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## **Acupuncture Management of Musculo-Skeletal Pain**

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# Acupuncture Management of Musculo-Skeletal Pain

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Pain can be defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. There are indications that pain is frequently under-diagnosed and inadequately managed in dogs and cats (Hansen and Hardie, 1993). It is possible that the situation is similar in other species of domestic animals. Pain is a subjective sensation non-communicable from animals to man. Consequently it is relatively difficult to recognise the degree of pain and suffering requiring medical management.

Pain, unlikely most other sensory modalities, has an essential function in survival (Cailliet, 1993). From a physiological point of view, pain is a protective mechanism for the body occurring whenever tissues are damaged. It causes the animal to react in order to remove the pain stimulus. This is so-called physiological pain. However, in many clinical situations pain loses its physiologically useful function as an early warning mechanism and it becomes harmful to the body. This is especially true in the case of traumatic, chronic and neoplastic pain and in burns. This so-called pathological pain arises as a consequence of either the inflammatory response that accompanies substantial tissue injury, or damage to the nervous system. Another characteristic feature of pathological pain, as compared to physiological pain, is that there is a mismatch between stimulus and response. The sensation is excessive and more prolonged than would be expected for the nature of the stimulus and it may even occur in the absence of any apparent stimulus, as after brachial plexus avulsion injury.

In the medical (TCM) and veterinary (TCVM) traditional Chinese medicine, pain is often considered as a part of broader symptoms such as Painful Obstructive Syndrome called also Bi syndrome (Maciocia, 1989). The underlying cause of pain is deficiency of Qi and stagnation of Qi (Marcus, 1998a). Maciocia (1989) defines pain as a deficiency/empty or excess/full condition. Somatic patterns are described in terms of acupuncture meridians or using other TCM paradigms such as Eight Principles.

Pathological musculo-skeletal pain develops as a consequence to external or internal causes. Among the former, one should consider particularly trauma, single or repetitive episodes of strain or overuse, prolonged under-use, postural strain and anatomical anomalies. Particular climatic changes and diet can be contributing factors.

The internal causes would include infections (certain viral infections, Lyme disease – Schoen, 1998), internal organ disorders (a link via viscerosomatic reflexes), metabolic dysfunctions (such as lactic acidosis) and acute or chronic toxicoses. Certain people and animals can be more susceptible to pain than others. Theoretically, this can be because of their differences to release particular excitatory and inhibitory neurotransmitters of the central nervous system. Also, levels of certain hormones such as sex hormones, oxytocin and the growth hormone are important in modulating the pain sensation. Placebo effect plays an important role in achieving acupuncture hypo- to analgesia in man, while the factor is assumed to be non-existing in animals. Depending on these (and perhaps other unknown) internal factors, certain subjects are known to be “good”, while the other are often found to be “poor” responders to acupuncture treatment. According to TCM, the internal disorders are linked particularly to the Liver, Kidney and Spleen dysfunctions. Mental distress (anxiety, fear etc) can be a contributing internal factor (Maciocia, 1989).

Under the TCM paradigm, etiopathogenesis of musculo-skeletal pain is linked to disorders in the flow and character of Qi and Blood. Stagnation of Qi is characterised by dull pain of imprecise location that may become worse for stress and emotional changes. Blood stagnation, on the other hand, is characterised by a sharp pain of fixed location. It is not affected by (mental) stress and emotions, and it is worse for pressure, while the pain due to Qi stagnation is relieved by pressure (Legge, 1997).

In the western medical framework, muscles, fasciae, ligaments, tendons and tendon sheaths, joint capsules, bursae, bones, meningeal membranes and intervertebral discs as well as nerves, blood and lymphatic vessels may be the source of musculo-skeletal pain.

Intense or protracted pain can provoke discomfort, manifesting itself by altered behaviour of the animal. Discomfort, defined as a state of being in which the animal feels "poorly", can be due to pain, fear or anxiety. It may be perceived as suffering when the animal cannot tolerate these sensations. Animals suffering from surgical pain show a reduced intake of water and food, as compared to the patients treated with analgesic drugs (Flecknell and Liles, 1992). In large animals, pain in the limbs may lead to serious complications such as prolonged recumbency or laminitis.

Apart from behavioural manifestations, pain is a major stressor causing a wide range of autonomic and metabolic reactions, such as excessive activity of the sympathetic nervous system and hypersecretion of

adrenal hormones. If uncontrolled or prolonged, these reactions may predispose the animal to disease. Surgical pain may prolong an undesirable catabolic phase of post-surgical convalescence with the consequence of delayed or complicated healing.

Pain should be prevented or treated whenever possible, as it causes suffering and it brings about undesirable neuroendocrine changes that may contribute to overall morbidity and mortality.

In order to provide optimal pain-relief in animals, it is essential to understand the patho-physiology and diagnosis of pain and be familiar with a broad spectrum of pain-relieving techniques.

Clinically, pain can be defined in many ways: as acute or chronic, mild to severe, continuing or intermittent, local or generalised, according to its origin etc.

