

ORIGINAL ARTICLE

# Comparative analysis of the national curriculum guidelines for the dentistry courses in 2002 and 2021

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## Abstract

**Introduction:** faced with the challenge of training dental surgeons who are fit for the job market, especially the Unified Health System, the National Curriculum Guidelines were established in 2002 with the aim of organizing the curricula of undergraduate dentistry courses, which were updated in 2021.

**Objective:** a comparative analysis of the 2002 and 2021 National Curriculum Guidelines for dentistry courses, verifying their proposals' theoretical and practical similarities and differences.

**Methods:** this is a qualitative, descriptive, and exploratory study, using documentary analysis of these guidelines.

**Results:** from the documentary analysis, six analytical categories were identified: Profile of the graduate; General and specific competencies; Contents for the training of the dental surgeon; Supervised curricular internship and course completion work; Pedagogical project and curricular organization; and Assessment. The 2021 National Curriculum Guidelines is more detailed and complete than the 2002 and strengthens mechanisms for improving and adapting dentistry courses in Brazil.

**Conclusion:** progress has been made with the inclusion of aspects such as permanent training for teachers, humanization in relationships, interprofessional and entrepreneurship, with the aim of providing training that meets the health needs of the Brazilian population.

**Keywords:** health education, educational evaluation, dentistry.

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## Authors summary

### Why was this study done?

This is pioneering research in Brazil. This study aims to analyze the National Curricular Guidelines (NCG) for Dentistry courses from 2002 and 2021, verifying the similarities and theoretical-practical differences between their proposals. The research topic is very current given the movement to change the pedagogical projects of dentistry courses in line with the NCG.

### What did the researchers do and find?

A qualitative, descriptive, and exploratory study was carried out, through documentary analysis of the aforementioned guidelines. From the documentary analysis, six analytical categories were identified, namely: Graduate profile; General and specific skills; Contents for the training of dental surgeons; Supervised curricular internship and course completion work; Pedagogical design and curricular organization; and Assessment. The 2021 NCG are more developed and complete than the 2002 NCG and strengthens the mechanisms for improving and adapting Dentistry courses in Brazil. Advances were noticed with the inclusion of relevant aspects such as the permanent training of teachers, humanization in relationships, interprofessional and entrepreneurship, bringing training appropriate to the health needs of the Brazilian population.

### What do these findings mean?

This comparative analysis allowed us to observe several advances in the new NCG, which, in a clearer and more detailed way, brought important aspects to the training of professionals who are better prepared to meet the health needs of society, with a focus on oral health care consistent with reality, epidemiology of the population.

Advances were made through greater detailing of general and specific competencies, curricular contents, curricular components necessary for curricular flexibility, supervised curricular internships, course completion work and the importance of course evaluation. Furthermore, aspects such as the humanization of relationships, citizenship, teamwork in the interprofessional and transdisciplinary dimensions, the need to adapt to the local reality of the community, self-evaluation and ongoing training of teachers were included.

## INTRODUCTION

Higher education in health plays a fundamental role in society, since the graduates of these courses will be the future professionals responsible for health care for the population, and universities are committed to generating knowledge aimed at actions that involve aspects relevant to society<sup>1</sup>. However, higher education in health was historically built on the fragmentation of content and organized around power relations, which gave teachers a central position in the teaching and learning process<sup>2</sup>. This logic created a technician character, with excessive specialization, distancing itself from resolute health care and placing little value on the preventive and educational dimensions<sup>3-5</sup>.

As a result, spurred on by public health policies and social needs, a new profile of health professionals began to be designed, which should be focused on Primary Health Care (PHC) and the exercise of generalist functions, with the necessary skills to operationalize actions to prevent illnesses and diseases and health promotion/education<sup>6</sup>. To this end, Higher Education Institutions (HEIs) need to take on the training of these professionals, restructuring their closed curricula to meet the new expectations of the National Health Care Policy<sup>7</sup>.

Faced with the challenge of training graduates from dentistry courses who are ready for the job market, especially the Unified Health System (SUS), and as a result of an important mobilization by health educators, the National Curriculum Guidelines (NCG) for undergraduate dentistry courses in Brazil were established in 2002. The aim was to organize curricula and guide courses to promote intellectual development and ongoing training for students in the search for professional autonomy<sup>8</sup>.

