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Original article

Acupuncture combined with Chinese herbs for the treatment in hemivertebral French bulldogs with emergent paraparesis

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ABSTRACT

This study follows the treatment of six French bulldogs with paraparesis caused by congenital hemivertebra which were structurally mild but clinically severe. A standardized acupuncture (針灸 zhēn jiǔ) treatment using *Hua-Tuo-Jiaji* (HTJJ) as local points and other distant points combined with Chinese herbs improved the clinical signs. Few, if any, published papers mention Traditional Chinese Veterinary Medicine (TCVM) for treatment of hemivertebral paraparesis in French bulldogs. Based on the rapid treatment outcome, we encourage practitioners to integrate this form of conservative management into emergency treatment.

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1. Introduction

Hemivertebra in French bulldogs is a breed-predisposed congenital anomaly.¹ Nonetheless, it does not commonly cause clinical signs.² A recent study found 9.8% (n = 41) of French bulldogs had compressive spinal cord disease associated with hemivertebra.³ However, once clinical signs appear, the disorder is considered urgent. The most common clinical findings are pelvic limb ataxia and paresis ranging from very mild ataxia to loss of voluntary movement of the pelvic limbs. More severe symptoms include faecal and urinary incontinence.¹ The diagnosis is based on clinical signs and diagnostic imaging such as X-radiography, CT or MRI.⁴

Treatment options depend on the severity of clinical signs and vertebral angulation, and range from conservative to invasive methods, including vertebral stabilizing surgery with or without decompression.^{5,6} Advanced imaging under anaesthesia or surgery is risky especially in emergency cases in this brachycephalic breed. Some clinicians choose conservative treatment such as medication, restriction, rehabilitation or acupuncture (針灸 zhēn jiǔ). Among these, acupuncture is proactive and has few side effects.

We found a lack of published reports of TCVM treatment in hemivertebral French bulldogs with paraparesis. This report describes 6 cases of French bulldogs with hemivertebra resulting in paraparesis that underwent acupuncture and herbal treatment with favourable outcomes.

2. Materials and methods

A three-year-old intact male French bulldog (dog 1) was referred to our veterinary hospital for sudden non-ambulatory paraparesis with urinary incontinence. There was no history of trauma and although the local veterinary hospital had administered steroids the dog's condition continued to worsen. After neurological examination, the lesion was localised T3–L3 region and severity was grade 4^{6,7} with hyperaesthesia of the middle thoracic region. The differential diagnoses included intervertebral disc disease (IVDD), spinal cord injuries or fibrocartilaginous embolism (FCE). Inflammation and neoplastic disease were considered unlikely based on the history and signalment. Survey radiographs revealed T6 to T10 hemivertebra and T13 to L1 narrowed disc space ruling out vertebral dislocation. Computed tomography (CT; Activion 16, Toshiba, Tokyo, Japan) revealed vertebral deformities at T6 to T10 (Fig. 1), ruling out T13–L1 disc extrusion. Following consultation, the owner decided to have acupuncture (針灸 zhēn jiǔ) treatment rather than advanced imaging by MRI. According to TCVM “Where

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Fig. 1. Computed tomography with myelogram and bone window study shows vertebral deformities at T6 to T10.

