Case Report

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Report Title

Acupuncture with Electrical Stimulation
was used to treat Suprascapular Nerve Injury in a Horse

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Title:

Acupuncture with Electrical Stimulation was used to treat Suprascapular Nerve Injury in a Horse

Abstract:

Electroacupuncture (EA) therapy was used to successfully treat severe lameness (grade 4/5) as a result of suprascapular nerve lesion, with subsequent fast and major supra & infraspinous muscles atrophy in a thouroughbred yearling.
Electroacupuncture treatment twice a week for 4 weeks and walking in a small paddock every day significantly increased the volume of muscular mass within the treatment period: lameness gradually improved and the filly was sound enough to progressively start yearling's prep 3 months after the accident.

History:

A **one-year old thouroughbred filly** named **MAESTRA**, was presented to me for acupuncture treatment on the **July 15, 2019.** At that time, the filly suffered from **severe lameness** (4/5) of the left shoulder subsequent to a horse kick that occured 6 weeks earlier, on May 28, 2019.

The day after the accident, May 29, the filly was taken to an equine hospital for X-ray & ultrasounds that revealed nothing, except for a mild inflammation of the brachii biceps tendon.
Clinical examination that day revealed a local hematoma and concluded in a probable lesion of the radial nerve with suppression of support (lameness grade 5/5). The filly received 20ml Diurizone (Dexamethasone + Hydrochlorothiazide) IV on May 29 to reduce edema & inflammation. The medical protocol for the 10 following days was Dexadreson (Dexaméthasone) 10ml IM/day + INFLACAM (Meloxicam, Benzoate de sodium). To finish with, two months of strict box were prescribed with clinical controls after 1 and 2 months.

Western diagnosis, July 15, 2019:

When the filly was introduced to me on July 15 after 6 weeks of strict box, the clinical examination revealed severe atrophy of the infraspinous and supraspinous muscles and an important lameness (4/5 grade) with a lateral deviation of the shoulder joint at each step.
A diagnosis of partial to total **paralysis of the suprascapular nerve**, known as **SWEENY**, was made based on those clinical signs.
The lateral shoulder subluxation is caused by the inability of the sub-spinous muscle, and to a lesser extent the supraspinous muscle, to fix the joint. Indeed, the shoulder joint has no lateral ligament, just the tendons of the muscles. Their amyotrophy allows a partial subluxation [2]. Some authors recommend the injection of irritating substances into the atrophied area to increase its volume, a painful treatment [1].
Another treatment of amyotrophy consists of a partial notched scapula osteotomy to decompress the suprascapular nerve [2]

Reminder: The suprascapular nerve passes around the anterior edge and then the outer surface of the scapula at the distal quarter of this bone (4 to 5 cm proximal to the supraglenoid tubercle). Then, it crosses the scapular spine below its tuberosity and will be depleted in the infraspinatus muscle of which it is the motor [4]. After an upward path, it gives several branches to the supraspinous muscle. This nerve is therefore the motor of the two muscles that cover the outer surface of the scapula [3]. Its relationship with this bone exposes it to be injured either in the deviations of the thoracic limb pulling the shoulder violently outside and behind, or in the lateral shocks then causing a compression of the nerve against the scapula. Historically, this nerve was harmed by poorly adjusted harness when workhorses were commonly used [1]. The two supraspinous and sub-spinal muscles are paralyzed by loss of their innervation [1, 2]. They undergo a rapid atrophy (visible in 10 to 14 days [5]) which gives to the shoulder an emaciated aspect, the scapular spine protruding on the skin, as in our case.

