

IMAGING INVESTIGATION IN DENTISTRY FROM BIOECONOMIC ASSESSMENT POINT OF VIEW

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Abstract

The purpose of our study is to correlate radiological investigations of different dental clinical manifestations with local or systemic disorders in order to point out the role radiological investigations have in early diagnosing of dental disorders, related to the bioeconomical factor.

Using radiological investigation is explained only by the need in acquiring additional information, which alongside clinical observations contributes to full thorough diagnosis of each patient. Thus, the first phase within the complex dental treatment is the thorough examination of the clinical case. The clinical examination offers primary information and, at the same time, gives orientation to the adequate radiological examination according to each patient's features.

Key words: imaging investigations, bioeconomy, dental diagnosis

INTRODUCTION

Radiological investigation contributes to obtain additional information, that alongside clinical observations contribute to complete diagnosis of each patient (Aldescu C., 1998). Thus, the first phase within the complex dental treatment is the thorough examination of the clinical case. The clinical examination offers primary information and, at the same time, gives orientation to the diagnosis.

Our paper approaches a presentation of using different radiological methods in dentistry according to peculiarities of each clinical case.

The aim of our study is to correlate radiological investigations of different dental clinical manifestations with local or systemic disorders in order to point out the role radiological investigations have in early diagnosing of dental disorders, related to the bioeconomical factor.

Radiological investigation is a valuable aid in diagnosis and determination of prognosis and its treatment results evaluation (Newman M.G et al., 2006; Morandi J. et al., 2010).

Retroalveolar radiographies are obtained by film endobuccally, behind the alveoli of a group of two or three adjacent teeth that are to be examined (Aldescu C., 1998).

These radiographs are indicated in case of periodontal condition, for periapical infections/inflammations detection, after dental-alveolar trauma, impacted or erupting teeth, in order to visualize radicular morphology prior

to extraction, after endodontic treatment, postoperative evaluation of implants, apical cysts or alveolar bone lesions (Loghin S. 1998; Comăneanu M.R. et al., 2011).

Periapical radiographs are overall or total radiographs, in other words they show in a single image (on a single film or on the visiograph monitor) a tooth or a group of 2-3 teeth including the supporting periodontium. A single radiograph (Dieck or parallel) is very useful, relevant and trustworthy on a limited area but for anatomico-clinical structures of local or overall periodontitis there are needed more radiographs in order to cover the area.

Orthopantomography is easily performed, devices are more expensive and images are not always analytical because in orthopantomography appear not very clear contours due to „kinetic flow” and interproximal spaces sometimes overlap and the periodontium appears „compressed”(Rădulescu M., 1980).

Informational technology is vital for operations, marketing, accountancy, finances, and administration but especially for dentistry. One of the most interesting technologies with a rapidly evolution in the modern dental office, is the digital application (Bud M. et al., 2008). With a leading developing technology in all medical fields and fast pace in which it acts, it is vital for the practitioner to keep up the pace with the new evolutions in the area of informational technology. Digital images acquiring consists in conversion of image in numerical data, called digital analogous system and bringing them back on a screen through an analogous digital converter of digital images computer processed (Bud M. et al., 2008). Image resolution is limited to a number of points to which vertical and horizontal lines correspond. The more points, the clearer the image is. Digital radiography advantages include a decrease in intraoral radiations exposure, increased speed in obtaining the image, easiness in digital stocking and electronic transmission of image, it does not require dark room (National C., 2003; Bud M. et al., 2008; ADA CSA, 2011).

A digital radiography can be adjusted for an optimal quality for diagnosis purposes, including contrast, density, amplification and colour alternations (Bud M, et al., 2008, Molander B, et al., 2004, Wenzel A, et al., 1995) being defined by a number of grey shades.

Digital radiography has promoted and, thus, the diagnosis quality of digital image has become comparable to that of conventional films (Wenzel A, et al., 1995; White S.C. et al., 1997; Loghin S., 1998; Molander B. et al., 2004).

Bioeconomics can be operatively applied focusing on the intelligent durable development, of resources preservation, for durable development of business environment, communities and social economy operators, by

obtaining satisfactory results for the consumer and patients (Alexandru T.B. et al., 2011).

MATERIAL AND METHOD

In order to achieve the proposed aim, a batch of 84 patients was studied, aged-23-78, out of which 48 females and 36 males, patients who came to the dental office during February-November 2011 requesting dental treatment.

For each patient who accepted further investigations within the study, we drew up a control chart. The patients belonging to the studied batch were examined and observations were recorded in their personal chart. This chart was taken over and adjusted according to Professor Dumitriu H.T.'s model (Dumitriu H.T, 2009).

Each patient was indicated to be performed retroalveolar radiographs with classical film and digital radiographs. Clinical manifestations correlation with radiological changes was followed up.

Retroalveolar radiography is indicated in periodontal condition evaluation for periapical infections/inflammations detection, after dental-alveolar trauma, impacted or erupting teeth, in order to visualise radicular morphology prior to extraction, after endodontic treatment, postoperative evaluation of implants, apical cysts or alveolar bone lesions, being, from bioeconomical appreciation point a view, an accessible work to all patients' social classes.



Fig. 1 Retroalveolar radiography performed from 3 angles.

