THE ACUPOINTS' BIOPHYSICAL FEATURES AFTER THE DRY ACUPUNCTURE AND ALLOPATHIC TREATMENT IN DOG'S SPONDYLOSIS DEFORMANS

CARACTERISTICILE BIOFIZICE ALE ACUPUNCTELOR CONSECUTIV ACUPUNCTURII USCATE ȘI TRATAMENTULUI ALOPAT ÎN SPONDILOZA DEFORMANTĂ LA CÂINE

C. HULEA[1], M. PENTEA[1], Crina L. MOȘNEANG[1],
Eugenia DUMITRESCU[1], F. MUSELIN[1],
A.O. DOMA[1], R.T. CRISTINA[1,*]

ABSTRACT | **REZUMAT**

Data from the literature emphasize the importance of measuring bioelectricity in the case of acupuncture points, the values obtained can be associated with the effectiveness of the treatment in numerous osteoarticular and muscular pathologies in humans and animals. In the present study, the biophysical evaluation of acupuncture points was followed, on three groups (n = 5) of dogs, specific acupuncture points in TCM, respectively the pairs: BL22-23, BL24-25, BL26-27, GV3 (a,b), and GV4-5, following dry acupuncture stimulation and allopathic treatment with a definite diagnosis of spondylosis deformans. Group A (Acupuncture) was treated with acupuncture only, daily for 14 days, in sessions of 30 minutes/treatment. In the case of group M (Meloxicam), treatments with a dose of 0.2 mg × kg.bw-1 were applied for seven consecutive days, and group C (Control) was not treated but only observed and measured. Electrical measurements, on days 0, 2, 7, and 14, respectively, after treatments, of a passive parameter (electrical resistance) and an active one (potential difference between two acupuncture points) were made using a digital multimeter (Sanwa, Japan). The results revealed the effectiveness of acupuncture as a means of spondylosis deformans treatment in dogs.

Keywords: acupoints, biophysical features, dog, spondylosis deformans

Datele din literatură accentuează importanța măsurării bioelectricității în cazul punctelor de acupunctură, valorile obținute putând fi asociată cu eficiența tratamentului în numeroase patologii osteoarticulare și musculare la om și animale. In prezentul studiu s-a urmărit evaluarea biofizică a punctelor de acupunctură, pe trei loturi (n = 5) de câini, acupuncte specifice în MTC, respectiv perechile: BL22-23, BL24-25, BL26-27, GV3 (a,b), și GV4-5, consecutiv stimulării prin acupunctură uscată și tratament alopatic cu diagnostic cert de spondiloză deformantă. Lotul A (Acupunctură) a fost tratat doar prin acupunctura, zilnic pentru 14 zile, în ședințe de 30 de minute/tratament. In cazul lotului M (Meloxicam) s-au aplicat tratamente cu doza 0.2 mg × kg.bw^{-1} timp de șapte zile succesiv iar lotul C (Control) nu a fost tratat ci doar observat și măsurat. Măsurătorile electrice, în zilele 0, 2, 7, și respectiv 14, după tratamente, a unui parametru pasiv (rezistența electrică) și a unuia activ (diferența de potențial între două acupuncte) s-a realizat folosind un multimetru digital (Sanwa, Japan). Rezultatele au relevat eficiența acupuncturii ca mijloc de tratament în spondiloza deformantă la câine.

Cuvinte cheie: acupuncte, caracteristici biofizice, câine, spondiloza deformantă

According to data from the literature, acupuncture points have special known biophysical characteristics compared to neighbouring areas. In this context, the electrical (1), acoustic (12), thermal (10, 17, 20), optical (15), magnetic (1, 7), and isotope migration along the meridians (14) were studied, as well as myoelectric activity (4, 5).

From all these characteristics, it appears that of great importance are the electrical effects of acupuncture points, probably because their evaluation would make it possible to comprehend their intimate action mechanism and identify the electrically polarized energy fields present around each cell and the body (6, 11, 19).

