JOHREI EFFECTS ON WATER: A PILOT STUDY BY COUNTING DROPS

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Background: Water is a key ingredient in the creation and sustainment of life. Moreover, water may be a key vehicle in the processes of energy healing, such as in the preparation of homeopathic remedies and spiritual treatments. Given these properties, the purpose of this study was to investigate whether the application of Johrei to water could lead to significant changes in the hydrodynamic behaviour of the fluid.

Methods: Four regular Johrei practitioners (P1, P2, P3 and P4) were selected for this study. Dripping water produced at the tip of a capillary was used as the hydrodynamic behaviour model. This behaviour was modelled mathematically, and tuning parameters φ_4 and τ were used to assess significant differences in the dripping water samples that were subjected to Johrei compared with the samples that were not so treated. The tuning parameters were obtained using the Levenberg-Marquardt fitting algorithm. The data sets for each Johrei practitioner and the control experiment were analysed using ANOVA and a paired t-test.

Results: The mathematical model exhibited an excellent fit to our data, generating correlation coefficients (r) greater than or equal to 0.999. Significant differences were observed in both τ (P1 and P2, $P < 0.05$ and $P < 0.01$, respectively) and φ_4 (P2, $P < 0.01$). As expected, no significant difference for the control experiment (without Johrei) was observed.

Conclusions: Our results indicated a statistically significant change in the hydrodynamic behaviour of water correlated with Johrei treatment for 50% of the participating Johrei practitioners.

Key words: Johrei, water cluster, energy healing, surface tension, viscosity, mathematical model

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INTRODUCTION

The use of alternative therapies is growing worldwide. Nevertheless, such methods, which are based in spiritual energy healing, are not fully accepted by the conventional medical and scientific communities. Johrei is one such alternative therapy that is practiced by an increasing number of people in the world. Johrei was created by Mokiti Okada in Japan (1935), and Johrei acts on its recipients through a process of spiritual purification. The practitioner believes that a spiritual energy flows through his body and that it can be directed through his hands into another person, thereby improving the recipient's health.

So far, there have been few papers evaluating the efficacy of the Johrei healing technique. In the first paper to address the issue, Gomes et al.[1] demonstrated the considerable influence of Johrei on the germination rate of irradiated seeds (gamma radiation, Cesium 137). Later, an article by Laidlaw et al.[2] suggested that Johrei had a beneficial effect on the mood of practitioners. Following that study, Reece et al.[3] demonstrated that Johrei recipients experience a significant decrease in their negative emotional states, whereas positive emotional states seem to increase in both Johrei recipients and providers. Brooks et al.[4] have also concluded that after Johrei sessions, patients in treatment for substance abuse experience enhanced energy, emotional states, and well-being, as well as decreased pain and depression. Data from Gasiorowska et al.[5] indicates that Johrei can serve as a good alternative method for the relief of functional chest pain. In 2010, Teixeira et al.[6] investigated the growth of sucrose crystals and demonstrated that Johrei increased their crystallization with respect to the control. Additionally, Abe et al.[7] have demonstrated that Johrei increases cell death and decreases cell proliferation of gastric cancer cells in vitro. Recently, Buzzetti et al.[8] have studied brain markers for sleep and have verified that mice subjected to Johrei therapy exhibited improved sleep patterns compared with the control group of mice when subjected to sleep interruption. By contrast, Taft et al.[9] did not detect any difference between the control and Johrei-treated cancer cells in relation to death and proliferation. Hall et al.[10] have also reported that Johrei did not heal cultured cells exposed to radiation. Radin et al.[11] reported that a single application of Johrei was not able to significantly alter the development of astrocytes cell cultures or

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generating random numbers produced by electronic devices; however, significant changes were observed for both systems, simultaneously, after repeated applications of Johrei.

In this context, Teixeira et al.[6] have proposed a hypothesis concerning the importance of water in the process of interaction between Johrei and matter, as though water may act as a mediator for the physical manifestation of Johrei. One of the mechanisms that was considered in this work to explain the observed changes in the efficiency of the crystallization of sucrose was a possible change in the state of organization of the water into clusters.[12–18] Furthermore, water molecules seem to have a key role to the physical manifestation of forms of energy healing, such as homeopathy; Bach Flowers, and Johrei.[6,19–24] Among the various properties of the liquid state that can be related to these organizational changes (cluster formation), we emphasize the hydrodynamic behavior of water in this work. Using a simple experimental setup to address this possibility, a study was conducted to demonstrate whether Johrei can act on water in the liquid state and change the hydrodynamic behavior of its dripping process.