## **Aetiology and patterns of musculo-skeletal pain**

### **1. Articular pain**

It is widely accepted that musculoskeletal pain is a sign of articular dysfunction. Clinically, these disorders are manifested through pain, stiffness, numbness and impairment of movement. Under the context of TCM, these dysfunctions are usually classified as so-called BI-syndromes. BI, in Mandarin, means block or obstruction (Legge, 1997). Arthritic pain is known to trigger satellite trigger points (see later). Pain-relief due to acupuncture can theoretically be attributed to its anti-inflammatory and pain-killing effects (Pomeranz, 1987), as well as to inactivation of trigger points and zones of referred pain (Legge, 1997). A lower success rate and a higher recurrence rate of the initial condition can be expected whenever there are signs of structural damage to the affected joint.

### **2. Referred pain**

Pain can be projected into the skin or muscles from abdominal or thoracic organs as so-called referred pain. An example would be pressure sensitive zones sometimes detected on the abdomen and the back of animals suffering from abdominal disorders, such as acute gastroenteritis and pancreatitis. These zones reflect the existence of viscerocutaneous and viscerosomatic reflexes between the corresponding embryonic segments of the endo-, meso- and ectoderm. The reflexes are mediated via the sympathetic nervous system. Head's zones are reflex zones of cutaneous hypersensitivity, whereas Mackenzie's zones are reflex zones located in the striated muscles. Some other manifestations of the reflex mechanisms such as segmental sweating, piloerection or localised heat will be briefly discussed in the course of the lecture.

The reflex zones have mostly segmental distribution, and some Mu and Shu acupuncture points (APs) can be detected within the zones. Although the segmental zones are usually asymmetrical (stomach on the left side, liver on the right side etc), the meridian distribution on the trunk is strictly symmetrical. Kothbauer (1999) described pressure-sensitive APs corresponding to various internal organs in cattle. It is interesting to note that his Shu point for the Pericardium is located in front of/cranially to the Association point for the Lung. This would correlate well with the TCVM data (Chuan and Hwang, 1990) but it is not in agreement with the transpositional veterinary atlases.

The existence of so-called microsystems such as ear-acupuncture, suggests that referred pain can also be projected far beyond the original embryonic segment, thus reflecting the involvement of supra-segmental mechanisms in pain-relief due to acupuncture.

## **Trigger points**

Especially in chronic conditions, trigger points can be an important source of musculo-skeletal pain. These spontaneous- or pressure-sensitive points are situated mostly in striated muscles. The aetiology of trigger points is not yet fully understood, although several predisposing factors have been identified including arthritis, trauma, stress, fever, chilling, internal disease and viral infections. The existence of trigger points is usually associated with zones of referred pain. The points cannot be considered as classical acupuncture points, as their location is not stable as a rule (Janssens, 1992). Indeed, some important APs such as GB34, ST36, GV14 and 20, or Jing/Well points cannot be considered as typical trigger points, as they mostly do not display the characteristic pressure sensitivity on palpation.

Referred pain and trigger points can be treated by a variety of stimulation techniques including acupuncture, transcutaneous electrical nerve stimulation (TENS) and other forms of physiotherapy.

Referred pain can be also treated by administration of counter-irritants such as blisters. As compared to TENS and conventional electrotherapy, acupuncture is a locally more specific treatment requiring less sophisticated and expensive equipment. The clinical advantage of acupuncture, as compared to the use of counter-irritants, resides in the fact that the technique is locally more specific and less traumatic. Trigger points are treated especially by dry needle technique and by injections of pharmacologically inactive solutions into the point.

## **Fibromyalgia and other patterns of generalised pain**

Fibromyalgia is a clinical condition of man characterized by chronic musculo-skeletal pain and tender points at multiple sites. The most common sites of pain are neck, low back and various joints. Weather factors, poor sleep, overuse, trauma, mental stress and noise often aggravate pain or stiffness. The condition has been reported to be associated with severe inflammatory diseases (Yunus and Inanici, 2001). Fibromyalgia has not been properly described in veterinary medicine yet. Nevertheless, in clinical practice we can often diagnose generalized painful conditions. Etiology of these conditions is often unclear. In some situations, the pain is associated with stress, overuse (excessive level of training), infection (viral diseases and babesiosis), inflammatory conditions (arthritis, tendinitis, myositis), intoxications and the use of certain drugs.

As a rule, the TCVM resources describe the regional or generalized muscle pain as muscle rheumatism (Xie, 1994). Indeed, this condition should not be confused with rheumatoid arthritis. Acupuncture can be useful in relieving certain forms of generalized muscle pain. Various therapeutical strategies can be used including:

1. treatment using standard points according to the most affected body areas (regional approach)
2. Eight principles
3. meridian therapy
4. microsystems such as ear acupuncture
5. combinations of the above

## **Acute inflammatory myofascial pain.**

Acute pain associated with extensive mechanical damage of the tissues and the subsequent inflammation can be due to trauma, surgery, acute overuse (exertional rhabdomyolysis), stress or due to an underlying metabolic abnormality (stress-induced or post-anaesthetic rhabdomyolysis). These emergency situations should be treated by rest or moderate exercise and physiotherapy, combined with symptomatic supportive treatment. Acupuncture may assist in relieving pain and in releasing the muscle contraction. Its anti-inflammatory effects may be beneficial. APs are chosen according to sore area (local and regional points); distant points from meridians passing through the affected area can be added. Non-steroidal anti-inflammatory drugs (NSAIDs) can be effective (Haskins, 1992; Reids and Nolan, 1991) and they should not interfere with the mode of action of acupuncture (Pomeranz, 1987). Muscle relaxants may be beneficial.

Particularly in small animals, tranquilizers should be considered, if a psychogenic component of pain is suspected. The theoretical possibility of synergy and antagonism between the drugs and acupuncture analgesia should be considered.

