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# Improvement of Postural Reprogramming by a Nanotechnology Device

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**Abstract:** The acquisition by man of the upright posture marks a great achievement in its evolutionary path allowing it to integrate itself more efficiently with the environment in which it finds itself living, both in terms of the individual's ability to face a stressful situation and therefore in the life of relationships, both in terms of movement efficiency and muscle coordination, fine and precise demand in particular sports disciplines. Since it is well known the interaction between electromagnetic field and biological structures, electromagnetic devices that in some way can interact with the electromagnetic field of man may influence and improve some functions of the organism. The purpose of the following work is to demonstrate how the information recorded in a nanotechnology electromagnetic postural devices, can modulate the antigravity muscle tone, thus influencing the posture of the subjects, to whom the devices were applied, evaluating the changes in the pressure center by means of the static stabilometric examination. The postural setting of the subjects, examined before and after the application of nanotechnological devices, was significantly improved. In conclusion, it is possible to hypothesize that the electromagnetic field has generated a rebalancing of ionic exchanges at the level of the cellular plasma membrane, with the consequent repolarization and normalization of the conductivity, which has influenced the activity of the nervous system. The results of this experimental work tend to confirm the potential that quantum physics can reserve in the field of medicine.

**Keywords:** Nanocrystals, Quantum Dots, Nanotechnology Device, Electromagnetic Field, Proprioception

## 1. Introduction

Organism are governed by energy, therefore also capable of emitting an electromagnetic field. The human organism is able to behave as transmitter and receiver of an electromagnetic field (EMF) emitted and modulated with a band ranging from about 1.5 to 9.5 Megahertz (EMF generated by cells and organs). Recent studies of quantum physics, have reported that the emission band of the human body extends beyond short waves, but also up to the light emission band. In terms of frequencies, the visible spectrum varies between 400 and 790 terahertz. The maximum average sensitivity of the human eye is probably at 560 nm (540 THz) of the electromagnetic spectrum [1].

An electromagnetic field is an oscillatory phenomenon composed of two quantities, an electric field, given by the presence of positive or negative electrical charges, that disturb a space and a magnetic field, given by the movement that these positive or negative charges present in a space. Hence, both the electric field and the magnetic field interact with each other and are concatenated, thus determining an EMF [2].

The natural physiological activities of the human organism, and animal in general, are mediated by physical fields, which are referable to only four types of fundamental forces: gravitational, electromagnetic, strong and weak nuclear [3].

A multilink neural network of vestibular, somatosensory (proprioceptive, tactile), and visual systems, in humans, is responsible of balance during upright standing [4].

Recent data were collected in support of the hypothesis that cerebral mechanisms integrating visual, somatosensory, and vestibular inputs for balance, are more effective during sports activities [5]. Indeed sports activities reduced the risk of falling and improved postural performance in aged people [6] .

Based on current knowledge on quantum physics, applied in the field of electrophysiology, in theory, it is possible to influence and improve the functions of the organism by acting at the level of the electromagnetic field. From these premises, it will be possible to design devices that are able to interact with the EMFs of an organism to produce beneficial effects [7].

Electromagnetic devices, which can interact with human EMF, influencing their functions, have been designed according to a reported experimental studies [8]. This observation, demonstrated that, by inducing the electromagnetic activity of an electromagnetic spectrum (7-12 Hz), on an electric field in stationary conditions, a quantum variation of the electric field can be obtained. This variation, when compared with those of the electromagnetic spectrum activity on the target, is visible through the biological effects. The electric field, which was induced by the quantum state electromagnetic activity variations of the electromagnetic sprectum, adopts the characteristics of the same frequencies. Such variations, are transferred to a support (H. I. T. devices), that posses a suitable electronic structure, to maintain the induced quantum characteristics, stable by the use of specific structured “Quantum dots”.

In conclusion, the H. I. T. postural devices embedded in any wearable used format, are electromagnetic supports that exploit a nanotechnology system inside them, in which the information is included in specific designed “Quantum Dots”. The devices are activated by the wearer's heat and also by a wide light spectrum, which will produce an electromagnetic field and vibrations, that will activate the nanocrystals.

The reported experimental data shows evidences on how the information recorded in the H. I. T. device can affect the posture of the subjects, to whom they were applied.

## 2. Experimental Protocol

### *2.1. Subjects*

20 subjects of age between 25 and 35 years old, underwent stabilometric examination, standardized according to the protocol of the “French Society of Posturology” [9]. The subjects did not present equilibrium disorders or related problems. Data were compared with that of subjects to whom a placebo patch was applied. Subjects who are under drug treatment or undergo gnathological and / or orthodontic treatments have been discarded.

