treatments for a duration of 20-30 minutes. In the first session, acupuncture needles^a (0.30×13 mm, 0.20×6.5 mm, silver handle) were inserted bilaterally at LIV-3, GB-41, BL-18, BL-12, GB-20, BL-17 and *Da-feng-men* (single needle) to treat the Liver *Qi* Stagnation and Wind (Figures 1 and 2, Table 2).⁵ The needles were rotated clockwise every 5 minutes.

Dietary changes were introduced gradually. High-quality forage and daily pasture grazing were recommended. According to TCVM principles, the color green is associated with the Liver and fresh green vegetables support Liver

Table 1: Sensitive diagnostic acupoints found on the first TCVM examination

Forehand Acupoints	Right [^]	Left*
LI-16	-	+++
LI-18	+++	+++
PC-1	-	++
TH-14	++	-
Bladder Meridian Acupoints**	Right [^]	Left*
BL-18	++++	++++
BL-20	++	++
Hindquarter Acupoints [^]	Right [^]	Left*
BL-35	++	-
BL-53	+++	+++
BL-54	+++	+++
SP-11	++	++
SP-12	++	++

+ = sensitive and degree (i.e. ++ = 2+); - = no sensitivity; * = left side: sensitivity at LI-16, indicating pain in the shoulder and fetlock; LI-18 and PC-1, reflecting foot pain; BL-18 and BL-20, indicating imbalances in the Wood and Earth elements, respectively; BL-53 and BL-54, suggesting hip pain; and SP-11 and SP-12, indicating stifle pain; [^] = right side: sensitivity at TH-14, reflecting shoulder pain; LI-18, pointing to foot pain; BL-18 and BL-20, indicating imbalances in the Wood and Earth elements, respectively; BL-53 and BL-54, suggesting hip pain; SP-11 and SP-12, indicating stifle pain and BL-35, reflecting hock pain.

Table 2: Acupoints used to treat Liver *Qi* Stagnation and Wind⁵

Acupoint	Approximate Needle Depth (cun)	Attributes, Indications and Actions
LIV-3	0.5	<i>Shu</i> -stream point (Earth), <i>Yuan</i> -source point; Liver <i>Qi</i> Stagnation, abnormal cycle, fetlock pain, paralysis of hind limb
GB-41	0.5	<i>Shu</i> -stream point (Wood), confluent point with the <i>Du Mai</i> /GV Channel; metatarsal region pain, flexor tendonitis, urinary incontinence, abnormal cycling, eye problems, mastitis
BL-18	1.5	Back- <i>shu</i> Association point for Liver, jaundice, eye problems, seizures, back pain
<i>Da-feng-men</i>	1 cun angular insertion toward the mane	Wind pattern, encephalitis, tetanus, <i>Shen</i> Disturbance, hyperactive behavior
BL-12	1	Influent point for Wind and trachea; Wind-Cold, Wind-Heat, skin itching, cervical stiffness, cough
GB-20	0.5	External Wind, Internal Wind, cervical stiffness, headache, epistaxis, nasal discharge/congestion, epilepsy
BL-17	1	Influent point for Blood, Back- <i>shu</i> Association point for the diaphragm; vomiting, nausea, heaves, cough, tidal fever, sweating



Figure 1: Dry needling acupuncture of LIV-3 and GB-41 for Liver *Qi* Stagnation. LIV-3 is located on the craniomedial aspect of the cannon bone (third metatarsal), and GB-41 is on the caudolateral surface of the cannon bone.⁵

health and help unlock stuck Liver energy.⁶ During clinical signs, therefore, the owner was instructed to include additional daily feeding of fresh green foods such as celery, green apples, cucumber, arugula and artichokes. The daily recipe included 3 green apples and 450 g of each of the other foods, all cut into pieces. High-performance feed was replaced with a lower energy maintenance feed. In addition, the use of a special head mask with sun protection was recommended during training sessions (Figure 3).

