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Flow Management of First-Time Orders: A Dental Office Case Study

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Abstract. The article presents the importance of managing the flow of first-time patients in a dental practice. Three main areas of difference between the popular linear model of dental office operation on the market and the author's model of an integrated multi-specialist dental team were analyzed. Performance indicators for working with first-time patients illustrating the ability to manage the flow of patients in the office, communicate with patients, build patient awareness of oral health conditions, and harness patients' potential for treatment are presented and discussed. It was proven that with the fuller utilization of patients' potential for treatment, a noticeable effect is a simultaneous increase in the profitability of the dental practice, which, with an entirely ethical process based solely on diagnosed dental problems, makes both profitable.

Keywords: quality assessment, performance measure, efficiency level, flow management, performance indicators.

1 Introduction

Management is the deliberate making, by selected individuals, of decisions and actions leading to the achievement of set goals using available methods.

Management is directing external resources and tasks not personally but through others [1]. In the case of treating first-time patients, external resources include the potential for treatment in these patients. And these services of external should, and even need to be managed. Flow Management serves to achieve the overriding purpose in the dental practice of restoring the patient's oral health and is accomplished by managing the flow of patients, creating opportunities for access to resources held by the recipient of the medical service, and making optimal use of internal resources, which are the available working hours of dentists. Employees play crucial in the realization of these points. Knowing and understanding the whole process, seeing the so-called big picture, have a sense of good work organization, belonging to a collective task, in which they have a significant part, a real influence on its course, and thus a sense of agency. This eliminates and prevents the effect of focusing solely on that task. In a dental office, no tasks are disconnected; one always follows the other. Flow management supports seemingly separated activities as an integrated process united by tasks, in which some activities influence and get feedback from others. When considering the flow process of first-time patients, the author relied on his research supplemented by analysis and interpretation of indicators of the functioning of the dental practices surveyed.

A first-time patient is often referred to as a person receiving services for the first time at a particular office. It is permissible to use an additional identification, in which first-time patients are also treated, those patients who, for various reasons, have interrupted the treatment they started and for at least the last four years have not used the services of the practice. Their oral health situation has most likely changed significantly, and previous diagnoses and recommendations have become obsolete. In building a competitive advantage in the market for medical services, dental office managers, in addition to striving for the highest quality of medical services and reducing costs, look for methods to improve their position in the market competition, leading to a steady increase in the number of patients served and change in the structure of the procedures performed to more complex and higher-value ones. Managers usually undertake promotional activities to differentiate the practice and attract more first-time patients. At the same time, they focus on managing medical factors, i.e., purchasing modern dental equipment, using high-quality dental materials, and introducing innovative medical methods and procedures. With the equalization of access to specialized medical equipment,

the increase in ease of movement around the world in the wake of globalization, the ability to attend foreign conferences, rapid access to the latest scientific discoveries, and the development of the Internet instant flow of information and the possibility of online consultations with other specialists, the previous factors determining the market position of the practice have lost their value. Meaningful differences in access to knowledge and equipment have blurred and are no longer crucial to distinguishing a practice in the market for medical services. The increase in the number of medical entities has led to an increase in the number of practice managers looking for new areas and tools to build a practice's competitive position in the dental services market.

2 Literature Review

While Stankiewicz calls competition a phenomenon whose participants compete in pursuit of similar purposes [2], Adamkiewicz-Drwiłło also calls the ability to create development trends, increase productivity and expand markets [3]. In the market for dental services, competition mostly means competition in reaching new patients, but it is also less common competition for the scope of treatment undertaken by patients.

According to Drucker, the moment when a manager can identify emerging opportunities in his environment will occur when he realizes his values and the advantage he can achieve through them [4]. The publication highlights the critical opportunity presented by properly leveraging first-time patientsc role in building a dental practice's competitive advantage in the marketplace.

Creating a relationship with a new patient in practice by forging a pathway for them to move between specialists enables them to completely restore their oral health and thus benefit from a broader range of treatment, and after treatment is completed, maintaining a lasting relationship between the patient with the hygiene practice and, as a result, increase the number of recommendations given by the patient and increase his satisfaction level.

Curing the patient is the primary objective of dental teams built based on skills and qualifications, which Kopalinski, according to the literature, defines as education, aptitude, and preparation for the profession [5]. It remains indisputable that a doctor's medical expertise is the basis of his work with patients, and the quality of the medical procedures used is the most essential medical factor affecting patient satisfaction with treatment.

Simultaneously, it is worth noting that skillful planning and supervision of the patient's flow in the office increases the likelihood of completing biological treatment and allows for building his readiness for prosthetic treatment and changes in the aesthetics of the smile [6].

Many currently managing dental offices fail to see the opportunities that come with more fully utilizing the potential to treat patients and focus only on attracting new patients for treatment.

A study led by Min-Gyeong attempted to identify factors influencing patients' intention to use the same dental office again [7].

A similar narrative was taken by Park et al., who last year published the results of a study in which they focused on finding factors that cause patients to visit again in dental offices, which can ultimately affect the profitability of medical facilities [8].

Both studies did not pay enough attention to how the practice's revenue is affected by the use of capacity to treat first-time patients and the change in the number of procedures performed during a single patient visit to the dental office.

3 Research Methodology

3.1 A linear mathematical model

According to our observations and audit surveys of dental practices, a linear model of dental office operation dominates the market for dental services. Its main feature is the realization of the patient's treatment by a single dentist. Such a linear type of structure Foltyn defined as classic centralized [9].