there is pain, there is lesion.”, we applied dry needle acupuncture to this dog at selected local and distant acupoints. The local points were *Hua-Tao-jiaji* (HTJJ) on T9, T11 and T13 which were the region of hyperaesthesia. Distant points were GB30 (*Huan Tiao*), GB34 (*Yang Ling Quan*), LI4 (*He Gu*) and LIV3 (*Tai Chong*) (Fig. 2).⁸ The local points and distant points on the trunk were stimulated using stainless steel needles (0.3 mm in diameter, 25 mm in length; Yu Guang Corp., New Taipei, Taiwan) with a perpendicular insertion depth of 0.5–1.0 cm. Distant points on extremities were stimulated using stainless steel needles (0.27 mm in diameter, 13 mm in length; Yu Guang) with a perpendicular insertion depth of 0.25–0.50 cm. With the dry needle method, the needles were inserted and remained in place for 15 min. Chinese herbs consisted of double PII (Jing Tang, Gainesville, FL, USA) and *Bu Yang Huan Wu Tang* (Sun Ten Pharmaceutical Co., Taipei, Taiwan). The dosage was 0.1 g per 5–10 kg of body weight given orally twice daily until recovery. According to TCVM, the treatment principles of Double PII are to break down stasis in the spine, move *Qi*, and relieve pain. The *Bu Yang Huan Wu Tang* tonifies *Qi* and smooths the channels (Table 1).⁹ The owner was instructed on intensive home care of the dog, which including restriction of the dog to a non-slippery flat floor, manually emptying the dog's bladder every 6 h, and passive range of motion therapy for the pelvic limbs. Caging was not

recommended. After two treatments, the dog regained motor movement and tried using its pelvic limbs. After the 4th treatment, the dog had obvious improvement in walking, with stifle extension, and without assistance. The dog regained use of his hind limbs after six treatments although he occasionally dribbled urine. Based on the treatment experience of dog 1, we hypothesized that sudden paraparesis in young hemivertebra French bulldogs could be well treated by TCVM after ruling out major structural changes via radiography.

A further two French bulldogs were referred to our veterinary hospital emergency department for sudden paraparesis with non-ambulation (paraplegia). Three more French bulldogs were referred to our neurology service with sudden ambulatory paraparesis. There was no history of trauma. Neurological examination localized lesions in T3–L3 with deep pain perception: these were graded from grade 2 to grade 3^{6,7} with hyperaesthesia of the middle thoracic region. Survey radiographs revealed hemivertebra from T4 to T13 with single or multiple vertebral deformities respectively (Fig. 3). Because of the owners' economic concerns and regarding the risk of surgery, anaesthesia (2 non-ambulatory dogs) and the ambulatory status (3 ambulatory dogs), they only received radiography to rule out spinal dislocation. Treatment-wise we applied dry needle acupuncture. HTJJ points corresponded to regions of hyperaesthesia associated with hemivertebra. Distant points were the same as dog 1. Only 1 dog (dog 3) received electrical acupuncture (EAP) because of sedation for taking the radiographs. In EAP, two pairs of electrical electrodes were applied including an HTJJ pair covering T6, T7, T8 and T9 as local points, and electrodes connecting T6 to T9 bilaterally. Additional electrodes connected GB30 to GB34 as distant points. An electrostimulator (Ching Ming Tens Model-05B, Ching Ming Corp., New Taipei, Taiwan) was used to provide stimulation for 15 min at 0.2 Vp-p (voltage peak to peak) at a frequency of 20 Hz (interrupted wave type). The intensity of stimulation was adjusted to produce visible muscle contraction surrounding the needles and hind limb vibration. The other distant points were LI4 and LIV3 with dry needles. Chinese herbs consisted of double PII and *Bu Yang Huan Wu Tang*; the same dosage as dog 1 were used for all dogs. They improved after 3 treatments and recovered within 6 treatments.

3. Results and discussion

The 6 dogs in this study comprised 1 intact female and 5 intact males with an average age of 3.5 ± 0.5 years (range, 3–4) and an average BW of 11.2 ± 1.8 kg (range, 8.8–14). The average time of duration of signs prior to TCVM treatment was 2.7 ± 2.0 days (range, 1–6). The average improvement time was 5.5 ± 2.9 days (range, 2–10), with an average recovery time of 19.8 ± 17.1 days (range, 5–49).