After the first session, the owner reported that the



Figure 2: Dry needling acupuncture at *Da-feng-men* (Great Wind Gate) for Wind pattern. *Da-feng-men* consists of three locations. The main point is on the dorsal midline at the rostral end of the forelock and the two auxiliary points are 1 cun ventrolateral to the main point.⁵

horse was more relaxed with the head tics and sweating decreased. During the second TCVM assessment, conducted one week after the initial treatment, the headshaking signs had decreased from 4/5 to 2/5 on the Newton's scale, from 3/3 to 2/3 on the Talbot's scale, and from 2/3 to 1/3 on the Roberts' scale.¹⁻³ The acupoint sensitivity scan at this session only identified reactivity at BL-18. A second DNAP treatment was performed in this session: bilateral LIV-3, GB-41, BL-18, GB-20 and *Da-feng-men* (single needle) were stimulated for a duration of 20 minutes.

During the third TCVM assessment, 3 weeks after the second session, headshaking signs had decreased to 1/5 on the Newton's scale, 1/3 on the Talbot's scale, and 1/3 on the Roberts' scale.¹⁻³ The TCVM clinical recheck exam identified a weaker pulse on the right side accompanied by a swollen-pale tongue. Reactivity at ST-7, GB-20, SI-16, SI-9, LI-16 and BL-20 was present. According to these findings, a Spleen Qi Deficiency diagnosis was added, most likely due to the overcontrol exerted by the Wood element over the Earth element. This session used DNAP (20-minute duration) at ST-36, BL-20, SI-9 and GB-20 (Table 3).⁵



Figure 3: Face mask with light-blocking eye protectors used to manage headshaking symptoms in a nine-year-old Warmblood gelding.



Figure 4: Current Lycra face mask used during competition with neoprene ear covers, nose net, and specialized bridle.

Table 3: Acupoints added to treat the Spleen Qi Deficiency⁵

Acupoint	Approximate Needle Depth (cun)	Attributes, Indications and Actions
ST-36	1.5	Master point for gastrointestinal tract and abdomen, <i>He</i> -sea point (Earth); nausea, vomiting, stomach pain, gastric ulcer, food stasis, general weakness, constipation, diarrhea
BL-20	1.5	Back- <i>shu</i> Association point for Spleen, vomiting, diarrhea, edema, back pain, jaundice, abdominal fullness

Clinical Outcome

Once the behavioral problem was resolved with the DNAP treatments, the horse was referred to an equine hospital for surgical resolution of the laryngeal hemiplegia. In addition, a maintenance protocol was recommended to preserve the successful clinical outcome of the horse's headshaking behavior. There was no need for further DNAP treatments or daily feeding of vegetables, and instead good handling and training practices were implemented to minimize stress in order to decrease a tendency towards Liver Qi Stagnation. Access to pasture for grazing (i.e. green food to support the Wood element) including high-quality forage in the diet was continued, along with a maintenance feed calibrated to meet the specific energy requirements of the animal. The use of a face mask during training and competitions was recommended according to the requirements of the horse.

Currently, the face mask has gone through a few changes, with a new modified mask now successfully implemented during competitions. It consists of a combination of two Lycra face masks, neoprene ear covers and nose net; combined with a specialized bridle that alleviates pressure points on the facial nerves (Figure 4). Based on the rider's experience, when the horse is in motion during competition, the irritation to the eyes is not as pronounced, however, the nose net is important, as long as it doesn't touch the horse's nostrils. Eye protection is still used when the horse is turned out to pasture to shield from insects/strong sunlight.

The maintenance program has enabled the horse to currently train and compete on a regular basis at expected levels. The horse has only exhibited mild symptoms of headshaking, which have been successfully managed through the stress reduction protocols, including the use of masks and nose nets.