The surface's bioelectric characteristics of acupuncture points are of particular functional importance in the circulation of Qi (the bioenergy) along the meridians. Also, the registered values documented in the electrical exploration of a skin surface describe both the electrical activity of the skin tissue and all electrical activity in the underlying tissues (6, 16).

To characterize the cutaneous electrical activity of the acupuncture points diverse parameters were used, classified in:

1) University of Life Sciences "King Mihai I",
   Faculty of Veterinary Medicine, Timisoara, Romania
*) Corresponding author: romeocristina@usab-tm.ro

- passive: electrical resistance, impedance, electrical capacity;

- active: electric potential, the intensity of the electric current produced by the stimulus (3).

Until today, numerous authors have highlighted the cutaneous electrical properties of acupuncture points, compared to the neighbouring skin, with low electrical resistance, intensity, potential, and increased electrical capacity (6, 10, 16).

Measurements of electrical biopotential at or at acupuncture points are preferable because the electric potential as the active electrical quantity adequately expresses the functionality of these points compared to the electrical resistance, which provides information about the material characteristics of the investigated structure (1, 10, 12, 15-19).

Deforming spondylosis is one of the most common locomotor disorders in geriatric dogs, clinically manifested by pain (3). Alternative medicine knows various pain-reducing techniques that would be safer methods for animals' long-term health, acupuncture being the most promising of all (2, 9, 11, 13).

Spondylosis deformans is a frequent injury of the spinal cord belonging to the group of Bony Bi syndromes in TCVM, where the stagnant Qi and Blood are the main causative factors of pain. Clinical research shows that acupuncture is an effective tool to treat spinal cord injuries and a series of specific acupuncture points have been successfully applied in the past (9, 11, 13).

To provide objective procedures to validate and confirm the findings, the present study was imagined to evaluate the biophysical properties (one passive and one active) of some main acupoints approached in dogs' deforming spondylosis cases.

MATERIALS AND METHODS

Ethical approval

All dogs included in the study were current patients of the Veterinary Clinic of the Faculty Timisoara. Procedures of the Ethical Committee of the Banat University of Agricultural Science and Veterinary Clinics from Timisoara have been respected. Animals were dewormed and their vaccinal status was checked before the start of the study. The experiment ensured the proper accommodation and animal handling by Directive 2010/63/EU, the experimental protocol including all methods for preventing and reducing animal distress/pain by the recommendations of the European Union and Romanian legislation, being approved by the Bioethics Committee of the University (No. 122 of 06.06.2022).

Animal groups

The study included dogs with a confirmed medical history of deforming spondylosis and showed pain in the lumbar region during an examination without a specific diagnosis. In all dogs, the main symptoms were more or less noticeable during the walking posture.

Dog owners initially signed written consent for their dogs' participation in the present study. After a detailed briefing on the therapeutic protocol and possible side effects, all animal owners agreed to the procedures as well as to the study being published.

An additional examination according to the principles of Traditional Chinese Veterinary Medicine (TCVM) was made for the acupuncture group to formulate a TCVM-pattern diagnosis. Following the diagnosis, which showed Qi and Yang deficiencies and local stagnation, an appropriate set of acupuncture points was selected and applied over 14 consecutive days (8, 18).

Animals were sheltered in individual boxes at the University Veterinary Hospital Timisoara at a constant temperature of 22-23 °C, fed with dry and wet food from Pedigree brand (with beef and vegetables), and water administered *ad libitum*.

The animals were split into three subgroups of five dogs each, one of which was treated with acupuncture, one with Metacam (meloxicam), and the third subgroup (Control) did not receive any therapy and was observed only. Individuals (n=15) selected for this study were grouped in Acupuncture (n=5); Metacam treatment (n=5); and Control (n=5) as possible uniform regarding sex, stature, and weight (their weight range was between 21,0 and 40,3 kg, age between 3 and 13 years old).