## **Diagnostic Acupuncture**

### **Anatomical description of APs**

TCM and TCVM resources describe location of acupuncture points with respect to particular anatomical landmarks. Also, proportional measurement (Cun) and finger measurements are used to determine the positions of AP's under clinical circumstances (Chuan and Hwang, 1990).

### **Pressure sensitivity**

Many veterinary acupuncturists use pressure sensitivity of active APs to determine their exact anatomical location. No pressure sensitive points should be found in healthy animals. The sites/points are found using digital pressure or a pressure of a detection probe. The reaction of the animal to this pressure varies from a mild withdrawal to severe defensive response depending on the detection pressure and the sensitivity of the site. Similar to that in man, detection of a so-called active auricular point, is accompanied by a sudden jerk of the head and neck and often vocalization when the area is exposed to light pressure of the order of 80-120 g/mm<sup>2</sup> (Still, 1987).

Cain (1997) has described a number of diagnostic points and zones for individual appendicular joints and other limb structures such as tendons, shins and hooves. The concept has been taught at the IVAS Courses, and many clinicians have successfully implemented the findings into their daily practice. Nevertheless, it is interesting to note that no such zones/points were described neither in medical acupuncture resources, nor in canine acupuncture.

McCormick (1996) has systematically monitored the incidence of selected diagnostic points in relationship to the confirmed pain (using intra-articular blocks) in the metacarpophalangeal joint in horses. His findings suggested that the articular pain is readily reflected into several, supposedly meridian points. Some of the reported points were close to the zones described by Cain (1997). Further research is needed to elucidate the role acupuncture in diagnosing the equine joint disease.

Some authors argue that determination of APs as pressure-sensitive points is clinically unreliable because of the subjective nature of pain, and that a better appreciation of the underlying energetic dysbalance can be achieved using other (less invasive) methods such as pulse diagnosis or VAS (Thoresen, 1998).

Auriculodiagnosis was tested in 154 dogs affected with well-defined clinical diseases and dysfunctions of their locomotor apparatus (Still, 1987). The paper describes the location of the following auricular points/zones corresponding to the affected body parts: cervical, thoracic, lumbar and sacral vertebral column, as well as fore and hind limbs including their major joints. The research further revealed that particular ear points appear most frequently when the corresponding organ is affected by acute (88%) and/or painful (91%) pathological processes. The detection rate was lower in chronic inflammatory (69%), degenerative (18%), and in non-painful locomotor diseases/ dysfunctions (51%).

### **Local trophic/autonomic changes**

Thoresen (1998) has found that three points located on the equine coronary band may be useful in diagnosing fetlock and carpus (front limb), and fetlock and hock joint (hind limb) disorders. According to the author, the active points should display the following qualities: local pitting and dry hair, dry and scaly appearance of the skin, or oedematous appearance. In acute conditions the active point/area is felt as a swampiness, a soft hole into which the finger sinks. In chronic cases, the point is "dry", i.e. less than the normal amount of softness related to the quality of the underlying subcutaneous tissue. Using the same diagnostic criteria, the author has further described so-called Ting points in the horses. The points correspond to the TCM Jing/Well APs in man and the dog.

### **Electrical skin resistance (impedance)**

APs display reduced electrical skin resistance (i.e. increased electrical conductivity) as compared to the adjacent "inactive" skin. This is true especially in the dog (Still, 1988a) and cat. An acupuncture atlas correlating the location of the canine transpositional APs and the electrical points was published (Janssens and Still, 1995). Detailed electrical skin measurements in healthy dogs revealed that there was 79 % agreement between the location of the electrical points and the location of the transpositional APs. There were more electrical skin points in the course of the supposed meridians than the "true" APs (Still, 1988a).



The electro-detection is significantly less reliable in the ungulate domestic animals where many false “APs” can be detected. These artificial points appear in response to sweating which can be easily induced with any mild stress in these species.

### **Vascular and thermal changes**

Thoresen (1998) reported on detection of auricular APs in the dog as “cold areas”. Von Schweinitz (2000) monitored thermographic changes in the course of acupuncture treatment of horses suffering from sore back. His pioneer research indicated that the tender back areas could be detected as areas of relative hypothermia; the subsequent acupuncture treatment then normalized the skin temperature. These findings underline the important role of the autonomic (sympathetic) nervous system in pathogenesis of sore back, as well the modulatory action of acupuncture on the autonomic nervous system.

Kothbauer (1999) has described detection of the bovine auricular APs using appreciation of vasomotor changes following mechanical pressure applied on the internal auricular surfaces. The “active” points appear as hyperaemic areas while the colouration of the “inactive” sites do not change their colour. Several veterinary acupuncturists use successfully the methods of VAS and pulse diagnosis to determine the position of somatic and auricular APs and of the abnormal energetic/meridian patterns (Durkes, Petermann, Roesti and Thoresen – PVA-L 2000 to 2002).

### **Methods of stimulation of acupuncture points.**

Many different ways of stimulation of APs have been suggested and practised in veterinary acupuncture. TCVM relies heavily on strong stimulation such as needling using rather large-diameter needles, fire needling, direct and indirect moxibustion, cauterization, cupping, hot packing and thread embedding. Some newer modalities such as electroacupuncture, laser and aquapuncture have been used too (Chuan and Hwang, 1990).