In this study, 3–4 year old intact male French bulldogs tended to suffer from paraparesis. The clinical signs were acute onset. Hemivertebrae in brachycephalic, screw-tailed dogs such as French bulldogs typically affects the T7–T9 region,¹ with lesions ranging from T3–L3. The cause of neurological signs is spinal cord compression.³ The reason paraparesis in French bulldogs with congenitally deformed vertebrae happens so abruptly is unknown. The conventional treatment is conservative if there is no obvious structural change. Analgesics such as NSAIDs or steroids, cage rest, and physical therapy are the main form of management.^{5,6} In this study, all referred dogs were treated by medication before referral except dog 2. However, this did not resolve the paraparesis. The six cases of French bulldogs with hemivertebrae resulting in sudden paraplegia were successfully treated with TCVM and responded rapidly within 4 treatments.

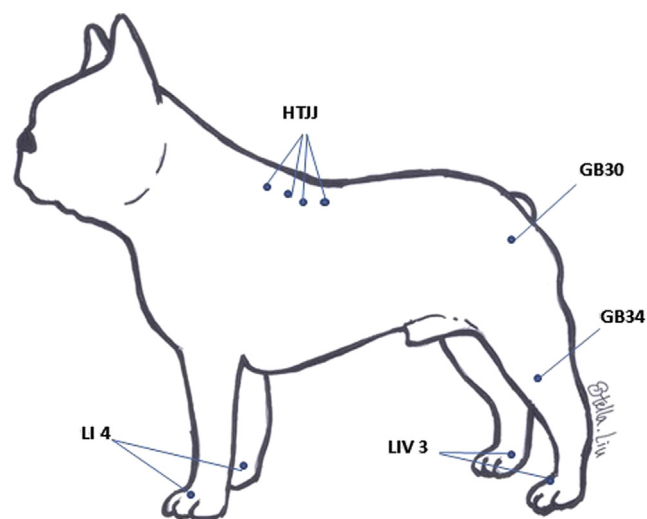


Fig. 2. The location of acupoints used for thoracolumbar spinal cord diseases. HTJJ (*Hua-Tao-jiaji*) on the dorsal region of the back, GB30 (*Huan Tiao*) in a depression midway between the greater trochanter of the femur and the tuber ischi, GB34 (*Yang Ling Quan*) on the lateral side of the pelvic limb at the stifle, LI4 (*He Gu*) on the medial side of the thoracic limb, LIV3 (*Tai Chong*) on the medial side of the pelvic limb.

Table 1
The ingredients and actions of Double P II^a and Bu Yang Huang Wu Tang.

Chinese herbs	Ingredients	Actions
Double P II	Angelica	<i>Dang Gui</i>
	Myrrh	<i>Mo Yao</i>
	Olibanum	<i>Ru Xiang</i>
	Strychnos	<i>Ma Qian Zi</i>
	Lindera	<i>Wu Yao</i>
	Notogenseng	<i>Tian San Qi</i>
	Sanguis Draconis	<i>Xue Jie</i>
	Buthus	<i>Quan Xie</i>
	Pheretima	<i>Di Long</i>
	Ligusticum	<i>Chuan Xiong</i>
	Paeonia	<i>Chi Shao</i>
	Carthamus	<i>Hong Hua</i>
	Eucommia	<i>Du Zhong</i>
	Dipsacus	<i>Xu Duan</i>
	Drynaria	<i>Gu Sui Bu</i>
	Morinda	<i>Ba Ji Tian</i>
	Cyathula	<i>Chuan Niu Xi</i>
	Psolarea	<i>Bu Gu Zhi</i>
	Astragalus	<i>Huang Qi</i>
	Aconite	<i>Fu Zi</i>
Bu Yang Huang Wu Tang	Glycyrrhiza	<i>Gan Cao</i>
	Astragalus	<i>Huang Qi</i>
	Angelica	<i>Dang Gui</i>
	Paeonia	<i>Bai Shao Yao</i>
	Pheretima	<i>Di Long</i>
	Ligusticum	<i>Chuan Xiong</i>
	Carthamus	<i>Hong Hua</i>
	Persica	<i>Tao Ren</i>

^a Xie H.S., Frank L.R., Preast V., Trevisanetto L., 2011.

