

Using Delphi Technique in a Consensual Curriculum for Periodontics

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Abstract: Periodontics has experienced several important conceptual changes in the last few decades. As such, it is important to have a periodontics curriculum built upon the expertise of specialists in that discipline and reflecting those changes. The main goal of this study was to attain a consensus, through the use of the Delphi technique, on the topics that should be included in a periodontics curriculum for undergraduate dental students. A sample of periodontics lecturers from nine dental schools in two Brazilian cities was used, and a Delphi technique approach was followed to investigate sample member perceptions on the subject. Participants received four postal mail questionnaires asking them to rate and rerate eighty-nine topics for possible inclusion in the curriculum. A descriptive analysis was conducted, and topic frequencies were calculated. Topics rated as highly important for inclusion were the following: health, ailment, prevention, etiology, epidemiology, diagnosis, and treatment. The Delphi technique approach proved successful in involving periodontics lecturers in the design of a periodontics curriculum for undergraduate dental students.

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The availability of inexpensive worldwide communication, access to improved technologies, and shifting roles and lifestyles are just a few of the causes and effects of a rapidly changing society. We are living in an ever-escalating period of change.^{1,2} More than thirty years ago, Toffler¹ stated that the ability to deal with change would be society's most essential task.

Faculties are constantly determining what adjustments should be made in curricula and instruction to keep up with the tremendous explosion of knowledge and evolution experienced by the health care delivery system. In line with this, relevant and progressive dental curricula should be designed to allow future dentists to meet the challenges of contemporary and future oral health needs of our changing society. Accomplishing this task, however, requires a thorough grasp of present and future health problems, as well as a clear perception of health care trends.

As with other oral health disciplines, periodontics is in a continuous process of change, with new concepts and therapeutic approaches³ being established. As such, there is a growing need for a dynamic curriculum for that discipline. For instance, chronic diseases such as obesity and diabetes are increasing

not only in developed countries but in developing nations as well. As a result, quality of life related to general health may deteriorate. Similar associations could also be established in relation to oral health. Given that oral and other chronic diseases have determinants in common, more emphasis should then be placed on the common risk factor approach.⁴ Furthermore, the world population is getting older, and the number of older individuals retaining their teeth is increasing. Greater demands are therefore being placed on general dental practitioners for periodontal therapy. Many factors, including the aging process itself, impact directly or indirectly on periodontal health.⁵ Moreover, future advances in science, such as the human genome sequence, will dramatically alter how we define, treat, and prevent disease. In this context, the development and implementation of innovative dental therapies will require the intensive education of current practitioners. Coupled with this, considerable restructuring of dental school curricula will have to take place.⁶

A curriculum planning process that incorporates recommendations from several periodontics experts is likely to result in an educational program that reflects multiple perspectives for this discipline. Such a program will be more likely to simultaneously

accommodate current and future training needs for dental practitioners.

We used the Delphi technique in an attempt to design a curriculum that represents an expert consensus opinion and is, most importantly, capable of producing periodontics instruction that is forward-looking. In doing so, we aim at producing dental school graduates prepared to meet the patient care challenges that will emerge throughout their careers.

The Delphi technique is a widely accepted method for obtaining group consensus in education, research, health, business, economics, and the social sciences.^{7,8} The Rand Corporation developed the technique, which was originally used for technological forecasting.⁹ It is intended to survey the “expert” opinion of individuals knowledgeable in a particular field of study. Delphi technique methodology uses sequential questionnaires sent to those involved in the experiment. Respondents should anonymously answer the questionnaires, indicating the desirability and/or the likeliness of possible future events occurring in the topic under investigation. Anonymity allows respondents to freely express their views, minimizing the possibility of any given individual influencing the opinion of others.¹⁰ Following every questionnaire dispatching and receiving round, participants are given feedback in the form of peer consensus. This feedback stimulates participants to consider factors they might have previously missed. Likewise, it also helps to elicit and continually refine their opinions. Every new survey reflects the consensus opinion reached by the experts at the previous stage. Typically, after three to four rounds, respondents tend to reach agreement on key issues, and the process should then be stopped. This process of eliciting the opinions and recommendations of experts, without incurring the interpersonal dynamics introduced by face-to-face contacts, tends to produce group consensus for evolving trends. Furthermore, while preventing psychological peer pressure, anonymity allows equal voice for all participants. For our particular application, consensus opinion reached at the end of the experiment could be used to examine projected curricular goals.¹¹