Acupuncturists in Europe, America and elsewhere outside of the Far-East geographic region tend to rely rather on “softer” stimulation of APs using fine needles, laser, direct and indirect electrostimulation, and acu-pressure.

## **Combined techniques**

Often, acupuncture is combined with other medical procedures in an attempt to potentiate its therapeutical effects. Two examples are given in order to indicate the potential hazards associated with the practice.

### **1. Acupuncture and TCM preparations**

Acupuncture is an integral part of TCM which would also include the use of herbal preparations, as well as the administration of substances based on animal tissues and minerals. Caution should be exercised whenever combining acupuncture with some of these preparations, especially in cases where their origin is unknown or otherwise suspect. A recent study of 260 Chinese patent medicines imported to the USA discovered that almost half of them contained potentially harmful levels of contaminants, such heavy metals (lead, arsenic, mercury), drugs (ephedrine, salicylates, caffeine, phenacetin, methyltestosterone, furazolidone) and other potentially harmful chemicals (strychnine, creosol etc). It was recommended that only medicines prepared under the Good Manufacturing Practice (GMP) should be used in that country (California Health Department, 1999). In particular, the use of any TCM preparations of animal origin should be considered carefully. Theoretically, their use might be associated with transmission of zoonoses; toxic and allergic reactions cannot be ruled out, especially when parenteral preparations are used. Additionally, the use could be often considered as unethical and illegal (i.e. the use of endangered species such as rhino or tiger). Some preparations such as bear bile (Xiong Dan) have been obtained from animals kept under inhumane conditions (Still, 2003).

### **2. Acupuncture and homeopathy**

Often, APs have been injected with homeopathic and herbal solutions. It is claimed that particularly homeopathic solutions work in synergy with the energy processes induced by acupuncture. Homeopathic solutions are supposed to be primarily carriers of energy imprinted from the original maternal tincture. As the solutions are heavily diluted, it is assumed that no chemical components are present in them. Thus, the mode of action of the solutions should, theoretically, be qualitatively different from chemical drugs and herbal preparations that are supposed to act via their chemical components.

In numerous countries, Traumeel S inj has been commonly injected into acupuncture points by veterinarians, acupuncturists, and even owners. It is believed that the injections are beneficial in terms of the healing of musculoskeletal disorders and to boost recovery from strenuous exercise in the horse. Some veterinary acupuncturists apply the procedure also in small animals.

According to the package leaflet, Traumeel S inj contains homeopathically diluted extracts of 12 herbs, calcium sulphide and mercury. This author has submitted a randomly purchased sample of Traumeel S inj (serial no Ch B 00639054; expiry data 05/2005) for chemical analysis for micro- and macroelements to an approved Laboratory in South Africa (06/08/2001). The chemical analysis revealed the presence of the following elements (concentrations in ug/L): Sodium 61733.0; Magnesium 3484.0; Potassium 2640.7; Calcium 2305.9; Manganese 2.0; Boron 55.5; Aluminium 509.7; Chromium 9.0; Cobalt 4.8; Nickel 5.0; Copper 21.3; Arsenic 8.8; Selenium 6.9; Cadmium 0.6; Barium 17.7 and Mercury 2.2. While certain elements could be considered as beneficial/ essential for the body, some other such as Al, As, Ba, Cd and Hg are generally considered to be poisonous even in minute concentrations. Traumeel S inj contains elementary and organic form of mercury (e-mail from Heel Co/ Dr G Herzberger dated 31/07/2001): both are known to affect the central nervous system. Also aluminium is known to cause damage of the nervous system. Additionally, the previously unreported admixture of heavy metals other than mercury is suspect in terms of homeopathic principles where stress is put on the use of particular chemical components only. While inquiring about the presence of heavy metals in Traumeel S inj, the Heel Company has categorically stated that there are no other heavy metals than mercury in the solution (Dr Reinhart, Heel, Germany – e-mail, 08/03/2003).

Theoretically, repetitive injections of the above heavy metals might lead to chronic toxicity. It could be further speculated that when injected into acupuncture points, these, and perhaps also other unidentified chemical constituents of Traumeel S inj could interact with the anatomical elements/ physiological processes at APs (effect on nerve fibers, immune cells etc). Further studies regarding the chemical analysis, safety and efficacy using acu-injections of homeopathic solutions should be conducted.

## **Incidence of musculo-skeletal pain**

Musculo-skeletal pain is common both in man and animals. For instance, some 40 % of the American population (and of the population of other industrial countries) is afflicted with acute or chronic pain that requires medical management (Marcus, 1998b).

This author has investigated incidence and patterns of musculo-skeletal pain in 50 polo horses in training in South Africa in early February 2003, i.e. during the local summer (temperatures 25° to 34°C, high humidity). The objective of this clinical study was to

1. Describe the incidence of somatic (musculo-skeletal) pain in a relatively homogenous group of horses (young to medium-aged Thoroughbreds) kept in particular climatic conditions. Also, their management, as well as methods of training was standard.
2. Describe this pain a) in relation to body areas, b) in terms of TCM terminology
3. Evaluate whether the incidence of the acupuncture patterns coincided with the season (Summer/Fire in TCM).