The important effect of local point (HTJJ) stimulation is that it activates the local immune-inflammatory systems.^{10,11} This effect is similar to that of micro trauma in local area and induces inflammatory material to heal the local lesion.¹² The purpose of stimulation to GB30, GB34, LI4 and LIV3 is to stimulate the distal extremities arousing conscious proprioception. Stimulation of the afferent nerves enters the spinal cord and courses up to the brain and then travels via the efferent nerves down to extremities to re-educate nerves and help nerve healing.^{13,14}

The decision to use EAP was to counteract the effects of sedation and strengthen the effects of acupuncture (針灸 zhēn jiǔ). Once sedated, the needling sensation decreases. The use of EAP theoretically replaces manipulation of the needles by hand^{15,16} and empirically strengthens the effects of AP. There was one case receiving EAP. The acupuncture treatment was performed daily for three days, then twice per week while significant improvement was achieved. The electrical current used was 20 Hz (interrupted wave) for 15 min. A previous study revealed that stimulation at 20 Hz elicited the maximal release of substance P¹⁷, which is associated with the regulation of neurogenesis.¹⁸ The possible reasons why acupuncture was beneficial and reduced the neurological signs were pain relief, local anti-inflammation, and elimination of local swelling and nerve arousal.

Comparing the six cases (Table 2), all were emergency referrals. All six dogs had mild vertebral deformities (Cobb angle less than 15°).⁵ The duration of paraplegia ranged from 1–4 days. Within four treatments, all of the dogs demonstrated obvious improvement in paraparesis, from inability to stand and were able to walk without assistance. Within six treatments, all dogs had recovered, although dog 1 continued to exhibit residual urinary incontinence. In the non-ambulatory group, the duration before TCVM was

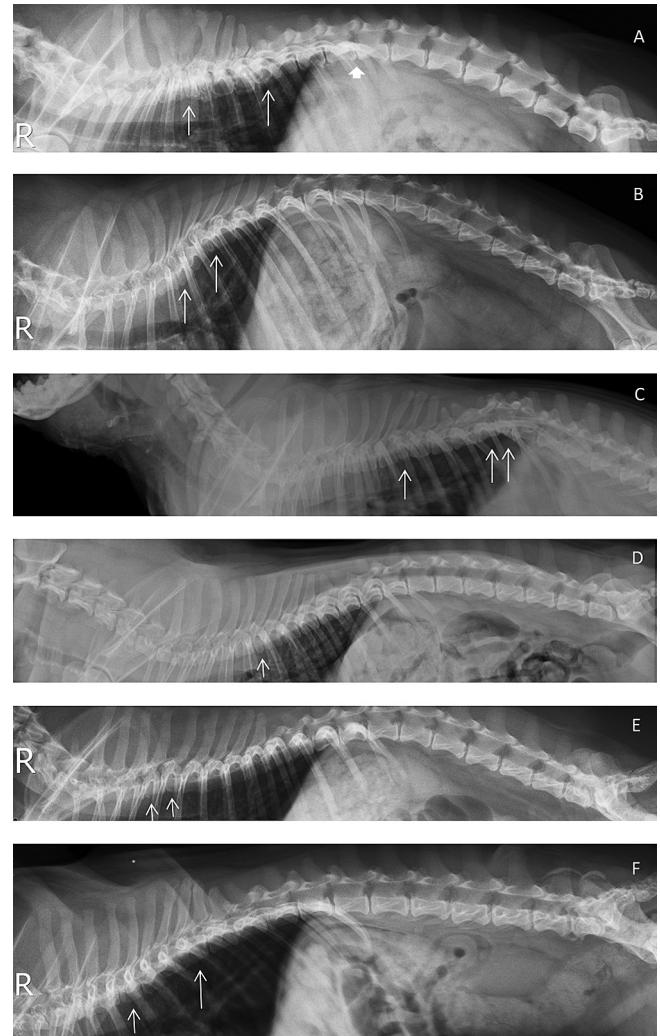


Fig. 3. Radiograph shows (A) T6 to T10 hemivertebra (arrows from left to right) and T13 to L1 narrowed disc space (arrowhead) in dog 1. (B) T5 to T7 hemivertebra (arrows from left to right) in dog 2. (C) T8, T12 and T13 hemivertebra (arrows from left to right) in dog 3. (D) T6 hemivertebra (arrow) in dog 4. (E) T4 and T5 hemivertebra (arrows from left to right) in dog 5. (F) T6 to T9 hemivertebra (arrows from left to right) in dog 6.