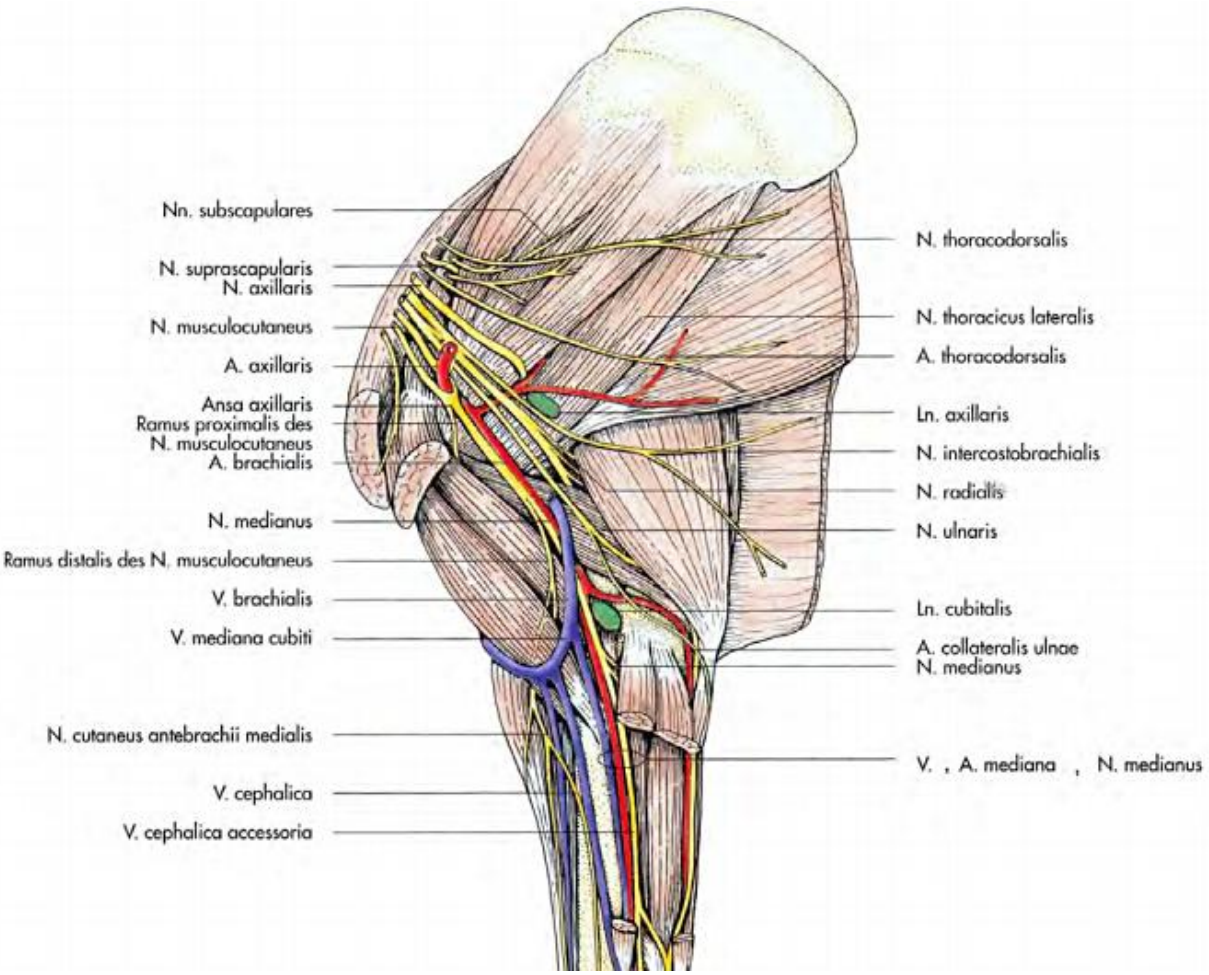


Figure 1 - Schematic representation of the innervation and vascularisation of the thoracic limb of the horse, medial face, according to [6].

Conventional western treatment:

No western treatment has been done after the initial 2 weeks treatment in June as described above. Recommendations from the equine hospital were to keep the filly on two months of strict box with clinical controls after 1 and 2 months.