The patterns of pain are further described in 46 (92 %) out of the 50 horses that were diagnosed with various pain patterns (see below). The group included 15 Thoroughbred geldings and 31 mares; mean age was 8.5 +- 3.8 (3-14) ( $\bar{x}$  +-SD; min-max) years. Most of the horses previously raced and then played polo for the past 6 months to 8 years. Mild to severe riding problems were reported in all 50 horses before the acupuncture investigations. None of the horses was clinically lame. The horses were thoroughly examined using detailed digital palpation of the head, neck, limbs and trunk. The area/point was considered to be sore/tender when the horse showed a definitive reaction ranging from a mild withdrawal or tensing of the anatomical area (mild pain) to a marked localized spasm and/or withdrawal or defensive reaction (severe pain). Also, other approaches of acupuncture clinical examination were applied in order to establish the correct TCM diagnosis. These complementary examinations included the evaluation of the eye, mucous membranes, pulse, hairs as well as the horse's attitude and behaviour.

Only 4 out of 50 (8%) horses were considered as completely pain-free, i.e. no pressure sensitive points were found. Among the 46 horses displaying sensitivity/musculo-skeletal pain on palpation, 21 horses displayed sensitivity in the upper back, 21 in the low back, and 11 in the croup area.

Seven, 1 and 13 horses were diagnosed with soreness (points or areas) in the upper, middle and low neck respectively. Twenty-one horses showed soreness in front leg(s), while hind limb soreness was diagnosed by palpation in 11 horses. The incidence of the palpatory pain in the remaining anatomical areas was (number of horses in brackets): head (7); pectoral muscles (4); ribs/lateral chest (3); abdominal muscles (3); hooves (1) and tail (1).

The incidence of acupuncture patterns in the 46 horses was as follows (numbers in brackets indicate numbers of horses displaying the given pattern):

1. *Meridian patterns*: BL (10), KI (2), LI (3), SI (1), ST (3), TH (2) and GB (1). In total, 22 out of 46 (48%) horses with palpable pain showed the characteristic meridian patterns.
2. *Qi dysbalance*: Excess condition was diagnosed in 23 (50 %) out of 46 horses, while the Deficiency pattern was observed in 9 (20%) horses. No definitive abnormal energetic pattern could be identified in the remaining 14 (30%) horses.
3. *Duration/stage of the musculoskeletal dysfunctions*: acute 3 (7%) out of 46 horses; chronic 35 (76%) and undetermined 8 (17%) cases.

The following conclusions can be drawn from these data:

1. Musculo-skeletal pain is frequent in equine athletes. The pain is widely distributed throughout the body with the highest incidence in the back. This provoked (palpatory) pain is often severe, yet it does not always cause major dysfunctions.
2. In some but not all cases, the location of the pain could have been correlated with the methods of training and past injuries.
3. There was a poor correlation between the incidence of meridian pathology and the time of the year in this study. According to the TCM theory, the Fire element should be predominant, while the incidence of the Water Element should be at its lowest during the Summer season. On the contrary, in this study, the Water element showed the highest incidence.

## **Acupuncture treatment**

Three examples from the author's research into the acupuncture treatment of musculo-skeletal pain in the dog and horse are given in the following text.

### **1. Canine thoracolumbar disc disease**

Clinically, acupuncture has been found to be effective in treating thoracolumbar disc disease (TLDD) in the dog. Indeed, the condition has not been described in TCVM textbooks. The extrapolation of the medical acupuncture data would suggest the obstruction within the BL and GV channels. Pain, as well as the other symptoms of the canine TLDD, develops depending on the degree of the damage to the neural structures, i.e. spinal cord and spinal nerves. The direct traumatic and the subsequent inflammatory stimulation of the other anatomical structures within the spinal channel (meningeal envelopes and blood vessels) can be contributing factors triggering the acute pain. Trigger points may be present.

### **Dogs and procedures**

Classification of dogs affected by TLDD is given below.

Grade I	Back-pain, no neurological deficit
Grade II	Hindlimb paresis
Grade III	Paraplegia, pain sensitivity of hindlimb is intact
Grade V	Paraplegia, pain sensitivity is absent in the hindlimb

*(Janssens,1983a,b).*

Sixty dogs with TLDD, grades I to IV were treated by acupuncture, as published elsewhere (Still 1988b; Still, 1998). Thirty-eight of them showed signs of back-pain before the acupuncture treatment and are presented in this study (Table 1) – Still, 1989.

**Table 1. Characterization of dogs**

Characteristic	Grade of thoracolumbar disc disease			
	I	II	III-IV	All types
Number of dogs	8	17	13	38
Males/females	4/4	7/10	8/5	19/19
Percentage of chondrodystrophoid dogs	50	88	85	79
Average age (years)	6.4	6.8	6.0	6.4
Average duration of clinical signs of pre-treatment disease (days)	3.9	4.6	3.7	4.1

The needles were 0.3 mm gauge steel acupuncture needles of the length 1.5 to 6.5 mm. Needles were inserted deeply, intramuscularly, into the following acupuncture points:

- (a) Grades I and II: BL18-27, GV3a (lumbo-sacral Bai Hui), GB30, GB34, BL60, LIV2-3.
- (b) Grades III and IV: BL18-31, BL47-47b, GV3a-6, GV2a, Hua Tuo points from the spinal segments T10-L7, BL40, BL58, BL60, BL63-65, GB30, GB34, ST36, LIV2-3 (nomenclature and location of the APs according to Janssens and Still, 1995).

