

# **SPECIAL CARE IN DENTISTRY**

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## **FEATURE ARTICLE**

Special considerations for treating dental patients exhibiting the "post-polio" syndrome

## **ARTICLES**

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Xerostomic complaints induced by an anti-sialogogue in healthy young *vs.* older adults

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Pyogenic granuloma in a renal transplant patient: case report

## **STUDENT ESSAY**

Delphi study to identify core competencies in geriatric dentistry

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## ABSTRACT

The Delphi technique and an expert panel of general practitioners were used to identify geriatric dentistry core competencies—the necessary knowledge, skills, and values of new graduates to meet the oral health needs of older patients. Of the 74 dentists solicited, 50 dentists agreed to participate, and 40 dentists returned two questionnaires. Respondents were mostly male, white, in solo practice, with a mean age of 51.6 (SD 7.4) years. The first survey asked the participants to identify at least three topics in geriatric dentistry that they believed to be essential to a dental curriculum to graduate competent practitioners who can effectively treat older patients. The 45 unique responses were used in the second questionnaire that asked the practitioners to rate the importance of each topic for inclusion in a curriculum. For the 29 items describing skills, respondents indicated how often they performed the skill in their practices. Finally, the respondents considered all 45 items, and selected the five most crucial topics. Overall, participants achieved good consensus as to core knowledge, skills, and values needed to provide general dental care to older patients.

**KEY WORDS:** Delphi Technique, dental care for older adults, dentists, gerontology, geriatric dentistry, health work force, health services for the aged.

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# Delphi study to identify core competencies in geriatric dentistry

## INTRODUCTION

Gerontology/geriatrics education is a relatively recent addition to the dental curriculum in the United States.<sup>1</sup> Studies of geriatric dental education completed in the 1970s found little predoctoral curriculum content devoted to geriatrics.<sup>2</sup> Several educational initiatives were developed beginning in 1979 to address the limited geriatric educational programs available in dentistry, the changing demographics of our society, and the changing epidemiology of oral diseases and treatment needs. These initiatives included: (1) Federally funded training programs to create a cadre of faculty trained in geriatric dentistry, (2) the development of curriculum guidelines in geriatric dentistry,<sup>2</sup> and (3) the development of the American Dental Education Association and Administration on Aging *Curriculum Resource Book in Geriatric Dentistry*. Dental schools have gradually expanded their gerontological and geriatric curriculum content over the past 20 years.<sup>1</sup>

Kress and Vidmar published a compendium of objectives for geriatric dentistry in 1985.<sup>3</sup> Their two-phase survey of persons identified as having special knowledge in geriatric dentistry identified 150 specific educational objectives. The study also provided priority ratings among the items in the list at each of five different levels of dental education: (1) predoctoral curriculum, (2) general practice residency, (3) prosthodontics specialty training, (4) geriatric fellowship program, and (5) continuing dental education. Most of the high-priority objectives were rated as important in every area of dental education; relatively few were reserved for advanced training programs. This finding is consistent with the belief that geriatric dentistry is better viewed as part of general dentistry than as a separate clinical specialty.

Dental education has recently moved from a behaviorally oriented curriculum to a competency-based curriculum. Dental schools are challenged to provide the learning experiences for students to develop clinical competency in general dentistry. Dental schools accredited by the Commission on Dental Accreditation (CODA) must “define the competencies needed for graduation.” CODA defines competencies as “written statements describing the levels of knowledge, skills and values expected of graduates.” The most recent curricular guidelines in geriatric dentistry were published in 1989.<sup>4</sup> These guidelines provide direction for guiding curriculum development and authoring behavioral objectives, but they do not define the competencies, or knowledge, skills, and values, expected of graduates.

