

## MANAGEMENT OF SCIENTIFIC RESEARCH IN THE EDUCATIONAL DISCIPLINES OF DENTAL MEDICINE

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### **Abstract**

*The accelerated development of the materials used in the dental office as well as the state-of-the-art equipment necessary for the complex oral rehabilitation therapy required the involvement of a large number of specialists in the field in order to carry out studies aimed at increasing the quality of life of the patient and optimize the way dental work is done. Currently, dental medicine has become a medical sector requiring interdisciplinarity especially in the case of patients with systemic conditions that can influence dental medical treatment. Between disorders at the level of the oral cavity and systemic ones there is an important interdependence which, if not properly and seriously addressed, can have adverse consequences on the patient's health. Dental studies focus on a number of issues including: determining the causes of the patient's anxiety about the dentist, assessing the patient's bio-psychosocial behavior and the degree of awareness of the negative effects in case of non-attendance at the regular check-up (tested by questionnaire on patients), performing histological laboratory studies by biopsy to establish a diagnosis. In order to be able to conduct the studies under appropriate conditions that do not endanger the patient's health or moral integrity, it is imperative that the specialist has the necessary knowledge of medical ethics and deontology.*

**Key words:** *Scientific research dental medicine, Ethics, Histological study, Medical questionnaires, Patient sample.*

### **Introduction**

In the health sector, ethics is a fundamental component in the absence of which medical practice could harm the patient morally, physically and financially. In addition to the Hippocrates oath, physicians are legally bound to comply with the Code of Medical Deontology, which was adopted on January 6, 2017, and contains 61 articles. The most recent update of the Code of Medical Deontology aimed at:

- clarifying the relationship between doctor and patient;
- the doctor's obligation to obtain the patient's informed consent regarding the work done in the medical cabinet (Nanu, 2012, pp. 48-49);

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- the attitude adopted in case of impossibility to obtain informed consent in emergency situations;
- making clear the facts considered non-deontological in the medical profession;
- the concept of distant medical act and its limits;
- the way of conducting medical research: legality, ethics, and the conditions for carrying out medical research on human beings;
- marketing and its limits in the medical field.

### **The concept of bioethics**

The concept of bioethics was introduced in 1971 by biochemist Van Rensselaer Potter, who claimed that this discipline is a true healthcare development that benefits both doctors and patients: "Bioethics: Bridge to the Future". Later, in 1978, bioethics was defined in the Paris bioethics encyclopedia as "the science that has as its object the systemic examination of human behavior in life sciences, in the light of moral values and principles." The most current definitions of this concept were issued in 1995 by Larousse, according to which bioethics represents the "whole set of problems resulting from physician and biologist researches as well as how they are applied" and Maximilian who considers bioethics a "meeting point of all which follow human destiny subjected to the pressures of science" (Pernick, 2009, p. 17). It should also be pointed out that bioethics is a branch of ethics whose major objective is to ensure the safe conduct of the medical act for both the medical practitioner and the physician while at the same time strengthening the doctor-patient relationship as well as encouraging interdisciplinarity between different areas of medical activity. Bioethics aims to promote medical prevention through the implementation of local or national programs for informing the population about compliance with hygiene rules and the mode of transmission of various diseases as well as streamlining treatment modalities.

### **The rational approach to ethics**

The rational approach to ethics encompasses three main theories: the virtue theory, the debt theory and the theory of principles. Virtue theory has been approached by the greatest philosophers including Socrates, Plato and Aristotle. If during the period of Plato the four ancient virtues were invoked (temperance, wisdom, courage, justice), during Aristotle's period were added the three Christian virtues: faith, love of thy neighbor and hope.

From debt theory results the following subdivisions:

- The Right of Well-being: this highlights the importance of respecting human rights and divides human rights into two classes: fundamental rights and acquired rights. In medical practice, an important major issue is given to the patient's right to life and health. The Romanian medical legislation provides for the patient's rights (Law No. 46/2003, Patient Rights Act, Law 95/2006). Thus, by consulting this law, the patient can be informed about his / her right to be informed about his / her state of health, important to the informed consent, but also the obligation to give his / her

consent to the medical procedure to be followed as well as the right to confidentiality as regards the information provided through the anamnesis and the observation sheet to the healthcare provider.