In this model, all examinations, medical procedures, and treatments for a single patient are carried out by a dentist, to whom a dental receptionist refers the patient, and to whom the patient is then made all subsequent appointments and comprehensively treated by him. This makes it so that one dentist performs treatments from areas of different specialties. The patient is referred for specialized treatments and consultations to other dentists only in extreme cases involving the risk of permanent damage to health or following the need for medical procedures beyond the medical knowledge and skills of the treating the patient.

This is partly a consequence of the standard method of accounting for doctors' cooperation with the dental practice's owner. It is based on a percentage commission fee on the value of each procedure performed. And is mainly due to historical tinctures in terms of one doctor's management of the patient in the treatment process, and the fear of transferring the treatment to another specialist with remuneration for future procedures. Such an arrangement results in the patient being treated by a single stomatologist and limits patient access to doctors of different specialties.

Figure 1 shows the handling of a first-time patient in a linear model, in which this one is signed up for an appointment with the first available dentist.

He or she is treated to the extent requested by the patient, without the doctor attempting to discuss any remaining dental problems that the patient did not know about before the appointment. This is often due to fear of the risk of equating the dentist with a salesman who offers the patient solutions that the patient does not need. This is because an important awareness-building stage is skipped, and the patient is moved to the stage of proposing solutions.

It makes the patient, not understanding the risk and impact of periodontal disease on the health of the entire body, consider the solutions as unnecessary.

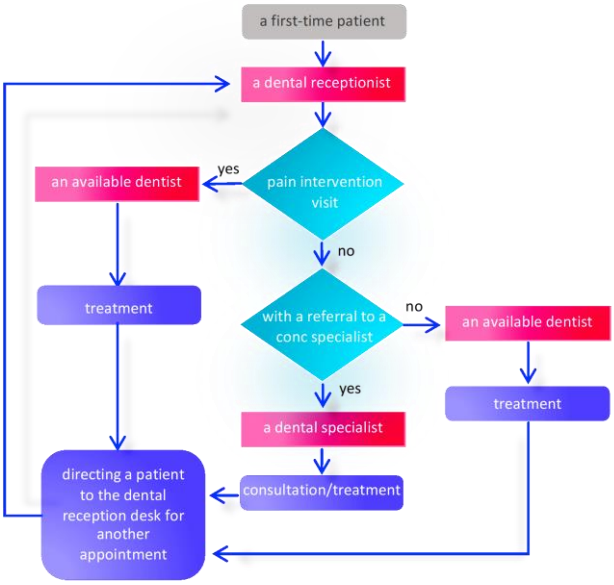

Figure 1 - A linear flow management model

Communication with the patient, which skips the stages leading to acceptance of the treatment plan, results in narrowing the scope of treatments provided in the dental office and indirectly jeopardizes the patient's health by influencing the patient to remain unaware of the current state of his oral health [6].

3.2 An integrated model

Competing with the linear model is the integrated model of the multi-specialty team.

In this model, not only is the patient's flow controlled at every stage of his contact with the dental office but also the way of thinking about the treatment process is different, which, in addition to the mission behind the idea of helping the sick. It does not exclude the conduct of medical activities inseparable from the sale of medical services. In dentistry, there are no classical sales. The dentist and the medical team do not focus on creating patient needs that did not exist before. Sales in this model are not made by offering patients additional treatments or services.

It follows the process of building patients' awareness of their current dental problems and possible medical procedures and solutions. With these, it will be possible to restore oral health completely. The integrated model for managing patient services in a multi-specialty dental office is shown in Figure 2.

It assumes that the treatment process is carried out with the full participation of the team's medical potential. Each dentist is characterized by a different skill level in building motivation for treatment in the patient's consciousness.

There are differences between them in their ability to skillfully lead conversations that create a patient's vision of a possible final health and aesthetic outcome.