Methodology

To demonstrate acupuncture effectiveness in dog deforming spondylosis, in terms of the acupoints' biophysical properties, we selected the electrical features, using two main electrical parameters:

- an active one, the electric potential difference between two acupoints, and
- a passive one, the electrical resistance at the acupoints.

The working protocol differed depending on the group, as follows:

For *Group A (Acupuncture),* determinations were performed 30 minutes on each individual, before treatment, on days 0, 2, 7, and 14, respectively, on the same days, and immediately after treatments. Determination of the acupoints' electrical potential difference, and the electrical resistance, required to group them in pairs as follows: BL22-23, BL24-25, BL26-27, GV3 (a and b), and GV4-5 (Table 1) (18). The two electrical parameters were determined using a digital multimeter model Sanwa, (Japan) and the two rods of the device, were positioned by the acupuncture points

Acupoints approached and the description

Acupoint	Acupoint (Pin Yin)	Technique /Depth (CUN)	Selected indication/Action (after Xie)
Bl-22	San jiao shu	DN/0.5	Back shu point triple heater, Qi stagnation in Shao Yang, local point for caudal back pain
Bl-23	Shen shu	DN/1.0	Back shu point kidney, tonifies kidney qi/yang, removes dampness, local point for caudal back pain
Bl-24	Qi hai shu	DN/1.0	The sea of Qi regulates Qi and Blood flow esp. in lower jiao – resolves stagnation, the focal point for caudal back pain
Bl-25	Da chang shu	DN/1.0	Back shu point large intestine, resolves stagnation, local point for caudal back pain,
Bl-26	Guan yuan shu	DN/1.0	Gate of yuan Qi, strongly tonifies kidney qi and yang
Bl-27	Xiao chang shu	DN/1.0	Back shu point small intestine, resolves dampness, local point for caudal back pain
GV-3a	Yao yang guan	DN/1.5	Gate of yang in the lumbar area, resolves wind-dampness, tonifies yang qi
GV-3b	Yao yang guan	DN/1.0	Gate of yang in the lumbar area, resolves wind-dampness, tonifies yang qi
GV-4	Ming meng	DN/0.5	Gate of vitality, a major point for kidney yang tonification
GV-5	Xuan shu	DN/1.0	The local point on the spinal cord/du Mai meridian

mentioned above. The description and indication/ action are presented in Table 1.

Statistical analysis

The obtained results were expressed as mean ± SEM (the mean's middle error) and were analyzed by one-way ANOVA with the Bonferroni's multiple comparison test considering the differences are statistically provided when $p < 0.05$ or lower, using the Graph Pad Prism 6.0 software (GraphPad Software, San Diego, USA).

For *Group M (Metacam),* measurements of the electrical parameters were performed on each individual before treatment, respectively, on the same days and 30 minutes after treatments.

Meloxicam (Boehringer Ingelheim, Ingelheim am Rhein, Germany) is a non-steroidal anti-inflammatory drug (NSAID) in the oxycham class. It is a yellowish viscous suspension with a honey odour, commercially formulated as an oral suspension, tablets, or injectable solution (5 mg × mL-1 a.s.), and sodium benzoate (1.5 mg × mL^{-1}), as an excipient. This group of dogs was treated with subcutaneous injections at a dose of 0.2 mg × kg.bw^{-1}, for seven successive days at maximum, as the producer advises.

Group C (Control) was not treated, but the electrical determinations were made, on days, 0, 2, 7, and respectively 14. The measurements were completed on each subject from the study, both left, and right sides, and the average value of determinations was considered, as the final value of the potential difference or electrical resistance. To avoid any possible errors caused by the incorrect placement of the rods of the digital multimeter, measurements were performed

in triplicate on each side, and their average represented the value obtained from Table 2.

