CONFIDENTIAL

DATE: May 12, 1989

TO: Executive Committee
Dr. Joseph I. Tenca
Dr. Eric J. Hovland
Dr. Joseph D. Maggio
Dr. James C. McGraw
Dr. Stuart B. Fountain

FROM: Gerald C. Dietz, Sr., DDS, MS

I have been informed that the recertification application submitted to the American Dental Association for continued recognition of endodontics as a specialty will be denied by the Council on Dental Education next week.

Following a review of the letter of denial, I feel we should make a strong appropriate response.

Enclosed you will find a draft of a letter which I think should be sent to ADA President Arthur Dugoni as well as Executive Director Thomas Ginley.

We need all the help on this matter from whatever source(s) available. I will have Irma set up a conference call on Tuesday, May 23, 1989 to discuss and share your views.

Irma is out of town until May 22 and I will be in Mexico City until May 20. In the meantime, please send any suggestions or information to the AAE Central Office via letter or FAX 312/266-9867.

GCD:kls
Enc.
cc: Ad Hoc Committee on Recertification
Dr. Charles J. Cunningham
Dr. Herbert Schilder
Dr. Edward M. Osetek
Dr. Michael A. Heuer
Dr. Stephen F. Schwartz
Dr. Henry J. Van Hassel

DRAFT

DRAFT

May 12, 1989

Irreparable harm would be done to organized dentistry by delaying the recertification of endodontics for a year, or even worse, permanently. This is particularly true if the reason for the delay is on a technical application matter as opposed to some substantive content error.

I feel that the recertification process is in some way flawed if in its structure it does not allow for technical mid-course correction in order to comply with application guidelines in a timely fashion. To not allow such timely response sheds a very negative light on an existing specialty and particularly dentistry's newest specialty.

I believe that upon sufficient reflection, the American Dental Association would agree with this point of view and I would respectfully request that some emergency mechanism be installed to rectify this obstacle so that the recertification process can go forward at the ADA Reference Committee Meeting in Hawaii as scheduled and also acted upon by the ADA House of Delegates at that meeting.

Your immediate response is respectfully requested.

Gerald C. Dietz, Sr., DDS, MS
President

Questions to committee:

1. Where should the letter be directed?
2. Who should be copied?
3. Is it strong enough for openers?
4. Who should sign it?

Your suggestions and comments are requested.

American
Dental
Association

211 East Chicago Avenue
Chicago, Illinois 60611-2678
(312) 440-2500

ADA

CERTIFIED

May 15, 1989

Dr. Gerald C. Dietz, President
American Association of Endodontists
211 E. Chicago Avenue, Suite 1501
Chicago, IL 60611

Dear Doctor Dietz:

During its May 1989 meeting, the Council on Dental Education reviewed the application for re-recognition of endodontics as a dental specialty submitted by the American Association of Endodontists (AAE). Following careful consideration of all information submitted by the AAE, the Council determined that the application failed to demonstrate compliance with all criterion as specified in the Association's Requirements for Recognition of Dental Specialties and National Certifying Boards for Dental Specialists. A detailed report containing the Council's findings and conclusions regarding the application is enclosed.

In accordance with established Council procedures for dental specialty recognition, the American Association of Endodontists has the right to respond to the Council's report. In addition, the AAE has the right to request a special appearance before the Committee on Specialty Recognition at its next meeting scheduled for Fall 1989 and before the Council at its December 1989 meeting. Notification of the AAE's intent to respond must be submitted to the Council within thirty (30) days of receipt of this letter. For your information, a copy of the process for review of applications for specialty recognition is enclosed.

Telex 247842 (ADA UR)
Telecopier (312) 440-7494

If you have any questions regarding the Council's action, the enclosed report or the specialty recognition process, please contact me.

Sincerely,

Mario V. Santangelo, D.D.S.
Secretary
Commission on Dental Accreditation

MVS/jk
Enclosures
cc: Ms. Irma Kudo, executive director, American Association of Endodontists
Dr. William Labadie, chairman, CDE
Dr. Clifford Miller, assistant executive director, Division of Education
Ms. Judith Nix, assistant secretary, Advanced Dental Education, CDE/CDA

THE AMERICAN ASSOCIATION OF ENDODONTISTS' APPLICATION FOR RECOGNITION OF ENDODONTICS AS A DENTAL SPECIALTY

Background: On January 3, 1989, the American Association of Endodontists (AAE) submitted an application for re-recognition of endodontics as a dental speciality. The application included information and documentation relating to the sponsoring organization and to the five criteria for dental specialty recognition specified in the Requirements for Recognition of Dental Specialties and National Certifying Boards for Dental Specialists.

In accordance with Council policy, notification of receipt of the application was transmitted to ADA constituent and component societies, recognized specialty organizations and certifying boards, the American Association of Dental Examiners and the American Association of Dental Schools through a letter from the Council Secretary dated February 1, 1989. A notice to the profession regarding receipt of the application was published in the February 6, 1989 issue of the ADA News. Comments on the application from interested individuals and organizations were invited. The Council carefully reviewed each of the written comments received.

The Council on Dental Education reviewed the application during a meeting held on May 4, 1989. All submitted information was evaluated in light of the established criteria for the sponsoring organization and for specialty recognition to determine the extent to which compliance with each criterion had been demonstrated. It should be noted that the Council's task was to review the application submitted by the AAE, not the field of endodontics in a broader sense beyond that information provided in the application. The burden of proof regarding compliance with the criteria rests with the sponsoring organization and was assessed on the basis of the specific information submitted in and comments provided on the application.

The Sponsoring Organization: The recognition Requirements specify:

> In order for an area to be recognized as a specialty it must be represented by a sponsoring organization whose membership is reflective of the special area of dental practice and recognized by the profession at large for its contribution to the art and science of the discipline.

To demonstrate compliance with this requirement, the Council requires sponsoring organizations applying for recognition to submit specific information on the organization's founding and historical development, its officers, membership, bylaws, activities and the contributions of its members to the art and science of the

discipline. The sponsoring organization is also requested to identify other national dental organizations with a primary interest in the same area of dental practice.

In 1943, the American Root Therapy Association was formed as a national organization comprised of those dentists interested in root canal treatment. In 1944, the organization's name was changed to the American Association of Endodontists. Today the Association's membership is organized into six districts representing the United States, the District of Columbia, the Commonwealth of Puerto Rico and the Federal Dental Services. The organization's official publication, the Journal of Endodontics, is published on a monthly basis. In addition, active members semi-annually receive a newsletter entitled Communique. The Journal is a refereed journal which also contains a news section which complements the newsletter.

Using the 1959 guidelines for recognition of special areas of dental practice, in 1963, the American Dental Association (ADA) House of Delegates voted to recognize endodontics as a dental specialty. In 1964, the ADA House of Delegates unanimously approved the American Board of Endodontics (ABE) as the national examining board for the discipline.

Since its inception in 1944, the organization's membership has continued to grow. From 1979 to 1988, the AAE's membership has grown from 2,457 to 3,435. The AAE's 1988 membership statistics as of January by category were as follows: 2,714 active, 209 associate, 150 life, 92 retired, 6 honorary, 251 student and 13 disabled. The application defines each of the membership categories. In addition, there are 612 diplomates of the ABE.

The AAE sponsors annual scientific sessions which include scientific sessions on endodontics and related topics, research seminars, essay programs, limited attendance seminars, roundtable discussions and table/poster clinic presentations. A detailed summary of the annual scientific sessions from 1979-1988 is included in the application.

The AAE sponsors research through its Endowment and Memorial Foundation. The application includes a detailed listing of the numerous grants awarded through this foundation since 1979. In addition, the Foundation sponsors a pulp registry at the University of Florida where histopathologic evaluations are conducted.

The Association encourages scholarly scientific activity by recognizing significant achievements toward advancement of the specialty. Also, graduate student awards are given for scientific and clinical research. In addition, the application includes a summary of references noting clinical and scientific advances over the last decade which have been authored or co-authored by an AAE member.

A review of all the information contained in this section of the application indicates that membership in the AAE is primarily drawn from those who have sought specialty training in endodontics and who are active in the field. In addition, the organization itself through its Endowment and Memorial Foundation has provided an effective means for its members to make an important contribution to the art and science of dentistry. In the Council's opinion, this criterion has been met.

Criterion: A specialty must be a distinct and well-defined field which requires unique knowledge and skills beyond those commonly possessed by general practitioners.

In order to assess compliance with this criterion, the Council requires a sponsoring organization to provide its definition of the proposed specialty; to identify the areas of behavioral and/or biomedical science in which advanced knowledge (beyond that included in the predoctoral curriculum) is required for practice and is not commonly possessed by general practitioners.

The specialty of endodontics as defined by the AAE and as approved by the Council on Dental Education is as follows:

> Endodontics: Endodontics is the branch of dentistry which is concerned with the morphology, physiology and pathology of the human dental pulp and periradicular tissues. Its study and practice encompass the basic and clinical sciences including biology of the normal pulp, the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular conditions.

The application includes a detailed analysis of the didactic and clinical instruction provided at an advanced level in advanced endodontic programs. The discussion highlights the following topic areas: anatomy of dental pulp, teeth and associated structure, oral and pulpal pathology, endodontic microbiology, biochemistry and physiology with emphasis on the dental pulp and contiguous tissues, pharmacology and therapeutics, physical evaluation and medical emergencies. This section of the application includes a detailed chart comparing the level of knowledge and skills of the general dentist and advanced dental education student in endodontics.

The Council expressed concern that, based on the information contained in the application, sufficient evidence had not been presented to demonstrate a clear distinction between the unique knowledge and skills of the individual with advanced training in endodontics versus the knowledge and skills of the general practitioner. In particular, the labeling of a content area as 'advanced' does not make the distinction between general practice and postdoctoral training. In the Council's opinion, there is a

need for the sponsoring organization to present additional information which supports the contention that the knowledge and skills of the endodontist are at a level beyond that of a dental school graduate. In addition, the Council expressed concern regarding the response to the request to identify advanced skills required for the practice of the specialty which are not commonly possessed by general practitioners. Specifically, the application presents information related to advanced skills that is not consistent with the predoctoral and advanced endodontic accreditation standards. Clarification is requested. Further, information presented on a chart in this section of the application which compares the education of general dentists and advanced education students in endodontics does not agree with the application's listing of advanced skills of endodontic graduates or the application's listing of competencies possessed by dental school graduates. Accordingly, the Council requests that this information be clarified. For these reasons, the Council agreed that the sponsoring organization has partially met this criterion.

Criterion: The scope of the specialty shall not be coincident with or readily subsumed within the scope of other recognized specialties.

In order to demonstrate compliance with this criterion, the Council requires sponsoring organizations to identify the advanced knowledge and skills required for practice of the proposed specialty that are not included within the scope of other recognized specialties and to identify and comment upon areas of perceived and actual overlap between the proposed specialty and one or more of the recognized specialties.

This section of the application describes areas of advanced knowledge and skills that are unique to the practice of endodontics and not included in other recognized special areas of practice. The specific areas of advanced knowledge identified in the application include: anatomy of the dental pulp and related structures, pulpal pathology, pulpal microbiology, biochemistry of the dental pulp, physiology of the dental pulp, endodontic pharmacotherapeutics, endodontic biomaterials, endodontic practice administration. The specific areas of advanced skills not included within the scope of other recognized specialties discussed in detail in the application include: diagnosis and treatment planning for patients with pulpal diseases, vital pulp therapy, emergency treatment associated with pulpal diseases, non-surgical endodontics, surgical endodontics, assessment of restorative requirements following endodontic treatment and evaluation of endodontic therapy. Areas of perceived and/or actual overlap with regard to the other seven special areas of practice were also described in the application.

The Council believes that the sponsoring organization has not adequately demonstrated that there are areas of endodontics that cannot be managed by some other specialties. Specifically, the Council felt that the application listed knowledge and skills but no attempt was made to separate out those areas performed by an endodontist. Further, in the Council's opinion, no distinction has been made in the application between areas which can or cannot be readily subsumed by another specialty. Based on its careful review of the information contained in this section of the application, the Council concluded that the sponsoring organization has partially met this criterion.

Criterion: In order to be recognized as a specialty, substantial public need and demand for services which cannot be adequately met by general practitioners or specialties in other areas must be documented.

Need

In order to demonstrate need in relation to this criterion, the Council requires the sponsoring organization to: cite epidemiological studies which indicate the incidence and/or prevalence of conditions diagnosed and/or treated by practitioners of the proposed specialty; cite data that indicate the severity of conditions diagnosed and/or treated by practitioners in the proposed specialty; and project the need for practitioners in the proposed specialty over the next ten years.

With regard to the need for endodontic services, the application summarized data compiled as a result of a recent AAE survey, confidential data supplied by some of the Delta Dental Plans and survey data from the Dental Products Report Survey. The data gathered indicates that endodontic procedures accounted for an average of 7% of the total dollars billed for third party payment (excluding orthodontics). The application indicates that according to AAE survey data, as the procedures become more difficult, a greater percentage of patients are being treated by an endodontist.

The application indicates that the need for specialty services is likely to increase steadily over the next ten years with significant factors being the aging population, retention of the natural dentition and continued oral health maintenance therapy. According to the application, the ADA has projected that the number of root canal treatments will increase from 17,390,000 in 1979 to over 30,000,000 by the year 2000.

Demand

In order to demonstrate demand in relation to this criterion, the Council requires sponsoring organizations to indicate the number of

dentists currently in practice who have received two or more years of advanced education; the number of advanced education programs of two years or more in length and the number of graduates from these program over the past five years; referral patterns; type and volume of services provided in the proposed specialty; and the projected demand for practitioners in the proposed speciality over the next ten years.

Of the 2,215 dentists currently devoting full-time to the practice of endodontics, 2,011 have received two or more years of advanced education in endodontics. With regard to referral patterns, AAE survey data indicates three primary referral sources. general dentists, other dental specialists and previous patients. Among these, the largest percentage (88.8%) are referred by the general dentist. Additional data provided by third party payers and Dental Products Report further supports this contention. The application stresses that the demand for endodontic services is projected to increase over the next ten years. The assertion is made as a result of "the level of awareness for improved health status and higher expectations regarding oral health with an increasing adult population." Further, the application notes the increased public awareness that endodontics is an alternative to extraction, combined with the desire to retain the natural dentition, will lead more people to seek endodontic care.

This section concludes by stating that survey data regarding referral patterns demonstrates that the endodontic specialist is providing a high percentage of the nation's endodontic procedures. The increasing case difficulty associated with the treatment of older adults who will expect to retain their teeth will require a large group of specialty-trained practitioners to meet the demand. The Council noted that only indirect or surrogate data (billings, referral patterns, reimbursements) are presented in support of public need and demand for endodontic care. Following careful review of all information contained in this section of the application, the Council determined that the sponsoring organization has met this criterion.

Criterion: A specialty must incorporate some aspects of clinical practice, i.e., individuals in the specialty must provide health services for the public.

In order to demonstrate compliance with this criterion, the Council requires sponsoring organizations to identify the principal health services provided and to identify the setting in which these services are customarily provided.

The application noted the principle health services provided to the public by endodontists are as follows: diagnostic, preventive, emergency and treatment services for diseases of the pulp and periradicular tissues. In addition, a more detailed listing of typical clinical endodontic services was included in this section. The Council noted that endodontists are experiencing a trend toward increasingly complex procedures. These procedures include those which are being referred after treatment has been attempted unsuccessfully, prior to referral, referral of the older adult and referral of the medially compromised patients.