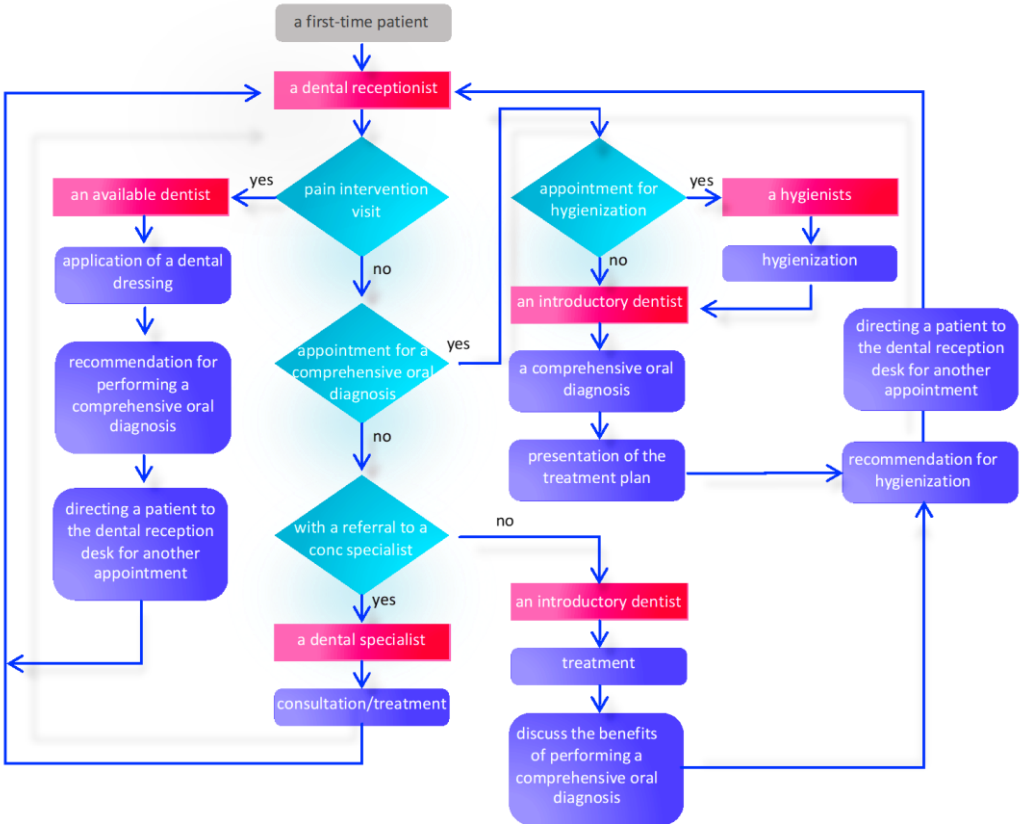

Figure 2 - An integrated model

It depends on dentist's interpersonal skills. Most often, the first of the dental practice is the dentist owner who defines and begins the introduction and what's more, is also the person the most involved in the process and focused on practical implementation. He performs a comprehensive oral health examination and conducts discussions with patients, during which mechanisms are set in motion to motivate them to start, continue and complete treatment.

Due to the highest level of soft skills and abilities of a doctor to talk to patients, he realizes his main task - to handle first-time patients and patients with irregular visits who have not yet opted for treatment leading to the restoration of total oral health. The introductory doctor creates a comprehensive treatment plan, which he presents and discusses in detail with the patient.

The patient is then coordinated by the introductory doctor of dental, who plans the course of treatment in the dental office and directs the flow and sequence of the patient's visits with subsequent specialists required to fully restore oral health or achieve the desired aesthetics of the smile.

When creating the plan, he consults substantively with the other specialists on the team. Upon the doctor's recommendation, the first-time patient benefits from a hygienization procedure, thus reducing the risk of a dental problem going undiagnosed due to being obscured by sediment or tartar.

3.3 Experimental studies

In one case in the survey, the author asked patients how much influence a recommendation given to a patient by a doctor has on their decision to use the services of a hygiene office.

The question was constructed as a single-choice option on a scale of 1 to 5, with a score of 1 indicating the most negligible influence and five showing the most significant impact. A total of 262 respondents from a group of 343 patients gave the highest rating of 5 or 4.

The percentage distribution of responses is shown in Figure 3.

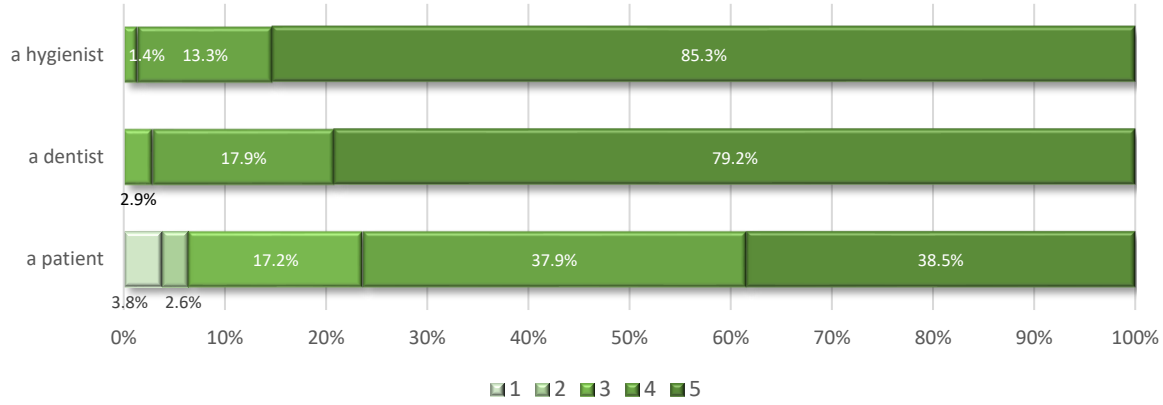

Figure 3 - Distribution of responses

The highest ratings from the surveyed groups were given by hygienists, whose work is primarily derived from recommendations provided by doctors and are fully aware of their influence on patients' choice of services at the hygiene office.

The answers given show the relevance of the measures taken by doctors in this regard. The dentist's omission of the hygiene stage when discussing the course of health restoration excludes it from the comprehensive treatment process.

During treatment, according to the multi-specialty team model, the patient for the next stage of treatment goes to dentists who focus exclusively on treatments directly related to their specialty. The patient is scheduled for consecutive appointments, a planned sequence of treatments carried out by doctors with the most significant expertise and experience in a particular field. In this model, assigning individual treatment stages to doctors who specialize in a specific area of dentistry allows them to focus their ongoing work on their chosen area of treatment and develop their medical skills. In this way, they reduce the time required to perform procedures while continuing to strive for an expert level in their specialty. In addition to the obvious benefit to patients, who gain access to specialized medical care, there is also an advantage that dental practitioners, and dental implantologists, gain from this model.