Studies carried out on dentistry courses in Brazil show that there are challenges to be overcome: the development of the skills and competences recommended by the NCG in subjects that expand health promotion and take into account the precepts of the SUS and the health needs felt by the population and health professionals<sup>9-11</sup>.

According to a study by Farias<sup>12</sup> carried out in a public HEI in southeastern Brazil, only 51.1% of teachers believe that graduates are prepared to meet the needs of the current Brazilian scenario, 43.6% of students consider the quality of teaching to be excellent and 50.4% are satisfied with the course. It is also possible to see that graduates feel discouraged in some aspects, such as the precariousness of the course's infrastructure and administration.

Since the implementation of the 2002 NCG, there has been a need to think about criteria to verify how the training of health professionals has responded to what was recommended, given the subjectivities and scope of factors for training that is appropriate to the health needs of the Brazilian population<sup>10</sup>. A study carried out at an HEI in the northeast of Brazil, which has been implementing a Pedagogical Course Project (PCP) for more than ten years, showed that the main weaknesses identified were related to professional/patient relations between the dental surgeon and the health team during professional training. They conclude that it is necessary to create strategies to reorient training towards new methodological concepts of teaching and learning in order to implement the NCG in the Dentistry course evaluated<sup>13</sup>.

In June 2021, new NCGs were approved for undergraduate dentistry courses in Brazil<sup>14</sup>. This update carried out at the request of the Brazilian Dental Education Association (BDEA), mainly took into account the demand for public health in Brazil, the diagnosis of oral health, and consultations with the HEIs themselves.

Given this context, the aim of this study is to comparatively analyze the 2002 and 2021 NCG for Dentistry courses, checking for similarities and theoretical-practical differences in their proposals.

## METHODS

### Study design

This is a descriptive and exploratory study with a qualitative approach and documentary analysis.

Documentary research is a scientific research methodology whose purpose is to examine and understand information contained in documents, in order to obtain the most significant information, according to the established research problem<sup>15</sup>.

### Data collection

The 2002 NCG, implemented by the National Education Council (NEC) through NEC/HEC Resolution No. 03 of February 19th, 2002<sup>8</sup>, and the 2021 NCGs, implemented through EM/NEC/HEC Resolution No. 3 of June 21st, 2021<sup>14</sup> were selected for documentary analysis.

## RESULTS

Based on the documentary analysis, six analytical categories were defined: Profile of the graduate; General and specific competencies; Contents for the training of dental surgeons; Supervised curricular internship and course completion work; Pedagogical project and curricular organization; and Assessment.

### Graduate profile

The 2002 National Curricular Guidelines for Dentistry courses stipulate that graduates should be able to exercise a generalist, humanist, critical, and reflective practice, based on ethical and legal principles, understanding the social, cultural, and economic reality in which they are inserted, and directing their work to the benefit of society. In the 2021 NCG, the content relating to the graduate profile has been expanded, and the characteristics of the professional listed more clearly, in relation to the points already covered in the 2002 NCG. Questions have been added regarding: interprofessional, interdisciplinary, and transdisciplinary teamwork; proactivity; entrepreneurial thinking; leadership attitude; and clear communication. It was also specified that graduates should be aware of and participate in social, cultural, economic, and environmental policies and technological innovations. According to the 2021 NCG, graduates are expected to be general dental surgeons with a solid technical-scientific, human, citizen, and reality-transforming education.

### General and specific competencies

The general and specific competencies define the knowledge required to train dental surgeons. They cover issues related to: health care; decision-making; communication; leadership; health management; and continuing education.

In relation to health care, the 2021 NCG, in addition to the 2002 NCG, points out that the training of dental surgeons must consider dimensions of diversity that singularize each person or social group. The dental surgeon must be able to act based on the principles of universality, integrity, and equity, as well as acting interprofessionally, interdisciplinarily, and transdisciplinarily, in order to allow qualified and unique listening to individuals and communities. The profession must be practiced in an integrated way with the social, economic, cultural, and environmental context, with a focus on understanding the living conditions of individuals and communities as determinants of the population's health and illness.

The continuous and integrated humanization of health care should be promoted through the development of shared therapeutic projects, encouraging self-care and autonomy for people, families, groups, and communities, and recognizing users, including people with disabilities, as active protagonists of their own health. In addition, processes and procedures must be carried out safely in order to prevent risks, adverse effects, and harm to users, professionals, and oneself. This must be done on the basis of clinical-epidemiological recognition and an understanding of the risks and vulnerabilities of individuals and social groups.