While the work of Kress and Vidmar and the 1989 Curriculum Guidelines are useful for curriculum planning, there is no national consensus on geriatric dentistry competencies for the new practitioner. In the absence of these accepted professional standards, expert panels can be used as the first step in identifying entry-level competence for a licensed professional. As described by Hendricson and Kleffner,<sup>5</sup> panelists, composed of working practitioners, can be asked to identify responsibilities and tasks that are

performed currently and frequently within their practices. Educational experiences leading to the development of competencies can be developed and sequenced once these tasks are identified. Generally, however, dental schools have not used practitioner expert panels to develop their competency statements, and they more commonly rely on discipline-based faculty members to develop competency documents.

A specific approach to the identification of core competencies in geriatric dentistry is the Delphi technique. The Delphi technique was first developed as a forecasting tool at the RAND Corporation, but has been applied in numerous fields since its development in the 1950s. The technique is believed to be useful when: (1) the problem or question does not lend itself to precise analytical techniques, but needs subjective judgments; (2) more individuals are needed than can effectively interact in a face-to-face interchange; and (3) disagreements among individuals are so severe that the communication process must be refereed and/or anonymity must be ensured.<sup>6</sup> An example of the use of the technique in dental education is the work of Smith *et al.* in a needs assessment for an innovative approach to advanced general dentistry education using distance learning.<sup>7</sup> While the topic of geriatric dental education does not meet all of the Delphi indications, we considered the technique a useful approach to developing a competency-based "gold standard" for geriatric dental education, because no such standard exists.

The purpose of this study was to develop a list of core competencies in geriatric dentistry that would prepare graduates to provide general dental care to older adults. This information could be used to guide the evaluation and revision of current curriculum in gerontology and geriatric dentistry. The decision was made to conduct this project in Florida because of its large population of older adults. Florida is considered a bellwether state in terms of the demographics of its population, and the impact of this demographic trend on education, health care services, and social policies. In 1996, older adults represented 18.5% of Florida's population, as compared with less than 13% of the total US population. Florida has the highest median age (37.6 years) of any state in our nation.<sup>8</sup> Community-based general

dentists provide most dental care for older adults. Thus, dental graduates in this state must be well-prepared to provide appropriate and effective care to their older patients. Dental schools in other geographic areas could also evaluate the list of competencies to determine its national applicability. However, this activity was not within the scope of the initial study.

## METHODS

### The Delphi Technique and Selection of Expert Panelists

We used the Delphi Technique to achieve consensus within the group of practitioners surveyed in our study. This technique solicits and combines reactions from a group of experts through a series of questionnaires. The expert panel of general dentists met the following criteria: (1) They had received Fellowship or Mastership from the Academy of General Dentistry, (2) they practiced dentistry at least three days a week, and (3) their practices were located in one of 25 pre-selected counties in Florida. Thirteen of the counties were the highest-populated counties in Florida, while the other 12 counties had at least 20% of their residents over the age of 65 years.<sup>9</sup>

A letter was sent to 74 dentists explaining the study and soliciting their participation. Participants were asked to return a self-addressed, stamped response postcard that affirmed or negated their desire to serve as an expert panelist. Fifty dentists (68%) agreed to participate. Respondents to the initial questionnaire were mostly male (97.4%) and Caucasian (92.4%), worked in solo practice (65.8%), and had a mean age of 51.6 (SD 7.4) years. The first questionnaire included demographic questions (participants' race, gender, and age), and a question about the dentists' practice characteristics (solo or group). The dentists were also asked to estimate the proportion of their patient population over the age of 65 years. The practitioners were asked to answer the following: "Please list, in your opinion, three or more important areas or topics in geriatric dentistry that should be included in the predoctoral dental curriculum to graduate competent entry-level practitioners who can knowledgeably and efficiently treat the growing geriatric population." To assist the panelists, the following definitions were included in the questionnaire:

**Table 1. Panelists' evaluation of the University of Florida College of Dentistry's geriatric dentistry educational philosophy.**

| Educational Philosophy  | Mean | (SD) |
|---|------|------|
| 1. Dental care for the elderly is the responsibility of all dentists.   | 4.4  | 1.1  |
| 2. The majority of older patients can be treated in the general dentist's office.   | 4.7  | 0.6  |
| 3. Psychosocial factors are as important as technique factors in treating older patients.   | 4.6  | 0.6  |
| 4. Students must learn specific knowledge and develop unique skills and attitudes to treat older adults competently.  | 4.4  | 0.8  |
| 5. Predoctoral students should routinely treat older adult patients.  | 4.7  | 0.6  |
| 6. Geriatric dentistry should be an integral part of all dental school courses that deal with older adults.   | 4.9  | 0.2  |
| 7. Ethical aspects of dental care for older adults should be addressed in the curriculum.   | 4.8  | 0.5  |
| 8. The changing demographics will require emphasis on age-sensitive dental practice management principles.  | 4.5  | 0.7  |
| 9. Clinical decision-making/critical thinking skills are essential in treating older adults.  | 4.9  | 0.4  |
| 10. Dental students should have clinical experiences in settings that reflect the continuing of health care for older adults, e.g., ambulatory care, home care, and institutional care. | 4.6  | 0.6  |
| 11. Faculty should be encouraged to understand aging as a life course issue in dental practice.   | 4.7  | 0.5  |
| 12. Dental faculty should be knowledgeable about the dental health needs of older adult patients.   | 4.9  | 0.3  |

Participants were asked the degree to which they agreed with the statements (5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, 1 = strongly disagree).

Table 2. Participants' rating of the importance of topics for inclusion into a geriatric predoctoral curriculum.