Eastern diagnosis:

- Observation: dry dirty coat, red eyes, red gums, skinny, very calm
- Palpation:
  - BL 18 (Shu Liver), LIV 14 (Mu Liver)
  - ST 9 to St 10, Shu ST (Bl 21), Mu ST(CV 12)
  - SI Ting point empty (hollow, cold, sluggish on the left hand)
- Pulse and tongue diagnosis were not done

A TCM diagnosis of **Liver QI stagnation** warming up (to **liver and stomach fire**) was made, and a left shoulder **WEI syndrome** diagnosis was made based on the clinical western examination together with TCM.

"The Chinese character, **Wei**, means wilting. This is combined with the chinese character **Bi** which suggests the inability to walk because one is not able to raise the foot. The two characters combined translate to "**crippling wilt**" and the condition is characterized by a withering of the muscles and tendons due to a lack of nourishment [10]", as for Maestra.

TCM Treatment:

STRATEGY: In TCM, to treat a WEI syndrome, the goal is to TONIFY blood and Qi, to nourish & reinforce the tissues [10].

✔ July 15,' 2019: ACUPUNCTURE INDUCTION TREATMENT

Since I did not have my electroacupuncture device in the car, I decided to start with an autohemotherapy & dry needle acupuncture session with the following goals:

1- **Move Liver Qi and Blood**: **LIV 3**
   - avoid the liver Qi stagnation to lead to liver fire
   - move blood: drains and feed muscles, nerves...

2- **Use Yang Ming channel as a source of Blood and Qi**: **LI 4 + ST 36**
   - **LI 4**: as well used as a strong point on the LI meridian to strengthen the shoulder muscles (and sustain the radial nerve tonus on its pathway)
   - **ST 36**: as well used to regulates stomach acidity

3- **Start treating the WEI syndrome by TONIFYING** affected channels with:
   - their STRONG points: SI 3, TH 5, LI 4 (already needled)
   - DISTAL points: GV 14, TING SI 1
   - LOCAL points:
     - SI channel covering the suprascapular nerve area :

     SI 9 & SI 10 in the brachii triceps, used as MOTOR acu points for the supra- and infraspinous atrophied muscles
     - Brachii Plexus : GB 21
     - Shoulder joint : LI 15- TH 14

4- **Invigorate marrow & nerves**: stimulate Kidney

- Autohaemotherapy with 10ml of self blood in the left Shen Shu point (a 21 G hypodermic needle was used for the injection): stimulate Antique Kidney Shu point

Needling technique to TONIFY (all points except for LIV 3): Insert the needle obliquely following the Qi flow, twist with a small angle for a short time or add rotational manipulation at 2 per second if possible, and withdraw the needle quickly after few (+/- 5) minutes, closing the hole

- LIV 3 was punctured with a 21 G hypodermic needle and bleed a little (harmonised the liver as its source point)
- LI 4-ST 36, SI 3, SI 1, LI 15 & TH 14 were needled with 0,30mm x30mm dry acupuncture needles
- TH 5,SI 9,SI 10,GB 21 were needled with 0,35mmx50mm dry acupuncture needles
- VG 14 was needled through both Bo Jian in direction of GV 14 between C7 &T1

✔ FOLLOW-UP TREATMENTS:

The goal was to improve the WEI syndrome by moving Qi and blood with an **EA stimulation** protocol e: sessions would be handled twice a week for 5 weeks (initial aim, according to [9]).

July 18, 2019: 1st electroacupuncture (EA) stimulation treatment

Eastern diagnosis:

- Observation: better coat and mucosae, still calm, Maestra is still kept in a box 24h a day.
- Palpation:
  - BL 18 (Shu Liver), LIV 14 (Mu Liver)
  - ST 9 to ST 10, Shu ST (BL 21), Mu ST(CV 12)
  - SI Ting point empty (hollow, cold, sluggish on the left hand)
- Pulse and tongue diagnosis were not done

TCM treatment:

1- **Move Liver Qi and Blood**: **LIV 3** (*21G hypodermic needle, bleed a little - source pt. harmonise liver)*
   - avoid the liver Qi stagnation to lead to liver fire
   - move blood: drains and feed muscles, nerves...

