Facultad de Odontología

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The preventive care model in restorative dentistry

A document-based review of its management criteria and pedagogical approach

UPDATE

Modelo preventivo-asistencial en odontología restauradora
Una revisión documental sobre sus criterios de gestión y enfoque pedagógico

O modelo de cuidado preventivo na odontologia restauradora.
Revisão documental dos critérios de gestão e do enfoque pedagógico

Abstract

» **Objectives.** To establish the criteria that define the dental care model and the activities that comprise it.

» **Methods.** A narrative review of institutional documents and publications by key authors addressing the oral health care model was conducted. The review included written and/or electronic sources retrieved from PubMed, Timbó, SciELO, and the Cochrane Library, without restrictions on publication year or study type. The following descriptors were used: model of care, clinical protocols, prevention, restorative dentistry, operative dentistry, and clinical teaching.

» **Development.** The criteria and indicators of the preventive care model in dentistry were reviewed. The educational role of Operative Dentistry, its place in the curriculum, the changes it has undergone across different paradigms, and the challenges of education committed to prevention, comprehensive care, and the population's real needs were explored.

» **Discussion.** The care model is discussed from the perspectives of different authors, together with the contribution of restorative dentistry in accordance with the principles of Minimal Intervention Dentistry. This made it possible to develop an original proposal for an indicator matrix for evaluating preventive care models.

» **Conclusions.** The preventive care model, a fundamental component of the dental curriculum, seeks to train dentists with a comprehensive approach to health; however, its effectiveness is limited by various factors. Universities, health services, and management bodies must work collaboratively to design and implement strategies with a sustainable impact on the oral health of communities.

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Keywords: model of care, clinical protocols, prevention, restorative dentistry, operative dentistry, clinical teaching.

Resumen

» **Objetivos.** Establecer los criterios que definen el modelo de atención odontológica y las actividades que lo integran.

» **Método.** Revisión narrativa de documentos institucionales y de autores referentes que analizan el modelo de atención de la salud bucal. La revisión abarcó fuentes escritas y/o electrónicas de PubMed, Timbó, SciELO y Cochrane Library, sin restricciones de año o tipo de estudio utilizando los descriptores: modelo de atención, protocolos clínicos, prevención, odontología restauradora, operatoria dental, enseñanza clínica.

» **Desarrollo.** Se revisaron los criterios e indicadores del modelo de atención preventivo en Odontología. Se exploró el rol formativo de la Operatoria Dental, su inserción curricular, los cambios atravesados según los diferentes paradigmas y los retos para una formación comprometida con la prevención, la atención integral y las necesidades reales de la población.

» **Discusión.** Se analiza el modelo de atención según la concepción de distintos autores y el aporte de la odontología restauradora de acuerdo con las directivas de la Odontología de Mínima Intervención lo que permitió elaborar una propuesta original de una matriz de indicadores para la evaluación de modelos preventivos-asistenciales.

» **Conclusiones.** El modelo de atención preventivo-asistencial, eje fundamental de la trayectoria curricular en odontología, busca formar odontólogos con un enfoque integral de la salud, sin embargo, su efectividad se ve limitada por diversos factores. Es fundamental que las universidades, los servicios y los organismos de gestión trabajen de manera articulada para diseñar e implementar estrategias que generen un impacto sostenible en la salud bucal de las comunidades.

Palabras clave: Modelo de atención, protocolos clínicos, prevención, odontología restauradora, operatoria dental, enseñanza clínica.

Resumo

» **Objetivos.** Estabelecer os critérios que definem o modelo de cuidados odontológicos e as atividades que o compõem.

» **Método.** Revisão narrativa de documentos institucionais e autores de referência que analisam o modelo de cuidados buco-bucal. A revisão incluiu fontes escritas e/ou eletrônicas do PubMed, Timbó, SciELO e Cochrane Library, sem restrições quanto ao ano ou tipo de estudo usando os descritores: modelo de cuidado, protocolos clínicos, prevenção, odontologia restauradora, cirurgia odontológica, ensino clínico.

» **Desenvolvimento.** Os critérios e indicadores do modelo de cuidados preventivos em odontologia foram revisados. Foram explorados o papel formativo da Cirurgia Odontológica, sua inserção curricular, as mudanças sofridas de acordo com os diferentes paradigmas e os desafios para o treinamento comprometido com a prevenção, o cuidado abrangente e as reais necessidades da população.

