Dental Pain Simulation Model Based on Biorhythm Charts
Within the Diagnosis and Treatment Expert Systems

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Abstract: The purpose of the study is to enlarge the application area of the precautionary principle toward the field of friendly treatments by assessing the potential interaction between the moment in which dental pain occurs and the physical and emotional biorhythm cycles, within a diagnosis and treatment expert systems.

Material and method: The study was performed upon 461 patients out of which 120 (21%) accused pains from acute pulpitis and the rest pains from acute apical periodontitis. The date that pain started and the birth date of each patient were taken into evidence, and based on this info, an individual biorhythm interpretations was created, using a specialized software. The physical (F) and the emotional (E) cycles were revealing to the study. Results and discussions: The results are read by interpreting the position of the sinusoidal curve at the date when pain occurred as compared to the time axis. Unfavourable results are considered those at the critical points and at the descending ones, be they above or below zero. Out of the entire group, 35% of patients were situated at the critical point, and 40% were in deficit within their physical and emotional cycles. Out of the patients accusing acute pulpitis, 20% of patients were at the critical point and 51.6% were in deficit within the physical and emotional cycles. Out of the acute apical periodontitis group, 14.1% of the patients were at the critical point and 53.9% were in deficit.

Conclusions: establishing the suitable time for successful treatment could induce a new perspectives in dentistry treatment techniques in line with the new vision of sustainable medicine.

Keywords: sustainable development, precautionary principle, natural biorhythm, emotional cycles, physical cycles, acute pulpitis, acute apical periodontitis.

1 Introduction

Applying the Precautionary Principle (as part of the Sustainable Development theory) means to better guide more health-protective decisions in the face of complex risks and complements evidence-based practice in situations of scientific uncertainty and complex risks [Tickner, J. 2006]. This article proposes a new application area of precaution in the context of dental practice, where activities that may convey risks also have public health benefits, and risk management are a possibility.
Reducing pain and new friendly treatments represent a challenge to scientists and public health professionals to develop newer and more effective tools for characterizing and preventing complex risks, in addition to being more explicit about uncertainties. More specific, modelling decisions and treatment options in dentistry are particularly difficult since they involve risk that is continuous over time, and timing in dental care is important.

In dentistry, the integration of patient or personal data with large amounts of stored information is widely used to perform computations in order to aid in decision-making [Hikmet, U. 2002].

The theory of Biorhythm is that each of us is influenced by three biological cycles which begin at birth and continue throughout our lives.

Biorhythms are based on the theory that human behavior is influenced by three basic rhythms or cycles of energy: the physical, which has a period of twenty-three days and regulates an individual's vitality and stamina; the emotional, which has a period of twenty-eight days and regulates creativity and sensitivity; and the intellectual, which has a period of thirty-three days and regulates the memory and decision-making process.

The cycles begin at birth, working independently of each other, but having a cumulative influence on man's behavior. Each cycle is divided into halves. The first half is when energy is readily available and can be channeled into successful ventures. The second half is a "recharging" period, during which it is advisable to refrain from strenuous efforts. Because of the different lengths of each cycle, all types of combinations can occur; for example, one may be overflowing with physical energy while intellectually and emotionally drained [Robert, E. S. 1976].

The active and passive phases of biorhythms were arbitrarily represented as sine curves that rise above a mid-line during the active phase, and fall below the mid-line during the passive Phase (fig. 1 adapted from Thommen's representation of a biorhythm). The conventional explanations of biorhythms are based on the metaphor that our bodies produce and store energies which are used ("discharged") during the Active Phase of a biorhythm, and then stored up again ("recharged") during the Passive Phase of the biorhythm cycle. Critical Days occur when the sine curve crosses the mid-line. Critical Days occur at the start of the Active Phase (discharge), and again when the Active Phase switches over to the Passive Phase (recharge). Each biorhythm period contains two such zones (Critical Days) [Amft, J. 2005, Debarbieux, P. 2001].