Thanks to the multi-specialty team model, they gain access to patients who are determined to receive implants. They can put their theoretical knowledge into practice and continue to hone their skills. After each stage of treatment is completed, the patient returns to the introductory doctor, who holistically guides the process, acting as a source of medical information and maintaining a constant level of patient motivation for further treatment.

4 Results

4.1 Comparison of the developed models

In terms of first-time handling patients, there are three key areas of activity that differentiate the linear model from the integrated multi-specialty team model: managing the flow of patients, building patients' awareness of their current dental problems and the consequences of negligent

treatment and possible solutions; performing more treatments during a single visit.

The use of the chosen model follows the decisions of the managers. A linear model of dental office operation based on the constant acquisition of first-time patients can effectively operate in the market. This is because some patients expect to start treatment immediately and focus exclusively on solving the current problem through symptomatic treatment. However, in this model, ensuring the continuous purchase of new patients requires constantly undertaking expensive promotional activities. This often entails managers accepting lower profitability for the practice or charging above-market prices for services. Meanwhile, the multi-specialty model involves building a lasting relationship with patients and treating patients in a broader range than the original one. It is a less costly tool, as it relies primarily on the ability of the introductory doctor to build patient motivation for treatment and coordinate the implementation of the process of treatment.

In the first area of difference between the models related to referring first-time patients for a comprehensive examination before treatment. It should be noted that a patient who does not experience pain most of the time is unaware of his dental problems. He does not undertake treatment in this area because he does not know that it is required. A study conducted by

Suchodolski shows that of 100 teeth with inflammatory lesions, 95 remain asymptomatic [10]. Diagnosis of health problems is possible when a comprehensive oral diagnosis is performed. For there to be an opportunity to do a dental check-up and build his awareness of the current state of oral health, it is necessary to control the patient's flow in the dental office and arrange by registration first for an appointment during which such a comprehensive oral examination will be performed. Except in situations where the symptom is severe pain disabling cognitive processes, a first-time patient should always be scheduled by dental registration for a visit during which a comprehensive examination will be performed in the first part of the visit, and treatment will be provided in the second part of the meeting to the extent expected by the patient.

When a first-time patient is reported to be in pain, the dental registration clerk arranges an emergency visit with one of the available conservative dentists. Since this is an unscheduled visit, it is short and takes place between treatments or as the last visit. The main purpose of this visit is to relieve pain, apply a dressing and refer the patient to the registrar, with whom he will schedule a scheduled treatment appointment. Suppose the doctor performing the interventional procedure is not also the introductory doctor. In that case, he only initiates a conversation about performing a detailed oral examination and the knowledge that the patient will receive as a result. Once the dressing has been applied, the doctor directs the patient to the registration desk to schedule a scheduled visit. At that point, the registration staff initiates discussions about the patient's participation in the visit, during which a comprehensive oral examination will be performed, followed by hygienization for complete access to information about the current state of the teeth.

Interestingly, in the linear model, where no patient flow control is used, patients are not ultimately dissatisfied with the service and treatment. Patients unaware of their existing dental problems receive treatment to the extent they come to the dental office. They get what they expect, so their satisfaction remains high because when evaluating the office, according to Rudawska, the patient also considers the relationship that connects him with the doctor and verifies it with previous expectations [11]. Therefore, it remains to be determined which of the activities was performed incorrectly since patients and all participating dental office employees and doctors believe that everything was completed correctly. Performing a comprehensive examination opens up the prospect of treatment while directing the patient according to his expectation, and making only an appointment during which treatment will be processed prevents the doctor from having

a conversation that builds his understanding of the nature and direction of further treatment. The interventional-only treatment leaves the patient unaware of the current situation in the oral cavity, exposes him to possible complications in the future, and reduces the chance of maintaining his teeth for life.

The conventional approach to the dental registrar's tasks is understood as enrolling for treatment those who contact the dental practice and are determined to make an appointment, providing face-to-face service to those who come to the medical facility, and billing payment for treatments. In the integrated model, the dental registration staff, who do not take active steps to acquire new patients on their own as the front line of patient contact, participate in selling the practice's services in the full sense of the word. This is because dental receptionists sell patients the time in the dentist's office, during which they will have access to the doctor's expertise. The way that this process takes place determines how many patients will receive the dentist's specialized care. When we are looking for an answer to the question of how to increase the profitability and efficiency of a dental practice, a range of possibilities can be pointed out to managers. These include defining and focusing on the extension of services with the most significant economic justification, reorganizing the flow of patients between specialists, actively acquiring patients via the Internet, developing the number of procedures performed during a single visit, changing the structure of the work performed, changing the scope of activities of the patient's caregiver, and using tools related to pricing. These measures can only be effective if the patient comes to the appointment. It should be known that this will not happen if contact with the dental practice is ineffective at the registration level. When listing the qualities and competencies that a good dental receptionist clerk should have (friendly, courteous, professional, able to recommend a dentist to patients and answer all incoming calls), managers rarely point to the overriding competency of professional phone service, which is the ability to sign up a new patient for an appointment, especially for a

comprehensive oral health check. All first-time patients, regardless of whether they are enrolled by registration for a comprehensive oral examination or, outside the established procedure, directly for treatment, are made an appointment with an introductory dentist for a visit on one of the days in the medical calendar reserved for first-time handling patients. An exception is made for visits by first-time patients with severe pain. The doctor does not perform a comprehensive oral examination during such a visit but afterward presents the patient with the resulting benefits and offers to perform it at the next visit.