A 1984 survey conducted by the AAE indicated that the majority of endodontic services are provided in private practice settings. The survey indicated the following general breakdown by setting:

Private practice - group	56%
Private practice - solo	25%
Dental schools	10%
Government service facilities	5%
Hospitals	2%
Closed panel, HMO, etc.	2%

It was noted that there is considerable overlap regarding the settings where endodontists provide clinical services because many endodontists in private practice also teach part-time or see patients in hospital settings. The Council agreed that the sponsoring organization demonstrated compliance with this criterion.

Criterion: Formal advanced education programs of at least two years beyond the predoctoral curriculum must exist to provide the special knowledge and skills required for the practice of the specialty.

In order to assess compliance with this criterion, the Council requires sponsoring organizations to identify all currently operational advanced education programs in the proposed specialty; to provide a description of the minimum curricular requirements for advanced education programs in the specialty and to provide a representative sample of curricula used in several existing advanced education programs in the proposed specialty.

The sponsoring organization provided a listing of the 45 advanced endodontic education programs currently accredited by the Commission on Dental Accreditation. The list includes the program director, board status of the director, mandatory length of the program and certificate/degree awarded. It was noted that over half of the programs listed offer graduate degrees. With regard to program director qualifications, 80% are diplomates, 11% are board eligible and the remaining 9% are educationally eligible.

The minimum curricular requirements for an advanced education program in endodontics are those stated in Requirements for Advanced Specialty Education in Endodontics which were attached to the application. It was noted that the last major revision of the Requirements occurred in May 1984 and became effective in January 1985.

This section of the document included a summary of the minimum curricular requirements for the didactic and clinical program as well as for the teaching and research components.

The Council agreed that the sponsoring organization demonstrated compliance with this criterion.

Summary: Following careful review of the application for re-recognition of endodontics as a dental specialty, the Council determined that:

The AAE had demonstrated compliance with Association requirements for the sponsoring organization.

The AAE had partially demonstrated that endodontics is a distinct and well-defined field which requires knowledge and skills beyond those commonly possessed by general practitioners.

The AAE had partially demonstrated that the scope of endodontics is not coincident with or readily subsumed within the scope of other recognized specialties.

The AAE had demonstrated public need and demand for endodontic services that could not be adequately met by general practitioners or specialties in other areas.

The AAE had demonstrated that endodontics incorporates some aspect of clinical practice, i.e., individuals in the field provide health services for the public.

The AAE had demonstrated that formal advanced education programs of at least two years beyond the predoctoral curriculum exist to prepare individuals for the practice of endodontics.

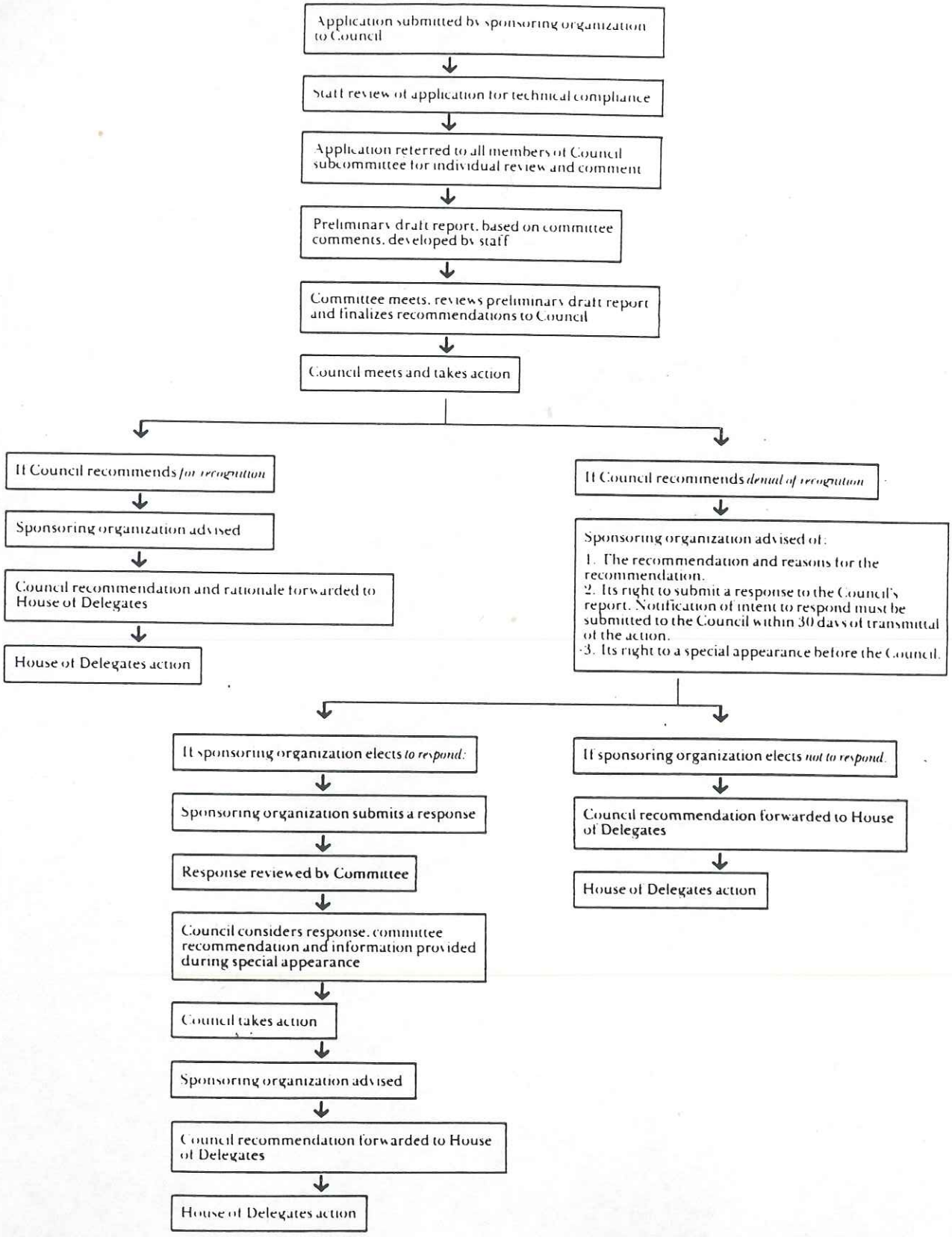
Council Action: The Council directed that the American Association of Endodontists (AAE) be advised that the Council has reviewed the organization's application and adopted the following recommendation:

Based on the application as submitted, it is recommended that the American Association of Endodontists' request for recognition of endodontics as a specialty be denied.

It further directed that the Council's report on the application be transmitted to the AAE. In addition, the Council directed that the AAE be advised of its right to respond to the Council's report in writing by October 15, 1989 and to make a special appearance before the Committee on Specialty Recognition during its next meeting scheduled for Fall 1989 and the Council during its December 1989 meeting. In accordance with established procedures for specialty recognition, the AAE's intent to respond to the Council's report must be submitted to the Council within 30 days of transmittal of the action.

8448B

Process for Review of Applications for Specialty Recognition



AMERICAN ASSOCIATION OF ENDODONTISTS
211 EAST CHICAGO AVENUE ◦ SUITE 1501 ◦ CHICAGO, ILLINOIS 60611 ◦ 312/266-7255

VIA FEDERAL EXPRESS

Date: May 24, 1989

To:
Dr. McGraw
Dr. Fountain
Dr. Maggio
Dr. Heuer
Dr. Osetek
Dr. Schwartz
Dr. Hovland
Dr. Tenca
Dr. Schilder
Dr. Cunningham
Dr. Van Hassel
Mr. Snapp

From: Dr. Dietz

Enclosed is a copy of my letter to Mario Santangelo. Upon careful consideration as to whether or not we should inform the ADA at this time that we will be requesting a change in their timetable to act on our application, I decided, with some advice, that it would not be wise to "warn" them of our intent until we have worked out our strategy completely on June 2.

Before we meet on June 2-3, I would appreciate receiving your thoughts on the issues that should be addressed in our letter to the ADA, such as what the negative impact would be if the Council did not reconsider its timetable; i.e., fragmentation of the profession, problems of endodontic graduate programs, possible medico-legal problems, potential lawsuits from endodontic practices. Other points that you feel should be addressed will also be appreciated, such as the composition of the committee that reviewed our application and the timetable of the review process.

Also send me your ideas on what should be contained in the letter that will be sent to our Board of Directors as well as the letter that will have to be sent to our membership.

Please send your written comments to Irma directly as soon as possible. Or, you may relay them to Irma via phone.

Dr. Heuer will prepare a draft of the revised response to the two sections in question this week-end (Thank you, Mike, for taking on this burden.), staff will re-type it and, hopefully, send you a copy of the draft prior to June 2.

Enc.
cc: Irma Kudo

Hansen

AMERICAN ASSOCIATION OF ENDODONTISTS
211 EAST CHICAGO AVENUE ◦ SUITE 1501 ◦ CHICAGO, ILLINOIS 60611 ◦ 312/266-7255

May 23, 1989

Dr. Mario Santangelo, Secretary
Council on Dental Education
American Dental Association
211 East Chicago Avenue
Chicago, IL 60611

Dear Doctor Santangelo:

Needless to say, the American Association of Endodontists is disappointed with the Council's determination that our application for re-recognition of endodontics as a dental specialty failed to demonstrate compliance with all specified criterion.

As a consequence of the Council's determination, we wish to inform them that we will respond to the Council's report by providing the additional information requested. Further, it is our intent to appear before the Committee on Specialty Recognition and before the Council to answer any questions which may arise following our written response.

Sincerely,

Gerald C. Dietz

Gerald C. Dietz, Sr., DDS, MS
President

GCD:kls
cc: Dr. William Labadie, Chairman, Council on Dental Education
Dr. Clifford Miller, Assistant Executive Director, Council on Dental Education
Ms. Judith Nix, Assistant Secretary, Council on Dental Education
Mrs. Irma Kudo, Executive Director, American Association of Endodontists

American
Dental
Association

211 East Chicago Avenue
Chicago, Illinois 60611-2678
(312) 440-2500

ADA

June 13, 1989

Dr. Gerald C. Dietz, President
American Association of Endodontists
211 E. Chicago Avenue-Suite 1501
Chicago, Illinois 60611

Dear Doctor Dietz:

This letter is in response to your correspondence to me dated June 3, 1989 concerning the timetable for rerecognition of endodontics as a dental specialty. Specifically, I am writing in response to the American Association of Endodontists (AAE) request for an accelerated review process in order that this matter can be considered by the November 1989 meeting of the American Dental Association House of Delegates.

Although I have noted that your letter requests that I advise you of my decision regarding this matter no later than June 12, I am unable to do so insofar as this is not a decision that can be made by the Council on Dental Education (CDE) Chairman alone.

Before a decision can be reached, it will be necessary for the Council to determine if it wishes to deviate from its established and published procedures. As you know, such an action would be unprecedented and is not called for as part of the process for specialty recognition. Because the process is one that is approved by the Council, only the Council can make the judgment to deviate from this process. Additionally, as part of the Council's approved process, the AAE's written response must be reviewed by the Committee on Dental Specialty Recognition (Committee G).

Telex: 247842 (ADA/UR)
Telecopier: (312) 440-7494

Upon receipt of the AAE's written response it will be reviewed by the Council staff for completeness. Should it be judged to be complete, it will be distributed to Committee G and the Council. Just as soon as the Council has made a final decision regarding the AAE's request I will correspond with you again.

I fully appreciate your specialty's concerns regarding this matter. I will contact you again as soon as the Council's decision regarding this matter has been made.

Sincerely,

William Labadie

William Labadie, D.D.S.
Chairman
Council on Dental Education

WL/gr
cc: Ms. Irma Kudo, executive director, AAE
Dr. Arthur Dugoni, president, ADA
Dr. Thomas Ginley, executive director, ADA
Dr. William Allen, associate executive director, ADA
Dr. Clifford Miller, assistant executive director
Division of Education
Dr. Mario Santangelo, secretary, CDE
Ms. Judith Nix, assistant secretary, CDE

FINAL DRAFT

June 3, 1989

VIA FEDERAL EXPRESS

Dr. William L. Labadie
Chairman
Council on Dental Education
American Dental Association
4855 E. Thomas Road
Phoenix, AZ 85018

Re: Timetable for Re-recognition of Endodontics as a Dental Specialty

Dear Dr. Labadie:

I am writing in response to the May 15, 1989 letter advising me of the Council on Dental Education's review of the AAE's application for the re-recognition of endodontics as a dental specialty and respectfully request an accelerated review process as detailed in this letter. As you know, the Council determined that the AAE's application fully met three criteria for dental specialty recognition and partially met two other criteria. As part of the determination, the Council advised the AAE of additional information that would be needed in order to fully comply with the two criteria that had been only partially met and invited the AAE to respond to the Council's report in writing.

Although the AAE had until June 14 to respond to the Council's notice, the AAE believed it was important to respond promptly. Therefore, on May 23, the AAE submitted a letter to the Council stating its intent to respond to the Council's report in writing and exercising its right to make a special appearance before both the Committee on Specialty Recognition and the Council.

As I am sure you recognize, the re-recognition of endodontics as a specialty by the American Dental Association is a matter of crucial importance to the AAE, the ADA, other recognized dental specialties, and the public. While the AAE is confident that it will be able to meet the two criteria identified by the Council as having been only partially met by the AAE's initial submission, the AAE is alarmed about the potential irreparable harm that will result if that re-recognition is not granted this year. If the AAE were making a request for original recognition, delay might not be so burdensome. But as an existing specialty, justice delayed will be justice denied with respect to re-recognition of endodontics. Accordingly, it is imperative that the AAE and the Council do whatever is necessary to continue the re-recognition process so that the issue can be considered by the ADA's House of Delegates in November, 1989.

In noting the need to keep the AAE's application on its original schedule for consideration by the 1989 House of Delegates, I am not unmindful of the additional logistical burden that will be placed on the Council, not to mention the AAE itself. However, the significance of those burdens pale in contrast to the direct and consequential damage that will occur to the profession and the public if final action on the AAE's application is delayed. Any unnecessary delay, during which time a cloud of uncertainty will hang over the very existence of endodontics as a specialty, will cause incalculable injuries, including, but not limited to the following:

1. Enrollment in post-graduate endodontic education will be adversely affected during this 18-month period of uncertainty. Because many of those programs do not have excess funding, some will be unable to survive a period of decreased enrollment.

2. Prolonged delay in re-recognition will certainly not go unnoticed by Dental School administrators and will most assuredly influence decisions relative to faculty recruitment and administrative reorganizations that are occuring with increasing frequency throughout dental education.

3. The 18-month period of uncertainty will adversely impact the ADA's ongoing accreditation of dental educational institutions.

4. The interest of the public will be adversely affected because of a prolonged uncertainty regarding re-recognition of the specialty. This uncertainty will be exacerbated by confusion resulting from the ADA's position relative to specialty advertising in its conflict with the FTC. Further complications could develop in state licensure statutes.

5. Advanced endodontic students competing for dentist/scientist/teacher training grants will be placed at a disadvantage during any period of uncertainty relative to re-recognition.

6. A prolonged delay in re-recognition, with its period of uncertainty, will adversely impact important practice management decisions (partnerships, leases, contracts) for many ADA/AAE members, particularly our Young Professionals.

7. With the recognition of endodontics as a specialty in doubt for a prolonged period, the American Board of Endodontics must expect a substantial decrease in the number of endodontists who begin or, for that matter, who complete the certification process to be recognized as Diplomates.

8. Within the dental profession, a cloud of uncertainty will hang over standard of care issues for at least 18 months. During this time, the status of the AAE's quality assurance guidelines will be uncertain.

9. Any delay will adversely affect the fundraising efforts of the Research and Education Foundation of the American Association of Endodontists.