DISCUSSION

Trigeminal-mediated headshaking (TMHS) is a poorly understood condition in horses, characterized by neuropathic facial pain.⁷ A study conducted in horses using perineural anesthesia suggests the disorder is a type of neuralgia involving trigeminal nerve hypersensitivity, where different trigger mechanisms may explain the range of headshaking behaviors and the varied responses to diagnostic tests. The research proposed clinical signs associated with the trigeminal nerve pain involve the

posterior ethmoidal/nasal division of the trigeminal's ophthalmic branch, rather than the infraorbital nerve which divides from the trigeminal's maxillary branch.¹ There are clinical similarities between TMHS and trigeminal neuralgia in humans.⁷ Microvascular compression and demyelination with ectopic impulses of the trigeminal nerve are prominent theories for etiology in humans, with the pain described as intermittent electric shock-like or burning sensations.^{8,9} This can create a short circuit in touch forms, transmitting slight pain stimulation to the center, but which is then perceived as severe pain by the individual.⁹

Clinical signs of equine THMS are characterized by uncontrollable, persistent or intermittent movements of the head and neck, which may occur seasonally or nonseasonally.¹ They predominantly include vertical headshaking often accompanied by sharp vertical flicks and nasal irritation.⁷ Typically, signs are worse during exercise and seasonality is usually reported.⁷ Associated clinical signs may include rubbing the nose, striking the nose with the forelegs, head pressing, or deliberate avoidance of light, warmth, or wind on the face.¹ Many affected horses become dangerous to handle and ride.¹⁰ The diagnosis is one of exclusion, which involves a full physical examination including ophthalmoscopy, otoscopy, and oral examination.¹¹ More detailed adjunct diagnostics may include endoscopy of the upper respiratory tract, radiography of the head, computed tomography (CT), magnetic resonance imaging (MRI), and infraorbital/maxillary nerve anesthesia.¹² Recent studies concerning cecal microbiota on horses reveal that *Methanocorpusculum* spp. was more abundant in the cecum of horses with TMHS.¹³

Current therapeutic options are limited by the incomplete understanding of trigeminal nerve sensitization and its role in the etiopathogenesis of TMHS.¹⁴ There may be more than one cause with the same clinical manifestation, leading to different response rates to treatment.⁷ Conventional therapies reported as having some efficacy have included anti-seizure/antihistamine pharmaceuticals (e.g. carbamazepine, cyproheptadine), bilateral infraorbital neurectomy, eye drops (i.e. sodium cromoglycate), and percutaneous electrical nerve stimulation (PENS).⁷ Results are mixed from the wide variety of conventional treatments reported, and as with humans, occasionally a positive response is merely short-term.⁷ Pharmaceuticals used in TMHS may be associated with adverse effects in horses.^{7,12,15} These medications would not be allowed in competition, and this fact may be sufficient to limit further research in this area.⁷

Nose nets and eye protection have been reported to provide useful, safe and a convenient first line of palliative care for horses with behaviors associated with vertical headshaking.^{16,17} It has been proposed that photic stimulation of the optic nerve by sunlight causes cross-activation of the maxillary branch of the trigeminal nerve. Face masks and nose nets reflect ultraviolet light. They also stimulate touch/pressure receptors whose axons synapse with terminals of small unmyelinated pain C-fibers, subjecting them to pre-synaptic inhibition.¹⁷ They are relatively inexpensive,

noninvasive, risk-free and accepted in most competitions.⁷ One study investigated treatment with cyproheptadine alone or in combination with environmental protection from sunlight or light-blocking eye protectors. Results were good with moderate to significant improvement in 76% of cases.¹⁸ A face mask with light-blocking eye protectors was introduced in the present case after testing different models and according to the preferences of the owner based on sensitivity of the horse.