The second area of difference between the models involves building patient awareness of their current dental problems, the consequences of negligent treatment, and possible solutions. In the linear model of dental office management, communication with the patient is carried out in terms of providing baseline information to questions asked by patients and meeting verbalized needs. The zone of expectations, which the patient does not indicate as important, remains outside the interest of the staff. What's more, in dental offices working in the linear model, there is a lack of interest on the part of the staff in scheduling another appointment if the patient has not asked for it himself. The patient service standards currently used in dental offices focus on implementing procedures and clearly presenting patient expectations rather than performing anticipatory measures that increase the level of care shown to the patient by the staff throughout the treatment process.

Meanwhile, in the integrated model, the dentist's tasks, in addition to treatment, also include providing patients with information related to health-promoting prevention and explaining the consequences of neglecting to maintain oral hygiene on the entire body's health. Our research shows that 91 % of patients expect their doctor to motivate them to continue treatment, 7 % have no opinion on this, and only about 1.5 % do not want to be motivated. The average patient's decisions on treatment methods for objective reasons cannot be based on his medical knowledge because he does not have it. For this reason, there is a need for a dentist to recommend solutions. There is, therefore, a parallel space for educational activities and the expectation of their fulfillment by the dentist. Another difference is the location of leading the conversation with the patient. As in the case of gynecological examinations, the conversation should not occur while the patient is on the dental unit, although this is common practice in the linear model. This is different in the integrated model, where the best place to have a conversation about the range of treatment, prognosis for a cure, and possible solutions is in the space where the patient is outside the immediate environment of the dental chair. In the integrated model, additional emphasis is placed on creating the right technical conditions to enable effective two-way communication.

If the layout of the furniture in the room allows it, the conversation between the doctor with the patient should be conducted at a desk or a table. The dental unit is not an appropriate place for a conversation that opens the patient to solutions, as many people with pain and lack of comfort associate it.

The literature [12] points out that inadequate communication between doctor and patient can harm the patient's health. However, the transmission of a message and the patient's understanding of its content is not the same as the activation of processes in which they will decide about treatment. For this reason, effective communication should be considered, one after which the patient will follow the doctor's medical recommendations, not just understand the content he or she is conveying. This means viewing communication with the patient as a process of constructing consciousness and motivation for treatment regarding his current dental problems and building his awareness of the negative consequences of neglecting treatment. Communication should be focused on creating a negative emotional status in the patient that will result in his ability to act and continue the treatment process.

As Shah notes, poor health awareness is associated with a higher risk of life-limiting diseases for patients, and practitioner-level health consciousness interventions can positively impact health behaviors and health outcomes in individuals with low levels of health care knowledge [13]. Building a patient's willingness to apply medical solutions enables the patient to be fully healed and thus creates space for the dentist to put his medical knowledge into practice, continue to develop his skills, and further gain professional experience. A patient who understands the consequences of stopping treatment and the causes and consequences of the development of periodontal disease, including their negative impact on the entire body, acquires an openness to treatment. Then the prices of the medical therapies cease to be of primary importance and do not block his health care decision.

Area three of the differences between the models relates to the approach to the number of procedures performed per visit. Increasing this number affects the efficiency of the process by reducing the daily number of patients served, fewer required room disinfection and preparation of instrument sets and materials dedicated to each patient, and fewer non-medical processes related to billing for payments for procedures and scheduling visits in doctors' calendars. Also, from the patient's point of view, performing several procedures during a single visit makes economic sense. It involves a reduction in the time needed for commuting, returning, and parking, as well as the fees associated with them, and most importantly, it reduces treatment time. Treating adjacent teeth allows for a single dose of anesthesia, which is essential for patients with an aversion to injections. The dental receptionist can use all these arguments when scheduling a visit with a patient and recommending that the patient be explicitly enrolled for a visit during which more extensive treatment will be provided.

Concerns have been encountered among dentists and managers about the advisability of performing several procedures during a single visit. Information gathered from those who use this method of making appointments confirms that these fears are unfounded. Implementing this

solution benefits practice owners, the patient, and the doctor. It reduces nervousness in the waiting room and reduces the likelihood of delays in the punctuality of starting appointments. Significantly from the managers' perspective, it reduces the possibility of situations that create unplanned gaps in visit schedules, during which dental staff remains idle, continuing to generate costs, and dentists have unscheduled, unpaid breaks. Because of this, offering patients longer visits, during which a more significant number of procedures are performed, makes greater use of the time potential of each of the dental units available in practice.

For this process to function correctly, it is necessary to apply the principles of a unified message directed to the patient. This begins at the registration level when proposing such a solution to the patient and continues during communication with the dentist. Dental assistants also confirm the validity of such a solution during patient contact. The statistical patient is not familiar with detailed medical and non-medical procedures. He cannot accurately assess what is good for him, acts intuitively, and expects recommendations. Suppose he receives consistent information at each level of the visit about the standard used in the office, which includes treatment of several teeth in one visit. In that case, he will consider this standard binding and follow the recommendations received.

4.2 Performance indicators

Based on the analysis of data extracted from 341 monthly periods from 65 different dental offices, covering for a single office a range of at least three consecutive months from the period from January 2017 to August 2022, practice performance indicators were developed to measure current states and compare performance between team members and offices. Their purpose is added to support managers in building conclusions based on managerial decisions. They allow compiling the results of analyzed people and processes in a way that generates a response presented as a percentage or quantifiable numerical value.