As for decision-making, the 2002 NCG emphasizes the need for decisions that guarantee efficacy and cost-effectiveness, a feature absent from the 2021 NCG. The current guidelines emphasize that the dental professional must be able to put procedures and knowledge into practice in order to improve the population's access to health, comprehensive health quality, and scientific and technological development, making it possible to respond to social needs. Both guidelines include the use of scientific evidence as a fundamental factor in decision-making. However, the 2021 NCG includes active listening centered on the needs of individuals, families, groups, and communities in order to make appropriate choices.

With regard to communication, the two guidelines share the importance of communication in healthcare and mention the need to keep information confidential and the importance of verbal and non-verbal communication, as well as writing and reading skills. However, the 2021 NCG points to interaction with users, family members, communities, and members of the professional teams, which is more specific than the 2002 NCG, only highlighting interaction with other health professionals and the general public. In addition, the current guidelines indicate the need to understand Brazilian Sign Language (BSL) and indigenous languages, as well as Portuguese. Another important difference arises in the use of information and communication technologies, which were only mentioned in the 2002 NCG, but are now highlighted as essential means for processing information and mediating the communication process between professionals and users.

As far as leadership is concerned, both NCGs mention attributes and skills in common for its exercise, such as commitment, responsibility, empathy, and decision-making, as well as highlighting the importance of leadership. However, the 2002 NCGs refer to leadership in multi-professional teamwork, while the 2021 NCGs bring in the more current concept of an interprofessional team, explicitly mentioning the importance of building collaborative relationships and encouraging team development. In addition, the more current guidelines mention aspects not previously addressed, such as proactive leadership, community interaction, and motivation to seek autonomy and self-care in health.

Both guidelines address the need to manage resources and the importance of leadership and teamwork in this process. The 2021 NCGs use the term health management, replacing the previous term administration and management, and more broadly point out the importance of knowledge and application of the fundamentals of

epidemiology and knowledge of the community for managing and planning professional actions. In addition, they highlight the need to develop partnerships, organize contracts, and build networks for health promotion and integration with other institutions and sectors. The structural, financial, organizational, and tax management of practices, clinics, and health services are mentioned, along with the effective and efficient management of health care. The management of the teamwork process must be in line with the broader concept of health, public policies, and the principles and guidelines of SUS. Finally, it highlights the importance of knowledge of social movements and the participation of the population in the health system, as well as contributing to the promotion and debate of public health policies.

Finally, with regard to continuing education, both guidelines address its importance in the training and practice of health professionals, the need for continuous learning throughout their careers, and the responsibility of professionals in relation to their own education. The new NCGs, however, emphasize the need for reflection on action so that the necessary changes can be made to structures and work processes, with a view to improving team performance in management practices, care, and relations with the population. In addition, they emphasize interprofessional action, i.e. the exchange of knowledge with professionals from other areas of knowledge and the need to develop new knowledge by engaging in community experience and the day-to-day running of health services, taking into account referrals, counter-referrals, and the management of unforeseen events.

The specific competencies in the guidelines generally address similar issues, but the more recent NCGs present the information in a clearer and less repetitive way. Both mention the importance of respecting the code of ethics in professional practice, but the new NCGs include laws, ordinances, and regulations on oral health. In relation to the levels of health care, both texts include action at all levels, integrating practices for the promotion, maintenance, prevention, protection, and recovery of oral health. However, in the new NCG, an important added factor is the recognition of the importance of the association between systemic conditions and oral health.

Other relevant aspects highlighted by the two guidelines are the importance of scientific research, articulation with the social context, community participation, health communication, and the incorporation of technological innovations in the practice of the profession. Despite this, the new updates include interprofessional teamwork to inform the team and the population about oral health. Furthermore, biosafety is included in order to emphasize the promotion of self-care and the prevention of accidents and occupational diseases.

With regard to epidemiology, the 2002 NCGs only included the need to identify prevalent oral and maxillofacial diseases. The new NCG includes the need to apply the fundamentals of epidemiology and community knowledge to health decision-making. In addition, the current guidelines include the competence to supervise the activities of oral health technicians and assistants.

## Contents for the training of dental surgeons

The 2002 NCG states that the training of dental surgeons should take into account the health system in force in the country, without specifying which system would be covered. This issue differs from the 2021 NCGs, which make progress on this point by including SUS as a professional practice scenario and learning field. In addition, training should include comprehensive health care, taking into account the regionalized and hierarchical system of reference and counter-reference, and interprofessional teamwork.

