



## ARTIGO ORIGINAL

# USE OF ELECTROBIOGRAPHIC PHOTO ON COMPARISON AMONG BREAST CANCER, HEALTHY SEDENTARY, AND HEALTHY RUNNERS WOMEN

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## O uso da bioeletrografia na comparação entre mulheres com câncer de mama, mulheres saudáveis sedentárias e mulheres praticantes de corrida

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### ABSTRACT

**Introduction:** Bioelectrography measures the emission of photons and electrons from live beings, and it is possible to assess peoples' health condition through it. **Objective:** to compare women with breast cancer (BC), healthy sedentary women (HS) and healthy runners women (HJ) concerning emotional pressure, yin percentage (yin%) and yang percentage (yang%) through electrobiographic photos (EB). **Methods:** EB were collected from all of the ten fingertips from 11 sedentary women diagnosed for BC (G12), aged 59±11 years; 18 sedentary women with no BC records (G3), aged 46±15 years; and 8 runners women with no BC records (G4), aged 45±9 years. EB were obtained and processed through Bio Well hardware and software, and later had been statistically analyzed through software IBM SPSS Statistics 23. **Results:** higher levels of emotional pressure (EP) were observed in G4 regarding G3 and G12. Greater levels of yang% and smaller levels of yin% were observed in G12 regarding G3 and G4. **Conclusion:** the present study points out the possibility of using bioelectrography as an option for detecting EP increasing inductive situations, as well as for those levels quantification, verifying the procedures presenting best results for EP control. Also becomes clear the possibility of using bioelectrography for measuring yin-yang percentage both in installed pathologies or as prophylaxis previously to clinical symptoms such as assessing balance between oncogenesis (yang) and suppressive genes (yin). Once this balance is set, cancer trunk cells growth will be under control avoiding cancer, cancer relapse or even its metastasis.

**Keywords:** photons; yin-yang; psychological stress; cancer; running.

### RESUMO

**Introdução:** A bioeletrografia mede a emissão de fótons e elétrons dos seres vivos, através dela é possível mensurar o estado de saúde das pessoas. **Objetivo:** Comparar mulheres com “câncer de mama” (CM), mulheres saudáveis sedentárias e mulheres saudáveis praticantes de corrida, quanto aos parâmetros pressão emocional, percentual yin (yin%) e percentual yang (yang%), através das fotos bioeletrográficas (FB). **Métodos:** Foram coletadas as FB dos 10 dedos das mãos de 11 mulheres sedentárias diagnosticadas com CM (G12) (idade:59±11), 18 mulheres sem diagnóstico de CM sedentárias (G3) (idade:46±15), e 8 mulheres sem diagnóstico de CM praticantes de corrida a pé (G4) (idade:45±9). As fotos foram obtidas e processadas através do equipamento e software da marca Bio Well e analisadas estatisticamente através do software IBM SPSS statistics 23. **Resultados:** foram observados maiores níveis de pressão emocional em G4 em relação a G3 e G12. Maiores níveis de yang% e menores níveis de yin% em G12 em relação a G3 e G4. **Conclusão:** Este estudo evidencia a possibilidade de utilização da bioeletrografia como uma opção na detecção de situações indutoras da elevação dos níveis da PE, bem como na quantificação destes níveis, verificando as condutas com melhores resultados no controle da PE. Também fica evidente a possibilidade de utilização da bioeletrografia na mensuração do equilíbrio percentual entre yin e yang em patologias instaladas ou como profilaxia, antes de manifestações clínicas, como por exemplo no equilíbrio entre a oncogênese (yang) e genes supressores (yin), pois uma vez mantido este equilíbrio a proliferação de CTC estará sob controle, evitando o câncer, recidiva ou mesmo metástase.

**Palavras-chave:** Fótons, yin-yang, estresse psicológico, câncer, corrida

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## INTRODUCTION

Electrography consists in the image obtained through the emission of photons and electrons (EPE) from materials surfaces when under influence of an electromagnetic field with specific characteristics. When those are biological materials, this phenomena is named after bioelectrography<sup>(1,2,3)</sup>.

Bioelectrobiography applied to the human organism is based on its electrical activity. Electrons and consequently photons measured at bioelectrography mainly derive from the transfer of electrons in stimulated state throughout both albumin chain of molecules and free radicals born at blood and other tissues <sup>(4,5)</sup>.