|  | Mean | SD   | Range |
|--|------|------|-------|
| <b>Gerontology: Understanding the Aging Process</b>  |      |      |       |
| 1. Understanding why personal or individual goals vary in aging patients ( <i>i.e.</i> , many patients in their 70s-90s are extremely interested in maintaining and improving their dental health, and many can easily afford the best of care). | 8.63 | 1.75 | 2-10  |
| 2. Changing needs during the retirement years: information about the needs of the senior citizens, and how to address their concerns.  | 8.10 | 1.91 | 2-10  |
| 3. Being knowledgeable about life expectancy.  | 7.65 | 1.92 | 2-10  |
| 4. Attitudes about aging and the elderly.  | 8.08 | 1.90 | 3-10  |
| 5. Understanding the types and nature of common health problems among the elderly ( <i>e.g.</i> , arthritis, memory problems, hearing and visual impairments).   | 8.80 | 1.31 | 5-10  |
| <b>Dry Mouth/Xerostomia</b>  |      |      |       |
| 6. Causes of dry mouth or xerostomia (age, medications, diseases, <i>etc.</i> ).   | 8.70 | 1.60 | 4-10  |
| 7. Complications/dental diseases resulting from xerostomia.  | 8.67 | 1.71 | 3-10  |
| <b>Psychology/Effective Communication</b>  |      |      |       |
| 8. Learning to listen and ask appropriate questions when developing a treatment plan, or providing care based on a patient's perceived needs and expectations.   | 9.70 | 0.65 | 8-10  |
| 9. Psychological aspects and techniques when treating older or aging patients.   | 8.90 | 1.13 | 5-10  |
| 10. Personality disorders; "How to be patient with patients."  | 8.90 | 1.50 | 4-10  |
| <b>Pharmacology and Aging</b>  |      |      |       |
| 11. Systemic medications and their oral manifestations.  | 9.75 | 0.59 | 8-10  |
| 12. Understanding the pharmacology of commonly used drugs, including adverse reactions and drug interactions.  | 9.60 | 0.71 | 8-10  |
| <b>Periodontology</b>  |      |      |       |
| 13. Recognition and treatment of periodontal conditions in the older patient.  | 9.28 | 1.15 | 6-10  |
| 14. Conservative maintenance of periodontal conditions.  | 9.35 | 1.03 | 6-10  |
| <b>Restorative Dentistry</b>   |      |      |       |
| 15. Appropriate dental materials for use in older patients.  | 8.85 | 1.78 | 2-10  |
| 16. Types of restorations that are useful in patients with fewer than 15 years to live.  | 8.05 | 2.69 | 1-10  |
| 17. Restoration of the cracked tooth.  | 8.61 | 2.06 | 1-10  |
| <b>Root Surface Caries/Root Surface Defects</b>  |      |      |       |
| 18. Restoration of root caries   | 9.43 | 1.26 | 3-10  |
| 19. Root caries risk assessment in older patients  | 9.05 | 1.53 | 3-10  |
| 20. Restoration of cervical erosion and/or abrasion  | 9.18 | 1.34 | 3-10  |
| <b>Fixed Prosthodontics</b>  |      |      |       |
| 21. Fixed prosthodontics: placement of new crowns and bridges  | 8.83 | 1.65 | 3-10  |
| 22. Fixed prosthodontic repair and/or replacement  | 8.64 | 1.85 | 3-10  |
| <b>Removable Prosthodontics</b>  |      |      |       |
| 23. Physiologic degeneration of the dental arch associated with tooth loss   | 8.95 | 1.52 | 3-10  |
| 24. Full denture fabrication   | 9.25 | 1.21 | 6-10  |
| 25. Overdentures, retained roots, attachments, implant-supported dentures  | 9.38 | 1.08 | 6-10  |
| 26. Improving the comfort of complete dentures   | 9.62 | 0.85 | 6-10  |
| 27. Partial denture design and delivery  | 9.03 | 1.70 | 4-10  |
| 28. Ridge augmentation   | 7.43 | 2.10 | 1-10  |
| <b>Dental Implants</b>   |      |      |       |
| 29. Dental implantology for older patients   | 8.92 | 1.63 | 3-10  |
| <b>Occlusion</b>   |      |      |       |
| 30. "Collapsed bite" and when to intervene and restore   | 9.13 | 1.18 | 5-10  |
| 31. Occlusal changes with arthritis  | 8.25 | 1.79 | 3-10  |
| 32. Recognition and treatment of "worn" dentition  | 9.28 | 0.96 | 6-10  |
| <b>Dental Treatment Planning</b>   |      |      |       |
| 33. Taking/Updating an accurate medical history  | 9.58 | 1.20 | 5-10  |
| 34. Dental treatment of the medically compromised patient; the interrelationship between systemic health and dental treatment  | 9.63 | 0.77 | 7-10  |
| 35. Rationale for developing a treatment plan appropriate to patient's health status and ability to tolerate treatment   | 9.55 | 1.01 | 5-10  |
| 36. Complete treatment planning to include organization, presentation, and actualization of necessary dentistry  | 9.43 | 1.06 | 6-10  |
| 37. Appropriate treatment options to provide relief to oral discomfort if health of patient precludes "ideal" treatment  | 9.18 | 1.28 | 6-10  |
| 38. How to convince patients to keep their natural teeth   | 9.10 | 1.58 | 5-10  |
| 39. The impact of limited finances on the "ideal" treatment plan   | 9.03 | 1.46 | 4-10  |
| 40. Treatment presentation and options   | 9.26 | 1.16 | 5-10  |
| 41. Maintenance of the aging dentition: when not to treat?   | 9.35 | 1.10 | 6-10  |
| <b>Preventive Dentistry for Older Adults</b>   |      |      |       |
| 42. Fluoride therapy for older patients  | 8.47 | 1.86 | 1-10  |
| 43. Use of special oral hygiene aids (electric toothbrushes, <i>etc.</i> )   | 8.71 | 1.33 | 4-10  |
| 44. Educating/motivating older adults to use good oral hygiene   | 8.84 | 1.62 | 4-10  |
| <b>Health Care Delivery</b>  |      |      |       |
| 45. The impact of changes in health care delivery and financing ( <i>e.g.</i> , managed care, HMOs, PPOs,) on the ethical practice of dentistry  | 8.61 | 2.52 | 1-10  |

Participants were asked to rate the topics on a ten-point scale ranging from essential (10) to unnecessary (1).