According to the 2002 NCG, the essential curricular content for undergraduate dentistry courses should include all subjects related to the health-disease process of the citizen, family, and community, integrated with the epidemiological and professional reality. In addition, the new guidelines state that the essential curricular content should be related to the health-disease processes of individuals, families, and communities in the different life cycles. Both guidelines were made up of syllabuses involving Biological and Health Sciences, Human and Social Sciences, and Dental Sciences. The 2021 NCG also reiterates that these contents must be interconnected and developed in an integrated manner, with a view to providing comprehensive care for individuals in different areas of activity.

The 2021 NCGs, compared to the 2002 NCGs, address curricular content in a more specific and detailed way. In the area of Biological and Health Sciences, they include content on biochemistry and morphology, as well as emphasizing the need to develop the practice of dentistry in order to achieve comprehensive health care.

In the area of Human and Social Sciences, the 2021 NCG included the bioethical and forensic dimensions of the health-disease process; collective health; education and environmental sustainability policies, human rights education, accessibility, equity and gender, sexual orientation, people with disabilities and ethnic-racial education; the psychological and humanistic referential bases of the relationship between professional and patient; health education and information and communication technologies with the official languages adopted in Brazil; and knowledge and application of scientific methods for carrying out research projects.

In the Dental Sciences, theoretical and practical content was included and better explained in the 2021 NCG. There was inclusion of the need to consider the epidemiological profile and local realities of patients and users; clinical indications based on scientific evidence; the incorporation of technological innovations in the practice of the profession from an interprofessional perspective; clinical prescription and safe anesthetic techniques; emergency approaches and basic life support; composition and chemical, physical and biological properties of dental materials; handling of X-ray equipment; principles of biosafety and ergonomics; concepts of dental expertise and audits, as well as the legal requirements for setting up and managing the operation of dental practices; care for individuals with special needs; care for individuals in health institutions; management and organizational and professional planning of health services.



Finally, the 2021 NCG included activities that involve students in SUS service networks during their undergraduate studies, enabling them to learn about and experience the system.

### **Supervised curricular internship and course completion work**

The supervised curricular internship is a compulsory curricular component for undergraduate dentistry courses. The 2021 NCGs state, in a similar way to the 2002 NCGs, that it must be carried out in a way that is linked to the increasing complexity throughout the training process. Its workload must correspond to 20% of the total workload of the course, not to be confused with the workload of practical activities. The 2021 NCG adds that the supervised internship must be carried out with activities directly related to the general and specific competencies, and can take place in environments inside or outside the HEI. In addition, they describe the curricular internship in greater detail by identifying the internship as a teaching activity, which must be supervised at all stages and distinct from other practical curricular activities necessary for the training of dental surgeons.

With regard to the course conclusion work (CCW), the 2002 NCGs stated that this should be a compulsory curricular component for completing the dentistry course, carried out under the guidance of a teacher and focused on a topic in dentistry. The 2021 NCG details the importance of the CCW for dentistry courses and describes this teaching instrument as a practical exercise in synthesis and learning through research. They define that the CCW can be presented in a variety of formats such as a scientific article, monograph, portfolio and intervention project, to be defined by the Pedagogical Projects of the courses.

### **Pedagogical project and curricular organization**

The pedagogical projects define the principles, foundations, conditions, and procedures for training dental surgeons. Both guidelines emphasize that the pedagogical project must be centered on the student as the subject of their own learning and that the teacher must be a mediator and facilitator of the process, for adequate student training with links between teaching, research, and extension. They also stress the importance of including active learning methodologies, as well as the importance of cultural preservation and national and regional practices, respecting the pluralism of conceptions and ethnic-cultural diversity.

The 2002 and 2021 NCGs emphasize the importance of including elements that take into account the institutional insertion of the course and the demands and expectations of the development of the health sector in the region in which it is located. However, the most recent guidelines provide a clearer and more comprehensive explanation: it is emphasized that it is essential to take into account local and regional diversities, the health demands of the local or municipal population, as well as the mechanisms for integration and articulation with SUS public policies. In addition, it is necessary to observe the practice scenarios integrated with SUS, which must take place both on the institution's campus and in the region in which it is located.

The new guidelines add an extremely important point in relation to teachers: the permanent training program. HEIs offering undergraduate courses in dentistry must maintain a permanent program of training and development for teaching staff, with a view to valuing teaching work in undergraduate courses and increasing teachers' involvement with and improvement of the PCP.