Only a few points were selected for each treatment, so that six to 12 needles were used in grade I and II and eight to 16 needles in grade III and IV. The APs were selected according to the results of clinical examination, the previous clinical history and according to the recommendations dealing with similar disturbances in man (Mann 1975). In addition, electrical stimulation of needles, ear-acupuncture, vitamins B complex and C were used in some of the dogs. Antibiotics (penicillin and streptomycin) were used routinely in grades III and IV with an objective to prevent the development of infection (cystitis). The applied acupuncture techniques were painless when used in dogs. The stimulation time was 20 minutes. Full details of the wider study are given by Still (1988b; Still, 1998).

Back-pain was characterised by an arched back because of the muscular hypertonicity in the affected spinal region. Manual palpation confirmed the pain in the spinal segment. Pain was evaluated by the

veterinary surgeon before the beginning of the acupuncture treatment, during the session and shortly (15 to 60 minutes) after it. Dogs were re-examined at each of the subsequent treatments, which were repeated at intervals of one to two days until the pain disappeared. A maximum of four treatments was performed.

## **Results and discussion**

The relief of the pain was characterised by muscular relaxation of the back and abdomen. Grade I dogs, who had been less active than usual and reluctant to perform any task associated with jumping or climbing, started to move actively, played with the owner etc. Manual palpation of the back did not provoke any pain reaction in 33 of 38 (87 %) dogs at the end of the acupuncture treatment. The remaining five dogs grade IV showed signs of back-pain in spite of the repeated acupuncture treatments. None of the dogs was cured from paraplegia.

Generally, analgesia developed in the majority of grade I and II dogs within a period of 24 hours after the first acupuncture treatment. Reliability of onset of the pain-relief was higher in grades I and II than in grades III and IV after the first treatment.

At most, four treatments were needed to induce a long term (more than one month) pain relief even in 'worse responders' of grade I and II. The pain-relief was achieved within one to eight days (mean 2.7) in 100% of dogs of grade I, within one to 22 days (mean 3.2) in 100% of dogs of grade II and within one to two days (mean 1.4) in 62% of dogs of grade III and IV. Long-term pain-relief occurred significantly more often ( $P<0.01$ ) in dogs of grades I and II than in dogs of grades III and IV after four acupuncture treatments.

The analgesic response to acupuncture in dogs varied with the severity of TLDD. An impressive effect of acupuncture was observed in grade I, in which the back-pain is not associated with any neurological deficit behind the spinal lesion (Janssens 1983a,b).

Response to grade II was slower but still highly effective, as far as the onset and duration of analgesia. Unsatisfactory results were obtained in the most severely affected dogs of grade III and IV. The apparent failure of acupuncture to induce the long-term pain-relief in five out of 13 paraplegic dogs might be explainable by the presence of severe damage of the spinal cord (Janssens, 1983a), which was confirmed as none of the dogs was cured in spite of the intensive medical care. No comparable data concerning particularly the analgesic effect of acupuncture in canine TLDD have been found in the related professional literature.



The supportive and protective medication used in some of the dogs in this study cannot be considered as an effective treatment of canine TLDD (Hoerlein 1971), as confirmed by a detailed analysis of the results (Still 1988b, Still, 1998). Any use of analgesic and/or anti-inflammatory drugs was excluded during the study.

Findings of this study indicate that the clinical results of acupuncture and the prognosis to full functional recovery decrease proportionally with the severity of morphological damage of the spinal cord (Hoerlein,1971). This conforms to the conclusions of another acupuncture study (Janssens, 1983b) and to the studies using other methods of conservative therapy of this disease (Hoerlein, 1971; Davies and Sharp,1983; Janssens, 1983a). The results of this study also conform to the clinical experience of acupuncture therapy in humans (Bischko, 1977) in which acupuncture can be an effective therapeutic treatment of diseases of a predominantly functional character.

## II. Sore back in horses

Sixty horses presented for acupuncture examination, and diagnosed with sore back, were allocated at random into three treatment groups (no 20 each) before the beginning of the treatment:

- 1. Local points** – only APs situated in close vicinity of the sore area were used. The local points were selected from the internal and external branches of the BL meridian as well as from the GV meridian; segmental Hua Tuo extra-meridian points were employed in some instances too.
- 2. Distant points** - only APs located more than 50 cm outside the sore back area were chosen for the treatment. Additionally, the points had to be located outside of the affected spinal segment +/- three neighbour segments. The treatment formula was chosen according to the particular meridian dysfunction/Five Element Theory (i.e. application of Command Points), or according to the prevailing pattern of the Bi syndrome. Sometimes, special function and cardinal points such as SP21, GV 14, SP6, BL40 etc were used.
- 3. Local and distant points** – a combination of the above two approaches.

**Inclusion criteria:** acute and chronic cases of sore back without any visible structural damage. Most of the horses were presented with complaints of poor sport performance, loss of obedience, non-specific lameness, stiffness, change of temperament, bucking, rearing, or sensitivity of the back on grooming and saddling.

**Exclusion criteria:** acute traumatic cases such as those with the apparent muscle and ligament bruising and tears, and typical cases of exertional rhabdomyolysis; concomitant local or general infection; congenital deformities of the back; limb lameness; recent (< 30 days) acupuncture treatment, physiotherapy or chiropractic; horses on medication (conventional and alternative medicine – up to two weeks before the trial); animals suffering from skin and internal diseases.

## **Clinical examination**

**A) Before the treatment** – the condition was scored for the degree and extent of the muscle soreness in the back – based on the standard palpatory evaluation.