RESULTS AND DISCUSSIONS
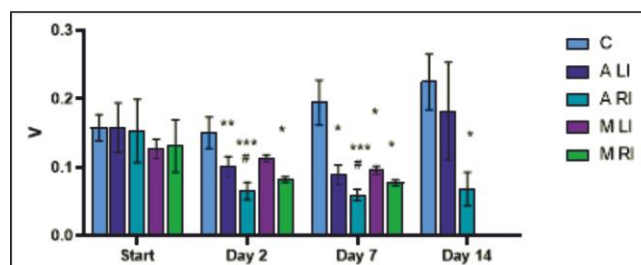
Fig. 1. The statistical values (ANOVA) for the electric potential difference between two acupoints (V)
Where: *p<0.05; **p<0.01; ***p<0.001, comparative with Control Group and day 0: and #p<0.05, comparative with Metacam Group
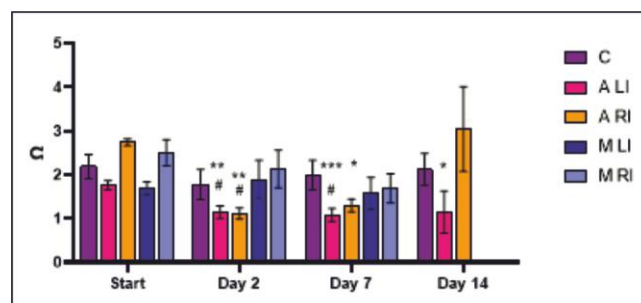
Fig. 2. The statistical values (ANOVA) for the electrical resistance produced by the stimulus (Ω)
Where: *p<0.05, **p<0.01; ***p<0.001, comparative with Control Group and #p<0.05, comparative with Metacam Group

Measuring acupoints (Voltage/Resistance)
on five nodal acupoints /group /individual

Group/Individual			BL 22-23	BL 24-25	BL 26-27	GV3 (a/b)	GV4-5	Average value
Experiment start								
			Meridian / Acupoint pair					
A1	LI	V	0.770	0.110	0.220	0.190	0.150	0.288
		Ω	1.700	2.200	2.100	2.100	1.700	1.960
	RI	V	0.100	0.150	0.180	0.170	0.130	0.146
		Ω	2.700	3.300	3.200	2.800	3.100	3.020
A2	LI	V	0.070	0.210	0.120	0.140	0.140	0.136
		Ω	1.800	2.000	1.800	1.500	1.700	1.760
	RI	V	0.090	0.015	1.300	0.120	0.110	0.327
		Ω	2.500	2.400	2.500	3.100	3.200	2.740
A3	LI	V	0.080	0.060	0.080	0.070	0.073	0.073
		Ω	1.600	1.400	1.500	1.300	1.300	1.420
	RI	V	0.070	0.027	0.015	0.060	0.090	0.052
		Ω	2.500	2.200	3.100	2.400	3.100	2.660
A4	LI	V	0.080	0.160	0.150	0.110	0.130	0.126
		Ω	2.300	2.400	1.900	1.600	1.900	2.020
	RI	V	0.070	0.140	0.140	0.100	0.120	0.114
		Ω	3.100	3.200	2.400	2.500	2.500	2.740
A5	LI	V	0.086	0.190	0.200	0.180	0.190	0.169
		Ω	1.800	1.900	1.500	1.600	1.400	1.640
	RI	V	0.070	0.150	0.140	0.160	0.120	0.128