2- **Calm down stomach fire** with its **water point: ST 44**

(21G hypodermic needle, bleed a little - ST fire goes out!)

3- **Improve Wei syndrome with EA stimulation:**
   - 4 acupuncture MOTOR points chosen for electrical stimulation:
     - TH 5-SI 9
     - SI 10-AH SHI point in the Triceps

Dry 0,35mmx50mm acupuncture needles with copper handle were placed into those acupuncture points, then connected with crocodile clips to the leads (2 needles/lead)

Why those points?

- SI 9 & SI 10 in the brachii triceps, used as MOTOR acu points for the supra- and infraspinous atrophied muscles in their upper scapula portion
- TH 5: strong motor point on the TH meridian, covering supra- and infraspinous atrophied muscles in their lower scapula portion
- Ah Shi point (local painful point!), it's important switch off this pain and to relax the triceps and avoid more tension in this muscle

 Chosen program on the AS SUPER 4 digital electric needle stimulator device: P7.1:"NogierB", low frequence (& short time) for tonification: **4,56Hz, 210µs, 15 min**

Stimulation started by increasing the intensity slowly up to the first muscular thrills around the connected needles, then the intensity was increased a little to be held at +/- 2 mA, just below perceptible threshold [8].

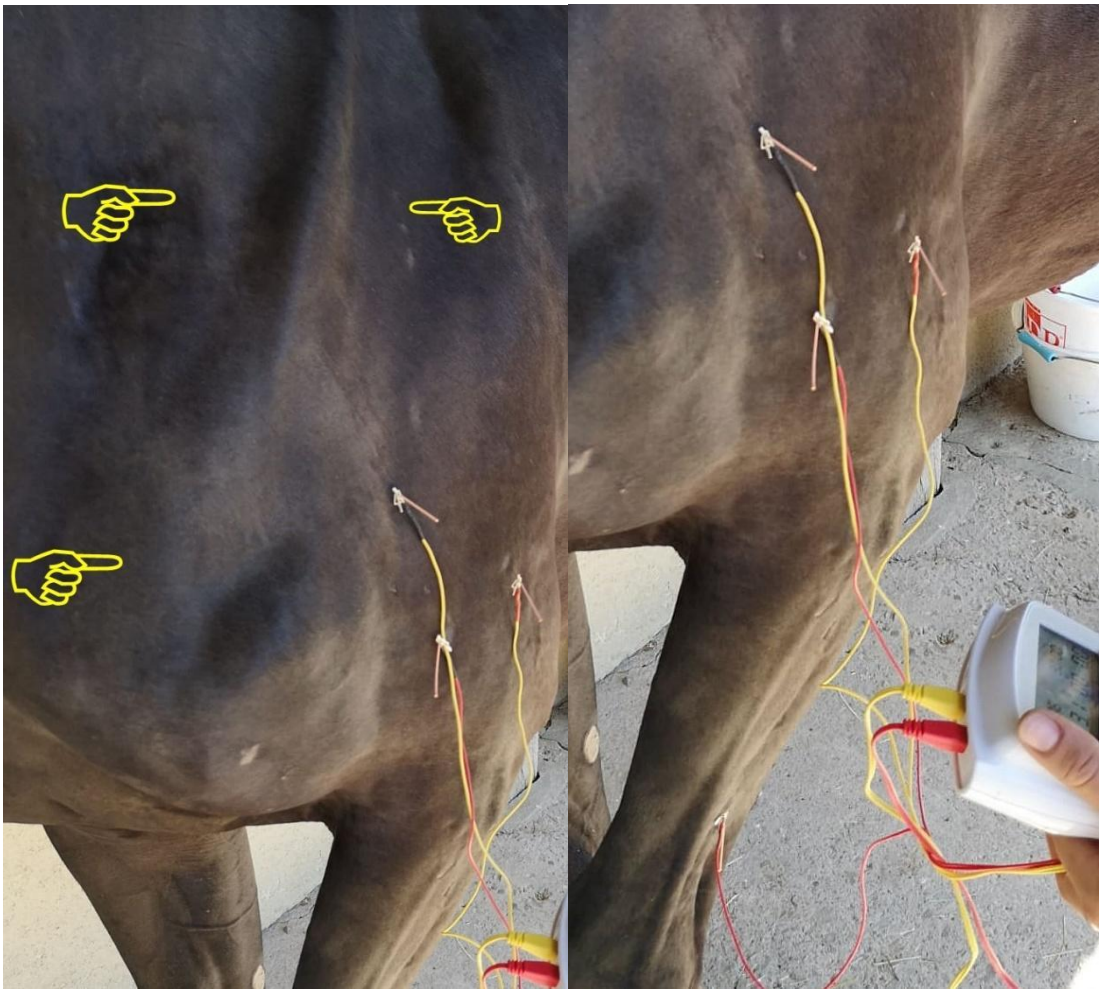


Foto 1: The amyotrophy becomes visible only 7 to 14 days after the incident [1, 5] and is evident 6 to 9 weeks after the accident. The tip of the shoulder then becomes palpable.
Foto2: 15 min of EA stimulation 4,56Hz, 2mA (points: coupled red leads points: TH5-SI9 & coupled yellow leads points: SI10- Ah Shi point in the triceps)

July 22-25-29, 2019
Three EA sessions as the previous stimulation protocol:

- *Move Liver Qi and Blood: LIV 3 with 21G hypodermic needle*
- *Same 4 acupuncture points chosen for electrical stimulation:*