Scientific research that supports the validity of acupuncture in veterinary and human medicine based on traditional Chinese medicine theories has been reported.^{9,19} It has been shown to enhance the release of endogenous analgesic substances, increase the pain threshold, and improve local circulation, which helps dissipate pain-causing metabolites.²⁰ In China, acupuncture has been used as a treatment for trigeminal neuralgia over a prolonged period with studies documenting its analgesic effects on both the neuralgia and myofascial pain with reduction of the frequency and intensity of pain episodes.²¹ A study of 6 horses, with headshaking behaviors making riding so difficult that 1 horse was being considered for euthanasia, were treated with electro-acupuncture (EAP).¹⁷ The study's objective was to evaluate its efficacy as a replacement for percutaneous electrical nerve stimulation (PENS) of the infraorbital nerve which had been reported to successfully (53%) treat cases of equine TMHS.^{17,22} The EAP treatment effectively reduced headshaking in all 6 horses and the procedure did not require hospital facilities and expensive equipment that is routinely needed for PENS.^{17,22,23} Both modulate perception of afferent nociceptive stimuli by inhibiting afferent pain signals and by activation of descending inhibitory pathways.¹⁷

For the present case, access to PENS equipment was not possible and EAP was initially considered but discarded due to the irritability and sensitivity of the horse. Dry needle acupuncture technique was therefore chosen as a viable option. Although no clinical studies have been performed with DNAP for headshaking in horses, there is precedence in humans for successful DNAP treatment of trigeminal neuralgia and 1 case report of success in a horse.^{21,24} Pharmacological treatment was not considered an option due to the lack of a clear diagnosis and inconsistent results reported for the use of drugs to treat TMHS.

With limited, incomplete information from a conventional perspective to explain the pathogenesis of this condition, the insights provided by a TCVM perspective may offer potential explanation. A clinical case of TMHS associated with pelvic limb shifting lameness was reported in a Thoroughbred.²⁴ The condition received TCVM pattern diagnoses of local Qi Stagnation of the lumbosacral region/right pelvic limb, and Liver Qi Stagnation, which led to Excess Heat causing damage to the Heart Yin (i.e. Fire flaring upward to Heart). As a result, the Heart could no longer house the *Shen*, leading to *Shen* Disturbance (head shaking movements). The Deficiency in Heart Yin resulted in Heart Blood Deficiency, which allowed External Wind to invade.²⁴ In the present case, similar to the reported case, signs of irritability and

difficulty at work were occurring. The clinical signs had worsened in spring (Wood season), as well as developing an eye discharge after exposure to the sun. The sum of these clinical changes indicated Liver Qi Stagnation, similar to the reported case, which had been exacerbated by possible drug use and previous work patterns. By the time of initial TCVM evaluation, the imbalance had become chronic and had progressed into Liver Heat or Liver Fire. The elevated Liver Heat was reflected in eye discomfort (eyes reflect the Liver), as well as the sensation of Heat and general discomfort in the head. This was aggravated by exposure to other Heat factors: 1) sun, 2) Stagnation of Qi in the Upper Burner (*Shang Jiao*) associated with laryngeal hemiplegia, and 3) increased exercise which generated more Heat through movement. These multiple sources of Heat promoted the entry of Wind, a master Pathogen present in the spring. Wind likes to invade the upper regions of the body, quickly appearing and disappearing which was manifested by the sudden head movements in the form of tics and excessive sweating.

The successful treatment and management strategies for this case, therefore, included DNAP based on TCVM pattern diagnoses, food therapy including introduction of fresh green vegetables to the diet to help relieve Liver Qi Stagnation and external protection from sunlight (i.e. face mask) based on acceptance by horse and rider. Further research into the clinical application of DNAP to treat this syndrome is needed, as it provides an approach that suggests efficacy, is lower cost, and may be better accepted to sensitive horses than other treatments now available. By using the integration of TCVM into the overall treatment for TMHS, as in this case, a hopeful prognosis can be given to owners of horses for a condition that has been difficult to achieve successful outcomes.

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Informed Consent

Written informed consent for patient information and images to be published was provided by the owner.

FOOTNOTES

- ^a Ener-Qi Acupuncture Needle, Suzhou Huanqiu Acupuncture Medical Appliance Co., Ltd., Jiangsu Province, China

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