» **Discussão**. O modelo de cuidado é analisado de acordo com a concepção de diferentes autores e a contribuição da odontologia restauradora, de acordo com as diretrizes da Odontologia de Intervenção Mínima, que permitiram o desenvolvimento de uma proposta original para uma matriz de indicadores para avaliação de modelos de cuidados preventivos.

» **Conclusões.** O modelo de cuidado preventivo, um eixo fundamental da trajetória curricular na odontologia, busca formar dentistas com uma abordagem abrangente da saúde, porém sua eficácia é limitada por vários fatores. É essencial que universidades, serviços e órgãos de gestão trabalhem juntos para desenhar e implementar estratégias que gerem um impacto sustentável na saúde bucal das comunidades.

Palavras-chave: modelo de cuidado, protocolos clínicos, prevenção, odontologia restauradora, dentística, ensino clínico.

Introduction

The Faculty of Dentistry, University of the Republic (Udelar), Uruguay, promotes a model of care for the education of dentists that incorporates oral health as an integral component of the primary health care system. The main objective of this model is to facilitate access to higher-quality dental services for a larger proportion of the population, with particular emphasis on the prevention of oral diseases, public education, and comprehensive treatment. This model is based on the principles established in the 1978 Alma-Ata Declaration, which proposed a global strategy for primary health care.[1] However, it is important to note that the original English term was "primary health care." In this context, care conveys a broader and more comprehensive concept than the provision of health services alone. Care is characterized by collaborative relationships between professionals and patients, in which both actively participate in health-related decisions and work as partners in the process. By contrast, the traditional service-based approach maintains a relationship in which the professional makes decisions and the patient accepts them passively. In addition, care involves coordination among different sectors, including education, social work, and nutrition, to address all factors affecting health, whereas service provision is often limited to specific health services provided by a single institution. The proposed reorientation of the health care model highlights the contrast between comprehensive care, which seeks to ensure health for all and by all through a multisectoral, multidisciplinary, health-promoting, preventive, participatory, and decentralized approach, and a reparative, curative, disease-centered model that has not generated a significant impact on people's quality of life, particularly in less developed societies and poorer communities (PAHO/WHO, 2023).[2]

The Faculty of Dentistry, University of the Republic, is organized into departments that group specific areas of the discipline. The Department of Preventive and Restorative Dentistry, which serves as the setting for this study, is part of the professional clinical training area and includes its three subunits: Dental Operative Techniques, Operative Dentistry I, and Operative Dentistry II, which are taught from the second to the fourth year of the degree program. An interdisciplinary approach and curricular coherence across these subunits are intended to provide students with continuous, integrated training that enables them to apply their theoretical knowledge in real clinical situations from the earliest stages of their education. This integrated structure is essential for developing a better understanding of oral health and preparing students to make informed clinical decisions and perform effective interventions in a professional setting.

This article examines the characteristics and evaluation criteria of the preventive care model in dentistry, the contribution of Operative Dentistry within restorative dentistry—with particular emphasis on Minimal Intervention Dentistry (MID)—and its integration into the university curriculum at the Udelar Faculty of Dentistry.

Objectives

- To conduct a documentary and literature review of the background and specific features of the oral health care model from the perspective of restorative dentistry.
- To establish the criteria that define this care model and the preventive and care-related activities that comprise it, which will serve as indicators.

Methodology

This study is a narrative review of institutional documents and literature on the dental care model, aimed at incorporating evidence into clinical practice. The search aimed to identify institutional documents and publications by key authors analyzing the oral health care model and the criteria and indicators that define it. Articles were retrieved from written and/or electronic sources to provide a novel contribution by offering a comprehensive perspective on complex concepts, theories, and treatments in dentistry. The PubMed, Timbó, SciELO, and Cochrane Library databases were consulted, with no restrictions on publication year, study type, country, or population. The following descriptors were used: care model, clinical protocols, prevention, restorative dentistry, operative dentistry, and clinical teaching. Preference was given to publications from the past 20 years concerning the preventive care model to ensure that the evidence connects scientific theory with current clinical applicability, including current technologies and protocols. In addition, the search was supplemented by screening the reference lists of the selected articles. The inclusion criteria were: **1.** institutional documents and original articles; **2.** articles that included clinical practice guidelines; **3.** articles addressing clinical decision-making; and **4.** articles published in indexed, peer-reviewed journals. A total of 52 articles and documents were retrieved. After their abstracts were reviewed, 22 were selected because they were considered to link scientific theory with the clinical applicability of the dental care model. In addition, 12 articles addressed the pedagogical approach, and 8 institutional documents established standards or regulations for care and pedagogical models in dentistry.