  - *TH 5-SI 9*
  - *SI 10-AH SHI points in the Triceps*

Dry 0,35mmx50mm acupuncture needles with copper handle were placed into those acupuncture points, then connected with crocodile clips to the leads (2 needles/lead)

- *Same chosen program on the AS SUPER 4 digital electric needle stimulator device:*

P7.1:"NogierB", Low Frequence (& short time) for tonification: ***4,56Hz, 210µs, 15 min***

Stimulation started by increasing the intensity slowly up to the first muscular thrills around the connected needles, then the intensity was increased a little to be held at +/- 2 mA, just below perceptible threshold [8,9].

... Maestra was getting happier through the sessions, showing nicer coat, mucosae and more energy!

On july 22, lameness was grade 3/5, I recommended to walk her in hand progressively up to 5 minutes twice a day.

On July 25, she could walk 10-15 min in hand twice a day.

On July 29, the lameness had improved to grade 2/5, I recommended to put Maestra in a small paddock with an old horse 3h/day to keep on stimulating her nerves & muscles.

August 1- 5-9-13, 2019:
Four EA sessions changing points!

- By the beginning of august, Maestra could not stand to be needled in TH 5 anymore, so adapting myself to her willing, I chose **alternatively 4 points** out of the one mentioned below & according to the following criteria:
  - **SI local points**: 9-10-11-14 (in front of the scapula, transporting pt. of the outside shoulder)
  - **TH local points**: TH 15 in front of the scapula, transporting pt. of the outside shoulder but not in the same session as SI 14
  - **Ah Shi points** in the triceps

Dry 0,35mmx50mm acupuncture needles with copper handle were placed into those acupuncture points, then connected with crocodile clips to the leads (2 needles/lead)

- *Same chosen program on the AS SUPER 4 digital electric needle stimulator device:*