10. An unreasonable delay by the American Dental Association will negatively impact on the quest for acheiving quality dentistry internationally-a goal shared by both the ADA and the AAE. This will occur at a time when endodontics is experiencing unprecedented growth worldwide as a value special area of dentistry. Evidence of this development is the establishment of graduate endodontic programs in countries other than the United States, endodontic text translations, and the return of U.S.-trained foreign endodontic graduate students to their home countries.

11. The 18-month period of uncertainty will cause irreparable damage to the professional relationships between and among endodontists, other specialty practitioners, and general practitioners.

The AAE, the ADA, and the Council have a mutual interest in avoiding or mitigating the direct and consequential damage that will result from delaying final action of the House of Delegates on the re-recognition issue. Had endodontics, like many other specialties, been scheduled to present its original application in July rather than January, there would have been adequate time planned in the schedule for the AAE to submit additional information and to have the House of Delegates act on its amended application with no delay in the established schedule. Endodontics should not be treated differently than other specialties simply because the ADA scheduled the AAE to submit its initial submission in January rather than July. And such differential treatment is unnecessary. Given the narrow focus of the deficiencies identified by the Council, the AAE and the Council, by working together, can avoid the damage that would result by the lengthy delay in the re-recognition process contemplated by the present schedule.

On behalf of the AAE, I can unequivocally state that the AAE will have an appropriate written response ready for presentation to the Council no later than June 30. Indeed, we may be able to complete that submission even earlier.

If the Council received the AAE's written submission on June 30, it should be able to review and act upon that written submission during the month of July. The Council's determination could then be reduced to writing and submitted to the Board of Trustees in time for its meeting in mid-August.

What I seek from you at this time is a commitment that the Committee on Specialty Recognition and the Council on Dental Education will consider and act upon a written submission from the AAE during the month of July. In addition, because of the substantial efforts that are already being taken by members of the AAE to prepare the written submission, I request that you advise me no later than June 12 whether the Committee and the Council are willing to grant this request. I also request that you advise me as soon as possible concerning when the AAE's special appearance before the Committee and Council can be scheduled.

Sincerely,

Gerald C. Dietz, DDS, MS
President

GCD:kls
cc: Dr. Arthur A. Dugoni, President, ADA
ADA Officers and Trustees
Dr. Thomas J. Ginley, Executive Director, ADA
Dr. Clifford H. Miller, Assistant Executive Director, ADA
Dr. Mario V. Santangelo, Secretary, ADA Council on Dental Education
Members, ADA Council on Dental Education
AAE Board of Directors

TRUSTEE CONVERSATION:

Sunday P.M. (first call)

Copy of letter is coming - addressed to William Labadie, Chairman of Council on Dental Education and cc: to ADA Trustees

Nature of letter - in response to Council's action on endodontic application for re-recognition as a specialty the timetble, i.e., Council review in December, 1989, will not permit action at 1989 House of Delegates.

When will you be free to discuss letter.?

Second Call:

Have you received and have you read the letter?

Do you understand what we are requesting?
"We are asking for review of additional information and action prior to Trustees' meeting in August and ADA Annual Session - we are not asking for reconsideration of Council's action."

Would you feel confortable about discussing this with ADA officers and/or Trustees?
"Any actions that would decrease uncertainty would help - but changing timetable of review for action at the 1989 House is key issue."

Do you have any suggestions on how this proposal can be acted upon?

AMERICAN ASSOCIATION OF ENDODONTISTS
211 EAST CHICAGO AVENUE ◦ SUITE 1501 ◦ CHICAGO, ILLINOIS 60611 ◦ 312/266-7255

DATE: June 14, 1989

TO:
Dr. James McGraw
Dr. Stuart Fountain
Dr. Joseph Maggio
Dr. Michael Heuer
Dr. Edward Osetek
Dr. Stephen Schwartz
Dr. Eric Hovland
Dr. Joseph Tenca
Dr. Herbert Schilder
Dr. Charles Cunningham
Dr. Henry Van Hassel
Mr. William Snapp

FROM: Gerald C. Dietz, Sr., DDS, MS

I received the enclosed written response from Dr. William Labadie, Chairman of the Council on Dental Education. The letter struck me as cautious, tentative, and guarded. It offered no time frame for possible action, and it certainly offered no promises. On the positive side, it didn't refuse possible timely reconsideration to review our application.

Puzzled, I phoned Dr. Labadie at his home Tuesday evening after carefully reading his letter. He said that he had just at that moment arrived from the airport returning from his meeting in Chicago. He was very friendly as he was in his previous conversation with me the week before. I explained to him my difficulty in completely understanding his letter, and he admitted that he wasn't sure what the outcome would be either. I told him our response would be submitted by June 20th. He thought that would be helpful and the best thing to do - actually the only thing. He said the biggest problem was to find out if the Council was willing to commit to an "unprecedented" meeting and said further that they were in the process of polling them now to get their views concerning a special meeting.

It seemed certain that Committee G will be assembled to review our response, but I couldn't get any other assurances from Dr. Labadie. My gut reaction is that after Committee G reviews our revised response, we may need to push again in a most forceful manner for a revision in their time schedule to allow for action in November, 1989. I feel our letter has their attention and sympathy, but not yet a consensus for change or deviation from "established and published procedures." Please collect your thoughts and consider strategy for possible further action following submission of our response to the Council next week. Please direct any comments through Irma at the Central Office, or call me directly if you think it's helpful.

GCD:kls
Encs.

Endodontic Associates professional corp.

Sent via FAX

June 14, 1989

Dr. Thomas J. Ginley
ADA Executive Director
211 East Chicago Avenue
Chicago, Illinois 60611

Dear Dr. Ginley:

I'm sure you are following the AAE's efforts to change the time schedule of the Council on Dental Education's review of our response to their return of our application for more information.

So far we have informed only our Executive Committee, our Task Force for Re-certification and our Board of Directors of our re-certification problems.

I feel I have a fiduciary responsibility to inform our AAE membership of our uncertain status for re-certification soon.

P l e a s e H e l p !!

- *What can I say ?*
- *When can I say it ?*
- *How do I keep the troops cool ?*

Our revised response will be given to the staff of the Council on Dental Education next week (June 21, 1989).

I understand that Committee G will review it, assuming it is judged complete by the Council staff. I further understand that the Council on Dental Education will at some point "determine if it wishes to deviate from its established and published procedures".

Is this information the best I can send to our membership or will a short delay result in a more complete plan?

I understand that the ADA Board of Trustees is meeting next week. Would it be possible for me to appear before them to ask for their help and understanding concerning our mutual problem? Can you offer me any advice? Please call me at (313) 647-7930.

Sincerely,

Gerald C. Dietz, Sr., DDS., MS.

BIRMINGHAM-TROY
50 W. Big Beaver
Birmingham, MI 48009
(313) 647-7930

PONTIAC-WATERFORD
2335 Pontiac Lake Rd.
Pontiac, MI 48054
(313) 683-2300

MT. CLEMENS-STERLING HGTS.
43151 Dalcome Drive
Mt. Clemens, MI 48044
(313) 286-3390

ROCHESTER-LAKE ORION
1460 Walton Blvd.
Rochester, MI 48309
(313) 656-1626

FARMINGTON HILLS-WEST BLOOMFIELD
31410 Northwestern Hwy.
Farmington Hills, MI 48018
(313) 737-1360

MILFORD-BRIGHTON

ANN ARBOR-YPSILANTI

Gerald C. Dietz, Sr., D.D.S./Melvyn Eder, D.D.S./John J. Dylewski, D.D.S./

M-Henry

DRAFT

June 21, 1989

Dr. Mario Santangelo, Secretary
Council on Dental Education
American Dental Association
211 East Chicago Avenue
Chicago, IL 60611

Dear Doctor Santangelo:

Enclosed is the response of the American Association of Endodontists to the Council on Dental Education's request for additional information to demonstrate compliance with the guidelines for re-recognition. We are responding by resubmitting in their entirety parts B.1. and B.2. of the criteria for re-recognition. Both parts have been re-written to contain information the Council requested and in a format that we hope is more understandable than that of the prior submission.

During the extended inspection of our initial response and as we undertook to prepare our resubmission, it became obvious to us where some of the misunderstanding with our answers originated. We hope that you will find the following information helpful as you review our resubmission. It is not in any way a criticism of the process, but offered as a background for our present resubmission.

It appears to us that there are two primary areas of misunderstanding between the Association in the preparation of its document and the Council in its review of it.

First, the definition of terms contained in the Accreditation Standards for Dental Education Programs (1985) do not coincide with those contained in the Requirements for Advanced Specialty Education Programs in Endodontics (1984-1987) both of which were approved by the Council.

The attached sheet (Attachment A) describes the definition of terms used for the various levels of knowledge and skill in the pre-doctoral and post-doctoral Standards. Quite understandably, differences in the definition of terminology for pre-doctoral and post-doctoral programs may have led to differences of interpretation of these definitions as used in the narrative of our intitial submission.

Second, the House of Delegates adopted Resolution 7H-1982 amending General Standard 2 under 5-C Announcement of Specialization and Limitation of Practice in the ADA Principles of Ethics and Code of Professional Conduct which now reads that "...The scope of the individual specialist's practice shall be governed by the educational standards for the specialty in which the specialist is announcing."

Our interpretation of this led us to conclude that if the post-doctoral education Standards in a special area of dental practice do contain terms describing knowledge and clinical skills that sets forth the scope of the specialty, as they do in Endodontics, that is indeed the scope of the specialty. Therefore, those areas of knowledge or clinical skills not described are not within the scope of the specialty. This is the position we have taken in preparing our initial submission to the Council as well as our response to the Council's request for additional information.

We hope that these observations are as helpful to you as they were to us in our effort to author a proper response in the areas that our original submission failed to demonstrate compliance.

Sincerely,

Gerald C. Dietz, Sr.,
President

GCD:kls
cc: Dr. William Labadie, Chairman, Council on Dental Education
Dr. Clifford Miller, Assistant Executive Director, Council on Dental Education

Ms. Judy Nix, Assistant Secretary, Council on Dental Education
Ms. Irma Kudo, Executive Director, American Association of Endodontists

AMERICAN ASSOCIATION OF ENDODONTISTS
Attachment A

The definition of terms used to describe the two tier levels of knowledge and skill in the Accreditation Standards for Dental Education Programs read as follows:

Level of Knowledge

1. In-depth - a thorough knowledge of concepts and theories for the purpose of critical analysis and the synthesis of more complete understanding. (Highest level of knowledge)

2. Familiarity - a simplified knowledge for the purposes or orientation and recognition of general principles.

Level of Skill

1. Competent - the level of skill displaying special skill or knowledge derived from training and experience. There is a level of skill beyond competency known as proficiency, e.g., that level of skill acquired through advanced training leading to specialization.

2. Exposed - the level of skill attained by observation of or participation in a particular activity.

By comparison, the definition of terms used to describe the three tier levels of knowledge and skill in the Accreditation Standards for Advanced Specialty Education Programs in Endodontics read as follows:

Level of Knowledge:

1. In-depth - a thorough knowledge of concepts and theories for the purposes of critical analysis, synthesis and evaluation. (Highest level of knowledge)

2. Understanding - adequate knowledge with the ability to apply.

3. Familiarity - basic knowledge for the purposes of orientation and the recognition of general principles.

Levels of Skill:

1. Proficient - the level of skill attained when a particular activity is accomplished with repeated quality and efficient utilization of time. (highest level of skill)

2. Competent - adequate ability to perform a particular activity.

3. Exposed - the level of skill attained by observation of or participation in a particular activity.

PROPOSED COVER LETTER - AAE RESPONSE

Enclosed is the response of the American Association of Endodontists to the Council on Dental Education's request for additional information to demonstrate compliance with the guidelines for re-recognition. We are responding by resubmitting in their entirety parts B.1. and B.2. of the criteria for re-recognition. Both parts have been amplified, clarified and re-written to contain information the Council requested and in a format more understandable than that of the prior submission.

There would appear to us to have been two primary areas of misunderstanding between the Association in the preparation of its document and the Council in its review of it. First, the definition of terms contained in the Accreditation Standards for Dental Education Programs (1985) do not coincide with those contained in the Requirements for Advanced Specialty Education Programs in Endodontics (1984-1987) both of which were approved by the Council.
The definition of terms used to describe the two tier levels of knowledge and skill in the Accreditation Standards for Dental Education Programs read as follows:

Level of Knowledge

1. In-depth -- a thorough knowledge of concepts and theories for the purpose of critical analysis and the synthesis of more complete understanding (highest level of knowledge).

2. Familiarity -- a simplified knowledge for the purposes or orientation and recognition of general principles.

Level of Skill

1. Competent -- the level of skill displaying special skill or knowledge derived from training and experience. There is a level of skill beyond competency known as proficiency, e.g., that level of skill acquired through advanced training leading to specialization.

2. Exposed -- the level of skill attained by observation of or participation in a particular activity.

By comparison, the definition of terms used to describe the three tier levels of knowledge and skill in the Accreditation Standards for Advanced Specialty Education Programs in Endodontics read as follows:

Level of Knowledge:

1. In-depth - a thorough knowledge of concepts and theories for the purposes of critical analysis, synthesis and evaluation. (highest level of knowledge)

2. Understanding - adequate knowledge with the ability to apply.

3. Familiarity - basic knowledge for the purposes of orientation and the recognition of general principles.

Levels of Skill:

1. Proficient - the level of skill attained when a particular activity is accomplished with repeated quality and efficient utilization of time. (highest level of skill)

2. Competent - adequate ability to perform a particular activity.

3. Exposed - the level of skill attained by observation of or participation in a particular activity.

Among the Accreditation Standards for Advanced Specialty Education only those for Prosthodontics contain definitions of levels of knowledge and levels of skill. The Prosthodontic definitions are also three tiered and although they are similar to those of Endodontics they are quite district from those applicable to dental school programs. Quite understandably deferences of language led to differences of interpretation of these definitions.

Second, the scope of a special area of dental practice is defined in the American Dental Association's Principles of Ethics and Code of Professional Conduct as governed by the education standards for the specialty. Specifically, the House of Delegates adopted Resolution 7H-1982 amending General Standard 2 under 5-C Announcement of Specialization and Limitation of Practice to read as follows:

> 2. Dentists who announce as specialists must have successful completed an educational program accredited by the Commission on Dental Accreditation two or more years in length, as specified by the Council on Dental Education, or be diplomates of an American Dental Association recognized certifying board. The scope of the individual specialist's practice shall be governed by the educational standards for the specialty in which the specialist is announcing.

This is the current (July 1988) language contained in the Principles of Ethics and Code of Professional Conduct. Strict interpretation leads one to the conclusion that if the Accreditation Standards for Advanced Specialty Education Programs in a special area of dental practice do contain terms describing knowledge and clinical skills which set the forth the scope of the specialty, as they do in Endodontics, that is indeed the scope of the specialty. Conversely, if they do not then those areas of knowledge or clinical skills not described are not within the scope of the specialty. This is the position taken by the American Association of Endodontists in preparing its submission to the Council and its response to the Councils request for additional information.

AMERICAN ASSOCIATION OF ENDODONTISTS
211 EAST CHICAGO AVENUE ◦ SUITE 1501 ◦ CHICAGO, ILLINOIS 60611 ◦ 312/266-7255

June 23, 1989

Dear Member:

Re: Re-recognition of Endodontics

This is to advise you of the status of our application for re-recognition of endodontics as a dental specialty. Our application was submitted to the American Dental Association in January of 1989. The application was reviewed by the ADA Council on Dental Education. Following its meeting in May, 1989, the Council advised us that two sections of our application required clarification.