Development

The preventive care model in dentistry is grounded in Primary Health Care, the guiding strategy of the health system, which prioritizes prevention and health promotion. This means that dental care is not limited to the treatment of disease but also focuses on preventing oral health problems.[3,4] The basic approach is prevention, which the WHO defines as “measures aimed not only at preventing the onset

of disease, but also at halting its progression and mitigating its consequences once it has been established."[5] Prevention focuses on reducing risk factors and promoting healthy behaviors to prevent disease and improve overall well-being. This preventive approach encompasses any measure that reduces the likelihood of a condition or disease occurring or interrupts or slows its progression. In dentistry, it includes education on oral hygiene techniques, dietary advice, and the importance of regular check-ups. The implementation of these preventive strategies is based on the principle that the most prevalent oral diseases are preventable through early and systematic interventions. This model faces challenges, including the need to transform health care toward a more humane and accessible approach, particularly for vulnerable populations. From an international perspective, the Bangkok Declaration[6] emphasizes the need to integrate oral health into global public health policies, highlighting its key role in health equity and sustainable development. More than 3.5 billion people worldwide are estimated to be affected by oral diseases, which disproportionately affect vulnerable populations facing significant barriers to accessing quality services. Within this framework, the WHO proposes a comprehensive care model based on primary health care that incorporates health promotion, prevention, early diagnosis, and treatment of oral diseases as a fundamental part of universal health coverage packages.[2] This perspective reinforces the need to align dental education with inclusive policies that address the social determinants of health and ensure equitable access to essential oral health services.

The comprehensive and educational approach seeks not only to prevent and treat disease but also to empower patients through health education, which is essential for the sustainability of the country's health system. However, in clinical training, those involved in educational settings do not always perceive its implementation as coherent or fully achievable. According to Wolpe et al.,[7] oral health education promotes the development of competencies focused on interprofessional collaboration, sociocultural sensitivity, and a comprehensive approach to prevalent oral diseases. Within this framework, dental education must embrace a preventive and context-sensitive care model that is not limited to lesion repair but also considers the social determinants of health and the active participation of patients. Along the same lines, Schüler et al.[8] document the development of a preclinical curriculum in Germany that emphasizes prevention from the earliest stages of training. This curriculum integrates learning objectives, active teaching methods, and formative assessment, promoting student participation and critical reasoning. Activities include clinical simulations, case studies, and small-group teaching, fostering a comprehensive understanding of the patient and the application of individualized preventive measures. For example, "the primary learning objective of the entire curriculum is for students to be able to recommend and justify appropriate preventive measures according to patients' age and needs.

It is not enough for students to recognize and diagnose deficiencies in oral hygiene; they must also be able to select cleaning techniques appropriate to the oral hygiene deficiencies identified and to educate patients, taking into account their overall health and motor and cognitive abilities." The underlying care model focuses on risk assessment and active patient participation, using indicators such as the plaque index to guide interventions. This experience highlights alternative curricular designs that could serve as inspiration for strengthening the preventive approach in national clinical training.

Regarding Restorative Dentistry, and specifically Operative Dentistry, the care model follows the principles of Minimal Intervention Dentistry (MID), which incorporates assessment of the patient's risk of developing disease and focuses on early prevention and control of disease activity and progression.[9–11] MID is a philosophy of dental treatment centered on preserving original tooth structure and the patient's health, prioritizing prevention and less invasive approaches in Operative Dentistry. Its goal is to prolong the lifespan of teeth through early diagnosis, lesion remineralization, patient education on oral hygiene, and the use of conservative techniques and materials that minimize the need for aggressive interventions.