### ***Extent of the back pain:***

Minor (+)- one to three spinal segments

Medium (++)– 4 to 6 spinal segments

Major (+++)- more than 70 % of the length of the back

### ***Severity of the sore back:***

1 -*Mild* – mild/slow tensing the affected muscles

2 -*Moderate* – marked local spasm or weakness and a definitive withdrawal reaction

3 -*Severe* – pronounced muscle spasm or weakness; a violent/quick withdrawal reaction

**B) After the treatment** – The same evaluator (this author), examined the horses in the same way as described above at the next acupuncture treatment scheduled at 1 to 8 days after the first treatment.

The response to treatment was based on a comparison of the extent and severity of the back pain before and after the treatment.

0 – got worse (more pain/spread over more spinal segments)

1 – no change

2 – improved (decrease of the severity of pain by 1 grading point or more; smaller area)

3 – significantly improved (decreased severity of pain by 2 scale points; only a few points left)

4 – cured (no painful points found)

Treatment was carried out using one of the two below-described methods:

- A) Dry needling - standard stainless steel acupuncture needles (0.3 mm gauge; 1 to 7 cm long).
- B) Acu-injections – APs were injected with 0.9 % saline solution diluted with vitamin B complex at the ratio of 200:1.

## **Results and discussion**

Details of the horses, as well as pre- and post-treatment data regarding the back pain are summarised in Table 2. The three experimental groups were similar, as far as the age, breed and performance distribution were concerned. Horses suffering from extensive back-pain were over-presented in group 1, as compared to group 3.

The pre-treatment pain scores were similar among the groups. Also, the intervals between the first and second clinical examinations were comparable among the groups. On average, the success rate of the treatment was the highest in the group 3, followed by group 2 and 1. However, these differences are probably not significant as

1. There were more horses displaying more extensive area of back pain in group 1 than in group 3
2. The variation of the responses to the treatment was significant within the individual groups (see high values of standard deviations).

In conclusion, results of this pilot study indicate that all three treatment regimens were successful in alleviating symptoms of sore back in horses after one treatment. No comparable literature data from available veterinary and medical acupuncture were available at the time of the completion of this paper.

**Table 2: Treatment of Sore Back in Horses**

Treatment Group	Details of Horses					Extent of Back Pain			Severity	Interval between 1 <sup>st</sup> /2 <sup>nd</sup> TT (days)	Success rate of TT (Score 1-4)
	Sex		Age (years)	Breed	Performance	Minor	Medium	Major	of back pain Score 1-3		
	Mares	Geldings				No. of horses					
<b>1</b> distant points	7	13	$\bar{X}$ 8.0 SD 3.0 3-13	T:18 W:2	J:6 D:5 J/D:1 E:1, LW: 1	8	3	9	$\bar{X}$ 2.5 SD 0.8 1-3	$\bar{X}$ 4.5 SD 1.8 1-7	$\bar{X}$ 2.5 SD 0.9 (1-4)
<b>2</b> local points	2	18	$\bar{X}$ 9.2 SD 3.2 5-18	T:17 W:2 P:1	J:11 D:2 J/D:6 E:1, LW:1	3	11	6	$\bar{X}$ 2.3 SD 0.6 1-3 (min-max)	$\bar{X}$ 5.3 SD 2.0 (3-8)	$\bar{X}$ 2.7 SD 0.7 (1-4) (min-max)
<b>3</b> distant and local points	1	19	$\bar{X}$ 7.8 SD 2.6 5-12 (min-max)	T:19 A:1	J: 14 J/D: 3 E: 2 R: 1	11	7	2	$\bar{X}$ 2.5 SD 0.5 2-3 (min-max)	$\bar{X}$ 5.0 SD 2.1 1-8 (min-max)	$\bar{X}$ 2.9 SD 2.1 2-4 (min-max)

**Explanations to the Table:**

**Numeric values:**  $\bar{X}$  – mean; SD – standard deviation; the two values below SD indicate minimal and maximal values within the group

**Breed:** T – Thoroughbred; W - Warmblood; P- pony; A - Arab

**Performance:** J – jumper; D – dressage; J/D – combination of the above two disciplines; E – eventing; LW – low level of work (early/basic training); R – racing

### **3. Hip pain in the dog**

Hip pain is a common cause of hind limb lameness, especially in large breeds of dogs. Often, the chronic pain is associated with canine hip dysplasia (HD). Nevertheless, the source of the pain can be sometimes localized to other tissues located in the hind limb and back. According to medical data from Legge (1997), hip and gluteal area are dominated by the Gall Bladder meridian. The literature data on the incidence, etiopathogenesis and acupuncture treatment of the hip pain in canine patients are incomplete.

#### **Details of dogs and pre-treatment examination**

The following research summarises data from the author's research of acupuncture in 25 dogs suffering from hip pain. The dogs were presented with a complaint of a subacute to chronic hind limb lameness, discomfort on standing up or because of difficulties in carrying out common exercises such as obedience (sit ups), jumping or man-work.

Table 3 describes details of the sex, age and breed distribution of the dogs. Radiographs confirming the earlier diagnosis of HD were available in 10 (40 %) out of 25 dogs. Three out of 10 dogs suffered from grade 2, 6 dogs from grade 3 and 1 dog from grade 4 of HD.

The hip pain was confirmed in all 25 dogs by response to the periarticular palpation and manipulation of the hip joint (Fingerroth, 1991).