Human body's electrical condition gets altered under a pathological state on comparison to healthy one. Once the electrical activity is altered, so is the electrons flow among the many body parts. Therefore, the organism's EPE in a pathological state will present a different pattern from that in a healthy condition<sup>(2,3,5)</sup>.

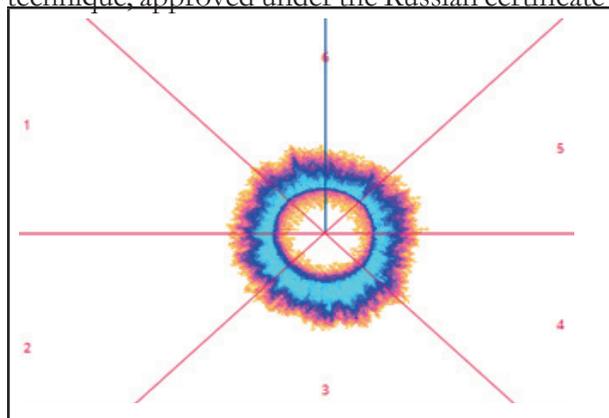
Bioelectrography is currently recognized by the Russian Health Ministry as a medical technique, approved under the Russian certificate

# FSR 2010/07602 from May, the 5th, 2010.

The traditional Chinese medicine (TCM) attests the existence of a channel web for the energy flow in the human body. Those channels, also known as meridians, connect the body surface to internal organs. Those channels are due to transport energy all over one's body <sup>(2,3,5)</sup>.

There are experimental evidences pointing out those meridians match connective tissue. Interstitial connective tissue – including subcutaneous one – compose a continuous web involving all the muscles, bones and tendons, spreading itself up to the deepest internal body areas, permeating every organ, nerve, blood and lymphatic vessel<sup>(7,8,9,10,11,12,13,14,15)</sup>.

The main meridians pass through toes or fingers and connect to further meridians. Once those energy channels connect to body's organs and systems, they have been used over thousands of years in TCM to restore corporal homeostasis. From that reasoning a diagram has raised (Figure 1), relating fingertips EB areas to the health condition of human body's organs and systems <sup>(16,17)</sup>.



**Figure 1** - Pinky finger EP and organs correspondent areas.

- 1- Duodenum
- 2- Ileum
- 3- Mamary glands
- 4- Right kidney
- 5- Heart
- 6- Coronary veins

Meridians are classified as yin or yang. For TCM, yin-yang concept is the base for understanding physiological processes, pathologies and treatments. Yin and yang represent opposite but also complementary qualities. Therefore, when yin overwhelms it will demand a yang decrease and vice-versa<sup>(18)</sup>.

In organisms, preponderant yang systems are responsible for transformation, digestion and excretion of “impure” substances from food and fluids. Yin systems stock “pure” essences derived from transformation processes. In other aspect, yang corresponds to function meanwhile yin relates to structure<sup>(18)</sup>.

Movement, ascension, brilliance, progression, hyperactivity and functional diseases belong to yang. Quietude, descent, obscurity, depravity, underactive and organic illness relate to yin<sup>(18,19)</sup>.

Accordingly TCM, any disease pathogenesis is caused due yin-yang unbalance. Classic TCM literature, Su Wen, – claims: “If yin and yang are in a relative balance, all the vital activities will be normally sustained; if yin and yang get separated, the vital essence will be totally depleted”. Therefore, accordingly TCM, cancer comes from yin-yang unbalance<sup>(32)</sup>.

Cancer characterizes by disorderly cells growth, invading tissues and organs with metastasis possibility<sup>(20)</sup>. Studies based upon rebalancing yin-yang have demonstrated positive effects on fighting cancer: inducing apoptosis

at tumor and differentiating cells; regulating transduction cellular routes; suppressing tumor angiogenesis; inhibiting telomerase activity; regulating immune function; and reverting multiple drugs resistance<sup>(32,43)</sup>.

There are evidence the many cancer types are organized in a heterogeneous cells population hierarchy under different biological characteristics. Also, the ability of sustaining birth and growth of tumors relies only in a small portion of tumor cells, named cancer trunk cells (CTC) of tumor initiation cells.