In the dental field, several studies have used this methodology. Investigations involving the identification of competencies in geriatric dentistry, tendencies in restorative dentistry, and the determination of the success or failure of periodontal treatment, among others, have been conducted using the Delphi technique.^{8,11-13} The goal of this study was to use

the Delphi technique to identify a consensus about what topics should be included in a periodontics curriculum for undergraduate dental students. Nine periodontics faculties at dental schools in two Brazilian cities participated in this curriculum planning process.

Methods

After receiving approval by the Human Research Committee of the Federal University of Rio de Janeiro Hospital, we contacted all nine dental school faculties teaching periodontics in two given Brazilian cities. Each of their forty undergraduate periodontics lecturers was invited and accepted to take part in the study. All of these lecturers were dentists. A four-phase Delphi technique approach was conducted with them in an attempt to reach a consensual periodontics curriculum.¹⁴

For the first phase of the experiment, lecturers were asked to list, in writing, items that should be included in a periodontics curriculum for dental students. Suggested items were split into two groups. The first group involved theory-related items associated with foundational concepts and basic principles of periodontics. The second group of items, related to dental practice, was associated with laboratory training and clinical experience with patients. For the second phase of the experiment, previously obtained responses were scrutinized and collated into items. Then, a comprehensive Likert-scale questionnaire was compiled for submission to the panel. The questionnaire offered the following options for rating the importance of proposed curriculum items: “indispensable”; “important”; “relatively important”; “of little importance”; and “should not be included.”

The Likert-scale questionnaire was sent to all forty respondents, and the returned answers were evaluated as follows. An item was “kept” if it reached a “50 percent plus one” consensus classification as “essential/important.” It was eliminated if it reached a “50 percent plus one” consensus classification as “of little importance/should not be included.” Whenever an item did not reach a “50 percent plus one” consensus agreement or a “50 percent plus one” consensus rejection, it was selected to be included in the next round of the questionnaire. For example, if an item attained an “important” rating of 30 percent, a “relatively important” rating of 45 percent, and a “little importance” rating of 25 percent, it was included in that questionnaire.

During stage three, the only participants were individuals who provided the most extreme positive ratings (indispensable) or most negative ratings (should not be included) during the previous stage for items where no clear consensus was reached.

For the fourth and last stage, for each non-consensual item singled out in the third stage, the positive and negative justifications required from third-stage participants were transcribed into a new questionnaire. The resulting instrument was then mailed to all original participants to vote for inclusion (“yes”) or exclusion (“no”) of each pending item. The format used for the fourth stage questionnaire was that of a sequence of items, each of them carrying its associated positive and negative justifications, followed by corresponding “yes” and “no” answering options. Frequencies for the answers thus obtained were calculated with the SPSS statistical package.

Results

Out of the forty initial participants in the study, six (15 percent) eventually dropped out. Two moved abroad, and the other four were unable to stay involved until the end of the experiment. In accordance with the literature, this 85 percent response rate may be considered as “good.”¹⁵

Out of the thirty-four lecturers who participated in each of the four Delphi technique stages, thirteen (38 percent) were females, and twenty-one (62 percent) were males. They had an average of ten years (± 8.19) teaching experience.

From responses obtained at the first stage, twenty-three theoretical items, involving 249 sub-items, and twenty-five dental practice items, involving ninety sub-items, were compiled and included in a questionnaire. For the second stage of the experiment, the theory-related section of the questionnaire involved items and sub-items spanning concepts associated with a historical review of periodontics, anatomy, periodontal disease, prevention, periodontal treatment, epidemiology, and implantology. The dental practice section of the questionnaire involved laboratory training and clinical treatment items. At the end of the second stage, seven theoretical items were left pending. For two of these items, all sub-items involved were left pending. For the other five items, some but not all sub-items were left in that same situation. All of the remaining sixteen theoretical items were voted for inclusion (Table 1). For the dental practice section of the questionnaire, item “peri-

odontal surgery performed by the student,” involving thirteen sub-items, had two of its sub-items excluded (“extended periodontal surgeries”), four sub-items included (“uncomplicated surgeries”), and seven sub-items pending (“different surgery techniques”). Six additional items were left pending. All other dental practice items were voted for inclusion (Table 2). For the third stage of the experiment, every participant who offered extreme positive or extreme negative support for any item in the second stage questionnaire was asked to justify his or her views on these items. Finally, for the fourth stage, out of the initially suggested items, ten theoretical and eighteen dental practice items ended up being excluded (following the same inclusion/exclusion conditions).