- The duty as a unique principle of morality: I. Kant philosopher is distinguished by the implementation of the categorical imperative that is mandatory and necessary, unlike the hypothetical imperative that is compulsory but not necessary. If the hypothetical imperative is variable and may vary according to circumstances, the categorical one focuses strictly on duty and is a defining element of the good actions in itself in which the will of man is directly proportional to reason (Kant, 1785). From the categorical imperative derive the three maxims, the first two being considered premise, and the last conclusion is the result of the syllogism. It is also underlined that Kant's ethics promotes the well-being of the patient and of the human being in general (Singer, 2006, p. 213).

- The duty as the first duty consists in the existence of a complex of duties, one of which is a maximum duty called "prima facie". This theory also suggests the importance of avoiding situations that can cause harm to the human being, preferring not to have a conclusive outcome than to have a negative impact on health.

The principles of bioethics are predominantly based on concepts that primarily aim to protect the patient and improve the quality of life by healing the pathology or improving the subjective symptomatology. These are: benevolent, non-malicious, autonomous and justice.

- Benefit: This principle seeks to get the most benefit from the treatment and reduce the risks to which the patient may be exposed both during the treatment and for a long period of time after the cessation of treatment.

- Non-maliciousness is defined by the obligation of the medical frame to do no harm to the patient. In the course of the medical act, some "aggressive" maneuvers that serve strictly in the surgery are allowed, the end result of which is to heal the existing condition. Another category of factors considered harmful but which are applied to the patient and which are aimed at ameliorating clinical symptoms are cytotoxicity (increased toxicity) in the curative treatment of malignancies.

- Autonomy refers to the patient's access to health data, encouraging him / her to make decisions about the intervention he wishes to ask the doctor. Another objective of this principle is to help people with low decision-making power to guide them towards making a right decision for the health benefit.

- Justice has the role of ensuring that the medical act is carried out within the limits of legality and presupposes the existence of medical documents of a juridical nature that attest the correctness of the medical act by applying the appropriate therapies or surgery. It will also take into account the way funds are distributed according to the severity of the pathology and the implementation of a medical system that assumes that all citizens have equal opportunities in accessing health services.

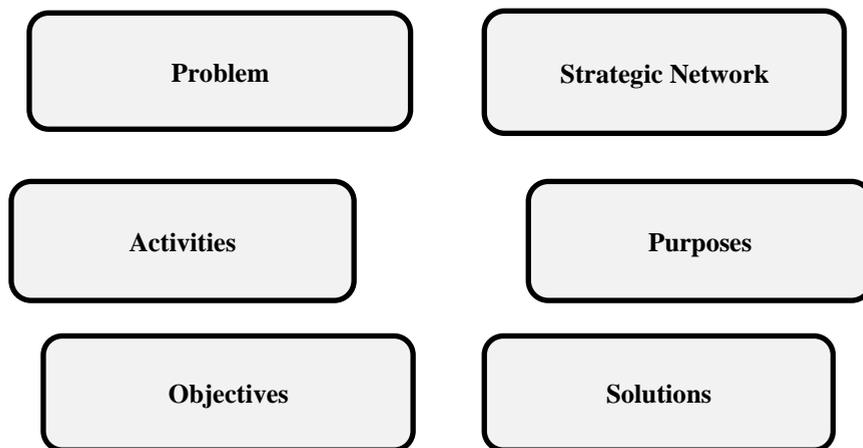
### Methodology of scientific research in the field of dental medicine

Scientific research occupies a particularly important place in the medical education system. Its purpose is to train as many students and teachers as possible in organizing and participating in scientific events. At the same time, students of dental medicine are being explained the importance of "evidence-based medicine" and the implementation in the daily activity of the future dentist of the results obtained based on the scientific research carried out (Bacârea, 2009, p. 2).