The fundamental principles of MID are: **a)** Recognition: early identification and assessment of potential risk factors; **b)** Reduction: elimination or minimization of risk factors through health education, changes in diet, oral hygiene habits, and other behaviors; **c)** Regeneration: arresting and reversing incipient lesions through appropriate agents, such as fluorides and other remineralizing agents; **d)** Repair: when a cavitated lesion is present and invasive intervention is required, conservative removal of the affected tissue should be performed, using selective dentin removal, to maximize the tooth's reparative potential and preserve its structure; **e)** Restoration: adhesive and bioactive materials, such as glass ionomers and resins, are used to restore the tooth and promote internal dentin healing; **f)** Reevaluation: monitoring the patient at established and agreed-upon intervals.[12]

To evaluate a preventive care model in dentistry, criteria and indicators such as adherence to oral hygiene habits, ongoing patient education on oral health, control of caries and periodontal disease activity, and reduction in the need for invasive restorative treatments should be considered. It is also important to assess patient satisfaction with care and the efficiency of the model in terms of costs and resources (**Table 1**). Using these criteria and indicators makes it possible to obtain a comprehensive view of the effectiveness of a preventive care model in dentistry and to implement improvements aimed at optimizing the oral health of patients and communities.

Table 1. Criteria and indicators for a preventive care model in dentistry

Criteria	Indicators
Assessment of oral health risks	Prepare the clinical record and assess oral health status, habits and practices, and dental history.
Education for oral health promotion, prevention, and maintenance	Assess how oral health promotion, prevention, and maintenance activities are implemented.
Adoption of oral hygiene habits	Record adherence to oral hygiene habits using plaque and gingival inflammation indices.
Healthy dietary measures	Assess the frequency and amount of sugar intake in relation to the risk of oral disease.
Control of oral disease activity (caries and periodontal disease)	Monitor the progression of caries and periodontal disease by checking for white spot lesions, new carious lesions, intact fissure sealants, and signs of gingival inflammation.
Preventive and therapeutic fluoride measures	Assess the use of preventive and therapeutic measures, such as fluoride toothpaste, mouth rinses, fluoride varnishes, and/or fluoride gels.
Operative Dentistry based on Minimal Intervention Dentistry (MID). Reduction in invasive treatments.	Preservation of tooth structure through maximum conservation of dental tissues. Appropriate extent of restorations according to the principle of minimal intervention. Remineralization of active lesions. Reduced invasiveness through selective dentin removal (removal of infected dentin and preservation of affected dentin). Use of adhesive and bioactive restorative materials. Polishing and adjustment of restorations that cause localized gingival and periodontal alterations. Improved patient experience through greater comfort and lower cost.
Periodic follow-up	Systematic clinician recommendation of periodic follow-up and patient adherence to recommended recall appointments.
Patient satisfaction	Assess patient satisfaction considering the care received, comfort during the experience, information provided, treatment effectiveness, and cost.
Comprehensive care	Verify the participation of interdisciplinary teams in the planning and delivery of dental care.

Operative Dentistry has historically occupied a central role in the clinical training of dentists and is one of the disciplines that introduces students to direct patient care at an early stage of their training. Since its inception, this field has focused on the diagnosis and treatment of caries lesions and other structural alterations of dental tissues through restorative procedures. However, in recent decades, advances in understanding the etiopathogenesis of caries, together with the

consolidation of care models based on health promotion and prevention, have challenged traditionally mechanistic approaches focused exclusively on tissue repair.[13] Significant advances have been made in recent decades in approaches to the most prevalent oral diseases. Within this framework, changes have affected both clinical practice and the education of professionals addressing oral health issues. These changes are part of an inseparable process of reciprocal feedback between academia and the dental industry, facilitating access to products and materials that support preventive and therapeutic procedures and promote tissue remineralization.[14] The current understanding of dental caries as a dynamic process resulting from continuous demineralization–remineralization mechanisms in dental tissues—enamel, dentin, and cementum—makes it necessary to further examine the available scientific evidence supporting Minimal Intervention Dentistry (MID). Its fundamental pillars are maximum patient comfort, maximum preservation of tissues, and promotion of reparative capacity. This philosophy directs efforts toward promoting protective factors for maintaining health and toward the early resolution of disease through early detection and treatment at its initial stage, emphasizing the concepts of maximum prevention, minimally invasive treatment, and periodic follow-up. Its main objective is to strengthen the educational component by reaching patients through information and motivation, fostering a sense of responsibility for their own health.[15]