To make it possible to compare parameters between establishments of different sizes, the author of the study used indicators depicting the functioning of the dental practice concerning a universal unit, for which he took one dental unit analyzed over one month. This method of converting parameters makes it possible to juxtapose data from offices of different scales of operation by reducing them to a common denominator and presenting indicator levels in terms of "per dental unit", also referred to interchangeably by the phrase "per dental chair". In addition, clustering and analysis of data from the same months in different years were applied. The results allowed the construction of average indicators depicting areas specific to the operation of the studied offices.

A wide variety of indicators can measure the evaluation of the performance of a dental practice. For effective management, the manager must select the key ones that, in his opinion, will allow comparing the implementation with expectations and often also with the market. One of the assessments of the quality of a practice's, dentist's, or non-medical staff's performance is efficiency, including effectiveness in working with first-time patients. The performance level indicators assessed the quality of patient communication carried out by the dental team. They represent the efficiency of the conversations held with the patient at the registration stage, the ability of dentists to build patient awareness of the current health situation leading to the emergence of the patient's motivation to start and continue comprehensive treatment, and the doctor's ability to recommend hygiene treatments to patients.

The first measure from this level is the WUKP indicator of "continuation of treatment of first-time patients", which most graphically shows the doctor's ability to work with the patient beyond the dental unit, i.e., the office's ability to retain the patient and begin the process of treating him comprehensively instead of just treating him symptomatically. The dentist's communication with the patient in terms of presenting and discussing their current oral health situation is a key moment in which there is an opportunity to build patient awareness and stimulate motivation to treatment continuation. This indicator illustrates the extent to which such conversations are effectively held with patients and indicates how first-time patients are managed at the practice. It helps determine whether the facility is attempting to seek to treat patients beyond their initial need or treating only within the patient's reported problems and focused on the constant search for new, more first-time patients. This measure can be referred to as a "return rate" of new patients or an indicator of a patient's "ability to retain" in dental practice.

To calculate it, the function $f(WUKP_{\mathrm{m}})$ was used:

$$f(WUKP_m) = \frac{sum\ of\ first\ time\ patients\ continuing\ treatment_m}{sum\ of\ first\ time\ patients_m} \cdot 100\ \% = \frac{\frac{\sum_{n=1}^{n}\left(\left(\frac{M_n}{u_n}\right)_m\right)}{n_m}}{\frac{\sum_{n=1}^{n}\left(\left(\frac{K_n}{u_n}\right)_m\right)}{n_m}} \cdot 100\ \%, \quad (1)$$

where *WUKP* – the indicator of continuation of treatment in first-time patients; *u* – the number of dental units in the office; *K* – the number of first-time patient visits during the period; *M* – the number of first-time patients continuing treatment (minimum 4 visits); *m* – month (from 1 to 12); *n* – number of data (monthly periods).

It was also assumed, as first-time patients continuing treatment, those patients who had a minimum of four consecutive office visits within six months of their first-time visit, regardless of the scope range to which they referred and related it to the number of all first-time patients of the period.

The average monthly values of this indicator, calculated as the ratio of the number of average monthly follow-ups of first-time patients to the monthly number of visits of all first-time patients, are shown in Figure 4, where its level is illustrated against the number of total patients.

The average value of the “continuation of treatment of first-time patients" indicator calculated from all the periods studied, rather than as an average of monthly averages, takes the value at 42 %. The lowest observed value of one studied period is 1 %, and the highest is 95 %.

The indications of this measure do not reflect work with the same group of patients since they refer to measurements for different time intervals. The information on the continuation of treatment occurs in the following six months differently than in the case of hygienization or examination, which is carried out during or immediately after the initial visit.

An indicator analyzed over a longer period of time can be treated as ongoing information that is a consequence of previous actions.

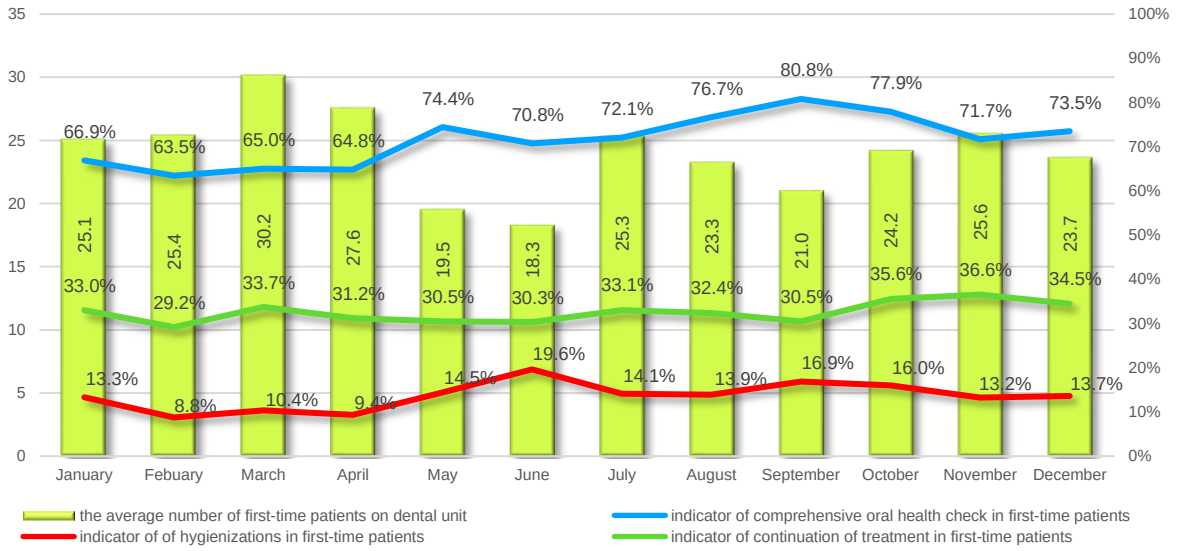

Figure 4 - Performance indicators

The return rate of first-time patients gives feedback to doctors about the effectiveness of their non-medical activities since it is the dentist, of all those in contact with the patient, who has the most significant influence on the patient’s decisions to continue treatment.