As in other fields of activity, in dentistry three types of research are distinguished:

- fundamental research;
- the applied research;
- research for innovation and development.

Fundamental research includes a set of rules and principles governing certain physiological and pathological phenomena that highlight the relationship between oral cavity manifestations and various systemic disorders. Through these, results are obtained that will help to correctly put into practice future experiments. Therefore, fundamental research is based predominantly on the theoretical and not the practical aspects. However, without the contribution of fundamental research, the applicability of various medical techniques can not be implemented. The applied research aims at implementing the theoretical notions obtained with the fundamental research. It has a fundamental role in the elucidation of current medical issues. Also, applied research contributes to worldwide scientific progress. Both fundamental and applied research materialize with the help of specialized publications.



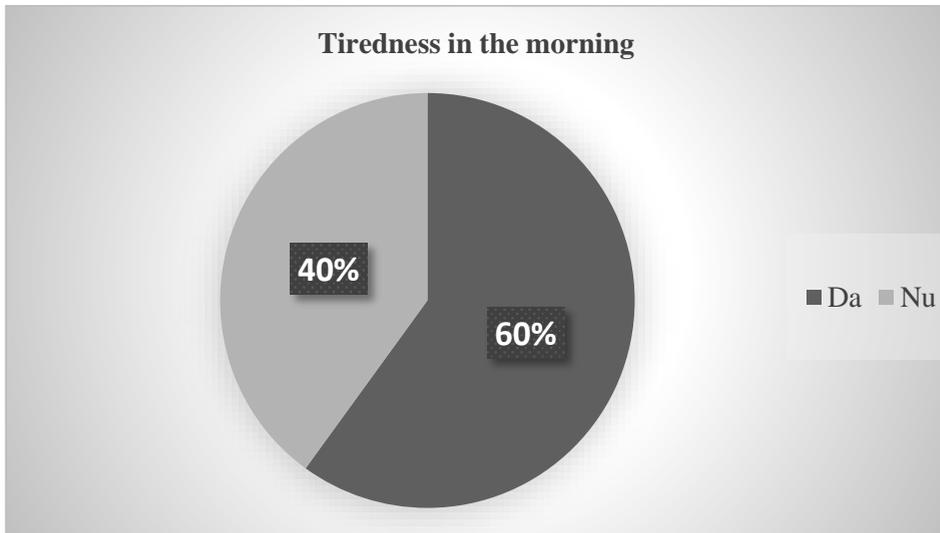
**Figure no. 1. Scheme of the operational phase of the research**

Between 2017-2018 we conducted a series of studies in the field of dental medicine that revealed the following results:

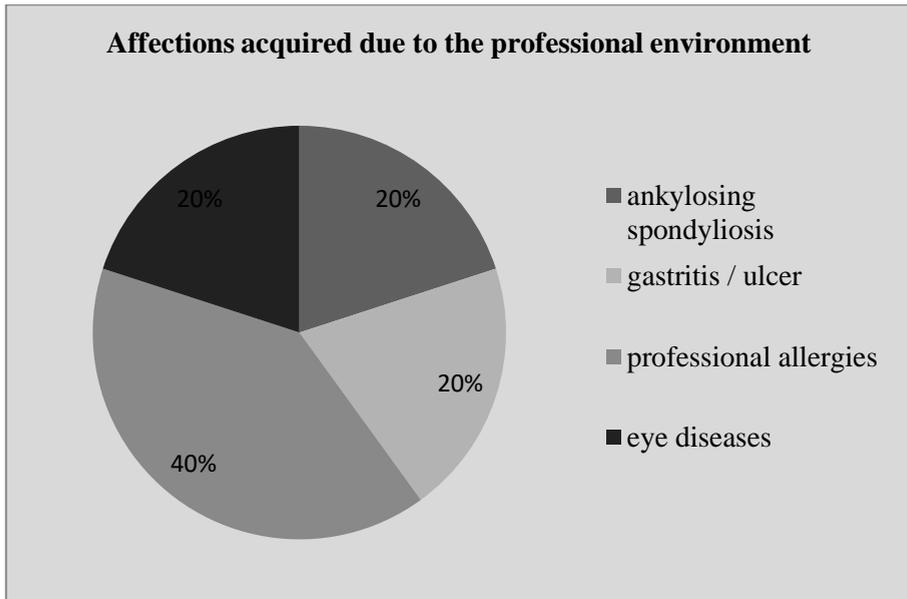
- a) **Statistical study: the appreciation of the degree of anxiety towards the dentist among the students in Craiova.** This study was conducted by applying a questionnaire with 20 unique compliancy questions on a sample of