### *2.2. Stabilometric Apparatus*

Static posturography was performed with patients standing on a stable force plate sensitive to vertical force. The stabilometric platform used for this study was a force plate mounted on three strain-gauge force transducers positioned at the vertices of an equilateral triangle, providing description of body sway in terms of displacement of patients’ center of pressure [Standard Vesibology Platform (SVeP) 3.5 system, Amplifon, Milan, Italy]. The platform was equipped with 3 transducers placed at the top of an equilateral triangle of 400 mm side, complete with acquisition electronics and external connection cables in the standard measurement of 3 meters. The platform communicates with a personal computer via a USB interface that processes data acquisition through a dedicated software. The software used allows the execution of the standard test lasting 26 or 52 seconds, under different conditions: open eyes, closed eyes, soft soil, rigid soil, with the ability to show the patient stabilizing or destabilizing images; - recording of the test and calculation of all the main parameters; - registry management of the patient archive, with the possibility of saving the tests on removable devices; numerical and graphical representation over time of the coordinates on the sagittal and frontal plane with indication of the minimum, maximum and average values and of the normality ranges detected in statistical mode; - calculation of the surface of the oscillations calculated on the basis of the ellipse that contains 90% of the points sampled; - calculation of the average speed of displacements and the length of the oscillations of the subject; - graph of frequency spectrogram obtained by rapid Fourier transform (FFT) with separate evaluation of the oscillations on the sagittal and frontal plane; graph of the stabilogram, of the kinesigram state, of the autocorrelation in X and Y and of the intercorrelation; comparison of any two tests, provided they are performed at the same frequency, both in numerical terms (Romberg indices) and graphs; - printing of parameters and graphs complete with personal data and personalized page header. The collected data, on the posture of the subject, by means of the stabilometric examination are presented, as condensed in the unrolling of the track over the time (stabilometric trace), which then allows to highlight any slow and progressive slipping of the subject in a certain position (drift) or other behaviors abnormal, such as pendulums or abrupt movements (Figure 1).

### *2.3. Electromagnetic Devices (H.I.T Devices)*

The patented H.I.T. postural devices, appropriately treated, with optical, magnetic, electrical and acoustic frequencies, can transfer very weak magnetoelectric signals, in the order of nanotesla (nT). This signals are able to induce an action on cellular structures, fundamental for cellular communication and recognition, by a direct activation of protonic and ionic fluxes, lowering the impedance in the nerve cells.

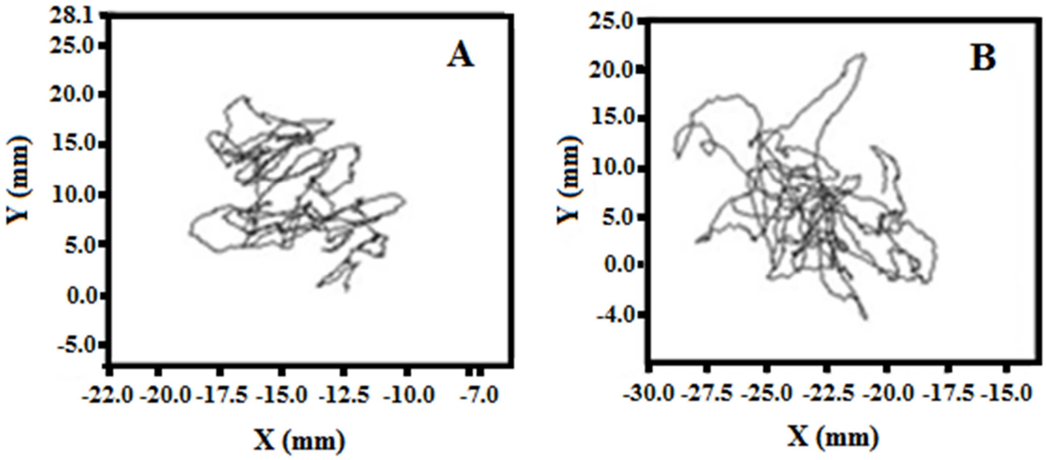


*Figure 1. Representative stabilometric trace of a patient with open eyes (A); representative stabilometric trace of a patient with closed eyes (B).*

### 2.4. Protocol of Examination

Patients were guided to a relaxed orthostatic position, arms extended along the body with open palms, sole of feet resting on the ground, malleoli in contact and tips of feet spread to form an angle of about 30°. All this took place in a place free of noises and lights that are too intense or too light. The subject was then asked to fix a point in front of him at a distance of about three meters. Typically, the devices are positioned on the wrist of the examined subject. We noticed that this localization could influence the investigation, since being the patch visible to the subject under examination the measurements could be less significant. For this reason the devices have been positioned on the skin near the Xifoid and C7 vertebra process, being these as the wrist, the plantar surfaces and other trigger points, representing connecting points of somatosensory afferents (proprioceptive and exostoceptive) of segments bodies distant from each other and functionally related to the four muscular kinematic chains (extension, flexion, opening, closure and lingual chains). Between one registration and the other, patients were not allowed to take drinks and / or drugs to prevent them from modifying postural compliance through various mechanisms. To the subject were permitted to rest sitting while waiting for the next exam.