In addition, the new NCG emphasize the importance of expanding the possibilities for learning, research and work. To this end, the implementation of national and international academic mobility programs is emphasized, with the aim of providing students with the opportunity to participate in academic exchanges and form collaborative networks between institutions. The importance of dental courses studying the oral health conditions of the population in which they are located is also emphasized, with a view to identifying possible improvements in the community's health conditions and quality of life.

With regard to curricular flexibility, both the 2002 and 2021 guidelines stress the importance of the curriculum taking into account local demands and expectations, as well as offering individual flexibility so that students can follow different training paths. An essential component of curricular flexibility is complementary activities, characterized by the use of knowledge acquired by students, in person or at a distance, such as monitoring, scientific initiation programs, extension activities, and complementary studies. The 2021 guidelines introduce optional components as a mechanism for curricular flexibility, allowing students to choose academic activities that contribute to their education, both within and outside the field of dentistry. In this way, they have the opportunity to build their own training path according to their interests and objectives.

Both guidelines emphasize that undergraduate dentistry courses need to establish a closer connection between basic knowledge and its clinical application. The recent guidelines explain that this integration should be achieved through an integrated curriculum, based on interdisciplinarity and the articulation of social, biological, dental, cultural, environmental, ethnic, and educational dimensions.

Another extremely important addition, which could have a major impact on HEIs, is the fact that the new curriculum guidelines stress that at least half of the course's total workload should be devoted to practical activities, including basic areas and clinical dental care activities, with the latter making up at least 40% of the course's total workload, excluding internship workload.

### **Assessment**

The item relating to the evaluation of the 2021 NCG, in a similar way to the 2002 NCG, states that, with the implementation and development of the NCG in dentistry courses, these should be followed up, monitored, and permanently evaluated in order to follow the processes and allow for the necessary improvement and adjustments. In addition to the 2002 NCG, the 2021 NCG presents an assessment system to be followed, which is the National Higher Education Assessment System. In addition, courses

must develop instruments that assess structure, processes, and learning in accordance with this system. They emphasize that student assessment should be included in relation to the daily practices of their training, such as communication; knowledge; technical skills; clinical reasoning; and the emotional dimension. All of this is aimed at benefiting the individuals and the community in which they work. This assessment system should also include student self-assessment, as an incentive to develop commitment to their training, as well as the ability to learn how to learn.

## ■ DISCUSSION

In general, the 2021 NCGs for Dentistry courses are more detailed and complete than the 2002 NCGs and more clearly explain the guidelines to be followed when drawing up the PCPs, with a view to improving and adapting training. Progress has been made with the inclusion of relevant aspects related to the humanization of relationships, interprofessional, entrepreneurship, permanent education for teachers, an increase in practical workload, and the establishment of the SUS as the main axis of training. It thus aims to train professionals to work better in the Brazilian job market.

With regard to the graduate profile category, the 2021 NCG broadens the characteristics of the professional to include attributes defined by competencies. Undergraduates are included in the SUS, with an emphasis on working in teams, in an interprofessional, interdisciplinary, and transdisciplinary way, in the health network. It also seeks to train more complete professionals with clinical skills, a broader view of health, and an ethical attitude.

Peduzzi and Agreli<sup>16</sup> concluded that one difficulty relates to the fact that health professionals are trained separately and then work together and that the experience of collaborative practices often begins at the end of the course, during internships, and sometimes only in postgraduate studies. With a view to improving this, the 2021 NCG proposed that working together between professionals from different areas provides an opportunity to exchange knowledge, which makes it possible to identify, discuss and solve problems, providing continuous improvement in the quality of healthcare<sup>14</sup>.

The new guidelines highlight desirable competencies for graduates, such as proactivity, leadership, clear communication, entrepreneurial characteristics, and being participative in social, cultural, economic, and environmental policies and technological innovations. Entrepreneurship and leadership are particularly emphasized. This shows a concern with these aspects which, even though they were present in the 2002 NCG, were not widely addressed during the undergraduate course<sup>17</sup>. The PCP needs to be adapted so that the themes of management, entrepreneurship, and professional direction are part of the student's training and can effectively help promote professional qualification and growth<sup>18</sup>. One viable way to encourage training in these subjects is to implement complementary subjects and activities in the area during the undergraduate course.