		Ω	2.700	2.700	2.400	2.600	2.300	2.540
M1	LI	V	0.130	0.130	0.110	0.190	0.100	0.132
		Ω	1.800	1.800	1.400	1.200	1.400	1.520
	RI	V	0.900	0.120	0.090	0.160	0.100	0.274
		Ω	3.300	2.700	2.600	2.800	3.400	2.960
M2	LI	V	0.090	0.180	0.240	0.160	0.220	0.178
		Ω	2.400	2.600	2.200	2.100	2.100	2.280
	RI	V	0.060	0.140	0.200	0.150	0.140	0.138
		Ω	3.500	2.600	2.800	3.100	2.500	2.900
M3	LI	V	0.110	0.130	0.180	0.110	0.080	0.122
		Ω	2.100	1.900	1.500	1.400	1.500	1.680
	RI	V	0.064	0.060	0.080	0.070	0.050	0.065
		Ω	1.300	2.100	2.600	2.300	2.100	2.080
M4	LI	V	0.100	0.120	0.100	0.090	0.110	0.104
		Ω	1.500	1.600	1.700	1.500	1.400	1.540
	RI	V	0.090	0.080	0.090	0.010	0.060	0.066
		Ω	2.700	2.400	3.100	2.700	1.500	2.480
M5	LI	V	0.080	0.080	0.110	0.130	0.110	0.102
		Ω	1.600	1.300	1.100	1.700	1.500	1.440
	RI	V	0.150	0.120	0.014	0.140	0.150	0.115
		Ω	2.400	3.700	3.200	3.500	2.400	3.040
C1		V	0.080	0.160	0.150	0.130	0.130	0.130
		Ω	1.700	2.500	1.900	1.800	1.600	1.900
C2		V	0.080	0.310	0.090	0.140	0.080	0.140
		Ω	1.900	2.100	1.300	1.100	1.800	1.640
C3		V	0.140	0.270	0.180	0.400	0.170	0.232
		Ω	3.500	3.600	2.600	2.900	3.200	3.160
C4		V	0.100	0.180	0.140	0.110	0.120	0.130
		Ω	2.400	2.200	1.800	1.600	1.300	1.860
C5		V	0.060	0.190	0.180	0.160	0.200	0.158
		Ω	2.400	2.300	2.500	2.200	2.500	2.380
Day 2								
Group / Individual			BL 22-23	BL 24-25	BL 26-27	GV3 (a. b)	GV4-5	Average value
A1	LI	V	0.110	0.140	0.170	0.180	0.110	0.142
		Ω	1.500	1.300	1.600	1.700	1.300	1.480
	RI	V	0.070	0.110	0.130	0.100	0.100	0.102
		Ω	1.700	1.500	1.400	1.200	1.300	1.420