Each stabilometric examination included data acquisition in the following conditions: open eyes (L1); eyes closed (L2), head retroflexed-eyes closed (L3), eyes open–mat (L4), eyes closed –mat (L5), eyes closed-head retroflex- mat (L6).

In consideration of the possibility that the subjects subjected to the stabilometric test could undergo a learning phenomenon, with consequent distortion of the results of the tests performed sequentially, the protocol of experiments was carried out both by a cross-over study with wash-out in the short and medium term and a study replicated after months with a consequently a long-term wash-out. The subjects examined did not undergo learning phenomena (data not shown). In this report we present a representative cross-over study, during which the stabilometric tests were performed at times 3 ,45, 90 minutes (Figure 2 ,3, 4), on the same patient and the other with a completely causal order.

### 2.5. Statistical Analysis

The differences of the performance on posturography, was elaborated using analysis of variance (t-test) in each group before and after treatment. We also performed analysis of variance between the two groups. Values of $p < .05$ were considered statistically significant.

## 3. Result and Discussion

The components that make up the postural tonic system are: somato-sensorial, vestibular and visual system, whose signals (input), assumed moment by moment, are integrated and processed by the central nervous system, which through outgoing nerve impulses (out-put), guarantees the maintenance of the antigravity muscle tone [10].

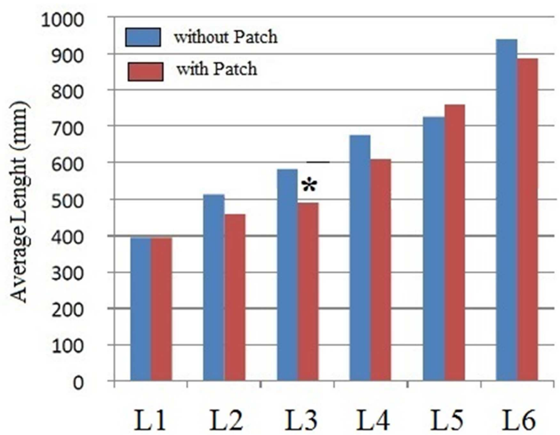


*Figure 2. Variation expressed as average length in mm, of static posturography obtained by a stabilometric platform of subject undergoing examination for 3 minutes by the application of devices (red column), in six parameters: open eyes (L1); eyes closed (L2), head retroflexed-eyes closed (L3), eyes open–mat (L4), eyes closed –mat (L5), eyes closed-head retroflex-mat (L6) as described in the Materials and Methods. The data represent the average of at least 10 observation with a S.D. lower than 5%. Statistically significant (p < 0.05) (*) is reported in comparison to control (blue column).*

The exercises were performed starting from the open-eyed position (L1), in which all three components of the postural control system were expressed, up to the closed-eye position / retroflex head / mat (L6), where the whole system could rely exclusively on the apparatus vestibular, while the other components were suppressed or strongly limited.

The average lengths drawn, highlight the positive effect of the presence of the patch. It is interesting to note that the average of lengths, increases progressively in relation to the progression of the tests, since it subtracts components from the postural control system, passing from an average double length to L6 with respect to the exercise performed in L1.

The differences between the average lengths, obtained without applying the patches, detected at three observation times (3,45,90 minutes of exercise, blue columns), under the different conditions mentioned (Figures 2,3 and 4), show not significant statistically differences. In the graph of Figure 2, it is appreciable a small significant difference in L3, (p> 0.05), between the observation with the patch (red column) and the control (without patch). In the graph of Figure 3, there are three significant differences in L2, L3 and L6 (p> 0.05), between the observation with the patch (red column) and the control (without patch). The difference with respect to the control, among these three parameters (L2, L3 and L6) become even more evident in the graph of Figure 4.

To avoid that the subjects examined with the stabilometric test, could undergo a learning phenomenon, with consequent distortion of the results, the protocol of experiments was performed both by a cross-over study with a short and medium-term wash-out and a study replicated after months with a consequent long-term wash-out. It is possible to state that the subjects examined did not undergo learning phenomena (data not shown).