CTC have been identified under several cancer types such and leukemia<sup>(44)</sup>, breast<sup>(45)</sup>, brain<sup>(46)</sup>, prostate<sup>(47)</sup>, and gastrointestinal cancer<sup>(48)</sup>.

Those studies demonstrate CTC are responsible for tumor growth and metastasis<sup>(49)</sup>.

Concerning CTC, oncogenesis stands for yang, and suppressive genes are yin. Once the balance between oncogenesis (yang) and suppressive genes (yin) is destroyed, CTC proliferation will be out of control, emerging cancer, cancer relapse, or even cancer metastasis. Due to control CTC proliferation, oncogenesis (yang) must be suppressed or the suppressive genes (yin) must be activated<sup>(32)</sup>. Breast cancer is one of the most common among women, behind non-melanoma one, responding for around 25% of new cases every year. Breast cancer may also but rarely attack men, representing only 1% of the disease total cases<sup>(21)</sup>.

In Brasil, breast cancer (BC) mortality rates are high due to late diagnosis. In 2015 it is estimated 57,960 new BC cases have happened. In 2013, 14,388 deaths were put on the records due to BC, being 181 men and 14,206 women <sup>(21)</sup>.

BC tends to a good prognostic when early diagnosed and treated. Mammography consists in one of the trial exams. Otherwise, the high cost and great demand equipments are not always available to the entire population <sup>(22)</sup>.

Bioelectrography shall be an alternative to mammography. Once that technique has been used for the assessment of organs and tissues health condition, it is possible there is significant correlation between EB data and BC existence or absence.

Cancer tends to generate EP. Psychological stress describes what people feel when they are under mental, physical or emotional pressure. People suffering from high levels of psychological stress shall develop health issues (mental and/or physical) <sup>(35)</sup>, including cancer patients' bad prognostic <sup>(35,36,37,38,39,40)</sup>.

EP increase is also present in moments preceding competitions, compromising one's athletic performance <sup>(23,24,25)</sup>. Responses to EP increases are regulated through hypothalamic-pituitary adrenal axis activation and sympathetic nervous system, acting together <sup>(26,27)</sup>. Every organs and systems function are regulated by the autonomic central nervous system (ACNS), composed by sympathetic ANS (SACNS) and parasympathetic ANS (PACNS) <sup>(34)</sup>. Bioelectrography measures ANS activation and the balance between SACNS and PACNS <sup>(16)</sup>. It is clearly observed in the statistically significant

correlations between EB data and heart rate variability <sup>(28)</sup>, and systolic and diastolic pressure <sup>(29)</sup>, sweating through the skin <sup>(30)</sup>, and physical and psychological stress levels <sup>(31)</sup>. Through those correlations, a 0–10 EP assessment scale has been created, where 0 stands for none EP, and 10 for maximal EP <sup>(16)</sup>.

### Study Objective

This study proposes to compare EP parameters and yin-yang percentages obtained through EB from all of the ten fingertips. Subjects are BC women; sedentary healthy women; and runners healthy women.

### METHODS

Accordingly Lakatos <sup>(33)</sup>, this is descriptive and comparative study, being part of a greater coverage project approved by UNIMEP Ethics at Research Committee (protocol #88/2015).

EB from all of the ten fingertips were collected from 11 sedentary women diagnosed with BC, aged  $59 \pm 11$  years, named as Group 12 (G12); 18 sedentary healthy women free of any BC records, aged  $46 \pm 15$  years, named as Group 3 (G3); and 8 healthy runners women free of any BC records, aged  $45 \pm 9$ , named Group 4 (G4).

All of the BC diagnostics were confirmed through biopsy.

Previously to data collecting, all of the subjects were under a 3h fasting, have not had drunk any alcoholic beverage, and were non-tobacco users. They also have not had any medications 24h previously to the data collecting. Fifteen minutes previously to the data collecting, subjects were put in a stretcher in a calm environment where they stood laying down and awake.

Group 4 data collecting has been done in a time frame between 30 – 60 minutes previously to the beginning of a running race or its simulation.

EB were obtained and processed through Bio Well hardware and software under these features: pulse current lasting 10mcs; repetition frequency 1000Hz; induction interval 1s; voltage pulse range under 3,5kV; image resolution 380x285 pixels.

Data were statistically analyzed through software IBM

SPSS statistics 23, and significance level has been pre-set as  $P < 0.05$ .