The general and specific competencies in the 2002 and 2021 NCG show an evolution in the training of dental surgeons over the years. The 2002 guidelines emphasized technical skills and training for individual practice, while the 2021 NCG promotes a broader and more comprehensive view of the profession. Brockveld and Venancio<sup>11</sup> analyzed the advances and challenges in the training of dental surgeons after the publication of the 2002 NCG and concluded that there have been advances in training, however, it is necessary to advance in the development of skills and competencies recommended by the NCG on topics that expand health promotion and disease prevention, contemplating the interests of the SUS and making the needs of the population and health professionals compatible and valued.

The NCGs propose that the dentistry course should not be organized according to content but with a focus on developing general and specific competencies<sup>8,14</sup>. The training of health professionals should not be limited to specialized knowledge but should encompass knowledge from other areas, respecting competencies, as a way of overcoming obstacles and providing health care that is committed to guaranteeing equal rights and social justice<sup>19</sup>.

However, knowledge needs to be acquired in a way that is linked to social reality and, in view of this, it is proposed that the curriculum be organized in the form of an articulated or integrative matrix, enabling a better interrelationship between theory and practice around a curricular axis aimed at training more humane, ethical and reflective professionals. A generalist education, as advocated by the NCG, improves the capacity for articulation in the field of social policies, which favors communication between professionals in order to guarantee the social right to health<sup>20</sup>.

In view of this, the 2021 NCGs emphasized SUS as a professional practice setting and learning field and expanded the content so that training includes comprehensive health care. The adoption of the SUS as a diversified teaching-learning scenario is a powerful initiative to stimulate the transformative nature of training, enabling healthcare to be done in line with real demands, based on critical-reflective action<sup>21,22</sup>. Teaching practices based on knowledge of the territory, team collaboration, and longitudinal, comprehensive care provide interprofessional learning during undergraduate studies<sup>23</sup>. In addition, integrating students into real practice scenarios allows them to experience the world of work, enabling them to perceive the SUS as a real possibility for future work<sup>22</sup>.

To this end, supervised internships are seen as a fundamental part of training, allowing for the practical application of theoretical knowledge acquired throughout the course, and developing technical, behavioral, and ethical skills<sup>14</sup>. Corroborating the NCG of 2021, Pessoa *et al.*<sup>24</sup> states that supervised internships promote growth not only in relation to health promotion, but also care, social participation, and teamwork, as well as administrative and managerial functions of the SUS, health policies, and the role of the dental surgeon within a health team.

However, according to Oliveira *et al.*<sup>25</sup>, changes in legislation are not enough to change training. Analyzing and rethinking the role of the PCP, focusing on its

dynamics, knowledge, and practices, should be goals among those involved in the process of training dental surgeons. Its construction should be done in a participatory way, presenting the vision and consensus of representatives from all the categories involved, thus facilitating its implementation<sup>26</sup>. It should be noted that even professors with master's degrees and/or doctorates can have a vision limited to their specialty, hindering the professional's generalist training<sup>27</sup>.

In view of this, the 2021 NCGs address the importance of ongoing training, development, and appreciation of teachers by HEIs. Promoting the continuous and ongoing training of teachers is important due to the procedural nature of professional development since preparation does not end at the moment of initial training in undergraduate, graduate, or postgraduate courses<sup>28</sup>.

Most teachers are unaware of the NCG and the profile of the students that the courses aim to train. As such, strategies should be implemented by HEIs to promote greater teacher awareness of this issue, with a view to encouraging adjustments and innovations in undergraduate dental curricula<sup>29,30</sup>.

It is important for teachers to understand that their role is not restricted to being a mere transmitter of knowledge, but rather a facilitator who will help students to build and develop not only their technical skills but also knowledge of professional ethics, politics, human and social sciences<sup>3</sup>. The use of active methodologies helps to make students responsible for their own education<sup>31,32</sup> and awakens their interest in thinking, questioning, learning how to learn and assuming their role as future transformers of social reality<sup>33</sup>.

Maciel *et al.*<sup>32</sup> found that there is a scarcity of studies related to active methodologies in the learning process in Dentistry, showing that their insertion is still low. Active teaching-learning methodologies are a challenge for teachers, students, and institutions because the traditional curriculum is fragmented and dichotomous between theoretical and practical aspects<sup>33</sup>.