initiated was relatively short, and recovery time was quick. Dog 3 had the shortest improvement time (3 days) to complete recovery (10 days), possibly because of the integration of electrical stimulation into the acupuncture treatment. Applying electrical stimulation to acupoints reinforces their effects.¹⁹ In the ambulatory group, dog 5 had the longest recovery time (49 days) because of long treatment interval time (49 days/5 treatments). The other 2 dogs recovered rapidly within 3 treatments, possibly because their severities were low.

4. Conclusions

In conclusion, acupuncture (針灸 zhēn jiǔ) combined with Chinese herbs is a good treatment choice for caudal paralysis due to mild congenital hemivertebra in French bulldogs. TCVM is especially useful for neurological emergencies in hemivertebra young French bulldogs when deep pain exists. Unfortunately, TCVM did not eliminate urinary incontinence.

Table 2

Signalment, lesion location, diagnosis, severity, treatment methods and different time courses in 6 French bulldogs.

Case no.	Signalment	Chief complaint/duration of signs prior to acupuncture/previous medication	Lesion localization	Imaging/diagnosis	Severity grade	Treatment: acupuncture/Chinese herbs	Improvement time	Outcome
1	M, 3 yr, 10.1 kg	Sudden non-ambulatory paraparesis/4 days/steroid	T3-L3	X ray, CT/T6-T10 Hemivertebra Cobb angle < 15°	4	AP ^a : HTJJ ^b , GB30, GB34, LIV3, LI4 Chinese herbs ^c	10 days (4 treatments) Ambulatory	28 days (6 treatments) Recover with residual dribbling urine
2	M, 3 yr, 11.2 kg	Sudden non-ambulatory paraparesis/1 days/none	T3-L3	X ray/T5-T7 Hemivertebra Cobb angle < 15°	3	AP: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs	6 days (2 treatments) Ambulatory	22 days (6 treatments) Recover
3	M, 4 yr, 12.2 kg	Sudden non-ambulatory paraparesis/1 days/steroid	T3-L3	X ray/T8,T12-T13 Hemivertebra Cobb angle < 15°	3	AP: LIV3, LI4 EAP ^d : HTJJ, GB30 + GB34 ^e Chinese herbs	3 days (3 treatments) Ambulatory	10 days (4 treatments) Recover
4	M, 3 yr, 11 kg	Sudden ambulatory paraparesis/2 days/steroid	T3-L3	X ray/T6 Hemivertebra Cobb angle < 15°	2	AP: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs	2 days (2 treatments) Improve	5 days (3 treatments) Recover
5	F, 4 yr, 8.8 kg	Sudden ambulatory paraparesis/2 days/steroid	T3-L3	X ray/T4-T5 Hemivertebra Cobb angle < 15°	2	AP: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs	7 days (2 treatments) Improve	49 days (5 treatments) Recover
6	M, 4 yr, 14 kg	Sudden ambulatory paraparesis/6 days/NSAID ^f	T3-L3	X ray/T6-T9 Hemivertebra Cobb angle < 15°	2	AP: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs	5 days (2 treatments) Improve	5 days (2 treatments) Recover

^a AP: acupuncture with dry needle stimulation.^b HTJJ: acupoint *Hua-Tuo-jiaji*.^c Chinese herbs: Double P II, *Bu Yang Huan Wu Tang*.^d EAP: acupuncture with electric stimulation.^e GB30 + GB34: connect GB30 to GB34.^f NSAID: non-steroid anti-inflammatory drug.

Conflict of interest

We declare there is no financial and personal relationship with other people or organizations that could inappropriately influence this research.

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