178 students from the University of Craiova and the University of Medicine and Pharmacy of Craiova. Achieved results: Most students tend to avoid visiting the dentist with causes: unpleasant previous experiences (43%), needles of needles, pliers, scalpel (34%), disturbing sound of the cutter (15%), external factors (6%). (17%), the need to handle various objects (15%), excessive sweating (10%), the syncope / painfulness of the teeth, lipothyme (4%), hypotension (3%), normal (2%).

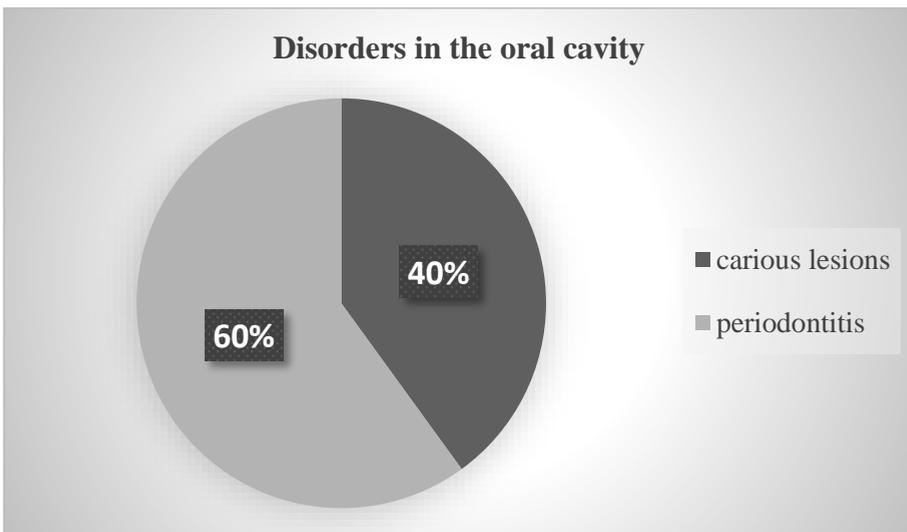
- b) **Statistical study: burn out syndrome among dentists in the emergency receiving system Craiova.** The study was conducted by applying a questionnaire containing 15 simple questions. As a study group we chose dentists working in the Emergency Prize Unit in Craiova. Achieved results: Most doctors working in the emergency receiving system suffer from burn out syndrome. The negative effects on somatic health induced by this syndrome include: gastritis internal affections, rheumatoid arthritis, ankylosing spondylitis, but also oral cavity diseases of the periodontal disease type.



**Figure no. 2. Tiredness in the morning**



**Figure no. 3. Affection acquired due to the professional environment**



**Figure no. 4. Disorders in the oral cavity**

- c) **Histological and immunohistochemical study: Modulation of expression of vascular growth factors in localized inflammation of the oral mucosa.** As a method of study, we used to harvest oral mucosa from the oral cavity with the aim of highlighting the stage of evolution of the disease as well as establishing a correct diagnosis and treatment plan. The