System Modeling

The chosen experimental system was the detachment of water droplets from the tip of a capillary tube (dripping) because of its experimental simplicity and because the physical properties of this system are well studied.[25–30]

The experimental system that was used consisted of a vertically oriented cylindrical glass tube with an inner diameter of approximately 7 mm, whose lower portion terminated in vertical capillary tubing of a length much greater than the inner diameter. The glass tube behaved as a reservoir, and when it was filled with water and the water was allowed to flow freely (as a Newtonian fluid) through the capillary, a dripping phenomenon was produced (not chaotic) at the lower end of the capillary. The mathematical modeling of these phenomena was performed using the equations of Poiseuille and Bernoulli, and the result was a function that describes the time dependence of the accumulated droplet count from the beginning of the experiment, given as follows:

$$D(t)=\varphi_4\left(1-e^{-\varphi_5 t}\right) \tag{1}$$

where

$$\varphi_4=\left(\varphi_0+\varphi_1-\varphi_2-\varphi_3\right)$$

with

$$\varphi_0=\frac{\rho g h R^2}{2\gamma(r_{ec}f)},\ \varphi_1=\frac{\rho g z(0) R^2}{2\gamma(r_{ec}f)},\ \varphi_2=\frac{(4\rho g h)^{\frac{1}{3}}R^2}{\left(3\gamma\, r_{ec}^4 f^3\right)^{\frac{1}{3}}},$$

$$\varphi 3=\frac{R\cos\theta}{(r_{ec}f)}\ \text{and}\ \varphi_5=\frac{\rho g r_c^4}{8\eta h R^2}$$

The parameters in the equation are as follows (Figure 1):

R = internal radius of the upper reservoir tube (7.0 mm), r_c = internal radius of the capillary (0.25 mm), r_{ec} = external radius of the capillary (0.70 mm), h = length of the capillary (80 mm), $z(0)$ = initial height of the water column measured from the base of the reservoir tube (200 mm), θ = contact angle between the liquid and the inner wall of the upper reservoir tube, f = Harkins correction factor,[31–33] η = viscosity of water, γ = surface tension of water, ρ = density of water, and g = acceleration of gravity.

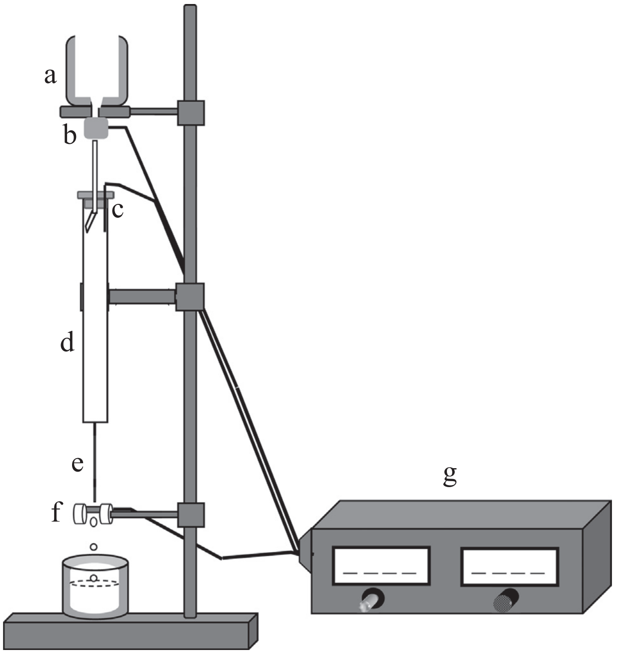

Figure 1. Schematic diagram of the drop-counting system. (A) Reservoir glass tube—water reservoir used in the experiments; (B) solenoid valve—electromechanical control of the opening for the water droplets; (C) level sensor—trigger of the electronic system used to close the solenoid valve; (D) cylindrical glass tube—water reservoir for the droplet system, used to define the precise amount of water to be used in each assay; (E) capillary tube—water duct, used to establish the conditions for the droplet-formation process; (F) photoelectrical system—electrical pulse generator triggered by the interruption of the light beam by each droplet, allowing the system to count the droplets; and (G) electronic system—system used to control the filling of the cylindrical glass tube (D) and the recording of the number of drops per time.

Eq. (1) was used to fit the data of the droplet count versus time. From the fitting, the empirical parameters φ_4 and φ_5 were obtained, and these parameters were used to investigate possible differences between the Johrei-treated water and the non-treated control. In fact, τ, the inverse of φ_5, was used instead of the raw φ_5 value because τ is the measured time constant of variation in the water-column height in units of seconds. The primary purpose of this work could initially be evaluated simply by means of the empirical parameters φ_4 and τ. Later in this article, we discuss the results of calculating the values of φ_4 and τ, as predicted by the model, using values of ρ, η, and γ obtained from standard tables[34] for a temperature corresponding to that of one of the control experiments (without treatment). However, a direct interpretation of the results in terms of the effects of Johrei on physical parameters such as surface strength, density, and viscosity is not performed because of the lack of a more extensive validation of