Where: LI = left side; RI = right side; A1,2,3,4,5 = Acupuncture group; M1,2,3,4,5 = Metacam treated group; C1,2,3,4,5 = Control (not treated)

Table 2

Measuring acupoints (Voltage/Resistance) on five nodal acupoints/group/individual
(continuation from previous page)

Group/Individual		V/Ω						Average
A2	LI	V	0.080	0.140	0.140	0.120	0.140	0.124
		Ω	1.400	1.700	1.500	1.300	1.300	1.440
	RI	V	0.030	0.070	0.070	0.060	0.050	0.056
		Ω	0.900	0.700	0.750	0.800	0.710	0.772
A3	LI	V	0.030	0.040	0.090	0.050	0.080	0.058
		Ω	0.800	0.700	0.800	0.460	1.000	0.752
	RI	V	0.020	0.040	0.030	0.020	0.030	0.028
		Ω	0.900	0.900	1.000	0.600	1.200	0.920
A4	LI	V	0.070	0.120	0.110	0.090	0.120	0.102
		Ω	1.100	1.200	0.900	1.000	1.200	1.080
	RI	V	0.070	0.090	0.090	0.100	0.060	0.082
		Ω	1.200	1.300	1.200	1.200	1.900	1.360
A5	LI	V	0.060	0.080	0.100	0.090	0.070	0.080
		Ω	1.000	1.000	1.100	1.000	0.800	0.980
	RI	V	0.060	0.070	0.080	0.050	0.040	0.060
		Ω	1.200	1.000	1.300	1.100	0.900	1.100
M1	LI	V	0.110	0.100	0.100	0.130	0.090	0.106
		Ω	1.200	1.500	1.700	1.400	1.200	1.400
	RI	V	0.090	0.090	0.090	0.100	0.080	0.090
		Ω	1.300	1.500	1.800	1.500	1.350	1.490
M2	LI	V	0.060	0.150	0.150	0.120	0.110	0.118
		Ω	1.500	1.100	1.500	1.200	1.100	1.280
	RI	V	0.050	0.100	0.100	0.110	0.080	0.088
		Ω	1.600	1.400	1.600	1.500	1.200	1.460
M3	LI	V	0.160	0.090	0.110	0.080	0.080	0.104
		Ω	1.700	1.400	1.200	2.200	2.500	1.800
	RI	V	0.140	0.070	0.100	0.070	0.060	0.088
		Ω	2.300	2.800	3.400	2.400	2.200	2.620
M4	LI	V	0.230	0.060	0.100	0.180	0.090	0.132
		Ω	3.300	3.200	3.400	4.000	4.200	3.620
	RI	V	0.140	0.030	0.080	0.070	0.050	0.074
		Ω	2.400	2.500	2.500	3.200	3.900	2.900
M5	LI	V	0.090	0.130	0.140	0.090	0.080	0.106
		Ω	1.800	1.600	1.600	1.100	0.700	1.360
	RI	V	0.070	0.090	0.070	0.080	0.050	0.072
		Ω	1.900	1.700	1.700	1.200	0.900	1.480
C1		V	0.140	0.200	0.110	0.060	0.100	0.122
		Ω	1.400	1.600	1.500	1.200	0.900	1.320
C2		V	0.070	0.140	0.150	0.120	0.190	0.134
		Ω	1.400	1.300	1.300	1.100	1.700	1.360
C3		V	0.150	0.250	0.200	0.400	0.200	0.240
		Ω	3.200	3.700	2.800	2.800	3.100	3.120
C4		V	0.140	0.150	0.130	0.100	0.060	0.116
		Ω	2.100	1.500	1.400	1.200	0.600	1.360
C5		V	0.100	0.170	0.140	0.160	0.140	0.142
		Ω	1.900	1.800	1.300	2.200	1.500	1.740

Day 7

Group/Individual			Meridian / Acupoint pairs					Average value
			BL 22-23	BL 24-25	BL 26-27	GV3 (a. b)	GV4-5	
A1	LI	V	0.100	0.130	0.160	0.170	0.100	0.132
		Ω	1.400	1.350	1.620	1.700	1.350	1.484
	RI	V	0.060	0.100	0.110	0.090	0.080	0.088
		Ω	1.600	1.400	1.800	1.800	1.600	1.640
A2	LI	V	0.070	0.130	0.120	0.100	0.110	0.106
		Ω	1.300	1.600	1.400	1.300	1.200	1.360
	RI	V	0.020	0.060	0.050	0.040	0.030	0.040
		Ω	1.400	1.600	1.500	1.400	1.200	1.420
A3	LI	V	0.020	0.030	0.080	0.0400	0.080	0.050
		Ω	0.700	0.650	0.700	0.460	0.900	0.682
	RI	V	0.020	0.200	0.030	0.020	0.060	0.066
		Ω	0.800	0.900	0.900	0.600	1.000	0.840

Where: LI = left side; RI = right side; A1,2,3,4,5 = Acupuncture group; M1,2,3,4,5 = Metacam treated group; C1,2,3,4,5 = Control (not treated)

Table 2

Measuring acupoints (Voltage/Resistance) on five nodal acupoints/group/individual
(continuation from previous page)