The second measure of the efficiency level in managing first-time patients is WUBP’s indicator of “comprehensive oral health check in first-time patients”.

It represents the effectiveness of a dental receptionist’s work in referring new patients for a comprehensive examination rather than referring them directly for treatment. Information related to the following can also be used to comprehensively assess the effectiveness of dental registrars' work related to the number of incoming calls answered and responses to uncompleted contact attempts, the availability of the dental office to the patient, the time spent on telephone or email and social messaging service, and the average length of face-to-face calls. All the indicators provide the manager with the necessary information about the structure and daily activity of registration. However, analyzing them in detail, it should be emphasized that the most important of them is the efficiency in conducting calls that lead to an appointment that begins with a comprehensive examination of the patient's oral health, and the measure of just this indicator is crucial in assessing the registrar’s efficiency. The level of this indicator is calculated using the function $f\,(WUBP_m)$:

$$f(WUBP_m) = \frac{sum\ of\ comprehensive\ oral\ health\ check\ in\ first\ time\ patients_m}{sum\ of\ first\ time\ patients_m} \cdot 100\ \% = \frac{\frac{\sum_{n=1}^{n}\left(\left(\frac{B_n}{u_n}\right)_m\right)}{n_m}}{\frac{\sum_{n=1}^{n}\left(\left(\frac{K_n}{u_n}\right)_m\right)}{n_m}} \cdot 100\ \%, \qquad (2)$$

where *WUBP* – comprehensive oral health check in first-time patients; *u* – number of dental units in the office; *K* – number of first-time patient visits during the period; *B* – number of comprehensive oral health checks in first-time patients (first-time screening patients); *m* – month (from 1 to 12); *n* – number of data (monthly periods).

It suggests the ability of the dental practice to obtain comprehensive treatment plans instead of performing only interventional treatment. During the period under review, it reaches an average value of 51 %, and its smallest value is 1.7 %. The value of this indicator close to 100 % indicates the dental practice’s use of patient flow standards, in which all first-time patients are referred for a comprehensive oral diagnosis as part of their first visit.

The third performance measure of WUHP's work with first-time patients illustrates the percentage of hygienizations performed on first-time patients. Together with the "follow-up of first-time patients" indicator and the "examinations in first-time patients" indicator, it is shown in Figure 4.

It is related to the management of first-time patients in terms of the degree of hygienizations performed. It illustrates the dentists' ability to motivate first-time patients to use the hygiene office.

The function $f(WUHP_m)$ is used to calculate it:

$$f(WUHP_m) = \frac{sum\ of\ hygienizations\ in\ first\ time\ patients_{\mathrm{m}}}{sum\ of\ first\ time\ patients_{\mathrm{m}}} \cdot 100\ \% = \frac{\frac{\sum_{n=1}^{n}\left(\left(\frac{H_n}{u_n}\right)m\right)}{n_m}}{\frac{\sum_{n=1}^{n}\left(\left(\frac{K_n}{u_n}\right)m\right)}{n_m}} \cdot 100\ \%, \quad (3)$$

where *WUHP* – an indicator of hygienizations in first-time patients; *u* – number of dental units in the office; *K* – number of first-time patients during the period; *B* – number of hygienizations in first-time patients; *m* – month (from 1 to 12); *n* – number of data (monthly periods).

Its average value is 19 %, with the highest value taken in a single period being 61 % and the lowest being 1.2 %.

The WUWP indicator, which depicts the percentage of first-time patient visits in the number of total visits, is used to evaluate the potential of the dental office to carry out the treatment. The values of the gauge are calculated using the function $f(WUWP_m)$:

$$f(WUWP_m) = \frac{sum\ of\ first\ time\ patients_m}{sum\ of\ total\ patients_m} \cdot 100\ \% = \frac{\frac{\sum_{n=1}^{n}\left(\left(\frac{K_n}{u_n}\right)m\right)}{n_m}}{\frac{\sum_{n=1}^{n}\left(\left(\frac{L_n}{u_n}\right)m\right)}{n_m}} \cdot 100\ \%, \quad (4)$$

where *WUWP* – the indicator of the ratio of first-time patients to total patients; *u* – the number of dental units in the office; *K* – the number of first-time patient visits during the period; *L* – the number of total patients during the period; *m* – month (from 1 to 12); *n* – number of data (monthly periods).

The average monthly level of this indicator is shown in Figure 5.