## RESULTS

For the results analysis, a multivariate variance analysis (MANOVA) has been used, run through software IBM SPSS Statistics 23. Table 1 presents average and standard deviation of the assessed parameters at each of the three groups.

**Table 1:** Average and standard deviation of the group analyzed parameters

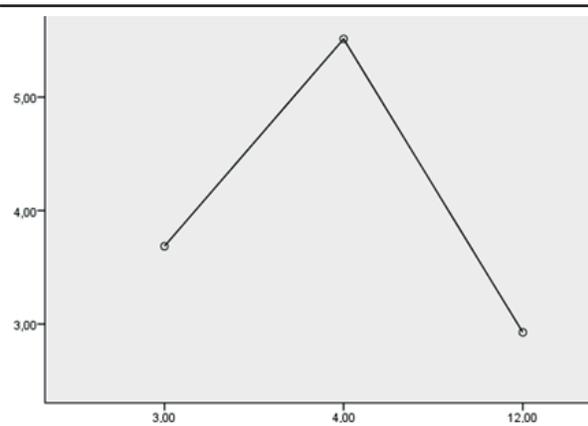
Analyzed Parameters	Groups	Average	(±) SD	Subjects
Emotional Pressure (EP)	3.00	3.6856	1.44971	18
	4.00	5.5125	1.89685	8
	12.00	2.9273	0.40881	11
	Total	3.8551	1.62060	37
Yin Percentual Value (Yin%)	3.00	52.1317	1.98485	18
	4.00	52.8913	1.96133	8
	12.00	50.3727	0.73231	11
	Total	51.7730	1.92319	37
Yang Percentual Value (Yang%)	3.00	47.8683	1.98485	18
	4.00	47.1088	1.96133	8
	12.00	49.6273	0.73231	11
	Total	48.2270	1.92319	37

Assumptions for MANOVA acceptance: independence, random sampling, existence of multivariate normality, and equality of variance-covariance matrices were all satisfied. The analysis revealed there is a multivariate difference among the

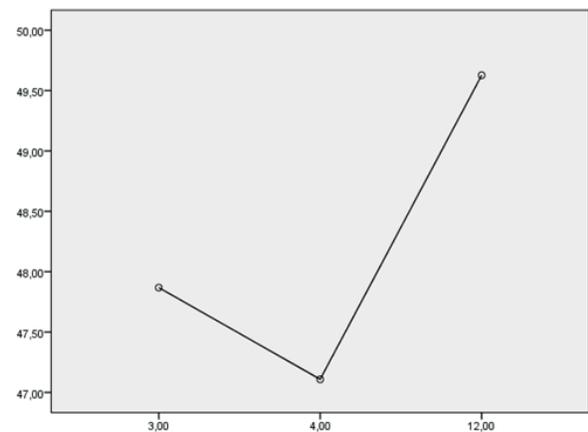
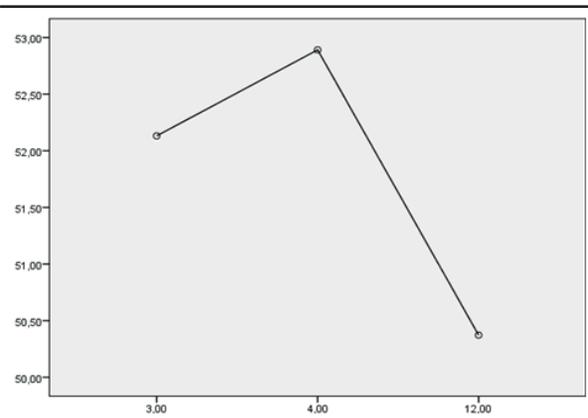
three groups. It is unlikely to have happened only due to sampling error;  $F(4,66) = 5.439$ ;  $p$  value = 0.001; Wilks' lambda = 0.566; observed power = 0.966. The post hoc has been run through Scheffe's test, and results are displayed on Table 2.