Discussion

At present, the scientific community agrees that dental caries should also be classified according to the anatomical site at which the lesion is located: coronal caries and root-surface caries. Differences between them arise from the biochemical characteristics of the tissues in which they develop. For example, dentin has a lower mineral content and lower crystallinity than enamel, making it more soluble when exposed to acid attack. Based on these concepts, the contemporary philosophy of “non-invasive intervention” for dental caries has emerged. It adopts the criterion that lesions involving superficial enamel, dentin, and cementum and/or that have progressed as far as the dentin–enamel junction can be controlled and reversed when conditions are created to sufficiently control cariogenic challenges in the microenvironment. This control is achieved by effectively disrupting the biofilm and, often, using therapeutic agents to treat demineralized tissues.

In other words, the shift toward a health-oriented paradigm is reflected in the concept of “restoration” in restorative dentistry under the new care model, which prioritizes treating dental tissues affected by the carious process (lesions) rather than performing cavity preparation. In this context, the analysis of clinical teaching in Operative Dentistry is especially relevant for reflecting on how dentists’ professional profiles are shaped during training. In particular, it is important to understand how this discipline can contribute to, or limit, the incorporation of

a preventive care approach into dental practice, aligned with the principles and strategies of primary health care. Operative Dentistry guided by the principles of minimal intervention is a philosophy that prioritizes prevention, early diagnosis, and maximum preservation of dental tissue. It moves away from traditional methods by using less invasive techniques and biocompatible materials to halt caries progression, prolong the lifespan of the tooth, and provide periodic follow-up. Treatments range from prevention and remineralization to conservative restoration and periodic monitoring.(16) According to Schüler et al.,[8] this approach promotes comprehensive care that considers the patient's biological, behavioral, and social aspects, and positions primary and secondary prevention as fundamental pillars of dental care. The evolution of Operative Dentistry reflects a gradual shift from a mechanistic model focused on repair toward an integrative model that encompasses prevention, health promotion, and active patient participation. This transformation posed a challenge for educational institutions, which must adapt their curricular and clinical programs to the new demands of the professional field.

This discussion explores the educational significance of Operative Dentistry, considering its integration into the curriculum, the changes it has undergone under different paradigms, and the challenges it poses within a training program committed to prevention, comprehensive care, and the real needs of the population. Operative Dentistry is the discipline concerned with the study, prevention, diagnosis, and treatment of lesions of dental hard tissues, primarily those caused by caries, trauma, and other conditions of nonbacterial origin, through restorative procedures aimed at restoring the patient's function, aesthetics, and oral health. Traditionally, its scope focused on the removal of affected tissue and restoration with filling materials, within a predominantly curative and restorative approach.[16] With advances in the understanding of the etiopathogenesis of caries—now understood as a dynamic, multifactorial, noncommunicable disease mediated by biofilm and modulated by diet—the need for prevention-centered approaches has been reinforced.[17] Dental caries is determined by multiple biological, behavioral, psychosocial, and environmental factors, requiring comprehensive clinical strategies focused on risk control rather than damage repair. In this context, Operative Dentistry has undergone a process of conceptual transformation, moving from a practice centered on the restoration of teeth toward person-centered dentistry and preventive disease management. From this perspective, restorative treatment is redefined as a complementary resource within a broader plan for risk management and control of caries progression.[13] There is broad agreement that Operative Dentistry, as a clinical discipline, should be oriented toward understanding the determinants of the health–disease process from a preventive and minimally invasive approach. This entails training students not only in technical skills, but also in diagnostic, communication, and ethical competencies within the framework of primary health care.

According to Lucarelli et al., the dental clinic is a setting in which two logics—educational and care-delivery—intersect and, at times, come into tension, with rhythms and purposes that are not always compatible.[18] The authors emphasize that the presence of the patient requires communication training and an ethical attitude that enables an appropriate relationship with the patient to be established. Minimal intervention, preservation of healthy dental tissue, and clinical decision-making grounded in scientific evidence are essential pillars in the contemporary redefinition of the discipline. Thus, the scope of Operative Dentistry can no longer be limited to repairing damage; it must also include the responsibility to contribute to the prevention of new lesions through clinical practice that emphasizes oral health promotion and patient education.