![Figure 1. Graphic representation of zones and critical points](image)

That composite curve (in gray) is the sum of the 3 cycles:

\[
y = \sin(2\pi/23) + \sin(2\pi/28) + \sin(2\pi/33)
\]
The medical applications of biorhythm are translated by choosing the appropriate model for administrating the medicine. As such medicinal doses work best in the late morning, before the deluge of gastric juices begins to peak. Schedule meetings in the later afternoons, when the gastric tide begins to reserve and drop to its nocturnal nadir. Ulcers occur when this gastric cycle goes haywire, produces more acid than the protective mucus can handle, burning through the stomach lining and creating open wounds. [Menaker, C. 2003].

For dentistry purposes it is important to know teeth are most sensitive to pain between 3 pm and 8 am. Mid afternoon is the best time for dental work because you threshold of pain rises as the day progresses and peaks at 3 PM when it is 50 per cent more intense than in the early morning [Taylor, B. 2005].

2 Purposes

The purpose of the study is to stimulate the relation between the moment pain occurs and the physical and emotional biorhythm, within the expert systems of treatment and diagnosis.

3 Material and method

The study was performed upon a lot of 461 patients aged between 15–55 years, 157 males and 304 females (fig. 2).

![Figure 2. Distribution on age groups](image)

From the entire lot of patient, 120 (26%) accused acute pulpitis and the rest accused acute apical periodontitis (fig. 3).

![Figure 3. Division according to dental diseases](image)
For the selected patient, the date of birth and the date when pain started were input and the individual biorhythm was created using a special software. The physical and emotional cycles were very important for the study. For each case, a graph was created, illustrating the evolution of biorhythms through sinusoidal curves.

According to the disposition of curves, they were codified as critical Cr. (critical), A+, A− for the ascending trends and D+, D− for those on the descending trend. The disposition and the trend of the curves representing the two biorhythms for each case determined their division into 10 groups.

4 Results and discussions

In 186 out of the 461 cases, pain occurred in a Cr. Day for one of the biorhythms (P or E) or for an association (E+P) as such in 58 cases, the critical day occurred for biorhythm P (20.8%), in 44 cases for biorhythm E (31.5%) and in 71 cases (47.7%) the 2 coincided (E+P).

The remaining 275 patients presented within the physical cycle the ascending phase + (29 patients – 10.5%), the descending phase + (39 patients – 14.2%) the ascending phase – (40 patients – 14.5%) and the descending phase – (52 patients – 18.9%) . Within the emotional cycle, 18 patients (6.5%) were in the ascending phase + and 25 patients (9.1%) were in the descending phase +, while 36 patients (13.1%) were equally in both the ascending and descending phases – (fig. 4).

As regards the tested pain diseases, 10 patients (8.3%) with acute pulpitis were in Cr day within the physical phase and 9 patients (7.5%) within the emotional phase while 5 patients (4.2%) presented an equality between E and P. In case of apical periodontitis, 20 patients were in Cr day within the physical phase and 9 patients (4.4%) in emotional phase while 13 patients presented the equality E+P (3.8).

![Figure 4. Representation of the batch](image)

Within the physical phase 11.7% out of the patient batch with acute pulpitis were in the ascending phase – and 12.5% in the descending phase –, 7.5% in the ascending phase + while 8.3% in the descending phase +.

Within the emotional cycle, 5.8% of the patients were in the ascending phase +, 8.3% were in the descending phase +, 13.3% in the ascending phase – while 12.5% in the descending phase – (fig. 5).
C. Biclesanu, I. V. Cherlea, E.-G. Despa, D. Baclesanu, A. M. Pangica

Figure 5. Division of groups with pulpitis

 Within the physical cycle, out of the patient batch presenting acute apical parodontitis, 7.3% of the patients were in the ascending phase + and 11.7% were in the descending phase +, while 9.4% were in the ascending phase –, and 14.4% were in the descending phase –.

As for the emotional cycle, 7.9% of the patients were in the ascending phase +, 12.6% were in the descending phase +, whereas 7.3% were in the ascending phase – and 15.2% in the descending phase – (fig. 6).

Figure 6. Division of groups with apical acute periodontitis

5 Conclusions

Pain is better tolerated during the period of maximum biological potential. In phases of emotional decline, administration of sedative medication is advisable prior to starting the treatment. The validation on large scale of the study’s results could induce a new vision for the dental treatments in accordance with the Precautionary Principle of sustainable development in the medicine area in terms of new friendly methods (less painful) of treatment and, more important, reducing the impact of some still existing hazardous technologies and encouraging the usage of “natural” products.
References