Another important training component in the 2002 and 2021 NCG is the CCW, which aims to enable students to deepen their knowledge in a specific area of dentistry and develop skills in research, critical analysis, scientific writing, and communication<sup>34</sup>. These skills will be important in their future professional practice, whether in health services or in postgraduate courses *lato* or *stricto sensu*.

Finally, course evaluation, as provided for in the 2021 NCG, is an indispensable tool for reorienting deviations in the training process, and this practice should be constant on the part of those involved in order to contribute to improving the quality of teaching<sup>29</sup>. It is necessary to constantly reflect on dental education, its responsibility in human/professional training, and the direction of future professionals<sup>3</sup>. To this end, the 2021 NCG proposes the monitoring and evaluation of courses by the National Higher Education Assessment System. This promotes the evaluation of institutions, courses, and student performance and should be a benchmark for the processes of regulation and supervision of higher education in Brazil<sup>35</sup>.

Changes in the university context are complex and require institutional support<sup>36</sup>. They may involve support and training for educators, as well as activities and debates for the sectors concerned (HEIs, students and users). Reorganizing HEIs and the teaching work process may be the most difficult aspect of changing current university practice.

Due to the greater specificity and targeting of the 2021 NCG, it can be considered that increasing curricular flexibility with greater integration of content and disciplines and the implementation of interdisciplinary and interprofessional practices can lead to a generalist education. It is essential to consider that the NCG are not just standards to be followed to guide the structure of dentistry courses in Brazil. In addition to training a health professional, they also involve training a citizen, who will be the future provider of healthcare to society.

The continuous discussion of alternatives to overcome the current barriers and challenges in higher education in Dentistry in Brazil can generate projects that seek new ways to improve dental education. It is timely and essential to monitor and evaluate the process of implementation of NCG by Brazilian dental schools, as well as to assess the profile of graduates.

## CONCLUSION

This comparative analysis showed several advances in the new NCG, which, in a clearer and more detailed way, have brought important aspects to the training of professionals who are better prepared to meet the health needs of society, with a focus on oral health care that is consistent with the epidemiological reality of the population.

Advances were made through greater detail on general and specific competencies, curricular content, curricular components needed for curricular flexibility, supervised curricular internships, course completion work, and the importance of course evaluation. In addition, aspects such as the humanization of relationships, citizenship, teamwork in the interprofessional and transdisciplinary dimensions, the need to adapt to the local reality of the community, self-evaluation, and ongoing teacher training were included.

## Author Contributions

All authors contributed to the manuscript. Nathalia Campos Dell'Orto Cardoso Bortolini: Participated in the study design, data collection, data analysis, writing of the text, discussion, results and final version of the text. Larissa Hitomi Morigaki: Participated in the study design, data collection, data analysis, writing of the text, discussion, results and final version of the text. Carolina Dutra Degli Esposti: Participated in the study design, data collection, data analysis, writing of the text, discussion, results and final version of the text. Karina Tonini dos Santos Pacheco: Participated in the study design, data collection, data analysis, writing of the text, discussion, results and final version of the text.

## Conflicts of Interest

The authors report no conflict of interest.

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## Resumo

**Introdução:** diante do desafio de formar cirurgiões-dentistas aptos para o mercado de trabalho com destaque para o Sistema Único de Saúde, em 2002, foram instituídas as Diretrizes Curriculares Nacionais (DCN) com intuito de organizar os currículos dos cursos de graduação em Odontologia, as quais foram atualizadas em 2021.

**Objetivo:** analisar comparativamente as DCN para os cursos de Odontologia de 2002 e 2021, verificando as semelhanças e diferenças teórico-práticas de suas propostas.

**Método:** Trata-se de um estudo qualitativo, descritivo e exploratório, por meio da análise documental das referidas diretrizes.

**Resultados:** a partir da análise documental foram identificadas seis categorias analíticas: Perfil do egresso; Competências gerais e específicas; Conteúdos para a formação do cirurgião-dentista; Estágio curricular supervisionado e trabalho de conclusão de curso; Projeto pedagógico e organização curricular; e Avaliação. As DCN de 2021 são mais detalhadas e completas que as DCN de 2002 e fortalecem mecanismos para melhoria e adequação dos cursos de Odontologia no Brasil.

**Conclusão:** avanços foram percebidos com a inclusão de aspectos como a formação permanente dos docentes, humanização nas relações, interprofissionalidade e empreendedorismo, visando uma formação adequada às necessidades de saúde da população brasileira.

**Palavras-chave:** educação em saúde, avaliação educacional, odontologia.

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