Members of the AAE Executive Committee and AAE Task Force for Re-recognition met on June 2 and 3, 1989 to initiate the preparation of the additional information requested. This special committee has continued to work diligently on this project, and the completed document will be forwarded to the Council on Dental Education next week.

We look forward to a successful review of our application in the near future and we will, of course, keep you informed as the process continues.

Sincerely,

Gerald C Dietz Sr.

Gerald C. Dietz, Sr., DDS, MS
President

GCD:kls

AMERICAN ASSOCIATION OF ENDODONTISTS
211 EAST CHICAGO AVENUE ◦ SUITE 1501 ◦ CHICAGO, ILLINOIS 60611 ◦ 312/266-7255

June 27, 1989

Dr. Mario Santangelo, Secretary
Council on Dental Education
American Dental Association
211 East Chicago Avenue
Chicago, IL 60611

Dear Doctor Santangelo:

Enclosed are twenty copies of the response of the American Association of Endodontists to the Council on Dental Education's request for additional information to demonstrate compliance with the guidelines for re-recognition. We are responding by resubmitting in their entirety parts B.1. and B.2. of the criteria for re-recognition. Both parts have been re-written to contain information the Council requested.

Please be aware that throughout the re-submission we have used the terms for the various levels of knowledge and skill as they are defined in the Requirements for Advanced Specialty Education Programs in Endodontics (1984-1988). We call this to your attention because we want to make certain that the terminology is properly interpreted within the context of the narrative and that any definitional differences between pre-doctoral Standards and post-doctoral Requirements be kept in mind when reviewing this submission.

You should also be aware that throughout the re-submission, the scope of each specialty has been governed by and conforms with the educational standards for that specialty, as defined in the ADA Principles of Ethics and Code of Profesional Conduct. Accordingly, to the extent that terms describing knowledge and clinical skills are contained within the post-doctoral Requirements in a special area of practice, that knowledge and skill is treated as being within the scope of that specialty. Conversely, knowledge and skill that is not described within the Requirements of a specialty program is treated as not being within the scope of that specialty.

We look forward to a positive outcome of this re-submission. If you have any questions, please let me know.

Sincerely,

Gerald C. Dietz

Gerald C. Dietz, Sr., DDS, MS
President

GCD:kls
Enc.
cc: Dr. William Labadie, Chairman, ADA Council on Dental Education
Dr. Clifford Miller, Asst. Exec. Director, ADA Council on Dental Education
Ms. Judy Nix, Asst. Secretary, ADA Council on Dental Education
Ms. Irma Kudo, Executive Director, American Association of Endodontists

PART B - CRITERIA FOR RECOGNITION

B.1. Reference: "A specialty must be a distinct and well-defined field which requires unique knowledge and skills beyond those commonly possessed by general practitioners."

The following references were used in developing section B.1:

American Dental Association, Commission on Dental Accreditation: Accreditation Standards for Dental Education Programs. Chicago, IL, ADA December, 1985. (Appendix X)

American Association of Dental Schools, Section on Endodontics, Curriculum Guidelines for Endodontics J. Dent. Education, 50:190-194, March, 1986. (Appendix VIII)

American Dental Association, Commission on Dental Accreditation: Requirements for Advanced Specialty Education Programs in Endodontics. Chicago, IL, May, 1984, Revised May, 1985, February, 1987, May, 1988. Appendix IX)

American Association of Endodontists, Glossary of Terms Used in Endodontics, Chicago, IL Fourth Edition 1984. (Appendix VII)

American Association of Endodontists, Quality Assurance Guidelines, Chicago, IL 1987. (Appendix VI)

American Association of Endodontists, Endodontic Re-recognition Survey. Chicago, IL 1987-88. (Appendix XI).

* American Dental Association, Council on Dental Education, Supplement 9 Dental School Curriculum, Clock Hours of Instruction Basic Sciences. Annual Report 87/88 Dental Education. (Appendix XVIII)

* American Dental Association, Council on Dental Education, Supplement 10 Dental School Curriculum, Clock Hours of Instruction Clinical Sciences. Annual Report 87/88 Dental Education. (Appendix XIX)

* American Dental Association, Division of Educational Measurements, Advanced Endodontics Summary Statistics 87/88. (Appendix XX)

* Mendel, R.W. and Scheetz, J.P. Characteristics of Pre-doctoral Endodontic Education in the United States and Canada. Jnl. Dent. Educ. 45:752, November, 1981. (Appendix XXI)

* Additional documentation provided June, 1989 and appended to response to Council on Dental Education report May 1989. (Appendices XVIII through XXI)

B.1.a Definition

[Provide the accepted definition of the specialty or proposed specialty.]

The specialty of Endodontics as defined by the American Association of Endodontists and as approved by the Council on Dental Education of the American Dental Association in May, 1984 follows:

Endodontics is the branch of dentistry which is concerned with the morphology, physiology, and pathology of the human dental pulp and periradicular tissues. Its study and practice encompass the basic clinical sciences including biology of the normal pulp, the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular conditions.

B.1.b Advanced Knowledge

[Identify areas of behavior and/or biomedical science in which advanced knowledge beyond that included in the pre-doctoral curriculum is required for practice of the specialty or proposed specialty.]

The definitions of terms used to describe the levels of knowledge in this section are those contained in the Requirements for Advanced Specialty Education Programs in Endodontics. They read as follows:

Level of Knowledge:

1. In-depth - a thorough knowledge of concepts and theories for the purpose of critical analysis, synthesis, and evaluation. (highest level of knowledge)

2. Understanding - adequate knowledge with the ability to apply.

3. Familiarity - basic knowledge for the purposes of orientation and the recognition of general principles.

Advanced education programs in endodontics must provide instruction in the following biomedical sciences which are considered to have relevant applications to the discipline:

1. Head and neck anatomy
2. Oral Pathology
3. Biochemistry
4. Pharmacology
5. Microbiology and immunology
6. Physiology
7. Microanatomy (histology)
8. Biostatistics and research methodology

Biomedical science instruction is conducted through a series of formal courses, conferences, seminars, reading assignments, and hospital or

laboratory assignments. These studies are designed for post-doctoral students and are not a repetition of pre-doctoral biomedical courses. A minimum of 15 percent of a two-year advanced endodontic program must be devoted to biomedical science instruction. The number of clock hours devoted to each subject area varies according to each program's particular curricular objectives and resources.

The primary role of the basic sciences in a dental education program is to provide a requisite knowledge base upon which sound clinical judgements are predicated. This knowledge base consists of a core of information in the basic sciences. Institutional priorities relative to the nature and degree of clinical competency and intellectual objectives vary and these variations are reflected in curricular emphasis, beyond a certain minimum in basic science instruction. The organization and level of conceptual material in basic science instruction is of such depth, scope timeliness, quality, sequence and emphasis as to support the clinical and intellectual objectives of an institution's curriculum. However, all basic science instruction in dental education must ensure an understanding of basic biological principles and their application to clinical care.

The principal role of basic science instruction in an advanced education program is to build upon the core of information common to all dental school graduates by concentrating on specific areas deemed to be of importance to a particular clinical discipline. Knowledge at an in-depth level in the biomedical sciences in selected areas is required of advanced education program graduates. The selected areas of concentration in post-doctoral endodontics, in which attention is focused and which extends beyond the depth required in a pre-doctoral curriculum, can be described as follows:

Head and Neck Anatomy - Microanatomy: The structure and function of the stomatognathic system including vascular, neural and osseous structures, the temporomandibular joint, musculature, fascial planes, salivary glands, oral mucosa, teeth, pulp and related features are studied at the gross, microscopic and ultra-structural levels by post-doctoral endodontic students. Special attention is paid by these students to the dental pulp and related structures; i.e., dentin, periodontal ligament, cementum and alveolar bone. Because an in-depth level of knowledge of the development of teeth and the dental pulp is central to the understanding of pulpal pathology and its sequelae, the developmental anatomy and histology of these tissues is studied extensively.

Since endodontists must treat infections arising from the teeth, and the practice of endodontics encompasses certain surgical techniques, in-depth knowledge of the surgical anatomy of the maxilla and mandible as well as associated structures beyond that obtained in the pre-doctoral curriculum is essential.

Oral Pathology: In addition to in-depth knowledge of the basic principles of pathology, particularly those applicable to inflammatory disease, the scope of concentrated study in endodontics is the epidemiology and natural history of pulpal diseases, their pathogenesis, clinical features and histopathologic manifestations. Pulpal diseases and their sequelae currently recognized as distinct entities are as follows:

Reversible pulpitis (symptomatic and asymptomatic)

Irreversible pulpitis (symptomatic and asymptomatic)

Hyperplastic pulpitis

Internal/external resorption

Fibrotic and calcific degeneration

Pulpal necrosis

Apical periodontitis (acute, chronic and suppurative)

Acute periradicular abscess

Periradicular cysts

Combined endodontic-periodontic lesions

Traumatic injuries to teeth

Failures of vital pulp therapy and/or root canal treatment

Biopsy material removed in the course of surgical treatment by endodontists is important for the confirmation of a diagnosis. The endodontist must be able to make the necessary histopathologic evaluations of these tissues as well as to interpret reports from pathologists. An analysis of conditions diagnosed and/or treated by endodontists taken from a survey conducted by the AAE indicated that 47.2 percent of all teeth had complications. Of the complications diagnosed and/or treated, 7.2 percent were related to the inability of the referring dentist to properly diagnose, 6.1 percent to the inability of the referring dentist to control pain and/or swelling, and 5.8 percent to endodontic-periodontic involvements. (B.3.a.ii. and Appendix XI) An in-depth knowledge of oral pathology and its applications to endodontics beyond that obtained in the pre-doctoral curriculum is essential for the endodontist to successfully diagnose and/or treat these and other complex cases.

Biochemistry: The biochemical phenomena occurring in the dental pulp and periradicular tissues, particularly as related to the process of inflammation and the repair of collagenous tissues, dentin and bone are studied at an in-depth level. Attention is given to those biochemical events involved in cellular interaction and host defense (immunochemistry) as well as biological products influencing cellular activity in both health and disease. Particular focus is placed on collagen tissue and tissue mineralization in the studies of advanced education students in endodontics.

The education of a general dentist provides the broad base of knowledge and understanding essential for the application of biochemistry to clinical care in general. The education of an endodontist builds upon this core in a special circumscribed area of expertise.

Pharmacology: The advanced study of pharmacology in endodontics is focused on the pharmacodynamics of agents used in the alleviation of anxiety, pain, and infection associated with pulpal and/or periradicular disease. The effects or side effects and dose schedules for both systemically and locally applied agents are studied. Local anesthetics as well as systemic analgesics and antibiotics require special attention. The pharmacologic actions of drugs used in the management of medically compromised patients, which have specific implications for endodontic diagnosis and treatment, also receive detailed study.

Pharmacotherapeutic agents used within the the root canal system for either the control of infection or pulpal pain are studied in depth, both in a historical context and for their present use in endodontic practice.

Developing knowledge holds that treatment decisions involving pharmacologic agents have far-reaching effects on the immunologic system as well as the potential for healing and repair following injury or infectious disease. These developments are of utmost importance to endodontic practitioners in that 6.1 percent of the cases seen by endodontists involve the inability of referring dentists to control pain and/or swelling and 4.3 percent involve medically compromised patients likely to be under medical care utilizing a variety of therapeutic agents. (B.3.a.ii. and Appendix XI)

Microbiology and Immunology: Since the vast preponderance of inflammatory pulpal diseases is of microbial etiology or involves contamination of pulpal tissues by microorganisms, advanced education in the microbiology of pulpal diseases is essential for the endodontist. The bacteriology of the microflora of dental caries and subsequent pulpal infection is studied in greater depth and detail than in the pre-doctoral curriculum. In addition, the microorganism associated with pulpal disease and periradicular infections, their cultural characteristics, pathogenicity and sensitivity to antimicrobial therapy and their application to clinical practice are studied in-depth. Endodontists are particularly interested in techniques of microbial culturing from the root canal system and the identification of microorganisms and their antibiotic sensitivity. These techniques are used on a selective basis in the clinical practice of endodontics.

Microbial infections are the result of imbalances between the pathogenicity of the invading organisms and the tissue and humoral defenses of the host. Therefore, the in-depth study of immunology and its clinical implications is important in the education of an endodontist. Immunopathologic reactions and their role in the diagnosis and treatment of endodontic diseases, both from a microbial as well as a pharmacologic standpoint, play an important emerging role in endodontic practice and require knowledge beyond that obtained in the pre-doctoral curriculum.

Physiology: Since the advanced education student in endodontics must develop proficiency in the diagnosis of pain of dentinal, pulpal and/or periradicular origin and be competent in the differential diagnosis of oral and oral and maxillofacial pain, advanced education in pulpal physiology as well as neurophysiology is essential. The intimate relationship of fluid dynamics and vascular tissues and their function in states of health and disease of dentin and the dental pulp are studied in detail. Mechanisms of

pain transmission, circulatory and respiratory regulation and function as well as neuromuscular activity are important areas of in-depth understanding for an endodontist who must diagnose and manage maxillofacial pain syndromes. Of the cases seen by endodontic practitioners, 13.3 percent involve diagnosis difficulties of the referring dentist or his/her inability to control pain and/or swelling. (B.3.a.ii. and Appendix XI) This requires knowledge beyond that obtained in a pre-doctoral curriculum.

Biostatistics and Research Methodology: Although the principles of the scientific method must be taught and appropriately applied in the pre-doctoral curriculum which all dental graduates complete, the pre-doctoral student is not required to have the knowledge of either biostatistics or research methodology required of post-doctoral advanced endodontic program graduates. Endodontic post-graduate students involved in original research are likely to be involved in computer applications of biostatistical methodology above and beyond that experienced by dental school pre-doctoral students. Graduates of post-doctoral endodontic programs are required to have experience in methods of scientific investigation whereas graduates from dental schools are not. This experience is essential if the endodontist is to have a creative attitude, be able to interpret the scientific literature and have a desire for continuous study.

In addition to the foregoing areas of behavioral and/or biomedical science in which knowledge at the in-depth level is required of advanced endodontic program graduates, they are also required to have knowledge at the understanding level in:

1. Medical emergencies
2. Management of medically compromised patients
3. Behavioral science applied to dentistry

Graduates of advanced endodontic programs are also required to be familiar with the history of endodontics; teaching methodology; scientific writing; hospital protocol; practice management, jurisprudence and ethics; physical evaluation; and biomaterials science as applied to the discipline of endodontics.

The areas of concentration in behavioral and/or medical sciences in which attention is focused and which extends beyond the depth required in a pre-doctoral curriculum can be described as follows:

Medical and Behavioral: Patients referred to endodontists include those who are in pain and under stress and/or who are medically, mentally or physically compromised. The endodontist must have an understanding of these types of conditions and how best to render endodontic services when they are present. This understanding must be more in-depth, substantial and relative to the practice of endodontics than the broad general understanding required of a general practitioner. The effect of systemic diseases or metabolic disorders on pulpal and periradicular health and disease and, conversely, the effect of pulpal and periradicular diseases on systemic health and disease are also studied in detail. Because of referral patterns in endodontic practice, advanced education students in

endodontics experience first hand the clinical procedures and laboratory tests involved in the physical evaluation of patients and understand fully the principles involved in the management of medically compromised patients as well as medical emergencies. While true of all advanced education programs in endodontics, this is particularly true of the endodontic residencies based in hospitals.

Post-doctoral students in endodontics are also required to have an understanding of the psychologic factors associated with pain and/or stress and the importance of these in the determination of a diagnosis in pulpal and/or periradicular pathology beyond that of a pre-doctoral student. Whereas dental school graduates are required to be exposed to pain and anxiety control techniques other than inhalation sedation, advanced endodontic graduates are required to understand and/or use such alternate techniques as intravenous sedation, modeling, biofeedback and systematic desensitization.