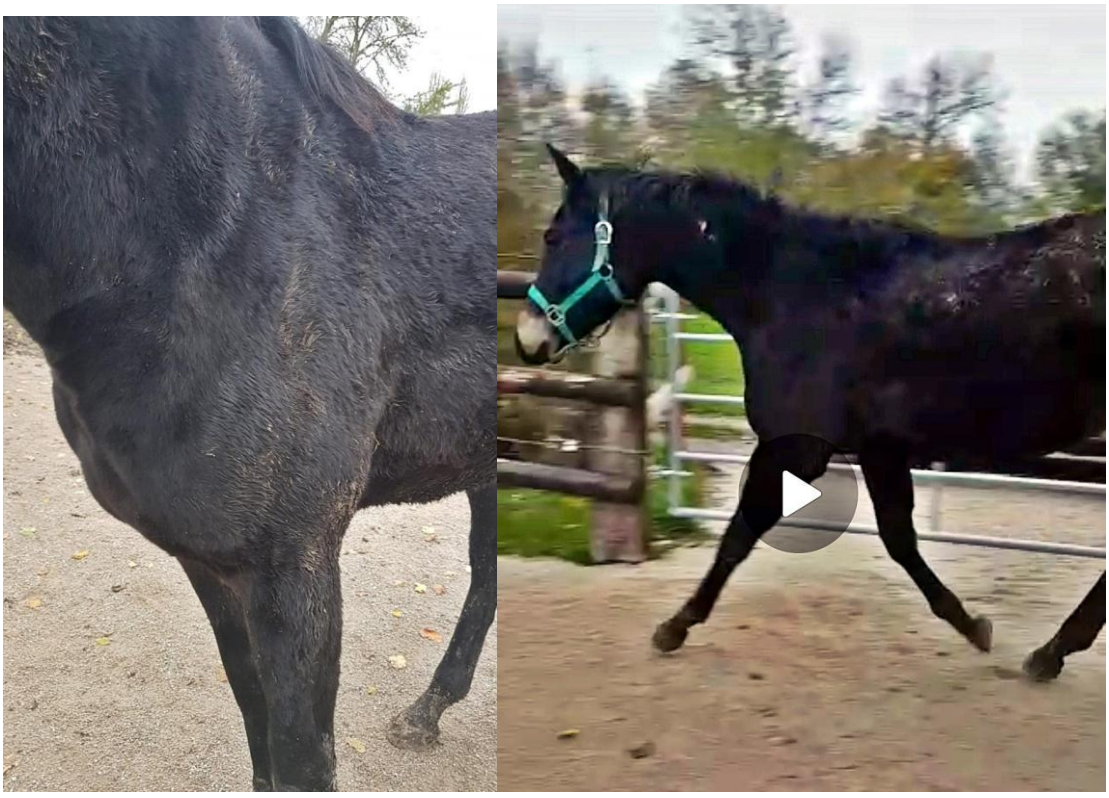
P7.1:"NogierB", Low Frequence (& short time) for tonification: ***4,56Hz, 210µs, 10-15 min***

Stimulation started by increasing the intensity slowly up to the first muscular thrills around the connected needles, then the intensity was increased a little to be held at +/- 2 mA, just below perceptible threshold [8,9].

On the last session, august 13, Maestra was full of life, she hardly stayed for 10 minutes with the needles on. The improvements were really good, so even if we couldn't carry on with the EA, we decided to start lunging her at walk on both sides.

Throught the last sessions we could progressively see muscular reconstruction of the supra and infraspinous muscles. While walking she was still showing a slight defect of protraction of the left forelimb.

In total, Maestra went throught 8 sessions of electroacupuncture over almost 4 weeks (between July 18 and August 13, 2019).
By the end of august she wasn't lame anymore but was lunging as the other yearlings.



Fotos 3 & 4: Maestra in November 2019

Maestra is now having a winter rest before going to pre-training in march 2020.

Rq: Throughout this rehabilitation period, Maestra was calm enough to avoid sedation, so we didn't have any interference with neuroleptics or any other western medication during our EA protocole.
She didn't receive chinese herbs either, but to help nourishing the muscles, she could have had the Zhi Bai Di Huang Wan (build Kidney and Liver YIN).

