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Computerized Acupuncture for Prevention of Chronic Diseases

By Prof. Maria Kuman

Abstract- This article explains the nature of chronic diseases, the mechanism of their onset by stress, and how acupuncture cures them. Stress causes different delays in different biorhythms. These delays (phase shifts) accumulate in the genetically weak organ, which does not have enough energy to propel them. This creates chronological disorder in its biorhythms, which manifests as functional (chronic) disease of the organ. Since the phase-shift accumulation is a slow process, the onset of chronic diseases takes 5 to 7 years ('chronic' means 'slow'). Acupuncture cure chronic diseases through accumulation of the stimulation effect of a series of 14 to 20 daily treatments, which restore the biorhythms' order of the sick organ. However, the cure is slow and unpredictable by nature (because more than one series of treatments might be necessary). For that reason, the right approach to chronic diseases would be prevention and their slow onset leaves us plenty of time for this. The ancient pulse diagnosis, which is still practiced in Asia, is a powerful technique for early detection of minor imbalances, which can be eliminated with just one acupuncture treatment.

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Computerized Acupuncture for Prevention of Chronic Diseases

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I. Chronic Disease of an Organ Means Stress-Induced Chronological Disorder of Biorhythms

Our body is a self-organized system (Prigogine, 1984) [1]. According to a book of H. Haken (1978) [2] § 7.2: "*Self-organization can be described only if the external forces are included as parts of the described system ... and external forces are variables in the equation of evolution.*" Hence, for description of the dynamic of onset or cure of stress-induced diseases, we will need an evolution equation, which will include the external forces (in our case stressors) as variables.

Stress induces delays because the body needs to stop whatever it was doing at the moment and mobilize for response to the stressor. For the periodic chemical reactions in the body called biorhythms, these delays are called phase shifts. Experiments show that different biorhythms are phase shifted in a different way [3]. Since the biorhythms of the genetically weak organ are weakly integrated, stress disorders them first. As a result, the organ starts to malfunction or suffers chronic disease (G.G. Luce, 1970) [3].

The survival of our body depends on its ability to adapt. The more flexible and plastic is the biorhythm organization at all three levels: body, organs, and cells, the better would be the adaptation and the survival. To manifest such plasticity, the biorhythms need to be nonlinearly related and they are. But regardless how plastic the biorhythms' organization is, strong or prolonged stress could surpass the ultimate level, which the genetically weak organ can tolerate, and destroy the harmony of its biorhythms. (Prolonged stress means a series of stressors acting on the body within short time intervals, which allows the effects of stress to accumulate.)

The organ with disordered biorhythms would try to evolve to a state with new biorhythm order. However, in the new state the biorhythms would be more poorly associated because some energy has been used to mobilize for respond to the stressors. The more poorly associated biorhythms would make the organ better adapted to stressful environment, but its functioning would be sluggish; the organ will suffer functional or chronic disease.

II. The Dynamic of Onset and Cure of Chronic Diseases can be Best Described by the Non-Equilibrium Theory of Prigogine

The nonequilibrium theory of Prigogine [1] is the only theory that can explain the dynamic of onset and cure of chronic diseases and to explain why the cure of chronic diseases is difficult and unpredictable. According to the nonequilibrium theory, strong or prolonged force can drag a system very far from equilibrium to a stable far-from-equilibrium state (FES) with a deep energetic minimum and a new type of order.

Thus, each chronic disease, which is a result of strong or prolonged stress, is a stable far-from-equilibrium state with lower energy and new type of biorhythm order. According to the non-equilibrium theory (Prigogine, 1984) [1], it is difficult to drag a system out of a far-from-equilibrium state. Since it took time to reach the state of chronic disease, it would take time and efforts to cure the chronic disease. For this reason the cure of chronic diseases is difficult.

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The cure of chronic diseases is also unpredictable because the far-from equilibrium state of chronic disease has a new type of biorhythm order and leaving this state requires reordering. Since reordering is a state with chaotic nature, the outcome is unpredictable, which makes the cure of chronic diseases unpredictable. *Thus, if one series of acupuncture treatments didn't cure the chronic disease, the acupuncturists shouldn't be blamed for this because the cure of chronic diseases is unpredictable by nature.*

III. Nonlinear Mathematical Model

Considering the nonlinear connection of the biorhythms, the following nonlinear differential equation was offered for description of the phase-shift changes induced by stress.

$$J_i\ \omega_i' + D_i\ \omega_i + \Sigma\ d_{ij}\ (\omega_i - \omega_j) + \Sigma K_{ij} \cos\theta_{ij} = \Sigma\ E_{ij} = E \quad (1)$$

$\omega_i' = d\omega_i/dt$, $\omega_i = d\theta_i/dt$ was the frequency of the phase shift changes, J_i - inertial coefficient, D_i - coefficient of self-calming, d_{ij} - coefficient of mutual effect of calming, E_{ij} - "energy" coefficient, which reflects the energy of integration of the biorhythms. It varies from individual to individual and decreases with aging. Since the decrease with aging is slow, for a limited period of time E_{ij} can be considered a constant.