Dental school graduates as general practitioners are not required to have experience in or extensive knowledge of either scientific writing or educational theory and teaching methodology. Experience in both these areas is required of advanced education graduates in endodontics. It is evident that endodontists do contribute to the scientific literature of their discipline (A.5.c and A.6) and do comprise the majority of dental school endodontic faculties at both pre-doctoral and post-doctoral levels. Endodontists are familiar with the history of endodontic treatment modalities within dental practice and endodontics as a special area of dental practice. This enables them to critique innovations in clinical practice in the context of a historical background as well as to understand the role of endodontics and endodontic practitioners in the economic, political and social fabric of the dental profession. General practitioners have little, if any, educational background in the history of endodontic treatment or endodontics as a specialty.

An analysis of the mean clock hours of pre-doctoral and post-doctoral instruction in behavioral and/or biomedical sciences required of the graduate of an advanced education program in endodontics can be summarized as follows: (Appendices XVIII, XIX, XX)

A COMPARISON OF THE PRE-DOCTORAL AND POST-DOCTORAL INSTRUCTION OF STUDENTS IN ADVANCED EDUCATION PROGRAMS IN ENDODONTICS
MEAN CLOCK HOURS (MCH) OF INSTRUCTION 1987-1988

	Pre-doctoral Education in Dental Program (General Practice)		Post-doctoral Education in Endodontic Program (Specialist)		Total (T) Education Pre- and Post-doctoral (GP + Endodontist)	
Subject area	MCH	% T	MCH	% T	MCH	% T
Head/Neck Anatomy	101.46	71.6	40.20	28.4	141.66	100
Microanatomy	94.89	54.0	37.09	21.0	175.86	100
Oral Histology	43.88	25.0	(Included above)			
Oral Pathology	94.54	64.8	51.28	35.2	145.82	100
Biochemistry	86.49	82.5	18.34	17.5	104.83	100
Pharmacology	84.42	75.1	28.00	24.9	112.42	100
Microbiology	76.65	54.4	39.22	27.8	140.98	100
Immunology	25.11	17.8	(Included above)			
Physiology	106.28	78.1	29.73	21.9	136.01	100
Biostatistics	Not Available		40.52	Not Available	40.52	Not Available
Research Methodology	Not Available		(Included above)			

Such a comparison based upon the actual reporting of clock hours of instruction from dental schools and advanced dental education programs in endodontics provides evidence of the extent that basic biomedical science education in an advanced education program in endodontics expands upon the knowledge base acquired in dental school.

B.1.c. Advanced Skills

[Identify the advanced skills (techniques and procedures) required for the practice of the specialty or proposed specialty which are not commonly possessed by general practitioners.]

The definitions of terms used to describe the levels of skills in this section are those contained in the Requirements for Advanced Specialty Education Programs in Endodontics. They read as follows:

Levels of Skill:

1. Proficient - the level of skill attained when a particular activity is accomplished with repeated quality and efficient utilization of time. (highest level of skill)

2. Competent - adequate ability to perform a particular activity.

3. Exposed - the level of skill attained by observation of or participation in a particular activity.

The Accreditation Standards for Dental Education Programs approved by the Commission on Dental Accreditation in December 1985 became effective on January 1, 1988. Requirements and/or guidelines in effect for dental education programs prior to this date made no mention of specific patient care modalities contained within the scope of endodontic practice as defined by the Requirements for Advanced Specialty Education Programs in Endodontics. By contrast, the 1988 Accreditation Standards for Dental Education Programs do so in four specific areas where minimal clinical competency is required and in four areas where there should be exposure to clinical endodontic treatment without actual clinical experience.

The educational programs of dental schools require each student to obtain experience in the management of the majority of dental emergencies including those of pulpal and periodontal origin, as well as the control, management and/or prompt referral of dental emergencies of traumatic origin and those resulting from treatment failures.

In order to competently undertake either diagnostic or prognostic patient evaluations in endodontic cases, a dental school graduate about to enter general practice should be able to take and record medical and dental histories, conduct a systematic clinical examination, determine the relationship between the patient's general and oral health, use appropriate clinical tests and support the significance of those modalities in identification of diseases of the pulp and/or periradicular tissues. On this basis, a general practitioner should be competent in formulating a plan of treatment for patients requiring either vital pulp or root canal therapy.

At a minimum the educational programs of dental schools require each student to be clinically competent in performing indirect and transdentinal pulp therapy, direct pulp capping and pulpotomy procedures as well as perform endodontic therapy on uncomplicated permanent teeth. They also

require at a minimum that each student be competent in the management of pulpal and periradicular disorders of traumatic origin and be exposed to endodontic therapy on complicated permanent teeth. To be clinically competent in these areas it can be presumed that a dental school graduate about to enter general practice has sufficient knowledge in endodontics provided through the curriculum to make the necessary rational clinical judgements in diagnosis and treatment.

Advanced education programs in endodontics are required to provide knowledge at an in-depth level in the following topic areas related to the clinical specialty:

1. Diagnosis of pulpal and periradicular pathosis in the primary and permanent dentition.
2. Vital pulp therapy.
3. Endodontic emergency procedures.
4. Non-surgical endodontic procedures.
5. Surgical endodontic procedures.
6. Coronal bleaching and the restoration of endodontically treated teeth.
7. Evaluation of endodontic therapy.

In addition, the knowledge at the familiarity level for endodontic post-doctoral students includes clinical science areas such as the transplantation of teeth, marsupialization and selected topics from the clinical disciplines of periodontics, prosthodontics, restorative dentistry and pediatric dentistry.

At a minimum, advanced education programs in endodontics require each student to be proficient in the diagnosis of pain of pulpal and/or periradicular origin and to be competent in the provision of treatment for complicated endodontic cases as well as in periradicular surgery associated with endodontic therapy. These cases include entities which are reflected in the clinical practice of the specialty as well as its educational programs.

Endodontists in clinical practice provide the full range of clinical services in which their educational programs require special knowledge and skills.

The type and volume of services provided by endodontists is reflected in data gained from the AAE survey of endodontic practices as well as in information obtained from third party payers. The following table from the AAE survey summarizes data from 22,469 cases reported by 120 endodontists nationwide. (B.3.b.v. and Appendix XI)

Type of Service Rendered by Endodontists	Percent of Specialty Practice
Non-surgical endodontics (complicated/non-complicated)	81.0%
Post and core build-up following endo	7.7%
Periapical surgery	4.2%
Non-surgical retreatment of previous endo	3.6%
Combination non-surgical/surgical endodontics	3.2%
Surgical retreatment of previous endo	2.7%
Post cementation following endo	2.6%
Apical maturation procedures	0.9%
Combination surgical/non-surgical retreatment	0.8%
Surgical repair of resorption/perforation	0.7%
Surgical removal of root(s)	0.6%
Hemisection	0.5%
Forced eruption	0.3%
Intentional replantation	0.1%
Replantation of avulsed tooth	0.08%
Endodontic endosseous implant	0.01%
Other	5.4%

In post-doctoral endodontic training programs based in dental schools, the referral source of these cases, as well as a significant number of posterior teeth, is from the dental school's pre-doctoral program. This referral pattern reflects that seen in the clinical practice of the specialty or programs based in non-dental school settings where referrals come principally from general practitioners. (B.3.a.i. and Appendix XI)

A survey conducted and reported by Dental Products Report in December, 1987 provided a detailed breakdown of referral patterns in endodontics from 680 general dentists. A significant 11.7% of all survey respondents referred all endodontic cases to the specialist. Based on the tooth involved, the respondents referred 33.8% of anterior teeth, 48.8% of pre-molar teeth and 77.9% of molar teeth to endodontists. The largest percentage of cases referred to endodontists by all age groups were the teeth with more complex root canal systems such as bicuspid and molars. (B.3.b.iv.)

A comparison of the mean number of clock hours of didactic, laboratory and/or clinical instruction provided to dental students with the minimal number of clock hours of similar instruction required of advanced education students in endodontics shows the contrast in education. (Appendices IX and XIX)

Educational Experience	Pre-doctoral Mean clock hours of Instruction	Post-doctoral Minimum Clock hours of Instruction
Endodontic Lectures	37.70	360
Endodontic Laboratory	36.68	Not available
Endodontic Clinic	110.29	960

Advanced education programs in endodontics are required at a minimum to be two academic years (2400 clock hours) in length and cannot have less than 40 percent nor more than 60 percent of their curricular time devoted to

clinical care. Biomedical instruction cannot be less than 15 percent of curricular time (360 clock hours) nor clinical teaching exceed 10 percent of curricular time. Most, if not all endodontic programs exceed the minimal clock hours of instruction and patient care required by the standard.

The minimum level of estimated didactic and laboratory instruction in advanced programs provided in clinical endodontics is approximately seven and one-half times that reported as the mean for all such instruction in dental school programs. Clinical instruction minimums (40 percent of total program length) for advanced education programs in endodontics are approximately nine times the mean reported for dental school programs. Even the most extensive dental school program reporting reported less than one-third the number of clock hours of clinical instruction in endodontics compared to the minimum for an advanced endodontic program. If such data provide justification for an assumption that dental school graduates are at a minimum competent in the prevention, diagnosis and management of pulpal and periradicular diseases, it must also provide evidence that advanced education graduates in endodontics are more than competent in providing these same services.

Data provided by the Council on Dental Education's Division of Educational Measurements for 1987-88 indicates that an endodontist in training completes a minimal average of 127 cases (35 anterior, 30 pre-molar and 62 molar) during their residency. (Appendix XX) Data from surveys of dental school pre-doctoral programs show a mean of 14.9 root canals (which includes a mean of 3.2 molars) completed by students prior to graduation or approximately seven cases. (Appendix XXI) By comparison, the endodontic post-doctoral student at a minimum completes 18 times the number of cases done by the average pre-doctoral student and of a more complex nature as noted above.

The specific areas in which advanced skills for the practice of endodontics are required which are not commonly possessed by general practitioners can be described as follows:

Diagnosis and Treatment Planning: Graduates of advanced education programs in endodontics must be proficient in arriving at a diagnosis or prognosis of endodontic cases and in formulating plans of treatment. Their education requires in-depth knowledge of both the primary and permanent dentition and the scope and extent of an endodontist's clinical experience reinforces it, particularly in the permanent dentition. Endodontists are also required to be proficient in the diagnosis of pain of pulpal and/or periradicular origin whereas only competency in the control of pain and anxiety, clinical pharmacology and the management of related complications is required of dental school graduates practicing general dentistry. Advanced education programs in endodontics provide students with sufficient clinical experience to achieve proficiency or competency beyond that of a dental school graduate in: (Appendix IX)

> Taking and recording appropriate medical histories, conducting systematic extraoral and intraoral examinations and determining the relationship between the general and oral health status of the patient insofar as specific endodontic therapy is concerned.

Performing and interpreting the significance of the various tests and examination findings used in the identification of pulp pathosis and pulpally related periradicular pathosis.

Determining a differential diagnosis of oral and maxillofacial pain.

Discriminating between periradicular lesions of pulpal origin and periradicular lesions of non-pulpal origin or normal structures which resemble periradicular lesions.

Diagnosing and providing the appropriate treatment procedures for disease conditions which indicate the need for endodontic therapy.

Vital Pulp Therapy: Both general dentists and endodontists must be able to recognize those local and systemic conditions which affect the dental pulp and understand the relationships between pulpal health, disease and endodontic treatment under these conditions. Both must also be competent in preventing pulpal disease and managing pulpal conditions by performing appropriate treatment to the dentin and/or dental pulp to enhance the reparative potential of these tissues and avoid the necessity of root canal therapy. Endodontists as graduates of advanced education programs possess in-depth knowledge of the biology and pathology of dentin and the dental pulp as well as sufficient clinical experience to be able to provide all aspects of vital pulp therapy beyond that obtained in a pre-doctoral curriculum. They are able to make better clinical judgements than are general practitioners as to case selection and post-treatment evaluation when vital pulp therapy is considered or rendered.

Dental Emergencies: General practitioners are expected upon completion of their dental school education to have limited but appropriate knowledge of emergency treatments for the relief of any pre-operative, inter-appointment or post-operative symptoms associated with pulpal pathology and its sequelae or of symptoms arising from endodontic treatment. Endodontists are required to have in-depth knowledge of these procedures and sufficient clinical experience to make them competent in providing emergency treatment for the relief of pain or the resolution of swelling associated with endodontic cases. While dental school programs must permit dental school graduates to have experience with these types of emergencies, specific competency in their management is not required. Referral patterns reported from endodontic practices indicate that 6.1 percent of the cases are complicated due to the referring dentist being unable to control pain and/or swelling. A further indication of the relationship between general dentists and endodontists is that 11.2 percent of cases referred to endodontists were cases in which treatment was initiated by the referring dentist but presented difficulties beyond his/her ability to complete treatment. (B.3.a.ii. and Appendix XI)

Non-Surgical Endodontics: General practitioners who are current dental school graduates are expected to have knowledge of a limited range of non-surgical endodontic treatment modalities and familiarity with others and are required to demonstrate competence in performing non-surgical endodontic therapy only on uncomplicated permanent teeth. By contrast, endodontists who are graduates of advanced education programs must have in-depth knowledge of a wide range of both non-surgical and surgical endodontic procedures and demonstrate competence in performing them as well as to have experience in a number of adjunctive procedures directly related to the clinical practice of endodontics.

Both general practitioners and endodontists are required to have sufficient pre-clinical and clinical experience in their educational programs to be competent to perform endodontic therapy on uncomplicated single and multi-rooted permanent teeth. Endodontists, because of their more in-depth education and extensive clinical experience, possess a competency in the treatment of uncomplicated endodontic cases beyond that of the dental school graduate. Data from third party payers on the incidence of cases diagnosed and/or treated by endodontic specialists by type of tooth in which 12-22 percent had single canals (anterior teeth and/or bicuspids), 24-30 percent had two canals (principally bicuspids) and 35-56 percent had three or four canals (molars) indicate that the relative levels of education and/or clinical experience possessed by general practitioners and endodontists are reflected in clinical practice. (B.3.b.v. and Appendix XI) This data is particularly significant when the numbers of endodontists who provide this percentage of the total endodontic services rendered is compared to the number of all practicing dentists.

Whereas dental school graduates must be familiar with the problems associated with endodontic therapy on complicated single and multi-rooted permanent teeth, so as to understand the limitations of their education, the graduate of an advanced education program in endodontics must have sufficient in-depth knowledge and clinical experience to be competent in performing endodontic therapy on complicated single and multi-rooted permanent teeth. Referral patterns established in the dental school setting where both pre-doctoral and post-doctoral programs exist reflect those encountered in clinical practice. The frequency of complicated cases being referred to endodontists constitutes 47.2 percent of all patient referrals to endodontists. (B.3.a.ii and Appendix XI) These complications can be broken down into the following categories and percentages:

Calcified root canal systems	16.8
Retreatment of previous root canal treatment	10.0
Inability of referring dentist to diagnose	7.2
Inability of referring dentist to control pain and/or swelling	6.1
Periodontic-endodontic complications	5.8
Medically compromised patients	4.3
Ledged or dilacerated root canal systems	3.9
Cracked tooth	2.8
Inability of referring dentist to obtain adequate anesthesia	2.9
Resorption involving root canal system	2.5
Perforations of root canal system	1.8
Separated root canal instruments	1.4
Incomplete root formation	1.4
Fractured roots	1.1

General practitioners who meet current requirements for dental school graduates should be able to recognize and avoid procedural errors during endodontic treatment of uncomplicated permanent teeth. He/she should be able to communicate the situation encountered to the patient and to refer the case for treatment by an endodontic specialist if indicated. The endodontist graduate of an advanced education program must have an in-depth knowledge of the causes, prevention and correction of procedural errors

encountered in endodontic treatment and sufficient clinical experience to be competent in recognizing and correcting procedural errors such as ledged root canal systems, perforations of the root canal system, separated root canal instruments, inadequately sealed root canal systems and/or extensions or extrusions of root canal filling materials beyond the apex of the tooth root. It should be noted that these categories of procedural errors constitute collectively 17.1 percent of all endodontic referrals in practice and, further, 11.2 percent of cases referred to endodontists were cases in which treatment was initiated by the referring dentist but presented complications beyond the level of their ability to continue treatment. (B.3.a.ii. and Appendix XI)

Evaluation of Endodontic Treatment: General practitioners who meet current requirements for dental school graduates should be able to determine whether endodontic therapy has been successful or has failed by relating this judgement to established clinical criteria. In addition, they should, on the basis of a clinical examination, clinical tests, and radiographic interpretation, be able to judge when it is necessary to consult with an endodontic specialist.