**Table 3. Frequency of procedures performed (%).**

| Procedure  | Daily | Weekly | Monthly | Yearly | Never |
|--|-------|--------|---------|--------|-------|
| Psychology/Effective Communication   |       |        |         |        |       |
| • Learning to listen and ask appropriate questions when developing a treatment plan, or providing care based on patient's perceived needs and expectations | 71.8  | 25.6   | 2.6     | 0      | 0     |
| Periodontology   |       |        |         |        |       |
| • Recognition and treatment of periodontal conditions in the older patient   | 52.6  | 34.2   | 13.2    | 0      | 0     |
| • Conservative maintenance of periodontal conditions   | 65.8  | 18.4   | 15.8    | 0      | 0     |
| Restorative Dentistry  |       |        |         |        |       |
| • Restoration of the cracked tooth   | 37.1  | 37.1   | 17.1    | 5.7    | 2.9   |
| Root Surface Caries/Root Surface Defects   |       |        |         |        |       |
| • Restoration of root caries   | 47.4  | 31.6   | 21.1    | 0      | 0     |
| • Root caries risk assessment in older patients  | 37.8  | 40.5   | 18.9    | 2.7    | 0     |
| • Restoration of cervical erosion and/or abrasion  | 50.0  | 34.2   | 13.2    | 2.6    | 0     |
| Prosthodontics: Fixed  |       |        |         |        |       |
| • Fixed prosthodontics: placement of new crowns and bridges  | 36.8  | 34.2   | 26.3    | 2.6    | 0     |
| • Fixed prosthodontic repair and/or replacement  | 24.3  | 51.4   | 16.2    | 8.1    | 0     |
| Prosthodontics: Removable  |       |        |         |        |       |
| • Full denture fabrication   | 13.5  | 32.4   | 37.8    | 16.2   | 0     |
| • Overdentures, retained roots, attachments, implant-supported dentures  | 13.5  | 37.8   | 32.4    | 13.5   | 2.7   |
| • Improving the comfort of complete dentures   | 16.7  | 52.8   | 27.8    | 0      | 2.8   |
| • Partial denture design and delivery  | 10.8  | 51.4   | 29.7    | 5.4    | 2.7   |
| • Ridge augmentation   | 6.3   | 0      | 21.9    | 25.0   | 46.9  |
| Dental Implants  |       |        |         |        |       |
| • Dental implantology for older patients   | 11.4  | 25.7   | 34.3    | 11.4   | 17.1  |
| Occlusion  |       |        |         |        |       |
| • "Collapsed bite" and when to intervene and restore   | 10.5  | 31.6   | 42.1    | 13.2   | 2.6   |
| • Recognition and treatment of "worn" dentition  | 18.9  | 37.8   | 29.7    | 10.8   | 2.7   |
| Dental Treatment Planning  |       |        |         |        |       |
| • Taking/updating an accurate medical history  | 76.9  | 17.9   | 0       | 2.6    | 2.6   |
| • Dental treatment of the medically compromised patient; the interrelationship between systemic health and dental treatment                                | 35.9  | 28.2   | 28.2    | 5.1    | 2.6   |
| • Rationale for developing a treatment plan appropriate to patient's health status and ability to tolerate treatment                                       | 43.6  | 28.2   | 23.1    | 2.6    | 2.6   |
| • Complete treatment planning to include organization, presentation, and actualization of necessary dentistry  | 41.0  | 35.9   | 15.4    | 5.1    | 2.6   |
| • Appropriate treatment options to provide relief of oral discomfort if health of patient precludes "ideal" treatment                                      | 39.5  | 28.9   | 26.3    | 2.6    | 2.6   |
| • How to convince patients to keep their natural teeth   | 45.9  | 32.4   | 16.2    | 2.7    | 2.7   |
| • The impact of limited finances on the "ideal" treatment plan   | 47.4  | 28.9   | 15.8    | 7.9    | 0     |
| • Treatment presentation and options   | 44.4  | 33.3   | 16.7    | 5.6    | 0     |
| • Maintenance of the aging dentition: when not to treat?   | 44.7  | 21.1   | 26.3    | 5.3    | 2.6   |
| Preventive Dentistry for Older Adults  |       |        |         |        |       |
| • Fluoride therapy for older patients  | 28.1  | 37.5   | 28.1    | 6.3    | 0     |
| • Use of special oral hygiene aids (electric toothbrushes, etc.)   | 36.1  | 30.6   | 25.0    | 2.8    | 5.6   |
| • Educating/motivating older adults to use good oral hygiene   | 50.0  | 25.0   | 13.9    | 8.3    | 2.8   |