Let us assume that prolonged stress through a series of stressors acting through small time intervals has disordered the biorhythms of the genetically inherited weak organ (through the delays each stressor creates) and the organ has drifted to a state of chronic disease. The only way to cure the chronic disease is to use a series of daily acupuncture treatments. These acupuncture treatments are mild stressors, which would stimulate or add energy to the organ (Kuman, 1985) [4], and when done daily, their effect would accumulate. This would restore the health of the organ, i.e. cure the chronic disease.

Every mild stressor i (like acupuncture treatment) stimulates the body, i.e. adds to the energy of the biorhythm integration E_{oi} energy ΔE_{0i}. After a series of acupuncture treatments the equation of evolution will be

$$J_i\ \omega_i' + D_i\ \omega_i + \Sigma\ d_{ij}\ (\omega_i - \omega_i) + \Sigma K_{ij} \cos\theta_{ij} = \Sigma E_{ij} = E_i + \Delta E_{0i} - E_l$$

Since Hans Selye, who is considered the Father of Stress, claims that the energy recharge is never full, there is always a deficit of energy. To consider these inevitable losses, we have subtracted a term E_l (index l stands for losses, which means not full recharge).

The change in the energy of biorhythm integration ΔE_i under the influence of a mild stressor i will be proportional to the initial energy of biorhythm integration E_i with coefficient of proportionality μ_i

$$\Delta E_i = \mu_i\ E_i$$

Research shows that when disturbed by stressors different biorhythms need different time to go back to norm (see Luce, 1970, p. 135-138) [3]. Hence,

$$\Delta E_i = \mu_i\ E_i = T_{0i}\ dE_i/dt.$$

T_{0i} is the time a biorhythm needs to react to a stressor, which is different for different biorhythms.

In order to adequately describe the effect of prolonged stress as accumulation of the effect of a series of stressors (acting through relatively short time intervals), we have to postulate a nonlinear equation of the type

$$T_{\omega i}\ d\mu/dt = s\ (s + 1)\mu + u_i,$$

Where u_i is an external governing signal and the term s (s + 1) reflects the nonlinear accumulation of the stressors' effect with time.

When speaking about stability of a system of biorhythms, the first important question is: if the stability is lost (or is close to being lost), how should the external governing signal u_i be modulated to assure stability of the system again?

From the Lyapounov's conditions for stability [7] one can get:

$$u_i = -k_{pi}[\ \partial V/\partial\omega_i + T_i d/dt(\ \partial V/\partial\omega_i)] - \beta_i(\ \Delta E_i + k_{pi}\ \partial V/\partial t)$$

k_{pi} and β_i are positive numbers reflecting amplitude changes of the pulse of the diseased organ found with the traditional Chinese pulse diagnostics.

Taking the "potential" in the simplest possible quadratic form

$$V = \Sigma\ [(1/2)\omega_i^2 + r_{c,i}\ \omega_i\ \theta_i + (1/2)\delta_i^2],$$

One can get for the external governing signal the expression:

$$u_i = k_{pi}\ (\ \omega_i + r_{c,i}\theta_i + T_i\ (d\ \omega_i/dt + r_{c,i}\ \omega_i) - \beta_i[\ \Delta E_i + k_{pi}\ (\ \omega_i + r_{c,i}\ \delta_i)]$$

The last expression means that we must monitor all the time the phase shift changes, which induce amplitude changes in the measured pulse in pulsed diagnostic (Kuman, 1984) [5]. When the critical point $\Delta\theta_c$ is reached (or is close to being reached), the system becomes instable and is characterized by large amplitude changes. This indicates that the system of biorhythms is close to losing stability. Then we should try (through acupuncture needles or any other mild stressor) to change the phase-shift parameters θ_i, ωi, k_{pi}, $r_{c,i}$, T_i, β_i in such a way that the governing signal u_i could restore the stability of the system.