The endodontic specialist is required in his/her educational program to have in-depth knowledge of the factors associated with the evaluation of endodontic therapy and sufficient clinical experience in his/her educational program to achieve competency in determining whether endodontic therapy has succeeded or failed as well as to be able to identify the probable causes of failure. He/she is required to be competent to recommend or deliver proper subsequent treatment if necessary or indicated.

Surgical Endodontics: General practitioners who meet current requirements for dental school graduates should be familiar with the diagnostic and technical procedures involved in surgical endodontic therapy. No clinical experience or competency is required in their pre-doctoral training.

Endodontic graduates of advanced education programs are required to have in-depth knowledge of the surgical procedures associated with endodontic therapy (i.e. incisions; drainage; trephination; periradicular curettage; apicoectomy; retrofilling; hemisection; root amputation; surgical repair of root perforations) as well as to have sufficient clinical experience to be competent in performing the diagnostic and technical procedures involved in the treatment of such cases.

The incidence of apical surgery diagnosed and/or treated by endodontic specialists is reported to range from 46 to 75 percent of all such surgical endodontic procedures submitted for payment to third party payers. (B.3.a.i. and Appendix XI)

Based upon their educational requirements as well as the realities of the clinical practice of endodontics, endodontists possess advanced skills in the area of endodontic surgery not commonly possessed by general practitioners.

Traumatic Injuries: General practitioners who meet current requirements for dental school graduates are required to be competent in the management of pulpal and periradicular disorders of traumatic origin, including apexification procedures. The limited number availiable in a dental school and nature of such cases make it highly unlikely that every dental student has clinical experience involving traumatic injuries to teeth let alone apexification procedures nor is there documentation that this is being done. More probable is a limited exposure to these types of cases and their treatment.

By contrast, the advanced education graduate in endodontics is required to have provided services and gained experience in complicated as well as uncomplicated permanent teeth with traumatic injuries. Graduates of advanced education programs in endodontics have clinical experience in evaluating the effects upon the pulp of impact injury to teeth including pulp testing, color changes, pulp chamber and/or root calcifications or resorptions and pulp necrosis as well as in performing therapy where indicated for intact teeth, coronally fractured teeth, root fractured teeth, partially displaced teeth and avulsed teeth.

The incidence of apexification procedures diagnosed and/or treated by endodontic specialists is reported to range from 69-73 percent of such endodontic procedures submitted for payment to third party payers. (B.3.a.i. and Appendix XI) Such data indicate that apexification procedures are not commonly done by general practitioners but rather are done by endodontic specialists who are trained to do them.

Ancillary Endodontic Services: Graduates of dental schools who meet current requirements should be familiar with the implantation and replantation of teeth as well as the bleaching of both vital and endodontically treated teeth. Although not specifically referenced in accreditation standards, it can be assumed that dental school graduates who must be competent in the preparation and fabrication of foundation restorations would be competent to restore endodontically treated teeth.

Graduates of advanced education programs in endodontics should have an in-depth knowledge of and clinical competence in bleaching both vital and non-vital teeth and in providing intracanal space for proper retention and resistance forms for the appropriate coronal restoration of endodontically treated teeth. He/she should have sufficient in-depth knowledge of the procedures used for the restoration of endodontically treated teeth so as to make appropriate recommendations for such when called upon to do so. The extensive clinical experience of graduates of advanced education programs in endodontics provides a level of competency in this area beyond that of the dental school graduate.

Endodontic post-doctoral students are required to have demonstrated experience in the clinical management of medically compromised patients, intentional tooth replantations, endodontic endosseous implants and in crown lengthening and forced eruption procedures, none of which are required of dental school pre-doctoral students. Advanced dental education graduates in endodontics are also required to have experience in a variety of root canal apical closure procedures in addition to apexification, the only competency expected of dental school graduates.

B.2. Reference: "The scope of the specialty shall not be coincident with or readily subsumed within the scope of other recognized specialties."

The following resources were used in developing section B.2.:

American Dental Association, Commission on Dental Accreditation Requirements for Advanced Specialty Education Programs. Chicago, IL.

Dental Public Health. May, 1985.

Endodontics. May, 1984, Revised, May, 1985, February, 1987.

Oral Pathology. December, 1982, Revised, April, 1983.

Oral and Maxillofacial Surgery. May, 1985, Revised, 1987.

Orthodontics. May, 1984.

Pediatric Dentistry. May, 1984, Revised, May, 1986, February, 1987.

Periodontics. May, 1985, Revised, February, 1987.

Prosthodontics. December, 1982, Revised, April, 1983, February, 1987.

American Dental Association Principles of Ethics and Code of Professional Conduct. Section 5-C Announcement of Specialization and Limitation of Practice. July 1988.

B.2.a. Advanced Knowledge

[Identify the areas of biomedical and/or behavioral science in which advanced knowledge is required for practice of the specialty which is not included in the scope of other recognized specialties.]

It is recognized that all of the dental specialties require advanced knowledge in a core of biomedical sciences. That core of biomedical sciences for endodontics consists of head and neck anatomy, microanatomy, oral pathology, biochemistry, pharmacology, physiology, microbiology and immunology. The focus of the endodontist's advanced knowledge in biomedical science is the dental pulp which differentiates endodontics from the other specialties. Use of this knowledge in an integrated manner provides the basis of diagnosis, treatment planning and therapy for diseases of the dental pulp and their sequelae and distinguishes endodontists from other specialists.

Specific areas of focus of the knowledge required for advanced education students in endodontics but not specified in the Requirements for Advanced Education in the other recognized special areas of dental practice, are listed below:

1. The morphology as well as microscopic and ultrastructural anatomy of the dental pulp.

2. Pulpal pathology and its sequelae.

3. Microbiology as related to pulpal pathology and its sequelae.

4. Molecular biology as it relates to the dental pulp and dentin in health and disease.

5. Physiology of the neural and vascular systems of the dental pulp and their relationship to oral and maxillofacial pain.

6. Pharmacotherapeutics as applied to the dental pulp and endodontic practice.

7. Biologic materials as related to endodontic practice.

8. An armamentarium specifically designed for and unique to endodontics.

9. Practice administration and interpersonal skills essential for the conduct of a referral based endodontic practice.

The selected areas of biomedical and/or behavioral science required for the practice of endodontics included in the Requirements for Advanced Education Programs in Endodontics which define the scope of this specialty, and not specifically included in the Requirements for Advanced Education in other recognized specialties which define the scope of these specialties, can be described as follows:

Anatomy of the Dental Pulp: The practice of endodontics as a specialty requires in-depth knowledge of the morphology of the root canal system and the structure and ultrastructure of the dental pulp. An intimate knowledge of dentin formation and calcification as well as tooth development is also essential. Knowledge of the changing characteristics of these hard and soft tissues during their development, maturation and aging is essential. Although several special areas of dental practice call for instruction in anatomy and/or histology, none focuses on the dental pulp and dentin as primary areas of interest.

The dentin and dental pulp are the primary tissues relating to prevention, diagnosis and treatment in the practice of endodontics. Pediatric dentistry and orthodontics require advanced education in facial development as well as tooth development. However, neither specialty limits the scope of its interest to the dental pulp and its contiguous tissues as does endodontics nor extends the study of these tissues beyond the development of the mature permanent dentition.

Pulpal Pathology: The practice of the specialty of endodontics requires an in-depth knowledge of the pathogenesis and natural history of pulpal diseases and their sequelae as they relate to diagnosis and treatment. Pulpal pathology is included in the overall scope of Oral Pathology, just as is periodontal pathology, but there is no specific mention of either in the requirements for this special area of dental practice. Knowledge of pulpal

pathology, its etiology, natural history, and sequelae is important to the practices of pediatric dentistry, periodontics and prosthodontics, but none of these special areas of dental practice study this area to the extent or in the depth that an advanced education student in endodontics does.

Pulpal responses to applied agents, restorative procedures and traumatic injury are studied by oral physiologists and oral pathologists but neither discipline applies the knowledge gained from these studies to clinical practice as does the endodontist.

A thorough understanding of the defensive and destructive role of the inflammatory and immunologic systems of the dental pulp and contiguous apical tissues is necessary, particularly as they relate to the process of wound healing and the predictability of endodontic procedures. The integration of these areas of basic scientific knowledge in pathology into a comprehensive understanding of pulpal disease and its sequelae is singular to the specialty of endodontics. The diseases studied in-depth by endodontic advanced education students are:

A. Pulpal Disease

1. Reversible pulpitis
   a) symptomatic
   b) asymptomatic

2. Irreversible pulpitis
   a) symptomatic
   b) asymptomatic

3. Metaplastic pulposis
   a) hyperplastic pulp
   b) internal resorption of dentin
   c) fibrous degeneration
   d) calcific degeneration

4. Necrosis of the pulp

B. Periradicular Diseases of Pulpal Origin

1. Apical periodontitis
   a) acute
   b) chronic
   d) suppurative

2. Acute apical abscess

3. Combined Endodontic/Periodontic lesions

4. External resorption

C. Pulpal and/or periradicular pathology associated with traumatic injuries to teeth.

D. Other conditions of the dental pulp, dentin, and associated structures important to endodontic diagnosis and treatment.

Pulpal Microbiology: Central to clinical endodontics is the knowledge that the bacterial invasion of pulpal tissues is the major etiologic factor in pulpal diseases and their sequelae. Accordingly, practicing endodontists have an in-depth knowledge of oral microbiology and of those pathogens associated with dental caries and pulp tissue contamination that relate to the commonly recognized endodontic diseases.

All of the dental specialties require advanced education in microbiology with the exception of Dental Public Health and Orthodontics. Oral Pathology and Oral and Maxillofacial Surgery require it because it relates to oral and maxillofacial infectious diseases and processes. Pediatric Dentistry and Prosthodontics require it because it relates to dental caries as well as oral infections. Periodontics focuses on the specific microorganisms and/or inflammatory processes endemic to periodontal disease whereas endodontics focuses on the microorganisms responsible for the inflammatory diseases of the dental pulp and/or infections arising from the root canal system. No other special area of dental practice does so.

Of all the special areas of dental practice, only endodontics incorporates techniques for the culturing and identification of microorganisms from the root canal system into clinical practice.

Molecular Biology: The practice of clinical endodontics is dependent upon in-depth knowledge of the biochemical phenomena associated with the structure and formation of fibrous and calcified connective tissues. Collagen chemistry and tissue mineralization, as they relate to wound healing and tissue mineralization in dentin and bone, are of particular importance to the specialist in endodontics.

Oral and Maxillofacial Surgeons, Orthodontists and Periodontists likewise have a special interest in collagen chemistry, the formation of fibrous tissue, bone and the mineralization of bone particularly as these processes relate to cementum, periodontal ligament and supporting alveolar bone.

While endodontists share this interest, they focus attention on the development of dentin, its mineralization and repair, or repair of the dental pulp. This knowledge is of particular importance for endodontists in the area of vital pulp therapy whether it is in the form of transdentinal treatment, pulp capping or vital pulpotomy. Endodontists apply this knowledge to the healing of periradicular tissues following root canal therapy.

Pulpal Physiology: A significant factor in the practice of endodontics is the ability to differentially diagnose those disease processes which cause oral and maxillofacial pain. Endodontic practitioners must be able to discern the difference between maxillofacial pain of dental, peripheral, central or psychic origin and to do so requires in-depth knowledge of neurophysiology. Of particular importance to endodontic practitioners is an understanding of the neural and vascular system physiology of dentin and the dental pulp which plays a major role in the generation of dental pain. In-depth knowledge of these inter-related physiologic processes contributes to an understanding of techniques for the diagnosis and management of maxillofacial pain as well as the diagnosis of other pulpal conditions.

While other special areas of dental practice require expertise in the differential diagnosis of oral and maxillofacial pain, most notably oral and maxillofacial surgery, none requires a focus on dentin and the dental pulp and the role in dental pain that they play as does endodontics. The inability of a referring dentist to diagnose constitutes 7.2 percent of endodontic referrals and reflects application of this knowledge. (B.3.a.ii. and Appendix XI)

Endodontic Pharmacotherapeutics: Endodontics as a special area of dental practice has developed a number of unique applications of pharmacological agents to endodontic practice through scientific investigation and extensive clinical experience. In particular are a number of agents used topically on dentin, the dental pulp or within root canal systems to either obtund pain, reduce inflammation, promote healing, aid in biomechanical cleansing or act as antimicrobial agents. These pharmacological agents are a unique and important part of endodontic treatment. Antibiotic therapy as well as the systematic use of analgesic and antianxiety agents are important in endodontics as they are in Oral and Maxillofacial Surgery and Periodontics which share responsibility for the prevention, control and treatment of infectious oral diseases.

Endodontics also requires in-depth knowledge of the pharmacology and use of local anesthesia since endodontic treatment addresses one of the most painful of all dental disorders. The inability to control pain and/or swelling or the inability to obtain adequate anesthesia constitutes 9 percent of endodontic referrals indicating the importance of this knowledge to the practice of the specialty. (B.3.a.ii. and Appendix XI) As in other special areas of dental practice when using pharmacologic agents, the endodontist must understand the mechanisms and interactions of all drugs taken either as a consequence of medical treatment or applied to a course of endodontic treatment.

Biologic and Endodontic Materials: A number of specialized dental materials, i.e., dentin sealers, pulp capping agents and root canal filling materials, are unique and important components of endodontic practice. The endodontic practitioner must be experienced in the use of a wide range of these materials and have a thorough understanding of their physical properties as well as the relationship of these materials to tissue injury and repair. All aspects of the biocompatibility and toxicity of dental materials as they relate to the dental pulp and periradicular tissues are a part of endodontic practice. A concern for the physical and biologic properties of materials which come into contact with periradicular tissues via the root canal system is unique to endodontics.

Endodontic Armamentarium: A special armamentarium of instruments and equipment is unique to endodontics and no other special area of dental practice. The instruments used for root canal length measurement, cleansing and shaping, root canal obturation and the special equipment used in endodontic diagnostic procedures are well known and identified with the specialty. The endodontic practitioner must have knowledge of and be experienced in the use of a wide range of special instruments and items of equipment.

Practice Administration: Like most other special areas of dental practice, the general principles of dental practice administration must be applied specifically to the practice of the specialty. This is equally true for Endodontics. Of particular importance to endodontics are the counseling and management skills essential for the diagnosis and treatment of patients with dental phobias and/or high levels of anxiety when undergoing the stress of dental pain. Effective communications with patients and with referring dental and medical practitioners is essential to the practice of endodontics. The differential diagnosis of oral and maxillofacial pain requires skill in patient interviews and a high degree of knowledge of human psychology, and endodontic practitioners are also concerned with these matters. This is particularly true in that many pathoses associated with dental and/or oral and maxillofacial pain cannot be detected by direct clinical observation but must be determined in large part by subjective information and/or responses provided by the patient.