Dependent Variables	(I) Groups	(J) Groups	Averages Difference (I-J)	Standard Errors	Sig.	Confidence intervals 95%	
						Lower Limits	Upper Limits
Emotional Pressure	4.00	3.00	1.8269*	0.57651	0.012	0.3513	3.3026
	12.00	3.00	-0.7583	0.51924	0.355	-2.0873	0.5708
	12.00	4.00	-2.5852*	0.63043	0.001	-4.1989	-.9716
Yin%	4.00	3.00	0.7596	0.72604	0.584	-1.0988	2.6180
	12.00	3.00	-1.7589*	0.65392	0.038	-3.4327	-0.0851
	12.00	4.00	-2.5185*	0.79395	0.012	-4.5508	-0.4863
Yang%	4.00	3.00	-0.7596	0.72604	0.584	-2.6180	1.0988
	12.00	3.00	1.7589*	0.65392	0.038	0.0851	3.4327
	12.00	4.00	2.5185*	0.79395	0.012	0.4863	4.5508

**Graphic 1** presents emotional pressure averages of the three groups in a 0-10 scale



**Graphics 2 and 3** present yin and yang percentages, in this order, based upon a 0-100% scale.



## DISCUSSION

EP was greater at G4 related to G3 and

G12 (Graphic 1). Those differences are shown as statistically significant at the level 0.05. At this same significance level there were not found differences between G12 and G3 (Table 2).

The greater EP in G4 may be explained due to the data collect being done in a 30-60 minutes time range prior to a running race or its simulation. Scientific literature demonstrates there are increased EP related responses in moments briefly prior to competitions <sup>(23,24,25)</sup>.

People diagnosed with BC tend to present greater EP in comparison to population's average <sup>(36,37)</sup>, mainly in the period between diagnosis and begging of the treatment <sup>(38,39,40)</sup>.

In our study, the subjects (G12) have not had initiated treatment, but were all aware it would start at most within two weeks after EB data collecting. Accordingly the report of our subjects, the information concerning the beginning of the treatment made them feel "calmer".

To know the treatment would be initiated may have been the cause of finding no differences statistically significant between G12 and G3.

The exaggerated EP increase has a negative correlation and statistically significant concerning the athletic performance <sup>(41)</sup>. EP increase is also connected to the emerging of several pathologies <sup>(42)</sup> and bad cancer patients' prognostic <sup>(35,36,37,38,39,40)</sup>. Bioelectrography comes up as an option for detecting EP levels increasing inductive situations, as well for quantifying those

levels, verifying procedures with better results on EP control.

Yang<sup>0</sup>% percentual was bigger at G12 related to G3 and G4. Those differences are shown as statistically significant at the level 0.05. At this same significance level there were found no differences between G3 and G4 (Table 2).

The biggest yang<sup>0</sup>% found at G12 corroborates the scientific literature. It claims yang matches function, meanwhile yin stands for structure <sup>(18)</sup>. Hyperactivity and diseases concern yang. Underactive and organic diseases concern yin <sup>(18,19)</sup>.

Cancer consists in a cellular function alteration due to hyperactivity, resulting in disordered cell growth <sup>(20)</sup> and characterizing excessive yang.

From CTC perspective, oncogenesis is yang, and suppressive genes are yin. Once the balance between oncogenesis (yang) and suppressive genes (yin) is destroyed, CTC proliferation turns out of controls, emerging cancer, cancer relapse or even its metastasis <sup>(32)</sup>. The re-balance between yin-yang concerning each cancer type may be restored through phytotherapy known for millenniums on East civilizations <sup>(50,51,52,53,54,55)</sup>.

Yin<sup>0</sup>% was smaller at G12 related to G3 and G4. Those differences were shown statistically significant at the level 0.05. Between G3 and G4 there were found no differences at this same significance level (Table 2).

Once yin and yang are opposite and

complimentary qualities, when yin preponderates, yang is lowered, and vice-versa <sup>(18)</sup>. This might be better observed in Graphics 2 and 3, and Table 2. Therefore, a lowered yin<sup>0</sup>% related to yang<sup>0</sup>% regards the same characteristics explained for an excessive yang<sup>0</sup>%.

## CONCLUSION

This study points out the possibility of utilizing bioelectrography as an option for detecting situations EP levels increasing inductive, as well as quantifying these same levels, verifying procedures with better results on EP control.

It is also clear the possible utilization of bioelectrography for measuring the percentage yin-yang balance at installed pathologies or as a prophylaxis method prior to clinical symptoms. For example, the sustained balance between oncogenesis (yang) and cancer suppressive genes (yin) keeps the CTC proliferation under control, avoiding cancer, cancer relapse or even metastasis.

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#### Potential Conflict of Interest Disclosure

All the authors declare NO conflict of interest in any forms.