Fig 2: Table of points used throughout the session according to [7]:
DANt= Dry Acupuncture Needle used in tonification
21G HNd= 21 Gauge Hypodermic Needle with dispersing action
EA = Electroacupuncture stimulation

ACU Point	Anatomic description: "in a depression…	Nature	Indication in our treatment	1st acu session	2sd Acu + electroAcu session	3rd to 8th session, 4 points out of:
LIV 3 Taichong	just plantar to the medial splint bone right under its distal button on the cannon bone	Source pt.	Moves liver Qi, nourishes and moves blood, sedate liver excess	21G HNd	21G HNd	
LI 4 Hegu	just palmar to the medial splint bone and distal to its base on the proximal third of cannon bone, 2sd depression	Source pt., master pt. for face & mouth	Source of Blood and Qi as a strong pt. of Yang Ming channel	DANt		
ST 36 Hou Sanli	lateral to the tibial crest in the muscular groove between the tibialis cranialis and long digit.extensor mm, 2 CUN distal to the proximal edge of the tibial crest	Master pt.for abdomen & gastrointestinal system; Earth pt.	Benefits ST function ; Source of Blood and Qi as a strong pt. of Yang Ming channel	DANt		
ST 44 Neiting	craniodistal to the fetlock, at the junction of the interosseous and long digit. ext. mm	Water pt.	Calm down ST fire		21G HNd	
SI 3 Houxi	distal to the lat. splint bone, right under its distal button on the cannon bone	Master pt. for Du MAi	Strong pt. on the most affected meridian	DANt		
SI 1 Shaoze	proximal to the coronary band, dorsolat., one third of the distance from the hoof dorsal midline to the palmar border of the lateral heel bulb	Ting pt. Metal pt	Distal pt. on the most affected meridian	DANt		
TH 5 Guo Liang	In the groove between the tendons of the lateral digit. Ext. and the common digit. ext. mm, at the level of midportion of the cranial border of the	Luo pt. to PC7 Opening pt. for Yang Wei Mai	Major pt for TH channel, covering lower third of scapula; Subdues liver yang	DANt	EA	EA

	chesnut					
GV 14 Daz Hui	on the dorsal midline between the spinous processes of the 7th cervical and the 1st thoracic vertebrae	Meeting pt. of Yang forelimb channels with BL, ST, GB	Forelimb disorders	DANt		
Shen Shu	2 CUN lat to the dorsal midline, at the level of the lumbosacral space	TCVM Kidney assoc.pt	Invigorate marrow and nerves	Blood inj.		
SI 9 *Chong Tian*	Large depression along the caudal border of the deltoid m., between the long and lat. head of the triceps brachii m.		Local pt.	DANt	EA	EA
SI 10 Tian Zong	In the fossa of the deltoid m. just ventral to the scapula		Local pt.	DANt	EA	EA
SI 11 Fei Pan	caudal border of the scapular cartilage at the level of the dorsal and middle third of the scapula, on the caudal border of the deltoid m.		Local pt.			EA
SI 14	just cranial to the cranial angle of the scapula over the cervical trapezius m.	Transporting pt. of the outside shoulder	Local pt.			EA
GB 21 Bo Zhong	in front scapula, between C6 and C7	Meeting pt. of GB & TH, pt. of Yang Wei Mai	Local pt.	DANt		
LI 15 Jian Jing	in front of shoulder joint, on the deltoid m. between the acromion and the greater tubercule of the humerus	Pt. of yang mobility vessel Yang Qiao Mai	Local pt.			EA
TH 14 Jian Wei Ju	between the acromion and the large tuberculum of the humerus	Transport point of external shoulder	Local pt.			EA
TH 15 Tian Liao	in front scapula, halfway between GV14 and acromion, dorsal to GB 21	Pt of Yang Wei Mai	Local pt.			EA
Ah Shi pt	Anywhere in a painful muscle	Painful pt.	Local pt.		EA	EA