From the late nineteenth century and through much of the twentieth century, Operative Dentistry was established as a highly technical discipline focused on removing carious tissue and restoring it with different filling materials. In this model, dentists were trained to perform restorative procedures, often without an integrated view of the health–disease process or the patient's social context. For decades, the understanding of caries was dominated by a linear bacteriological view focused on the pathogenic effect of specific plaque, in which the type of microorganism was considered the main determinant of the disease.[19] This reductionist conception ignored the dynamic and multifactorial nature of the cariogenic process. Subsequently, the ecological plaque model introduced a broader perspective by considering not only the presence of microorganisms, but also environmental and behavioral factors that affect the balance of the oral microflora. Within this framework, caries is understood as a disease that begins with an imbalance in the homeostasis of the oral ecosystem, representing a substantial shift in its etiological interpretation.[13] Relevant scientific advances began to challenge the assumptions of the traditional model by showing that caries is a reversible disease in its early stages and can be controlled through noninvasive interventions.[20] This paradigm shift marked a turning point in the discipline, promoting an approach centered on prevention and risk control as the main focus of dental care and relegating restoration to a last resort within a minimal intervention model.

For Udelar dental students, instruction in Operative Dentistry within the undergraduate curriculum represents their first direct clinical experience with patients and therefore holds key educational value in the construction of their professional identity. As Falsafi et al.[21] pointed out, learning experiences play a central role in shaping learners' identities, as well as in projecting those identities toward their professional future. Located in the early years of the clinical cycle, this curricular unit fulfills a dual pedagogical function: on the one hand, it introduces students to the fundamentals and basic preventive and restorative procedures; on the other, it begins to integrate the theoretical knowledge acquired in previous cycles with care practices in real clinical settings.[22]

In a 2018 study, Frese et al.[23] assessed the perceived psychosocial impact, stress levels, and effects of learning among dental students during the transition from preclinical to clinical training. They concluded that teaching during this transition may be positively influenced by a supportive learning environment and by the establishment of progressively more complex stages within the curriculum. They stated that students should begin their clinical training with "an introduction to clinical practice, preventive care, periodontal treatments, restorative dentistry, and endodontic treatment." Because of the high levels of perceived stress, endodontics should be introduced later in the clinical curriculum. This assessment illustrates how restorative dentistry, particularly Operative Dentistry, and preventive dentistry converge and currently contribute to the preventive care model.

From a didactic perspective, the teaching of Operative Dentistry involves the progressive acquisition of psychomotor skills, the development of clinical reasoning, and the acquisition of diagnostic and therapeutic criteria. However, when these practices are approached in an overly technical or fragmented manner, they may hinder the development of a comprehensive understanding of health care. In this regard, a solid integration of theory and practice is essential for addressing the contemporary challenges of clinical training. As Zabalza[24] points out, the coherent integration of both components promotes a more comprehensive and cohesive understanding of learning, in which theory and practice mutually enrich one another, enhancing both the quality of the educational process and students' professional training.

The institutional contexts and material conditions in which clinical teaching takes place significantly influence the quality and educational value of the learning experience. Factors such as high student-to-teacher ratios and pressure to meet procedural targets may foster a productivity-driven logic that obscures the educational and reflective dimensions of clinical practice. In the aforementioned study, Frese et al. clearly address how the student-to-teacher ratio can positively or negatively affect specific areas of dental students' learning.[22] Within this framework, De Alba[25] and Litwin[26] agree on the urgent need to promote learning experiences that stimulate critical thinking and the development of complex cognitive skills, moving beyond merely technical or reproductive approaches.

In line with this perspective, the teaching of Operative Dentistry should be oriented toward a comprehensive approach to the patient, fostering clinical reasoning to identify risk factors and plan appropriate interventions according to the individual context. Likewise, it should promote a critical attitude toward clinical decision-making, grounded in the principles of primary health care. For this educational contribution to be effective, the course's pedagogical approach must not be reduced to the mere reproduction of techniques but must integrate knowledge, skills, and attitudes within a reflective framework.[26] In this way, clinical teaching in Operative Dentistry can become a key component in shaping a professional profile committed to the preventive care approach.