Panelists were asked to rate how often they perform the procedure in their clinical practices on a five-point scale ranging from daily to never.

**The Delphi Technique:** convergence of expert opinion, from which comes insight into the subject under research (done through several questionnaires to expert panelists).

**Gerontology:** the branch of knowledge dealing with the process of aging and the problems associated therein.

**Geriatric Dentistry:** the provision of clinical oral health care to older adults (generally considered to be over the age of 65 years).

**Competent Entry-level General Dentist:** a recent dental school graduate with the knowledge, skills, and professional values to independently provide general dental care to his or her patients.

**Table 4. Participants' evaluation of the 5 most crucial topics for inclusion into a geriatric dentistry curriculum.**

| Topic   | n  | %*   |
|---|----|------|
| • Understanding why personal or individual goals vary in aging patients ( <i>i.e.</i> , many patients in their 70s-90s are extremely interested in maintaining and improving their dental health, and many can easily afford the best of care.) | 11 | 28.2 |
| • Understanding the pharmacology of commonly used drugs, including adverse reactions and drug interactions  | 9  | 23.1 |
| • Recognition and treatment of periodontal conditions in the older patient  | 9  | 23.1 |
| • Rationale for developing a treatment plan appropriate to patient's health status and ability to tolerate treatment  | 9  | 23.1 |
| • Systemic medications and their oral manifestations  | 8  | 20.5 |
| • Appropriate dental materials for use in older patients  | 8  | 20.5 |
| • Complete treatment planning to include organization, presentation, and actualization of necessary dentistry   | 8  | 20.5 |
| • Causes of dry mouth or xerostomia (age, medications, diseases, <i>etc.</i> )  | 7  | 17.9 |
| • Complications/dental diseases resulting from xerostomia   | 7  | 17.9 |
| • Taking/updating an accurate medical history   | 7  | 17.9 |
| • Appropriate treatment options to provide relief of oral discomfort if health of patient precludes "ideal" treatment   | 7  | 17.9 |
| • Understanding the types and nature of common health problems among the elderly ( <i>e.g.</i> , arthritis, memory problems, hearing and visual impairments)  | 6  | 15.4 |
| • Conservative maintenance of periodontal conditions  | 6  | 15.4 |
| • Restoration of root caries  | 6  | 15.4 |
| • Dental treatment of the medically compromised patient; the interrelationship between systemic health and dental treatment   | 6  | 15.4 |
| • Maintenance of the aging dentition: when not to treat?  | 6  | 15.4 |
| • Full denture fabrication  | 5  | 12.8 |
| • Dental implantology for older patients  | 5  | 12.8 |
| • "Collapsed bite" and when to intervene and restore  | 5  | 12.8 |
| • Attitudes about aging and the elderly   | 4  | 10.3 |
| • Partial denture design and delivery   | 4  | 10.3 |
| • Being knowledgeable about life expectancy   | 3  | 7.7  |
| • Types of restorations that are useful in patients with fewer than 15 years to live  | 3  | 7.7  |
| • Fixed prosthodontic repair and/or replacement   | 3  | 7.7  |
| • Educating/motivating older adults to use good oral hygiene  | 3  | 7.7  |
| • The impact of changes in health care delivery and financing ( <i>e.g.</i> , managed care, HMOs, PPOs, <i>etc.</i> ) on the ethical practice of dentistry  | 3  | 7.7  |
| • Changing needs during the retirement years: information about the needs of senior citizens, and how to address their concerns   | 2  | 5.1  |
| • Root caries risk assessment in older patients   | 2  | 5.1  |
| • Overdentures, retained roots, attachments, implant-supported dentures   | 2  | 5.1  |
| • Improving the comfort of complete dentures  | 2  | 5.1  |
| • Recognition and treatment of "worn" dentition   | 2  | 5.1  |
| • The impact of limited finances on the "ideal" treatment plan  | 2  | 5.1  |
| • Treatment presentation and options  | 2  | 5.1  |
| • Fixed prosthodontics: placement of new crowns and bridges   | 1  | 2.6  |
| • Physiologic degeneration of the dental arch associated with tooth loss  | 1  | 2.6  |
| • Ridge augmentation  | 1  | 2.6  |
| • Psychological aspects of and techniques for treating older or aging patients  | 1  | 2.6  |