Group/Ind									Average
A4	LI	V	0.060	0.100	0.100	0.080	0.110		0.090
		Ω	1.000	1.000	0.700	0.900	0.900		0.900
	RI	V	0.040	0.080	0.070	0.040	0.060		0.058
		Ω	1.200	1.100	0.800	1.000	1.400		1.100
A5	LI	V	0.050	0.070	0.090	0.070	0.060		0.068
		Ω	1.100	1.800	0.850	0.500	0.700		0.990
	RI	V	0.040	0.060	0.070	0.040	0.030		0.048
		Ω	1.600	1.900	1.000	1.800	1.700		1.500
M1	LI	V	0.100	0.090	0.010	0.110	0.080		0.078
		Ω	1.100	1.100	1.800	1.200	0.900		1.220
	RI	V	0.050	0.080	0.090	0.100	0.070		0.078
		Ω	1.180	1.500	1.600	1.300	1.100		1.336
M2	LI	V	0.060	0.130	0.100	0.110	0.100		0.100
		Ω	1.200	1.200	1.200	1.000	1.000		1.120
	RI	V	0.050	0.100	0.090	0.100	0.080		0.084
		Ω	1.300	1.300	1.300	1.100	1.200		1.240
M3	LI	V	0.140	0.080	0.100	0.080	0.070		0.094
		Ω	1.500	1.200	1.100	1.900	2.100		1.560
	RI	V	0.120	0.060	0.090	0.060	0.050		0.076
		Ω	1.600	1.300	1.100	2.000	2.300		1.660
M4	LI	V	0.200	0.050	0.090	0.160	0.080		0.116
		Ω	2.800	2.900	3.000	3.200	3.020		2.984
	RI	V	0.180	0.040	0.060	0.100	0.060		0.088
		Ω	3.000	3.000	3.100	3.600	3.200		3.180
M5	LI	V	0.080	0.120	0.120	0.070	0.070		0.092
		Ω	1.400	1.000	1.200	0.800	0.500		0.980
	RI	V	0.050	0.090	0.090	0.050	0.040		0.064
		Ω	1.600	1.400	1.500	1.000	0.600		1.220
C1		V	0.180	0.210	0.140	0.160	0.120		0.162
		Ω	1.600	1.700	1.600	1.300	1.000		1.440
C2		V	0.110	0.160	0.180	0.140	0.220		0.162
		Ω	1.500	1.400	1.500	1.200	1.900		1.500
C3		V	0.180	0.300	0.250	0.600	0.300		0.326
		Ω	3.400	3.800	2.900	3.000	3.300		3.280
C4		V	0.180	0.170	0.150	0.170	0.100		0.154
		Ω	2.500	1.800	1.600	1.300	1.800		1.800
C5		V	0.100	0.220	0.180	0.190	0.160		0.170
		Ω	1.800	2.000	1.700	2.500	1.800		1.960

Day 14

Group/Individual			Meridian / Acupoint pairs					Average value
			BL 22-23	BL 24-25	BL 26-27	GV3 (a. b)	GV4-5	
A1	LI	V	0.090	0.110	0.140	0.150	0.080	0.114
		Ω	1.100	1.200	1.300	1.000	1.000	1.120
	RI	V	0.050	0.090	0.100	0.080	0.060	0.076
		Ω	1.200	1.300	1.500	1.400	1.200	1.320
A2	LI	V	0.050	0.100	0.110	0.100	0.090	0.450
		Ω	0.700	0.500	0.700	0.600	0.500	3.000
	RI	V	0.030	0.050	0.040	0.030	0.020	0.160
		Ω	1.200	1.400	1.200	1.200	1.000	6.000
A3	LI	V	0.020	0.030	0.070	0.030	0.060	0.210
		Ω	0.500	0.450	0.200	0.300	0.400	0.370
	RI	V	0.020	0.020	0.020	0.020	0.040	0.024
		Ω	0.600	0.500	0.600	0.400	0.800	2.900
A4	LI	V	0.040	0.090	0.090	0.080	0.100	0.080
		Ω	0.800	0.800	0.600	0.700	0.600	0.700
	RI	V	0.030	0.070	0.060	0.040	0.050	0.050
		Ω	0.900	1.000	0.700	0.900	0.800	4.300
A5	LI	V	0.040	0.060	0.080	0.050	0.050	0.056
		Ω	0.500	0.700	0.800	0.450	0.300	0.550
	RI	V	0.020	0.040	0.060	0.030	0.020	0.034
		Ω	0.800	0.800	0.900	0.600	0.400	0.700
C1		V	0.190	0.220	0.150	0.200	0.140	0.180
		Ω	1.650	1.700	1.700	1.400	1.100	1.510
C2		V	0.120	0.160	0.190	0.140	0.230	0.168
		Ω	1.550	1.500	1.600	1.300	2.000	1.590
C3		V	0.200	0.350	0.270	0.700	0.400	0.384