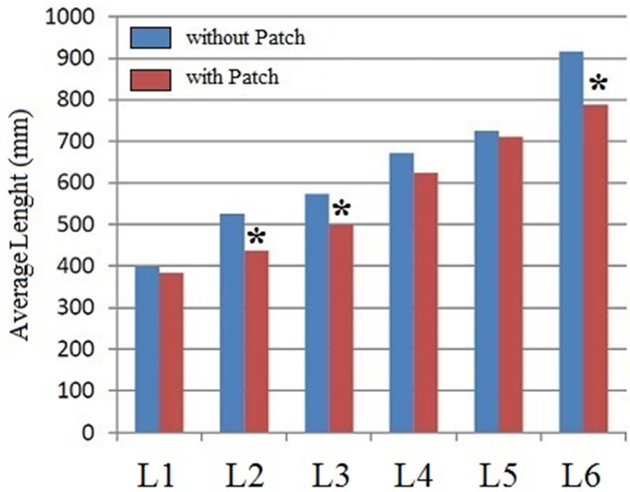


***Figure 3.*** *Variation expressed as average length in mm, of static posturography obtained by a stabilometric platform of subject undergoing examination for 45 minutes by the application of devices (red column), in six parameters: open eyes (L1); eyes closed (L2), head retroflexed-eyes closed (L3), eyes open–mat (L4), eyes closed –mat (L5), eyes closed-head retroflex-mat (L6) as described in the Materials and Methods. The data represent the average of at least 10 observation with a S.D. lower than 5%. Statistically significant (p < 0.05) (*) is reported in comparison to control (blue column).*

Therefore, it is possible to affirm, that the subjects, while repeating the test several times also consecutively in the same session or after a longer time, did not significantly improve their performance. The analysis of the difference between the averages has in fact highlighted that there are no significant differences related to the average lengths measured at baseline and long-term (60 days), or short and medium-term (at 3, 45 and at 90 minutes), reaching the conclusion that the subjects did not undergo learning phenomena.

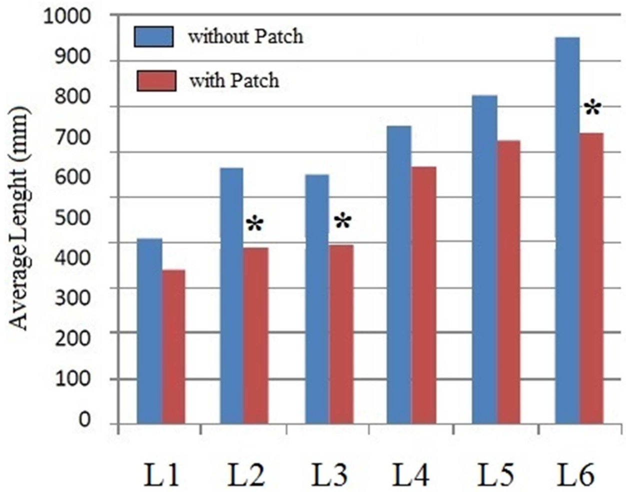


***Figure 4.*** *Variation expressed as average length in mm, of static posturography obtained by a stabilometric platform of subject undergoing examination for 90 minutes by the application of devices (red column), in six parameters: open eyes (L1); eyes closed (L2), head retroflexed-eyes closed (L3), eyes open–mat (L4), eyes closed –mat (L5), eyes closed-head retroflex-mat (L6) as described in the Materials and Methods. The data represent the average of at least 10 observation with a S.D. lower than 5%. Statistically significant (p < 0.05) (*) is reported in comparison to control (blue column).*

On the whole, under these conditions, at the afferential level, the somatosensory system benefited from the therapeutic action of the devices, even in the conditions in which the mat made it more difficult to maintain the upright position. We therefore hypothesize that the electromagnetic field, generated by the devices, has given informational coherence to the receptor system, translating from the biological point of view into a rebalancing of ionic exchanges, at the cellular membrane level, with a consequent repolarization of the cell membrane and normalization of the conductivity [11]. In this way the receptor peripheral information thus resumed, were more correctly integrated to the higher centers, which were able to reprogram, more precise answers on the whole system. Therefore, the result was a modulation of muscle tone and an improvement in the postural structure of the subjects examined.

## 4. Conclusion

From the results of the different observations presented, statistically analyzed and demonstrated significant, we can deduce that the action of the electromagnetic devices reported (H.I.T. postural devices), can interact with human EMF, influencing their functions, and in particular they play a balancing function of posture, acting on the three components of the postural control system [12]. On the basis of these activities it is possible to state that the application of the H.I.T. postural device can act on the bilateral muscle tone, leading to a reduction in the lack of accuracy in voluntary movements as expression of proprioception.

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