histological and immunohistochemical laboratory test tends to become indispensable in the XXI century in the pathology of the oral mucosa to avoid diagnostic errors that may have a negative effect on the patient's health. Also, with the help of laboratory laboratory investigations, the differential diagnosis between a benign condition and a malignant disorder can be made, as well as the assessment of the evolutionary stage of the disease or possible aspects that require the patient's guidance in carrying out a set of additional analyzes. Results: The microscopic study revealed epithelial changes: acanthosis, hyperkeratosis, and numbered proinflammatory cells in deep layers. In the superficial chorion we noticed the appearance of small vessels, capillary neoformation, the increased number of proinflammatory cells. Immunohistochemical reactions - different intensity of the two growth factors involved in vasculogenesis (progranulin, VEGF) both in the epithelial keratinocytes and in the coronary proinflammatory cells.

### **Experimental Scientific Study in Dental Medicine**

Current dentistry seeks to find, through experimental research, minimally invasive or even non-invasive materials and treatments for the human being. The clinical experiment is the last step of the research process, but it is also the most important, because it is the one that has the ability to validate or invalidate the effects of the research (Comes, 2005, pp. 58-59).

In order to carry out experimental research, it is necessary to: establish the research field and the object of the research, the objectives of the research, the choice of a study group, the enumeration of the stages of the process, the interpretation of the obtained results and their exploitation. The study group chosen must consist of a sample large enough for the research to be accurate, and to provide objective estimates (Bacărea, 2009, pp. 16-17).

The methods of data collection are numerous, but the researcher will choose which type of study they are doing. Among the methods we mention: clinical observation, interview, questionnaire, physiological. The observation involves collecting data on changes resulting from the application of a new type of dental material, the evolution of the disease following administration of a drug therapy. The study leader has the obligation to observe the ethical principles throughout the experiment and to systematically and objectively enter the variations that appear to be able to obtain a concrete result (Popescu, 1974, pp. 16-17). The interview is an easy-to-implement method that can be done either through targeted questions or by addressing a general theme without having a built structure (Bacărea, 2009, p. 22). The questionnaire method in the management of dental scientific research is frequently used with good accuracy, being also a means of obtaining information used daily in the dental office by means of an anamnesis. Also, the researcher should establish the type of question (closed, open) in a questionnaire in order to obtain answers that will lead to the desired data and minimize the errors (Moscovici, Buschini, 2007, p. 65). The physiological method is based on the collection of data

on certain physiological parameters of the oral cavity: dental eruption: normal, eruption delays or early eruptions (Bătăiosu, 2010, pp. 30-33), the appearance of the first caries, the first dental extractions. At present, the predominant comparative experiment is often used when choosing the type of dental material. Numerous dental materials have been compared over time and their advantages, drawbacks, indications and contraindications are highlighted. A good example would be the metallic and ceramic work: Both materials have the advantage of being resistant and restoring coronal morphology, but each of them has important disadvantages: metallic works are non-ionic, and ceramic have the disadvantage to be honest (Manolea, 2011). Analyzing and capitalizing on research results often requires the development of statistics (Vlăsceanu, 2013, p. 196) which aim to group and systematize the data gathered, as well as to display the percentage obtained for each item checked (Vasile, 2016, p. 13).

The capitalization of the results can be achieved through 4 major ways:

- Scientific articles published in specialized journals and indexed BDI or ISI;
- Thesis;
- Obtaining a patent for invention;
- Communications at National and International Congresses of Medicine and Dentistry.

For the publication of the results it is necessary to check them by specialized committees for plagiarism, but also to certify their correctness. The issue of plagiarism remains a topical issue due to its frequency and its complexity (Socaciu, Vică, Mihailov *et al.*, 2018, p. 109). Through the large amount of information made available to researchers, and with the help of state-of-the-art technological systems, plagiarists are hard to detect.

### Conclusion

In conclusion, it can be argued that the field of dental medicine is a medical sector in which scientific research occupies a primordial place. Scientific research management awareness is primarily aimed at improving the quality of life of the patient by discovering new treatments and minimally invasive or non-invasive techniques that restore the physiological, physiognomic component of the dento-maxillary apparatus and restore the psychological balance.

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