



## AN OVERVIEW OF DENTAL IMAGING AND PRODUCTIVITY BETWEEN HEALTHCARE ADMINISTRATION AND DENTISTS

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### Abstract:

The presence of dental disorders has a negative impact not only on healthcare systems but also on societies as a whole. It is arguable that making dental care more accessible can enhance health results, lower the costs of healthcare consumption, and improve a number of social consequences. The bulk of the programs that have been discovered have shown to be beneficial in lowering the usage of medical and dental healthcare services (particularly for services that are not preventative), preventing more invasive treatments, and, to a lesser extent, resulting in cost savings. Patients in dental clinics require specific care due to their clinical and behavioral circumstances, and they require the collaboration of healthcare administrators with nursing staff and the radiology department in order to provide excellent dental treatment. Managing and shaping the behavior of dental clinic patients is essential to providing quality dental care.

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**DOI:** 10.53555/ecb/2022.11.9.82

**Introduction:**

Oral disorders are among the most prevalent chronic ailments that afflict humans. These diseases can be exceedingly painful and incapacitating, and they are responsible for a large amount of morbidity in a number of individual instances [1]. In addition to the negative consequences it has on people, the literature has also documented the larger repercussions it has on the healthcare system and society as a whole. These impacts have been studied. An increase in the number of visits to hospital emergency rooms for non-traumatic dental disorders, a decrease in productivity, and a worsening of academic and employment performances are the effects that are most frequently reported as being the result of dental problems that are not handled. These days, the consequences of dental issues are far more substantial than they were in the past. According to the most recent figures, over 92 million hours of work or school time are missed yearly in the United States as a result of unscheduled dental treatment that is considered to be an emergency [3]. In a similar vein, in Canada, working persons lose a total of forty million hours of their time each year owing to dental issues and treatments. Additionally, twenty million hours of school time are wasted by children who cite the same reason [4]. In terms of healthcare, each year millions of people in Canada who do not have access to dental treatments go to the emergency rooms of hospitals or the offices of their physicians for oral problems that are not considered to be life-threatening [5]. According to studies, children who have poorer oral health are more likely to miss school days and have lower academic results compared to their peers who do not have dental difficulties. This is the case even when comparing children who do not have dental problems. As a consequence, this has a cumulative effect on the economy that is greater than one billion dollars per year (5).

Since its inception in the 1950s, panoramic imaging has developed into a diagnostic tool that is both widely used and extremely significant. It is a specialized tomographic method that is utilized for the purpose of producing a flat picture of the curved surfaces of the jaw mouth. Curved surface tomography is the fundamental imaging principle that underpins the process. It provides a panoramic or bird's eye view of the jaws by seeing the whole maxilla, mandible, temporo-mandibular joints, and related tissues on a single film. [4] This allows for a more comprehensive understanding of the bite. The dentition and bone support are evaluated, impacted teeth are identified, the site of dental implants is seen, and other procedures are carried

out with the help of this preliminary screening radiograph. Additionally, it provides a fundamental evaluation of the osseous state of the temporo-mandibular joints and has the ability to identify fractures of the maxillary and mandibular bones. There is additional research being done to establish whether or not panoramic radiographs are a cost-effective method of determining bone mineral density [6].

On the other hand, it is susceptible to a significant amount of geometric distortion that is not predicted, and it has a relatively low spatial resolution in comparison to intra-oral radiography. There is the potential for significant variations in picture projection in the anterior area, which is contingent upon the placement of the patient as well as the specific curvature of the jaws. A further limitation is that it does not exhibit the fine anatomic characteristics that are seen on an intraoral periapical radiograph. On the other hand, it provides a dosage benefit in comparison to a high number of intraoral radiographs [7].

**Review:**

A two-dimensional picture of a three-dimensional object can be obtained through the use of radiographs. Because it is not possible to adequately evaluate the relationship between the tooth and the anatomical components that surround it, the diagnostic performance of the tooth is restricted [8]. It is able to view the items in the mesial-distal plane and the apical-coronal plane; however, it is not possible to evaluate the buccal-lingual plane [9]. The intricacy of the maxillofacial skeleton makes it impossible for two-dimensional radiography pictures to provide an adequate representation of the anatomy that is being evaluated. It may be difficult to interpret periapical radiographs due to the presence of anatomical or background noise caused by the combination of anatomical components around the teeth that may superimpose on one another. Radiographs taken in two dimensions reveal a lesser degree of bone damage than is actually there. It is not possible to determine the connections between soft tissue and hard tissue using radiographs [9].