Anamnestic data and pre-treatment clinical examination further revealed that some dogs (no in brackets) suffered from other chronic problems: incorrectly fused pelvis fracture (1), cauda equina syndrome (1), stabilised intervertebral disc protrusion in the lumbar spine (1), mild degree of degenerative myelopathy of German shepherds (2), severe/advanced arthritis of the knee joint (2), polyarthritis affecting at least one front and hind limb joint, as well as back (4), unexplained soreness of the metatarsal bones/joints (1) and chronic diarrhoea (1).

Myofascial examination revealed that the hip provoked pain was further accompanied by the palpatory soreness in the following hind limb muscles (Ah'Shi points/trigger points and zones) and joints – numbers of dogs in brackets: gluteal muscles (20); mm quadriceps femoris (18): mm rectus femoris, and vastus intermedius and medialis (11), m vastus lateralis (10); m pectineus (15); mm biceps femoris, semimembranosus, semitendinosus and adductor (9); and mm gemelli and quadratus femoris (5). Uni- or bilateral shoulder (7 dogs) and elbow chronic arthritis (6 dogs) was diagnosed clinically (manipulation and palpation) and radiographically.

**Table 3: Sex, age and breed distribution of dogs treated for hip pain**

<b>Total no of dogs</b>	<b>Sex</b>	<b>Age (years)</b>	<b><i>Breed distribution</i></b> <b>(number of dogs)</b>
25	12 males/13 females	8.5 +- 3.3 (0.75-15) $\bar{x}$ +- SD (min-max)	German shepherd (11) Rottweiler (5) Crossbred (3) Labrador (3) Staffordshire terrier (1) English shepherd dog (1) Border collie (1)

## **Treatment protocol**

The dogs were treated using dry needling, electro-acupuncture and/or acu-injections. Usually, important Ah'shi points were needled or injected with small amounts (+- 1 ml) of saline/vitamin B complex 200:1 solution. In some cases, lignocaine 0.7 % was added to the solution in order to blunt the discomfort associated with injecting the tender muscle points. Electro-acupuncture (5 and 80 Hz alternatively; intensity up to mild muscle contractions) was added in some cases, especially in the low back and sacral area (BL21 to 35) and in the major APs such as ST36, GB34, SP6, BL 60 and 40.

To treat the hip pain, Ah'shi (trigger) points as well as important meridian local and regional APs were selected among the following APs: BL19 to 35, BL52 to 54, 40 and 60; KI3, 7 and 10 to 11, ST34 and 36; SP6, 9 to 12, GB25 to 34; LIV2, 3 and 8 to 13. Using the rules of TCM as well as western/research data, 5 to 16 APs were selected according to the associated symptomatology such as hip and low back strain, and shoulder or knee pain. Corresponding somatotopic ear points were added in some dogs (Still, 1987).

Only in 4 out of 25 dogs, NSAIDs were allowed during the initial 1 to 2 treatments. Some dogs continued their homeopathic, vitamin and nutraceutical (glucosamine) medication throughout the treatment; this medication was deemed to be insufficiently effective during the previous period lasting several weeks.

The acupuncture treatments were repeated 2 to 8 times at intervals of 2 to 7 days. The treatment was terminated when there was no significant improvement during the first 4 treatments, or when both the clinician and the owner agreed that the dog was "improved" or "cured" (see below for details).

## **Evaluation of the success rate of the treatment**

*No improvement* – the degree of lameness/discomfort and palpatory findings similar as before the beginning of the treatment

*Improved* – both owner and the clinician noted better performance of the dog, less lameness; there were at least 50 % less painful points on palpation

*Cured* – the dog achieved the level of performance as before the beginning of the disorder; up to 5 mildly sensitive points were diagnosed at most on the last treatment; there was no further need for analgesic/ anti-inflammatory medication

## Results and discussion

Number of acupuncture sessions was 4.6 +- 2.1 ( $\bar{x}$  +- SD) per dog (2-8; min-max). Six (24 %) out of 25 dogs were cured; 14 dogs (56 %) were improved and 5 dogs (20 %) were not improved in the course of the acupuncture treatment. The five dogs in which no improvement was achieved were diagnosed with severe/chronic knee osteoarthritis (2 dogs), congenital severe bilateral hip and elbow dysplasia (9 months old Rottweiler) and two geriatric patients suffering from severe/chronic osteoarthritis in multiple joints including hips, shoulders, elbows and sections of the back.

The following conclusions can be drawn from the data:

1. As a rule, the hip pain is associated with pain in multiple muscles of the low back, sacral area and the low limb muscles. Typically, the affected meridians would be BL, GB, ST, SP and LIV. According to TCM theory, the cases were classified as Painful or Fixed Bi Syndrome.
2. Meridian patterns were usually combined with local tender points. Generally speaking, the success rate of the treatment can be expected to be lower in dogs affected with the severe/extensive hip joint pathology and other complicating factors such as dysfunction/pathology of the back, involvement of the front limb joints etc.

## Conclusions

Musculo-skeletal pain is a major clinical problem in veterinary medicine. All necessary attention should be paid to its diagnosis and management. Acupuncture is one of the clinically effective methods of pain-relief. It should be judiciously applied, either alone or together with other methods, in order to relieve suffering from pain and to improve the patient's general well-being. Acupuncture can be a useful diagnostic and therapeutical method in a variety of musculo-skeletal disorders in the horse and dog.



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