IV. Why should Acupuncture be Used to Prevent Chronic Diseases?

Since the cure of chronic diseases is difficult and unpredictable, we should do our best to prevent the oncoming chronic disease. Prevention is the only way to secure success in the cure of chronic diseases. What we offer here as preventive measure is to monitor certain body parameters: biorhythm phase shifts θ_i and the dynamic of their changes with time ω_i and $d\omega_i/dt$, the biorhythm's amplitudes and their changes k_{pi} and β_i, etc., and to be able to foresee the moment of biorhythm de-synchronization.

By using a suitable mild stressor such as acupuncture treatment, we could change these parameters and prevent the biorhythm de-synchronization, or in other words prevent the oncoming chronic disease. *Any mild stressor, such as mild laser, mild electric current, light, magnets, etc., could be used with the same success for the same purpose - to restore the balance* destroyed by stress, or prevent the chronic disease.

Mathematical modeling of Tikashi Nishikawa and Edward Ott [6] showed with simulation and analytically that if the system is influenced before reaching the threshold called bifurcation, a small push (just a few times larger than the noise level) has 90% chances to prevent the bifurcation from happening [6], which in our case means to prevent the chronic disease. Similar to what we have just proposed here for humans is already done for security evaluation of power systems to prevent power outages (Pang et al., 1974) [7]. Measuring the parameters of a system of generators of electricity, the engineers can catch the moment when the system is close to losing stability. Using Lyapounov's functions V, they are finding the correction parameters that will make the system stable. By correcting these parameters, they are preventing oncoming destabilizations. This saves time, money, and prevents electric power outages.

V. Conclusion

In antiquity acupuncture was used for prevention rather than cure of chronic diseases. Now, when we know that the cure of chronic diseases is difficult and unpredictable, we should be looking for prevention rather than cure of chronic diseases. For this purpose, we will need new medical techniques allowing early detection of the subtle changes preceding chronic diseases.

In ancient times, doctors were able to detect with pulse diagnosis very subtle deviations from norm and catch 'disease' that would appear 5 to 7 years later. It is not yet 'disease' because clinical complaints are not yet present, but if not treated with time it would turn into disease. In modern times, even when preclinical complaints are present, they are completely ignored. Such is the so-called 'moving pain', which moves from organ to organ.

Contemporary doctors presently classify the 'moving pain' as 'psychosomatic', which means the patients just imagine they have moving pain. It is always ignored because we do not have the necessary sensitive equipment to detect the subtle changes causing these symptoms. Neither can we explain them.

I think, the 'moving pain' reflects the movement of stress-induced phase shifts (delays) from organ to organ following the pathway of the organ's maximal activity described by 'the law of five elements' in acupuncture. When the phase shifts (delays) reach the genetically inherited weak organ, they accumulate there because the weak organ does not have enough energy to propel them. When the ultimate stress E_c is reached, which the weak organ can endure, the biorhythms of this weak organ will become desynchronized. This will lead to a dysfunction, or the genetically inherited weak organ will suffer functional (chronic) disease.

In the past (and presently) pulse diagnosis was successfully used in China, India, Vietnam, etc. for very early diagnosis of chronic diseases. Measuring the pulses (frequencies, amplitudes, etc.) of different organs on the surface of the body, and comparing the pulses on wrist, neck and ankles, these pulse diagnosticians can predict a disease 5 to 7 years before the symptoms would appear (or tell you about a disease you had 10 to 15 years ago). When the deviations from norm are caught early, one acupuncture treatment is usually enough to restore the health.

In England, Kanyon built apparatus called pulsograph [8], which can monitor the pulse changes just as a pulse diagnostician would do. The pulsograph registers amplitude and frequency changes in the rhythms of different organs. Just as pulse diagnosis, this pulsograph can detect very early subtle phase-shift changes in the biorhythms, which signal oncoming pathology long before preclinical complaints would appear.

We would like to believe that in the future such pulsograph would be connected to a computer with software that allows analysis of detected pulses. Using the last equation, the computer should be able to tell us the proper governing signal u that will restore the balance of the body or bring back its health. The computer should tell us how to modify the existing pulse parameters θ_{ij}, ω_i, T_{i0}, β_i, r_{ci}, k_{pi} through acupuncture or other mild stressors, to achieve health balance. Therefore, computerized acupuncture will be the basis of the future acupuncture used to prevent chronic diseases. More details can be found in the book of Dr. Maria Kuman *Modern Aspects of Ancient Acupuncture* [9].

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