An engineer working for EMI in Great Britain named Sir Godfrey N. Hounsfield came up with the idea for the first commercially available computed tomography (CT) scanner in the year 1972. It is possible to say that the advent of clinical X-ray computed tomography has been the most significant development in radiology since the discovery of X-rays. This is because it has completely revolutionized medical imaging with its revolutionary capabilities. In order to show an

item's underlying architecture, computed tomography employs a narrow fan-shaped X-ray beam and numerous exposures around the object. This allows the doctor to observe morphologic characteristics and pathologies in three dimensions [10]. This allows for the determination of the degree of the disease in both the buccolingual and mesio-distal regions.

The radiographic tube that makes up a CT scanner is connected to a number of scintillation detectors or ionization chambers in a number of different configurations. As the patient moves forward in the gantry, the circular aperture in the middle of the apparatus is opened. Either the tube head and the reciprocal detectors that are included within the gantry revolve in a synchronized manner around the patient, or the detectors may form a continuous ring around the patient, and the X-ray tube may move in a circle within the detector ring [10]. The CTs have been around for four generations. Hounsfield's unit was a member of the first generation of computed tomography (CT) scanners, which were characterized by the utilization of a single detector element to capture X-ray beams. As contrast to the pencil-beam scanning that was utilized in the first generation of CT systems, the second generation of CT systems, which was released in 1975, utilized more than one detector and utilized tiny fan-beam. The skull was the only part of the body that was scanned by the first and second generations of CT scanners, which were designed with a translate-rotate layout [9,10]. A broad, arc-shaped detector is utilized by CT scanners of the third generation, which were first launched in 1976. This detector is capable of acquiring a whole projection without the requirement for translation. Currently, the most widespread use of scanners is seen in the third generation. In the fourth generation of scanners, the arc-shaped detector was replaced by a detector that was surrounded by a whole circle. This configuration involves the X-ray tube rotating around the patient, while the detector remains in a fixed position. Scanners of the fourth generation are not utilized in the modern day since they are more costly and suffer from higher degrees of dispersion. It was possible for the incremental scanning method to produce mistakes that were associated with the movement of the patient, and the Z-axis (vertical) picture resolution was restricted, which led to a loss of fracture conspicuity occurring. In the late 1980s, the discovery of the power slip ring made it possible to produce spiral CT, also known as helical CT or volumetric CT. Image data are obtained in the shape of a "spiral" or "helix" rather than in the form of a sequence of slices when using spiral CT. This

is because the patient is moved constantly along the revolving gantry during the procedure [11]. When compared to incremental CT scanners, spiral scanners offer superior multiplanar image reconstructions, a shorter exposure period (12 seconds as opposed to 5 minutes), and a lower radiation dosage (up to 75 percent) [12]. The formal process of selecting an organization's vision, mission, and overall goals; developing operational goals and selecting strategies and tactics to accomplish these goals; and assigning resources to achieve the goals is what is meant by the term "planning." Within the realm of the public sector, planning is understood to be a process of reasoning that involves determining how an organization will arrive at its desired destination. Planning is the driving force behind the whole field of public administration, according to this viewpoint, which asserts that it is responsible for setting the boundaries of government duty, the distribution of resources, the distribution of costs, the division of labor, and the amount of public controls. Furthermore, in the realm of public healthcare, a hierarchical framework is utilized to describe broad-based goals for the future of a health institution. This framework contains the values that the national government holds for the health of the people as well as the aims of the health sector. Additionally, it encompasses the resources that are available for the delivery of health care as well as particular procedures for putting the plans into action. Following the formulation of these long-term goals, operational plans are developed, which include specific actions, responsibilities, budgets, and timelines [12].

A distinct differentiation is formed between the functions that are fulfilled by the participants in the planning process. Top management is responsible for developing broad directional plans, with input from managers at various levels. Middle management is responsible for developing tactical plans, and both middle management and lower management are responsible for developing operational plans. On the other hand, this top-down approach has been called into question, with some suggesting that plans can originate from any element of an organization. In spite of this, operational plans operate inside a particular framework that is determined by the context, which in this case is oral health services [13].