Endodontic practice requires specific procedures in record keeping in order to record diagnostic tests, assessments of pulpal status, unusual pulpal morphology, tooth restorations, etc. to enable the endodontic practitioner to correlate these findings to the diagnosis, treatment and post-treatment prognosis of endodontic cases. Radiographic records are an important part of endodontic practice not only for diagnostic purposes but as an integral part of root canal treatment as they are in post-operative recall evaluations of treatment.

B.2.b. Advanced Skills

[Identify the advanced skills (techniques and procedures) required for practice of the specialty or proposed specialty which are not included within the scope of other recognized specialties.]

It is recognized that all of the dental specialties share a common core of clinical skills derived from education and experience in general practice. The focus of the endodontists' skills is upon the diagnosis, prevention and treatment of diseases and injuries of the dental pulp and associated periradicular conditions.

The following advanced skills required for the practice of endodontics, but not specified in the Requirements for Advanced Specialty Education in the other recognized special areas of dental practice, are listed below:

1. Diagnosis and treatment planning for patients with pulpal disease and/or its symptoms and sequelae.

2. Vital pulp therapy in the permanent dentition especially as it relates to apexogenesis and emergency or interim treatment.

3. Emergency treatment for the pre-operative, inter-appointment and post-operative relief of symptoms associated with pulpal pathology and/or its treatment.

4. Non-surgical endodontic treatment procedures including but not limited to uncomplicated and complicated single and multi-rooted teeth particularly in the permanent dentition.

5. Surgical endodontic treatment procedures including but not limited to apicoectomy, hemisection and root amputation associated with root canal obturation as well as retrofilling of the root canal system and the surgical repair of root canal perforations.

6. Assessments of the restorative requirements of endodontically treated teeth.

7. Post-treatment evaluations of endodontic therapy.

8. Endodontic endosseous implants.

9. Intentional replantation of teeth following extra-oral obturation of the root canal system.

Those specific advanced skills required for the practice of endodontics, included in the Requirements for Advanced Education Programs in Endodontics which define the scope of this specialty, and not specifically included in the Requirements for Advanced Education in other recognized specialties which define the scope of those specialties can be described as follows:

Diagnosis and Treatment Planning: The skill exercised by endodontists in the diagnosis of pulpal diseases and their sequelae is singular among the specialists in dentistry. Endodontists are specifically educated to perform and interpret the significance of the various tests and examination findings used in the identification of pulp pathosis and pulp-related periradicular pathosis. No other special area of dental practice requires either in-depth knowledge of these procedures or the clinical experience necessary to develop clinical proficiency.

The endodontist by virtue of his/her education and experience is best able to diagnose pulp disease as well as to develop and accomplish the most definitive treatment plan for attending to it. Endodontists have developed the clinical judgement necessary for them to be able to select the most appropriate treatment based upon individual patient needs for endodontic care.

The ability to perform a differential diagnosis of oral and maxillofacial pain, make appropriate treatment or referral recommendations and to provide treatment for the relief of pain of endodontic origin is central to the clinical practice of endodontics. This is true whether the patient's pain is acute or chronic, intermittent or sustained, real or imagined.

A detailed understanding of those factors which have led to the patient's condition as well as the restorative procedures that will follow endodontic treatment is essential. In order to do so, the endodontist is trained to closely coordinate his/her treatment with that of restorative dentists.

During diagnosis and treatment planning, the total health of the patient must be evaluated so that endodontic therapy can be specifically applied to the individual patient's condition and needs. The endodontist must also be cognizant of the effect of pulpal pathology and endodontic treatment on the general health of the patient.

Vital Pulp Therapy: Although dentists are expected to be competent in preventing or managing reversible pulpal disorders and performing appropriate treatment where indicated such as the desensitizing of dentin, protective liners and bases, and direct and indirect pulp capping, the endodontist, by virtue of his/her education and experience, is uniquely qualified to discern when these treatments ought to be rendered or to evaluate their outcomes.

Although pediatric dentists perform pulpotomy procedures on the deciduous dentition, clinical competency in or advanced knowledge of pulpotomy procedures are not specifically referred to in the Requirements for this specialty as they are in Endodontics. The level of expertise of endodontists in performing pulpotomy and/or apexogenesis procedures, particularly in the permanent dentition, is not attained by specialists in other areas of dentistry. The incidence of apexification procedures diagnosed and/or treated by endodontic specialists is reported to range from 69-73 percent of all such procedures submitted for payment to third party payers. (B.3.a.i. and Appendix XI)

Emergency Treatment: The endodontist, by virtue of his/her education and experience, is uniquely qualified to provide appropriate emergency treatment to relieve pain and/or resolve swelling associated with pulpal

disease and/or it sequelae. Oral and Maxillofacial Surgeons also perform surgical techniques including incision and drainage or trephination where indicated for apical abscesses, although such treatment is not specifically referred to in their Requirements. In particular, symptoms associated with pulpal pathology as well as the pre-operative, interappointment and post-operative symptomology associated with root canal therapy, requires the mastery of skills fundamental to endodontists. The incidence of referrals to endodontists for the control of pain and/or swelling associated with endodontic cases is 6.1 percent of endodontic referrals. (B.3.a.ii. and Appendix XI)

Non-surgical Endodontics: Endodontists are specifically educated to perform the technical procedures involved in the full spectrum of root canal treatment procedures for complicated anterior and posterior permanent teeth. No other special area of dental practice requires either in-depth knowledge of these procedures or the clinical experience necessary to develop clinical competency in providing them.

Research has shown that successful root canal treatment is dependent upon a thorough cleansing and shaping of the root canal system of a tooth followed by a hermetic sealing of the root canal system so as to prevent the ingress or egress of fluids or toxins into either the root canal system or the supportive tissues of the tooth. Root canal cleansing and shaping is done by means of instrumentation specific to the discipline assisted by the appropriate use of biochemical agents. Root canal filling is done by means of materials and techniques specific to the discipline of endodontics.

Although Pediatric Dentists receive instruction in pulp biology and/or pulp treatment and have some clinical experience in vital pulp therapy and non-surgical endodontic procedures in the deciduous and developing permanent dentition, such education and/or clinical experience is not required in either the didactic or clinical cores of their advanced education curriculum as it is in endodontics.

Endodontic cases diagnosed and/or treated by endodontic specialists include 12-22 percent of single canal teeth (anterior and/or bicuspid), 24-30 percent of two-canal teeth (principally, bicuspids) and 35-56 percent of three-four canal teeth (molars) among all non-surgical endodontic procedures submitted for payment to third party payers. (B.3.b.v. and Appendix XI) No other special area of dental practice provides this level of endodontic care.

Surgical Endodontics: Endodontists are educated to perform the technical procedures associated with surgical approaches to endodontic care especially apicoectomy, retrofilling as appropriate for the case, hemisection or root amputations appropriate for the case, and the surgical repair of root canal perforations. Oral and Maxillofacial Surgeons are trained to perform alveolar surgery including incision, drainage, trephination and periradicular curettage as are endodontists.

Endodontists possess in-depth knowledge of the importance of sealing the root canal system and have the clinical experience in cleansing, shaping and sealing the root canal system as part of the surgical procedure not commonly possessed by Oral and Maxillofacial Surgeons. Within the general area of surgical procedures in the oral cavity, endodontics has developed and practices some unique techniques which separate it from other special areas of dental practice.

Specifically, no other surgical specialties combine techniques for sealing the root canal system with surgical operations that expose or remove a portion of the whole tooth root. This applies specifically to apicoectomy, retrofilling of the root canal, hemisection and root amputation as well as the repair of perforations of the root canal system. In the requirements for Advanced Education Programs in Oral and Maxillofacial Surgery, there is no specific mention of these procedures nor is there specific mention of such procedures in the Requirements for Periodontics.

The incidence of apical surgery diagnosed and/or treated by endodontic specialists is reported to range from 46-75 percent of all such surgical endodontic procedures submitted for payment to third party payers.

Assessment of Restorative Requirements: By virtue of their education and experience, endodontists are uniquely qualified to determine those teeth amenable to bleaching and to perform such procedures. All endodontic practitioners have some experience in the fabrication and placement of posts and cores in endodontically treated teeth. Because of their intimate knowledge of root canal morphology, endodontists are uniquely qualified to recommend appropriate restoration of the specific teeth which they have treated and to provide the internal space for proper retention and/or resistance forms for the intracanal and coronal restorations which follow their treatment.

Post-treatment Evaluations: The expertise of endodontists in the evaluation of the results of endodontic treatment, i.e., vital pulp therapy, non-surgical endodontics or surgical endodontics, is singular among the specialists in dentistry as only the Requirements for Advanced Education Programs in Endodontics specifically require it. The regeneration of non-pathologic soft and hard tissues in the healing of endodontic related wounds involves a series of complex biological events demanding special study in order to understand and interpret clinical results. Also required is the specific knowledge and experience peculiar to each clinical technique and procedure used in the practice of endodontics.

Endosseous Implants: Endosseous implants are osseous implants which are sealed within the root canal system and extend beyond the apex of the tooth root into the periapical bone. The preparation of the root canal system and periapical bone to receive such a combination root canal filling and osseous implant is unique to endodontics and has been a recognized clinical technique for over twenty years. The placement of such implants in which the tooth root provides a cervical gingival attachment as well as provision for coronal restoration is included in the scope of endodontics and in no other special area of dental practice.

Intentional Replantation: The intentional extraction of teeth in order to seal the root canal system followed by the replantation of the extracted tooth is included in the scope of endodontics and in no other special area of dental practice. Oral and Maxillofacial Surgeons have been known to transplant developing teeth into extraction sockets in anticipation of tooth replacement, but neither this technique nor that of the intentional replantation of root canal treated teeth is specifically referred to in the Requirements for an Advanced Education Program in Oral and Maxillofacial Surgery.

B.2.c. Overlap in Scope

[Identify and comment upon any area of perceived and/or actual overlap between the scope of this specialty or proposed specialty and one or more recognized specialties.]

In a generic sense the basic sciences studied by endodontists are common to most dental specialties, since all eight recognized dental specialties share some common interests in biomedical and behavioral sciences. Education in sound principles of the scientific method applied to research design and biostatistics are also mutually shared by most specialties. Since all specialties are composed of dentists, there is a common base of shared knowledge of clinical dental science as well as shared clinical competencies. However, by focusing on the dental pulp, specific aspects of the basic sciences are integrated into the clinical practice of endodontics, and definable and specific clinical skills provide the essence of the discipline. This creates a special area of dental practice unique from that of other specialties.

Perceived and/or actual overlaps with other specialty areas can be identified as follows:

Oral and Maxillofacial Surgery: Outpatient oral and maxillofacial surgery experience includes the management of traumatic injuries and dentoalveolar surgery. Endodontic experience includes the management of traumatic injuries to the teeth and dental pulp and is limited to periradicular surgery insofar as dentoalveolar surgery is concerned. Oral and Maxillofacial Surgery is concerned with a broad overall surgical experience whereas endodontics is focused scientifically and clinically into a specific, well-defined area.

When endodontists perform periradicular surgery they are concerned with techniques for sealing the root canal system in addition to the surgical removal of pathologic tissue or the correction of anatomical defects of the teeth or alveolus. This is evident in that the scope of endodontic surgery is limited to apicoectomy, retrofilling of the root canal, hemisections and root amputation as well as the repair of perforations of the root canal system. Both endodontists and oral surgeons use, and are trained, in biopsy techniques as well as surgical procedures of incision, drainage and trephination to relieve the symptoms of acute apical abscesses. The off-service rotation in anesthetics required of oral surgeons must be supplemented by continuing experience in all aspects of pain and anxiety control with emphasis on systemic approaches and ambulatory techniques in general anesthesia. These are experiences not usually associated with the education of an endodontist whose focus is on the differential diagnosis of oral and maxillofacial pain and non-surgical and surgical treatment modalities directed toward pulpally related maladies.

Data from endodontic practices indicate that those surgical techniques included in the scope of endodontics constitute collectively 12.7 percent of the practice of endodontics. (Appendix XI) Further, the incidence of apical surgery done by endodontists as reported by third party payers ranges from 46-75 percent by all such surgery done by general practitioners or oral and maxillofacial surgeons. (B.3.a.i. and Appendix XI)

Oral Pathology: Pathology of the dental pulp and its sequelae is not the central focus of an oral pathologist as it is for an endodontist. Both disciplines require advance training in the radiographic diagnosis of oral and systemic diseases. Oral pathology is an all encompassing discipline of the head and neck whereas endodontics is a discipline of narrower scope and focus centered on the tooth and pulp requiring skills in clinical treatment.

Orthodontics: There is little if any overlap of Endodontics and Orthodontics with the possible exception of endodontists being able to provide services and/or demonstrate experience in those forced eruption procedures used as part of the treatment modality for teeth having lost tooth structure below the alveolar crest.

Pediatric Dentistry: Pediatric dentists as post-doctoral students participate in seminars which focus on pulp biology and pulp treatment. Pulp diseases of the primary dentition concern both Endodontists and Pediatric Dentists and are more likely to be treated clinically by Pediatric Dentists. This is particularly true of pulpotomy techniques in the deciduous dentition. Pulp diseases in the developing permanent dentition are more likely to be treated clinically by endodontists particularly since their education and experience makes them best able to treat cases in which the teeth do not as yet have completely formed apices. This applies to both vital and non-vital teeth. Root-end closure techniques and apexogenesis procedures usually fall into the endodontic domain. Both disciplines have an interest in and practice vital pulp therapy and transdentinal therapy particularly on adolescent patients. Community referral patterns and practices determine the extent to which vital pulp services are provided by general dentists or specialists in Endodontics or Pediatric Dentistry, but national data from third party payers indicate 69-73 percent of apexification procedures are done by endodontists. (B.3.a.i. and Appendix XI)

Periodontics: The education and experience of a Periodontist closely parallels that of an Endodontist insofar as the basic biomedical sciences relate to each specialty. The application of fundamental principles of the biomedical sciences to the mechanisms of inflammation and wound healing are similar. In the case of Periodontics these principles are applied to the alveolus, periodontium and oral mucous membrane whereas in Endodontics, they are applied to the dental pulp and its contiguous hard and soft tissues including the periodontium and alveolus. Both disciplines are interested in the diagnosis and treatment planning of cases in which combined endodontic/periodontic lesions are present. Crown lengthening by means of the surgical removal of gingival tissue can be an element of endodontic treatment. Both disciplines utilize hemisection and root amputation techniques in therapy, but only the endodontist incorporates sealing of the root canal system as an integral part of treatment. The treatment modalities for endodontic services are quite disparate from the treatment modalities for periodontic services as are the post-treatment regimens for the restoration and/or maintenance of clinical cases in these disciplines.

Prosthodontics: Endodontists should have experience in the fabrication of posts and cores for endodontically treated teeth in consultation with the dentist who will be completing the restoration. Endodontists also must be able to recommend appropriate restoration of endodontically treated teeth and to provide space for the proper retention and/or resistance form for restoration of these teeth. Prosthodontists, by the very nature of the fixed prosthodontics component of their curriculum, may have similar clinical experience but in addition they must be proficient in the restoration of endodontically treated teeth, a requirement not demanded of endodontists.

Public Health: There is little if any overlap of Endodontics and Public Health Dentistry, except in the study of areas of practice administration and those organizations used for the delivery of dental services to the general public. Both Endodontics and Public Health Dentistry include biostatistics and research design as biomedical curriculum requirements for their graduates as do Orthodontics, Oral Pathology, and Periodontics. Other special areas of dental practice place less emphasis on research design and all but Oral and Maxillofacial Surgery require some education in biostatistics.