For Operative Dentistry to contribute meaningfully to the institutionally defined professional profile, it is necessary to review not only the clinical content and criteria, but also the pedagogical strategies, assessment methods, and the teacher–student relationship. Incorporating opportunities for clinical reflection and assessment strategies aligned with educational objectives can foster closer alignment between educational aims and clinical practice. In this regard, Collazo[27] argues that the curriculum should be understood as a dynamic and complex process requiring ongoing review and adaptation in response to social, academic, and professional change, reinforcing the need for flexible pedagogical approaches. Integration with other disciplines within preventive and restorative dentistry can overcome the fragmentation of knowledge and strengthen more contextually grounded clinical education. This interdisciplinary approach is key to developing in students a critical, context-sensitive perspective aligned with the principles of the comprehensive health care model.

The WHO[28] emphasizes that oral health training programs should align with global health priorities, promoting prevention and equitable access to dental care. However, previous studies have shown that professional practice generally remains focused on curative care, with limited graduate integration into the primary level of care (Olmos et al., 2013).[29]

The preventive care model, a central axis of the dental curriculum, seeks to train dentists with a comprehensive approach to health, capable not only of addressing disease but also of promoting healthy habits among the population. However, its effectiveness is limited by several factors, including low professional participation in community programs and the lack of incentives for preventive practice.[30]

A key aspect of this analysis is the concept of professional competencies and their development in higher education. According to the Faculty of Dentistry, Udelar,[3] the graduate profile for dentists in Uruguay is intended to ensure that professionals acquire clinical, research, and socio-educational competencies enabling them to respond to population needs and enter the labor market. However, graduate surveys, such as that conducted by Collazo and López,[31] have revealed discrepancies between the education received and the demands of the professional field, evidencing a gap between academic preparation and professional reality. The above study sought to understand graduates' views on the training they had received and their employment status one year after graduation, as part of the ongoing curriculum evaluation process. Its principal findings included substantial emigration among graduates; a highly positive appraisal of the education provided by the Faculty; a strong vocational orientation among graduates; near-universal employment in paid professional practice; high regard for the new educational approach, particularly the shift in the care model and the importance of continuing education; and, as the main shortcomings, insufficient practical training linked to overcrowding in the educational system, together with gaps in specific areas of training. The authors conclude that, although graduates view the program positively, certain

elements of the curriculum need to be updated to align with current demands in the professional field. They recommend changes that strengthen practical and theoretical competencies in emerging areas of dentistry. The study confirms the importance of ongoing improvement of the academic program and highlights the need to maintain a continuous dialogue between educational institutions and the professional sector to ensure relevant, up-to-date training.

Another fundamental element in dental education is assessing the impact of curricula on population health. Competency-based teaching models should be accompanied by follow-up and monitoring strategies that make it possible to measure their effectiveness in professional practice. Research in oral health has also highlighted the influence of social determinants on the prevalence of oral diseases. The WHO report[29] emphasizes that oral health is directly related to socioeconomic status, access to health services, and personal hygiene habits. In Uruguay, epidemiological studies indicate that oral diseases affect the most vulnerable sectors more severely, underscoring the need for dental education that incorporates an interdisciplinary and socially engaged approach.[32]

Conclusions

Institutions responsible for training health professionals should examine the extent to which graduate profiles are aligned with the country's health needs, in light of concerns about the effectiveness of implementing a preventive approach in clinical training. Health and educational institutions must also address questions regarding the alignment of educational and health policies. Concerns about the social impact of dental education should not be overlooked, as the Uruguayan population continues to face high rates of preventable oral diseases. At the Faculty of Dentistry, Udelar, continuous and integrated training requires both an interdisciplinary approach and coherence among the programs of the three subunits within the Department of Preventive and Restorative Dentistry: Dental Operative Techniques, Operative Dentistry I, and Operative Dentistry II. This integrated structure is fundamental to helping students develop a better understanding of oral health and to preparing them to make well-considered clinical decisions and carry out effective interventions in a professional context. Finally, the need for national public policies that promote an intersectoral approach is emphasized. Educational institutions, public health services, and bodies responsible for health planning must work in coordination to design and implement strategies that generate a real and sustainable impact on the oral health of Uruguayans. Establishing systematic monitoring and evaluation mechanisms that make it possible to measure and ensure the effectiveness of these policies over time is a priority.

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Data availability

The dataset supporting the results of this study is published within the article.

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