It is important for dentists to take into account the patient's behavior since it might make the process of providing dental treatment more difficult. They ought to make an effort to verbally condition the patient in order to obtain permission to carry out the

dental treatment, with the goal of gaining the patient's participation in the least restrictive manner possible [14]. The dentists should explore the use of chemical and/or physical restraints in the event that this method is unsuccessful. In spite of this, dentists are required to acquire approval from the patient's legal guardian before employing any form of restriction. Additionally, they must use the approach that is the least restrictive and will enable them to offer dental care in a secure manner [14]. One final alternative is to refer the patient to a dentist who can do dental work while they are under general anesthesia [14].

### Conclusion:

This article draws attention to the information gaps that exist in the existing literature with regard to the scope and outcomes that were investigated during the process of evaluating the effects of dental care programs and productivity in connection to the administration of healthcare and radiology teams, as well as the nursing staff. In the future, research should pay greater attention to studies that investigate the implications of dental care treatments at the larger society level. This is necessary in order to provide recommendations for policy solutions that are sustainable. Based on the findings of the previous investigations, it was discovered that the dentists who participated in the study felt that the management planning of oral health services was ineffective. This inefficiency, as described by the participants, was caused by factors that hinder careful planning; factors that constrained the expansion of community-based oral health services; factors that caused a breakdown in communication between dentists and their authorities, which led to poor service delivery; and factors that were strongly impacted by issues involving both internal and external stakeholders.

### References:

- Kelekar U, Naavaal S. Hours lost to planned and unplanned dental visits among US adults. *Prev Chronic Dis.* 2018;15.
- Singhal S, Quiñonez C, Manson H. Visits for Nontraumatic Dental Conditions in Ontario's Health Care System. *JDR Clin Transl Res.* 2019;4(1):86–95. doi: 10.1177/2380084418801273.
- Listl S, Galloway J, Mossey PA, Marcenes W. Global Economic Impact of Dental Diseases. *J Dent Res.* 2015;94(10):1355–1361. doi: 10.1177/0022034515602879.
- Allin S, Farmer J, Quiñonez C, Peckham A, Marchildon G, Panteli D, et al. Do health systems cover the mouth? Comparing dental care coverage for older adults in eight jurisdictions. *Health Policy.* 2020;124(9):998–1007. doi: 10.1016/j.healthpol.2020.06.015.
- Sadeghi L, Manson H, Quinonez CR. Report on access to dental care and oral health inequalities in Ontario. Public Health Ontario; 2013.
- Listl S. Income-related inequalities in dental service utilization by Europeans aged 50+ *J Dent Res.* 2011;90(6):717–723. doi: 10.1177/0022034511399907.
- Elstad JJ. Dental care coverage and income-related inequalities in foregone dental care in Europe during the great recession. *Commun Dent Oral Epidemiol.* 2017;45(4):296–302. doi: 10.1111/cdoe.12288.
- Fisher J, Selikowitz HS, Mathur M, Varenne B. Strengthening oral health for universal health coverage. *The Lancet.* 2018;392(10151):899–901. doi: 10.1016/S0140-6736(18)31707-0.
- Nations U. Political declaration of the high-level meeting on universal health coverage: “universal health coverage: moving together to build a healthier world.” United Nations New York (NY); 2019.
- Quiñonez C, Vujicic M. COVID-19 has clarified 2 foundational policy questions in dentistry. *JDR Clin Transl Res.* 2020;5(4):297–299. doi: 10.1177/2380084420941777.
- Benzian H, Beltrán-Aguilar E, Mathur M, Niederman R. Pandemic considerations on essential oral health care. *J Dent Res.* 2021;100(3):221–225. doi: 10.1177/0022034520979830.
- Seirawan H, Faust S, Mulligan R. The impact of oral health on the academic performance of disadvantaged children. *Am J Public Health.* 2012;102(9):1729–1734. doi: 10.2105/AJPH.2011.300478.
- Singhal S, Correa R, Quinonez C. The impact of dental treatment on employment outcomes: a systematic review. *Health Policy.* 2013;109(1):88–96. doi: 10.1016/j.healthpol.2012.09.016.
- Halasa-Rappel YA, Tschampl CA, Foley M, Dellapenna M, Shepard DS. Broken smiles: The impact of untreated dental caries and missing anterior teeth on employment. *J Public Health Dent.* 2019;79(3):231–237. doi: 10.1111/jphd.12317.