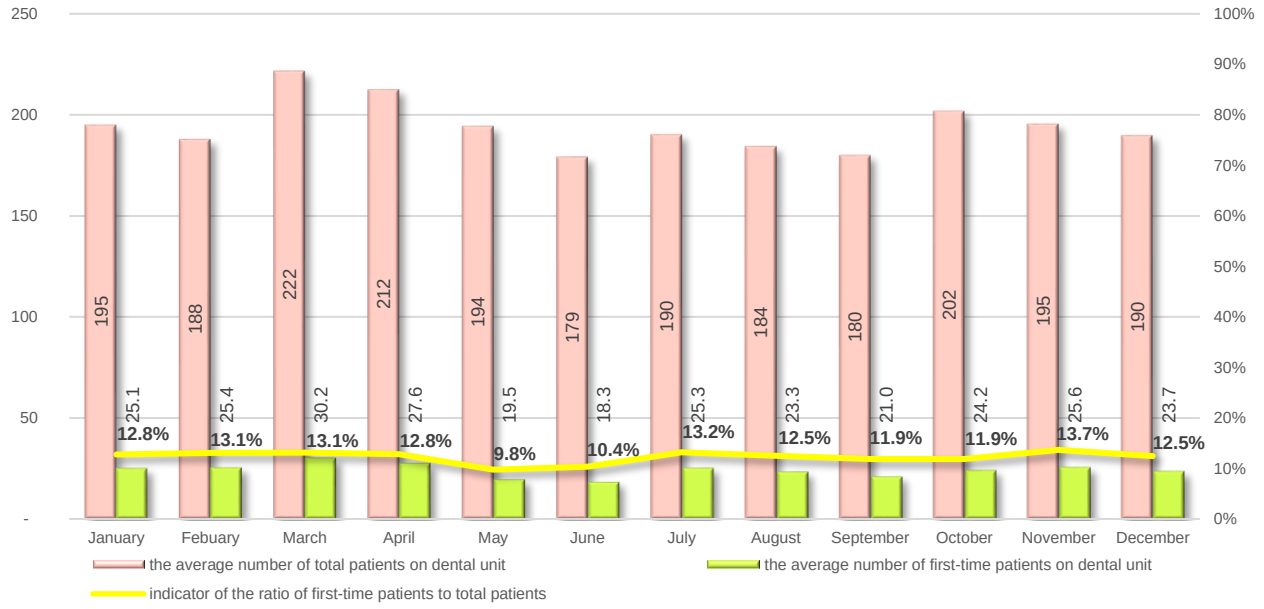

Figure 5 - Ratio of first-time patient visits in total patient visits

The gauge illustrates the current capacity of the dental practice to generate an influx of new patients. It is a consequence of the number of referrals by patients because of promotional activities aimed at attracting new patients.

This indicator indirectly depicts the evaluation of the dental practice by current patients and the number of recommendations they give to their closest and most familiar people. It makes it possible to make a preliminary prediction of the future number of total patients and first-time patients by determining trends of change.

It is the yardstick for evaluating the management model chosen in the practice's management model. Its high values indicate a focus on activities attracting many first-time patients and not taking advantage of their potential for treatment. Values below 5 % suggest lower levels of patient satisfaction and limited recommendation for dental practice. On average, the ratio of first-time patient visits to total visits is 12 %, taking an average monthly figure of 25 new patients per dental unit. This ratio reached 62 % among the surveyed facilities and the lowest at 3 %.

5 Discussion

Understanding the interpenetration of processes in the dental office seems crucial when using an integrated model of first-time patient management, in which the patient receives information and recommendations that are maintained in the same narrative. There is no discrepancy between advice from the dental registration, recommendations from the dentist, and information provided by the hygienist. The entire team is centered around convergent patient service procedures that guarantee repeatable processes and provide the patient with a sense of security and stability. This creates a professional image of the dental team, which gives the patient full access to the resources in the dental office and guarantees the use of uniform communication.

Simultaneously, the patient's level of satisfaction is derived from repeatedly exceeding his original expectations with which he came to the dental office. This satisfaction influences the recommendations given by patients, both the number of recommendations and their commitment when referring the dental practice to others. This is important for the dental practice's growth and affects future profitability, as the author''s research shows that for 85 % of patients, the dental office's choice follows a recommendation from family or friends.

Kesy argues that the permanent qualities of competence are complicated to change and sometimes impossible [14]. Therefore, matching the tasks performed by dental receptionists and dental assistants with their natural predispositions in terms of working with patients is essential.

Bukowska-Pietrzynska rightly notes that the entire dental office staff, not just the dentist, is responsible for the patient's overall assessment of the quality of service [15]. Therefore, when recruiting new people and developing the competence of the existing dental team members, their individual acquired qualities should be considered, which can be developed.

6 Conclusions

Some patients' decisions will be influenced by the potential negative consequences of not treating them years from now; others will be affected by arguments about the importance of smile aesthetics in building a professional image. The dentist's role is to select the communication with a patient in a way that will most enable the key information to reach them. Patient ignorance leads to a lack of action taken. Awareness and understanding of the disease processes occurring in the oral cavity and their adverse effects on the function of the heart, kidneys, and other internal organs if the patient ignores the need for treatment, need not, but can result in the initiation of comprehensive treatment.

If the patient is unaware of his problems or does not understand them, he will undoubtedly take no action, but if he has knowledge and awareness, he may begin treatment. Activities in each of the three areas discussed, in an integrated model carried out under the principles of Flow Management, serve the recipient of services and, as a result, enable the patient to restore his oral health in the shortest possible time. It is true that following the fuller utilization of patients' potential for treatment, a noticeable effect is a simultaneous increase in the profitability of the dental practice, which, with an entirely ethical process based solely on diagnosed dental problems, makes both sides a winner.

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