\* The proportion of subjects who ranked the item as a "top 5" topic area. Note: Thirty-nine of the 40 panelists completed this portion of the survey.

Additionally, the participants were asked to rate the "Educational Philosophy in Geriatric Dentistry" of the University of Florida on a five-point Likert scale that ranged from "strongly agree" to "strongly disagree." The "Educational Philosophy in Geriatric Dentistry" was adopted by the faculty of the College of Dentistry in 1990, and served to guide the development of the curriculum in gerontology and geriatrics. We were interested to learn if practitioners agreed with the philosophy statements written by dental educators and gerontologists, as shown in Table 1.

Panelists submitted a total of 117 topics in the initial questionnaire. These items were summarized into 45 unique subject areas or topics in geriatric dentistry within 12 categories (see Table 2). A second questionnaire was created, asking the panelists to rate

the importance of each of 45 topics (scale: 1 = unnecessary to 10 = essential) for inclusion in a dental curriculum. For the 29 items describing specific clinical skills, respondents were asked how often they performed the skill in their practice (scale: 1 = daily to 5 = never). Finally, respondents were asked to consider all 45 items, and to select the five most crucial topics. Forty participants completed and returned the second questionnaire.

Data were entered, verified, and analyzed by means of SPSS 6.1 Statistical Software.<sup>10</sup> Descriptive statistics about the responding dentists were calculated. A mean "importance" score for each topic, frequency of the practiced skills, and "top 5" geriatric competencies were determined. A mean rating for each item of the Educational Philosophy was also calculated.

## RESULTS

The practitioners rated all 12 items of the Educational Philosophy with a mean rating of 4.4 or higher, indicating strong agreement with the college's philosophical statements about geriatric dental education (Table 1). Because of the strong level of agreement, we did not ask participants any additional questions about the philosophy in the second questionnaire.

The 45 unique topics identified from responses to the first questionnaire were summarized into 14 categories: *Gerontology, Xerostomia, Psychology/Effective Communication, Pharmacology and Aging, Periodontology, Restorative Dentistry, Root Surface Caries/Root Surface Defects, Prosthodontics (Fixed and Removable), Dental Implants, Occlusion, Dental Treatment Planning, Preventive Dentistry for Older Adults, and Health Care Delivery*. The participants achieved good consensus as to the importance of 43 of the 45 items (Table 2). One example of an item with good consensus was "systemic medications and their oral manifestations" (mean, 9.75; SD, 0.59). Two notable exceptions were "ridge augmentation" (mean, 7.43; SD, 2.10) and "being knowledgeable about life expectancy" (mean, 7.65; SD, 1.92).