The final consensus reached at our Delphi technique application selected a total of twenty-one theoretical and twenty dental practice items. These encompassed periodontics concepts such as health, ailment, prevention, etiology, epidemiology, diagnosis, and treatment (topics highlighted in bold in Tables 1 and 2).

Discussion

The literature suggests that dental colleges should keep pace with the continuous process of social and medical changes experienced in recent decades. In tune with that, curricula for these institutions should be dynamic to accommodate these changes.^{16,17} This view is reinforced with evidence that, throughout the next century, dentistry and dental education are bound to change much more than they have changed over the past century.²

Throughout the four stages of the consensus-building Delphi technique approach used in this study, participants identified various up-to-date scientific research trends within periodontics. However, in spite of that, items associated with some recent technological advances were not included in the final set of “indispensable” items. Furthermore, from our perspective, it is important to note that only a few of the aspects regarding professional periodontal training that received high (indispensable) ratings were directly related to the health needs of our society.

Several items related to medical periodontics ended up being selected for the curriculum. This is in accordance with the high prevalence of chronic diseases in elder populations,⁴ who are an increasing proportion of the overall population. Accommodating older people’s needs requires the dentist to have a basic

Table 1. Theoretical subject topics and respective number of items, included, excluded, and for consensus on the second phase

Theoretical Subject Topics (number of items)	Included % (n)	Excluded % (n)	Consensus % (n)
1. Periodontology: historical review (1)	100.0 (1)	—	—
2. Oral anatomy (2)	100.0 (2)	—	—
3. Anatomy of the periodontium (6)	100.0 (6)	—	—
4. Periodontal disease: etiology (7)	100.0 (7)	—	—
5. Periodontal disease: classification (7)	100.0 (7)	—	—
6. Pathogenesis of periodontal disease (10)	100.0 (10)	—	—
7. Immunopathology (3)	100.0 (3)	—	—
8. Periodontal diseases (16)	100.0 (16)	—	—
9. Systemic disorders and the periodontium (16)	93.7 (15)	—	6.3 (1)
10. Infection control in clinics (1)	100.0 (1)	—	—
11. Periodontal disease: exam, diagnosis, prognosis, and treatment planning (27)	88.9 (24)	—	11.6 (3)
12. Prevention in periodontitis (9)	88.9 (8)	—	11.1 (1)
13. Periodontal treatment (74)	94.6 (70)	—	5.4 (4)
14. Occlusal considerations in periodontology (9)	100.0 (9)	—	—
15. Periodontal considerations in prosthetic dentistry (4)	100.0 (4)	—	—
16. Periodontal considerations in endodontic lesions: combined origin (10)	100.0 (10)	—	—
17. Periodontal considerations in orthodontics (7)	100.0 (7)	—	—
18. Supportive periodontal therapy (12)	100.0 (12)	—	—
19. Periodontal disease: epidemiology (17)	100.0 (17)	—	—
20. Implant concepts (5)	20.0 (1)	—	80.0 (4)
21. Research in periodontics (1)	—	—	100.0 (1)
22. Advances in periodontal diagnosis: biochemical and immunologic techniques (3)	—	—	100.0 (3)
23. Patients' periodontal records (1)	100.0 (1)	—	—

Topics in bold were included in the final syllabus.

knowledge of heart disease, diabetes, high blood pressure, and the interaction between these diseases and the oral cavity. The interrelation between periodontics and other disciplines also reinforces the concept that curricula for health care providers should be interdisciplinary in nature. This is necessary to reflect the merging patterns identified for disease and the increasing need for interdisciplinary therapeutic strategies.¹⁷

The literature also stresses the need to acquaint students with modern techniques.¹⁸ Items related to technological advances in odontology, such as human molecular genetics and DNA probing, were initially listed as important to a periodontics curriculum. However, half way through our study, they were excluded from the final list of selected items.