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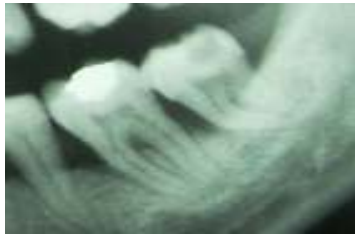


Fig. 2 Periapical radiography.

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Fig. 3 Orthopantomography.

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A digital radiography can be adjusted for an optimal quality for diagnosis purposes, including contrast, density, amplification and colour alternations (Parks E.T., 2007) being defined by a number of grey shades.

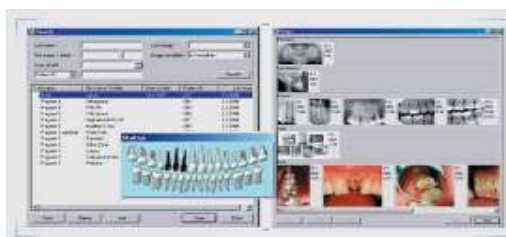


Fig. 4 Manufacturing dental radiographs

Digital radiography has promoted and, thus, the diagnosis quality of digital image has become comparable to that of conventional films (Carvalho F.B. et al., 2007).



Fig. 5 Display of processed dental radiological images

Bioeconomy is an alternative to capitalistic economy. Contradictory to economic models specific to the last known economic and social systems, bioeconomy bases on living body mechanisms. It considers humanity an a living body, in which human beings are comparable to cells, enterprises, regions or states are comparable to some types of tissues or organs, public services perform indispensable organic functions. This planetary human body, or society lives due to fluids (money, water, energy, etc.) and due to nutrients (manufactured goods, foods, services etc.) (Roegen G.N., 2004).

RESULTS AND DISCUSSIONS

Within the studied batch of patients, 14 presented mainly decay conditions, 42 mainly periodontitis and 28 had odontal and periodontal processes determined.

In patients with odontal conditions, it was noticed that in case of incipient decay processes, in which the degree of demineralisation was less than 30%, clinical manifestations were not obvious and radiographs with classical films did not show relevant modifications. In these cases, there is an incipient phase of dental decay that could be shown by digital radiography, situation which we came across in 4 out of the 14 patients.

Peculiarities of the studied patients batch

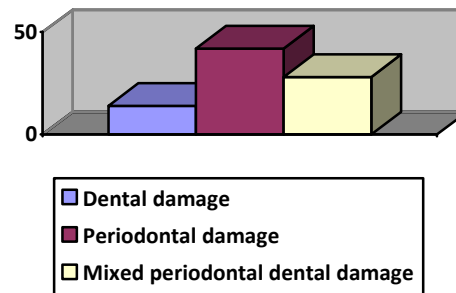


Fig. 6 Peculiarities of the studied patient's batch

Digital radiography allowed early detection of the first radiological changes in case of periodontal pathology or in cases in which periodontal affliction was associated to the odontal one.

Early detection of decay processes through digital radiography

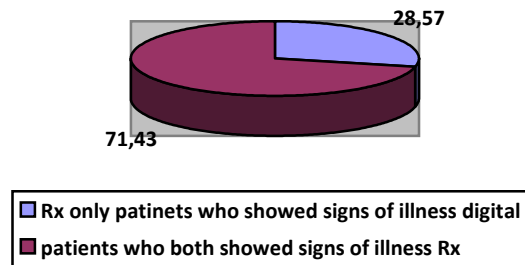


Fig. 7 Early detection of decay processes through digital radiography.

Thus, in patients in which periodontal affliction is prevalent, we were able to early detect afflictions at the level of certain dental units that clinically did not have signs of sickness and that in radiographs with classical film did not present modifications (in 14 out of 42 patients and respectively 9 out of 28 patients with mixed manifestations of dental-periodontal affliction).

Early tracking down of periodontal condition through digital radiographs

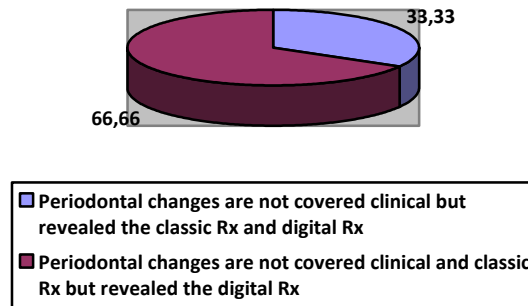


Fig. 8 Early tracking down of periodontal condition through digital radiographs

Digital radiograph offers a quality of diagnosing digital image comparable to the one of conventional films (Carvalho F.B. et al., 2007), bringing, the patients, at the same time, the benefit of a decreased radiation dose. Research in the field (Bud M. et al., 2008; Teslaru S., 2010) prove a reduction in radiation amount up to 80% at exposure moment compared to films, this being due to the sensor properties that make it more sensitive to radiation X photons.

CONCLUSIONS

Digital radiography advantages include a decrease in intraoral radiations exposure, increased speed in obtaining the image, easiness in digital stocking and electronic transmission of image, it does not require dark room.

This type of radiographs does not affect the human body health, because the quantity of X rays during exposure is very little. Moreover, each person is daily exposed to different environmental radiation-microwave oven, cell phone or from the space. In spite of this, the radiations effect can cumulate in time and can produce cell lesions, therefore the number of radiations should be limited on the dentist's advice.

Radiological investigation must be an essential phase in dental conditions prevention, by determining early dental lesions, reducing this way the additional treatments, leading to financial bioeconomy and by decreasing the number of dental interventions and their difficulties as well.

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