Because 29 of the 45 items were procedure-based, dentists were asked how frequently they performed these procedures in their practices (Table 3). Two of the most frequently performed procedures were "taking/updating an accurate medical history" and "learning to listen and ask appropriate questions when developing a treatment plan." "Ridge augmentation" is an example of a procedure infrequently performed by the practitioners, and may not represent an appropriate predoctoral competency. Responses did not vary by practitioner age, gender, or practice characteristics, although the small sample size may have limited our ability to detect differences.

The topic most frequently identified as crucial to a geriatric curriculum was "understanding why personal or individual goals vary in aging patients" (Table 4). However, 37 items were identified by one or more practitioners as a "top 5" topic, suggesting that many items were considered important and that competency in geriatric dentistry requires knowledge and skills in a broad array of topics.

## DISCUSSION

Using a Delphi technique, we were able to achieve consensus on the competencies needed by a new dental graduate to treat older patients. From the first questionnaire, 45 unique responses were identified from the 117 items submitted by the panelists, suggesting early consensus among the practitioners. Also, it is reassuring that the practitioners agreed with all statements in the College of Dentistry's Educational Philosophy, developed by academic leaders in gerontology and geriatric dentistry.

In the second questionnaire, the general dentist panelists were asked to rate the importance of 45 topical areas. Good consensus as to the importance of including these topics in the curriculum was established in all but two of the topics. The category *Pharmacology and Aging* had two of the highest-rated topics for inclusion into a core curriculum. With the high rates of chronic health problems and associated medication use among the elderly, it is not surprising that these topics were considered essential. "Ridge augmentation" had a lower rating, and panelists did not perform this procedure routinely in their

practices, suggesting that the ability to perform a ridge augmentation is probably not an appropriate predoctoral competency. However, because the mean score was relatively high, at 7.43, the item deserves further consideration.

Analysis of data from the second questionnaire suggests that no topic clearly stands out as essential to a predoctoral curriculum. Rather, competency in geriatrics requires a broad range of knowledge and skills across the dental disciplines. This finding is consistent with the earlier work of Kress and Vidmar,<sup>3</sup> who concluded that geriatric dentistry is better viewed as part of general dentistry than as a separate clinical specialty. In their survey, 104 of the 150 objectives were rated as important in predoctoral education. However, Kress and Vidmar agreed with the suggestion of Ettinger and Beck<sup>11</sup> that one year of general practice residency training may be needed to prepare dentists to treat the frail elderly, and that a two-year program is needed to prepare a small group of dentists who would "...form a cadre of teachers of geriatric dentistry in dental schools and postgraduate centers while acting as consultants to community dentistry on how to treat frail and functionally dependent elderly patients". A similar recommendation was made in the 1995 consensus document, *A National Agenda for Geriatric Education*.<sup>12</sup>

The present study has limitations. Our panelists were from a single state, and they may not represent the views and experiences of the broader cross-section of dentists in the United States. Further research based on our findings could include validation of the competency list using a larger panel of practitioners in a broader geographic area.

Expert panels can be a useful first step in identifying entry-level competencies for a licensed professional. The Delphi technique helped us identify a list of core competencies needed to treat older patients. Florida has the highest proportion of elderly citizens in the United States. As medical technology continues to improve, the proportion of older adults in society will continue to increase. Dentists, as primary care providers, must be adequately prepared to meet the oral health needs of these patients. Dental educators must provide effective learning experiences in gerontology and geriatrics for predoctoral students. By surveying practicing dentists, we utilized an outside perspective to validate the college's educational philosophy and to develop a benchmark upon which we can evaluate the geriatric curriculum to ensure that graduates can competently serve older patients.

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