Out of all general periodontics concepts addressed in the study, either theoretical or practical, only one theoretical sub-item related to public health made it to the final list of selected items. Not a single

item related to public health/prevention appears in the dental practice section of the inventory. This result corroborates criticism that undue emphasis is still being given to the “private practice dentistry service model.” More specifically, emphasis is still being placed on teaching technical treatment procedures to the detriment of educating students about health promotion and disease risk prevention. This point becomes even more evident if one observes that, out of the forty-one items eventually selected to be included in a periodontics curriculum, only one presents a clear social focus. This fact indicates that the currently used periodontics teaching approach is far from training the student to be a modifying health agent, i.e., someone with a critical conscience capable of addressing a social reality.¹⁹

The results of our study indicate that some issues involved in the discussion above, such as a public health-oriented vision, were not addressed

Table 2. Practical subject topics and respective number of items, included, excluded, and for consensus on the second phase

Practical Subject Topics (number of items)	Included % (n)	Excluded % (n)	Consensus % (n)
1. Developing students' skills to manage periodontal patients (considering their local and systemic conditions and their personal and cultural background) (1)	100.0 (1)	—	—
2. Macroscopic anatomy of periodontal features (1)	100.0 (1)	—	—
3. Microscopic anatomy: histology (1)	—	—	100.0 (1)
4. Infection control procedures in periodontics (1)	100.0 (1)	—	—
5. Identification of periodontal instruments (4)	100.0 (4)	—	—
6. Laboratory training (11)	100.0 (11)	—	—
7. Clinical periodontal examination (6)	100.0 (6)	—	—
8. Filling out forms/patients' records (1)	100.0 (1)	—	—
9. Clinical photographs of periodontal patients (1)	—	—	100.0 (1)
10. Periodontal disease classification (1)	100.0 (1)	—	—
11. Diagnosis and treatment planning of periodontal disease (5)	100.0 (1)	—	—
12. Treatment of periodontal disease (10)	100.0 (1)	—	—
13. Occlusal trauma therapy (1)	100.0 (1)	—	—
14. Periodontal splints (1)	100.0 (1)	—	—
15. The decision to treat or to refer a patient with periodontal disease to a specialist (1)	100.0 (1)	—	—
16. Peri-implantitis (1)	—	—	100.0 (1)
17. Surgical demonstrations performed by the professor/teacher (9)	100.0 (9)	—	—
18. Surgical periodontal treatment conducted by the student (13)	30.8 (4)	15.4 (2)	53.8 (7)
19. Incisions and sutures conducted by the student (4)	—	—	100.0 (4)
20. The use of periodontal dressing (1)	—	—	100.0 (1)
21. Furcation therapy conducted by the student (5)	80.0 (4)	—	20.0 (1)
22. Treatment of combined periodontic and endodontic lesions (1)	100.0 (1)	—	—
23. Supportive periodontal treatment (2)	100.0 (2)	—	—
24. Periodontal considerations in prosthetic dentistry (3)	100.0 (3)	—	—
25. Seminars in clinical periodontal cases (1)	100.0 (1)	—	—

Topics in bold were included in the final syllabus.

by the panel. This suggests that the majority of the individuals involved are focused on the treatment model rather than on health promotion. However, such a drawback may also be credited to limitations of the Delphi technique, which does not allow an interpersonal discussion of topics.

Overall, however, the Delphi technique proved functional in allowing periodontics lecturers from dental schools in two Brazilian cities to participate in the design of a periodontics curriculum. This happened in spite of some practical limitations that would otherwise occur in such an experiment. These relate to difficulties associated with scheduling meetings involving all participants, implementing associated transportation arrangements, and providing convenient physical locations for these meetings. Such limitations made it, right from the start, very difficult for us to contemplate the organization of

multiple meetings involving the forty participants in our study. Overall, use of the Delphi process allowed accomplishment of the primary goal of the study, which was to identify a consensus about what items should be included in the periodontics curriculum for undergraduate dental students based on the perspectives of a panel of faculty who teach periodontics at several different institutions.

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