Discussion:

The lesion of the suprascapular nerve diagnosis was mainly based on the clinical examination of Maestra, with an unstable shoulder and supra- & infraspinous muscles atrophy on top of a traumatic history. But that was 6 weeks after the accident.
In acute lameness, the clinical diagnosis was more difficult: Maestra was in suppression of support, which masked the instability of the shoulder. In addition, the local edema & hematoma associated with a crushed brachii biceps tendon complicated the clinical examination. This might be the reason why the diagnosis made just after the trauma was a radial nerve lesion. But the physical examination after all, when Maestra accepted to put some weight on her left hindlimb, didn't show a descent of the elbow or claw-forming shoe as in radial nerve injury situation, but highlighted a fast atrophy of supra and infraspinous muscles and shoulder instability.

In acute situation, I guess TCM could have helped the diagnosis: as the LI channel follow the radial nerve pathway, its TING point LI1 would have been impacted, whereas in our situation (and after 6 weeks) it's the SI TING point which was empty (as of suprascapular innervation pathways)... but I didn't see the horse during the acute stage.

> *Rq: in differential diagnosis, imaging examinations must be undertaken to exclude any tendon lesions (rupture of the tendon of the infraspinous muscle), joint (dislocation of the scapulohumeral), muscle (myositis) or bone (fracture of the humerus, tuber supraglenoidal scapula, or osteochondrosis lesion). The differential diagnosis includes also a localized infection, hematoma and podal abscess [1, 2].*

Additional exams by electromyography should have been carried out to evaluate precisely if the supraspinal nerve paralysis was partial or total to be able to give a prognostic to the owner [1]... considering that Maestra was bred to become a race horse and that a lot of money is involved for the maintenance and training of those horses.

In our case, I didn't test the suprascapular nerve, not even by electrical stimulation to evaluate the lesion (partial or total). Today, considering those good results I guess we were lucky and that it was most probably a partial nerve paralysis, as in Wei Syndrome we are more into a conservative approach (avoid degradation / aggravation) than total healing treatment (full rehabilitation of the structure & function), unless the lesion is partial and so, reversible.

Concerning the EA treatment itself, I tonified Ah Shi point as I used low frequency for all needled points with electric stimulation... whereas we could have thought high frequencies would have been better to sedate those painful and tense Ah Shi points *[8]*.
I always took only one Ah Shi point per session, coupled with an SI or TH local point, at the same low frequency (4,56 Hz).
The experience showed that Ah Shi were diseapearing after the sessions and that I didn't used the same Ah Shi point twice.
I could have coupled two Ah Shi points on high frequency electrical waves (greater than 15 Hz, just below pain threshold *[8])*, theoretically it would have been more appropriated... but that wasn't in my thoughts on the field during the sessions.

Otherwise, the LIV 3 and ST 44 points have been really beneficial for Maestra, kept so far in a box for weeks without moving, the worst thing ever for a 1-year old thouroughbred!
I guess we preserved her stomach and avoid liver Yang rising and fire complications (stomach bleeding, muscle stiffness, behaviour troubles, agitation & aggressiveness which could have cause an other accident....). When I saw Maestra first she was very calm, probably depressed, as in Liver Fire

conditions, we see mood swings alternating between anger and depression. When we decided to stop the sessions after a month, she was full of life, with nice pink mucosae and nice hair, which sign a good QI and blood flow.

Conclusion:

Wei syndrome secondary to acute trauma can result in poor prognosis as western medications are not designed to nourish and build up new tissues: western medicine take care of inflammation in the acute phases but is of little help with chronic conditions where atrophy is present. As in our case, EA can be helpful to induce the regeneration of new axons even if it is not able to re-grow severed axons injuries *[9,10]* and acupuncture has well optimizing Zang-fu Organ function by sustaining the liver for better nourishment of the tissue and avoiding Qi stagnation that led to heat situations.

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