Where: LI = left side; RI = right side; A1,2,3,4,5 = Acupuncture group; M1,2,3,4,5 = Metacam treated group; C1,2,3,4,5 = Control (not treated)

Table 2 shows the electrical measurements' values (voltage and resistance) on five nodal acupuncture points in the dogs treated for spondylosis deformans, and Figures 1 and 2 are presenting the statistical values obtained (after ANOVA) for the electric potential difference between two acupoints (Voltage –active parameter) and the electrical resistance produced by the stimulus (Ω – passive parameter).

The outcomes of this research indicated modifications after acupoints/meridians' stimulation statistically significant values being registered for the electrical parameter V, on days 2 (with p = $**p<0.01$) and 7 (with p = $***p<0.001$) of treatment, compared to day 0, and Metacam Group. In the case of the passive parameter measured (Ω), the statistical values were significant for day 2 (with p = $**p<0.01$) and day 7 (with p = $***p<0.001$), and day 14 ($*p<0.05$), confirming the acupuncture's important healing role, in this case. Under the conditions of administration of anti-inflammatory drugs in deforming spondylosis, in our case, Metacam, presumably the healing has installed as a consequence of a reduction in the inflammatory process in the lumbar region with favourable effects for the dogs. This fact was also revealed by the statistical values but in a lower expression ($*p<0.05$), comparatively with acupuncture acupoints' electrical measured values.

If the Metacam administration is known that decreases the local temperature, the acupuncture will cause an increase in it, compared to day 0, on treatment days 2 and 7, but also in 14 the efficiency and temperature values became maximum, The results of this study are confirming the data found in the literature. It appears that the stimulation of acupuncture points causes changes in local temperature, and electrical features characterized mainly by its increase, similar results being also obtained by moxibustion in mice (1, 7, 11, 20).

Of the biophysical characteristics of acupoints, their electrical properties are yet of interest for practice since, until now it's known, that the implantation of needles induces the formation of a measurable electric current up to 500 mA/cm called "lesional" so that as a result of acupuncture, for example, the contracted muscles will relax, the blood circulation will improve, and all these will drive the local temperature to rise (1, 5, 6, 12, 16, 20).

In this aim, all newly added data come to confirm the beneficial role of micro electricity for acupoint stimulation, all new inputs helping the practicians to understand better the role of low-intensity electrical (active or passive feature) as a healing signal. Moreover, the authors observed that the local bleeding, along with the lesional current, stimulates the secretion of many growth factors, such as platelets and neutrophils, that generate healing and tissue regeneration by stimulating the synthesis of collagen and specific proteins capable of repairing affected cells and restoring affected function (2, 7, 13, 15).

The produced electric current, jointly with bleeding, will cause tissue healing, revitalization, and the synthesis of collagen and proteins capable of repairing the affected cells and restoring function. Lesions induced after stimulation of acupuncture points are active for 48 hours. Another characteristic of acupuncture is the local and systemic immune and inflammatory effect (12, 14). As physical methods, it seems that the application of ultrasound, cold or hot compresses and low-intensity electrical current to mechanical and thermal receptors causes presynaptic inhibition of nociceptive pathways (interneuronal inhibition) (4, 10).

CONCLUSIONS

The present study revealed the efficiency of acupuncture in dogs' spondylosis deformans, statistically demonstrated. Efficacy of treatments was induced after stimulation of the acupuncture points which was active and measurable after 2 days and 7 days for both studied parameters. The dry needle implantation by determining the appearance of lesional current, as a result, will decontract and relax the muscles, improving blood circulation, which increased the local temperature much better than other allopathic treatments.

Conflict of Interest
There are no conflicts of interest declared by the authors.

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