ADA American Dental Association
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Supplement 9

Dental School Curriculum, Clock Hours of Instruction Basic Sciences

Supplement 9 to the
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Dental Education

Council on Dental Education

TABLE 2
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
HEAD AND NECK ANATOMY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	85	58	143
215	DENTAL	27	72	99
785	MEDICAL	11	56	67
852	DENTAL	55	55	110
1239	MEDICAL	41	48	89
1437	DENTAL	24	107	131
1448	DENT-MED	25	48	73
1469	DENTAL	93	67	160
1471	MEDICAL	65	50	115
1753	DENTAL	77	68	145
1821	MEDICAL	19	16	35
2336	DENT-MED	43	66	109
2346	MEDICAL	65	79	144
2602	DENT-MED	73	54	127
2849	DENT-MED	57	47	104
2889	MEDICAL	38	21	59
2979	DENTAL	32	96	128
3379	DENTAL	14	39	53
3835	MEDICAL	39	79	118
3983	DENTAL	31	60	91
4044	DENTAL	38	92	130
4075	MEDICAL	54	38	92
4495	DENTAL	36	66	102
4664	DENTAL	47	81	128
4897	DENTAL	67	58	125
5066	DENTAL	38	58	96
5145	DENT-MED	29	41	70
5214	DENT-MED	70	55	125
5361	INDEP	43	60	103
5386	DENTAL	75	53	128
5470	DENTAL	33	51	84
5695	DENT-MED	64	53	117
5886	MEDICAL	55	59	114
6011	DENTAL	58	59	117
6034	MEDICAL	68	75	143
6309	DENT-MED	58	60	118
6473	MEDICAL	43	55	98
7175	DENTAL	28	0	28
7272	INDEP	40	58	98
7307	DENTAL	28	48	76
7525	MEDICAL	60	100	160
7996	DENTAL	14	28	42
8092	DENTAL	42	46	88
8220	DENTAL	62	35	97
8265	DENT-MED	35	55	90
8339	DENTAL	18	58	76
8558	DENT-MED	30	47	77
8752	MEDICAL	47	51	98
8856	DENTAL	48	28	76
8938	MEDICAL	42	57	99
9064	DENTAL	54	56	110
9281	DENT-MED	22	44	66
9344	DENT-MED	86	77	163
9424	MEDICAL	45	55	100
9445	DENTAL	11	0	11
9769	MEDICAL	61	69	130
9880	DENT-MED	44	64	108
MEAN		45.74(57)	57.75(55)	101.46(57)
MINIMUM		11	16	11
MAXIMUM		93	107	163
MEDIAN		43	56	102

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 3
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
GENERAL ANATOMY - MICROSCOPIC

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	31	36	67
215	DENTAL	60	54	114
785	MEDICAL	26	64	90
852	DENTAL	22	42	64
1239	MEDICAL	44	71	115
1437	DENTAL	27	52	79
1448	DENT-MED	72	78	150
1469	DENTAL	69	15	84
1471	MEDICAL	30	51	81
1753	DENTAL	40	41	81
1821	MEDICAL	29	53	82
2336	DENT-MED	36	67	103
2346	MEDICAL	93	81	174
2602	MEDICAL	51	78	129
2849	DENT-MED	43	39	82
2889	DENT-MED	50	14	64
2979	DENTAL	48	48	96
3379	DENTAL	80	40	120
3835	MEDICAL	97	38	135
3983	DENTAL	50	75	125
4044	DENTAL	30	22	52
4075	MEDICAL	35	64	99
4495	DENTAL	100	0	100
4664	DENTAL	44	22	66
4897	DENTAL	34	24	58
5066	DENTAL	65	53	118
5145	DENT-MED	118	74	192
5214	MEDICAL	50	47	97
5361	INDEP	22	14	36
5386	DENTAL	26	28	54
5470	DENTAL	118	15	133
5695	DENT-MED	60	34	94
5886	MEDICAL	88	30	118
6011	DENTAL	44	32	76
6034	MEDICAL	22	40	62
6309	DENT-MED	37	52	89
6473	MEDICAL	41	50	91
7175	MEDICAL	60	32	92
7272	INDEP	31	67	98
7307	DENTAL	63	4	67
7525	MEDICAL	40	46	86
7996	MEDICAL	30	90	120
8092	DENTAL	21	36	57
8220	DENTAL	77	28	105
8265	DENT-MED	72	58	130
8339	DENTAL	49	55	104
8558	DENT-MED	61	52	113
8752	DENTAL	49	12	61
8856	DENTAL	30	40	70
8938	MEDICAL	76	59	135
9064	DENTAL	29	55	84
9281	MEDICAL	55	44	99
9344	DENT-MED	34	31	65
9424	MEDICAL	22	28	50
9445	MEDICAL	39	64	103
9769	MEDICAL	55	45	100
9880	DENT-MED	43	57	100
MEAN		50.32(57)	45.38(56)	94.89(57)
MINIMUM		21	4	36
MAXIMUM		118	90	192
MEDIAN		44	46	94

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 4
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
ORAL HISTOLOGY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	21	10	31
215	DENTAL	32	42	74
785	MEDICAL	17	42	59
852	DENTAL	26	29	55
1239	DENTAL	37	18	55
1437	DENTAL	14	25	39
1448	DENT-MED	48	22	70
1469	DENTAL	32	8	40
1471	MEDICAL	20	22	42
1753	DENTAL	17	29	46
1821	MEDICAL	25	19	44
2336	DENT-MED	12	22	34
2346	DENTAL	21	33	54
2602	DENTAL	22	0	22
2849	DENT-MED	18	14	32
2889	DENT-MED	27	11	38
2979	DENTAL	32	32	64
3379	DENTAL	38	20	58
3835	DENTAL	34	15	49
3983	DENTAL	22	27	49
4044	DENTAL	34	8	42
4075	DENTAL	16	0	16
4495	DENTAL	30	0	30
4664	DENTAL	27	18	45
4897	DENTAL	20	40	60
5066	DENTAL	25	25	50
5145	DENT-MED	14	15	29
5214	DENT-MED	22	18	40
5361	INDEP	23	16	39
5386	DENTAL	22	10	32
5470	DENTAL	15	10	25
5695	DENT-MED	26	10	36
5886	DENTAL	36	35	71
6011	DENTAL	31	18	49
6034	DENTAL	37	21	58
6309	DENTAL	21	0	21
6473	DENTAL	39	4	43
7175	DENTAL	32	24	56
7272	INDEP	10	31	41
7307	DENTAL	46	0	46
7525	MEDICAL	14	8	22
7996	DENTAL	15	33	48
8092	DENTAL	16	22	38
8220	DENTAL	19	4	23
8265	DENT-MED	30	8	38
8339	DENTAL	24	17	41
8558	DENT-MED	18	10	28
8752	DENTAL	31	0	31
8856	DENTAL	23	24	47
8938	DENT-MED	35	5	40
9064	DENTAL	33	13	46
9281	DENT-MED	22	33	55
9344	DENT-MED	16	21	37
9424	DENTAL	41	9	50
9445	DENTAL	90	0	90
9769	MEDICAL	18	20	38
9880	DENT-MED	25	20	45
MEAN		26.51(57)	19.80(50)	43.88(57)
MINIMUM		10	4	16
MAXIMUM		90	42	90
MEDIAN		24	20	42

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 5
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
BIOCHEMISTRY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	60	0	60
215	MEDICAL	60	0	60
785	MEDICAL	63	0	63
852	DENTAL	58	1	59
1239	DENT-MED	120	0	120
1437	DENTAL	99	24	123
1448	DENT-MED	80	0	80
1469	DENTAL	120	0	120
1471	MEDICAL	75	0	75
1753	DENTAL	76	0	76
1821	MEDICAL	75	0	75
2336	DENT-MED	51	0	51
2346	MEDICAL	97	0	97
2602	DENT-MED	113	3	116
2849	DENT-MED	95	4	99
2889	MEDICAL	57	0	57
2979	DENTAL	90	0	90
3379	MEDICAL	80	0	80
3835	MEDICAL	81	8	89
3983	DENTAL	80	3	83
4044	DENT-MED	78	0	78
4075	DENTAL	80	0	80
4495	DENTAL	33	3	36
4664	DENTAL	79	0	79
4897	DENTAL	82	0	82
5066	DENTAL	45	0	45
5145	DENT-MED	169	2	171
5214	MEDICAL	57	10	67
5361	INDEP	76	0	76
5386	DENTAL	48	8	56
5470	DENTAL	89	0	89
5695	DENT-MED	95	0	95
5886	MEDICAL	76	0	76
6011	DENTAL	89	0	89
6034	MEDICAL	68	2	70
6309	DENT-MED	98	0	98
6473	MEDICAL	90	0	90
7175	MEDICAL	106	48	154
7272	INDEP	68	14	82
7307	DENTAL	65	0	65
7525	MEDICAL	89	0	89
7996	DENT-MED	90	0	90
8092	DENTAL	101	0	101
8220	DENTAL	60	0	60
8265	DENT-MED	78	0	78
8339	DENTAL	75	24	99
8558	DENT-MED	90	0	90
8752	MEDICAL	91	12	103
8856	DENTAL	61	28	89
8938	MEDICAL	167	0	167
9064	DENTAL	99	0	99
9281	MEDICAL	53	2	55
9344	DENT-MED	96	16	112
9424	DENT-MED	53	0	53
9445	MEDICAL	109	0	109
9769	DENTAL	112	0	112
9880	DENT-MED	73	0	73
MEAN		82.77(57)	11.78(18)	86.49(57)
MINIMUM		33	1	36
MAXIMUM		169	48	171
MEDIAN		80	8	82

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 6
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
MICROBIOLOGY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	53	25	78
215	MEDICAL	69	0	69
785	MEDICAL	37	44	81
852	DENTAL	36	18	54
1239	DENT-MED	33	34	67
1437	DENTAL	54	8	62
1448	DENT-MED	60	28	88
1469	DENTAL	108	0	108
1471	MEDICAL	72	35	107
1753	DENTAL	58	27	85
1821	MEDICAL	38	19	57
2336	DENT-MED	36	18	54
2346	MEDICAL	85	37	122
2602	DENT-MED	95	10	105
2849	DENT-MED	78	13	91
2889	DENT-MED	49	18	67
2979	DENTAL	80	4	84
3379	MEDICAL	31	40	71
3835	MEDICAL	42	23	65
3983	DENTAL	36	43	79
4044	MEDICAL	55	31	86
4075	DENTAL	39	12	51
4495	DENTAL	95	39	134
4664	DENTAL	61	28	89
4897	DENTAL	54	21	75
5066	DENTAL	57	15	72
5145	DENT-MED	88	24	112
5214	DENT-MED	35	14	49
5361	INDEP	61	0	61
5386	DENTAL	62	18	80
5470	DENTAL	85	9	94
5695	MEDICAL	51	19	70
5886	DENT-MED	66	10	76
6011	DENTAL	47	5	52
6034	MEDICAL	35	11	46
6309	DENT-MED	43	15	58
6473	DENTAL	48	30	78
7175	MEDICAL	72	4	76
7272	INDEP	47	15	62
7307	DENTAL	23	50	73
7525	MEDICAL	56	20	76
7996	DENT-MED	66	30	96
8092	DENTAL	43	20	63
8220	DENTAL	63	14	77
8265	DENT-MED	97	26	123
8339	DENTAL	54	40	94
8558	DENT-MED	71	8	79
8752	DENT-MED	60	20	80
8856	DENTAL	62	0	62
8938	MEDICAL	72	72	144
9064	DENTAL	50	32	82
9281	MEDICAL	33	22	55
9344	DENT-MED	41	15	56
9424	MEDICAL	40	12	52
9445	MEDICAL	94	48	142
9769	DENTAL	80	0	80
9880	DENT-MED	49	42	91
MEAN		57.98(57)	23.75(52)	79.65(57)
MINIMUM		23	4	46
MAXIMUM		108	72	144
MEDIAN		55	20	77

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 7
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
IMMUNOLOGY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	17	4	21
215	DENT-MED	14	0	14
785	MEDICAL	8	4	12
852	DENTAL	9	0	9
1239	DENT-MED	27	9	36
1437	DENTAL	12	1	13
1448	DENT-MED	36	16	52
1469	DENTAL	10	0	10
1471	MEDICAL	20	4	24
1753	DENTAL	11	4	15
1821	MEDICAL	21	4	25
2336	DENT-MED	17	0	17
2346	MEDICAL	28	14	42
2602	DENT-MED	35	3	38
2849	DENT-MED	19	0	19
2889	DENT-MED	24	1	25
2979	DENTAL	20	4	24
3379	MEDICAL	9	0	9
3835	MEDICAL	13	2	15
3983	DENTAL	10	3	13
4044	MEDICAL	17	0	17
4075	DENTAL	7	3	10
4495	DENTAL	31	3	34
4664	DENTAL	25	7	32
4897	DENTAL	33	0	33
5066	DENTAL	57	12	69
5145	DENT-MED	94	4	98
5214	DENT-MED	20	4	24
5361	INDEP	0	0	0
5386	DENTAL	17	0	17
5470	DENTAL	20	1	21
5695	MEDICAL	13	3	16
5886	DENTAL	45	1	46
6011	DENTAL	17	1	18
6034	DENT-MED	9	0	9
6309	DENT-MED	10	0	10
6473	DENTAL	1	3	4
7175	MEDICAL	16	0	16
7272	INDEP	10	6	16
7307	DENTAL	9	10	19
7525	MEDICAL	25	0	25
7996	DENTAL	9	0	9
8092	DENTAL	25	6	31
8220	DENTAL	40	0	40
8265	DENT-MED	56	0	56
8339	DENTAL	14	0	14
8558	DENT-MED	14	0	14
8752	DENT-MED	16	0	16
8856	DENTAL	25	0	25
8938	DENT-MED	57	3	60
9064	DENTAL	21	0	21
9281	DENT-MED	33	0	33
9344	DENT-MED	23	3	26
9424	MEDICAL	21	0	21
9445	-	0	0	0
9769	DENTAL	29	0	29
9880	DENT-MED	15	4	19
MEAN		22.44(55)	4.74(31)	25.11(55)
MINIMUM		1	1	4
MAXIMUM		94	16	98
MEDIAN		19	4	21

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 9
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
PHARMACOLOGY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	70	0	70
215	MEDICAL	83	0	83
785	DENT-MED	72	3	75
852	DENTAL	127	3	130
1239	DENT-MED	83	6	89
1437	DENTAL	49	2	51
1448	DENT-MED	72	6	78
1469	DENTAL	93	2	95
1471	MEDICAL	57	0	57
1753	DENTAL	69	0	69
1821	MEDICAL	110	4	114
2336	DENT-MED	41	0	41
2346	MEDICAL	77	0	77
2602	DENT-MED	125	0	125
2849	DENT-MED	84	0	84
2889	DENT-MED	80	0	80
2979	DENTAL	80	0	80
3379	MEDICAL	70	15	85
3835	MEDICAL	113	0	113
3983	DENTAL	85	21	106
4044	MEDICAL	83	0	83
4075	DENT-MED	42	0	42
4495	DENTAL	75	0	75
4664	DENTAL	68	0	68
4897	DENTAL	106	0	106
5066	DENTAL	87	0	87
5145	DENT-MED	97	15	112
5214	DENT-MED	72	0	72
5361	DENTAL	81	0	81
5386	DENTAL	70	0	70
5470	DENTAL	148	8	156
5695	MEDICAL	109	3	112
5886	DENTAL	47	0	47
6011	DENTAL	47	0	47
6034	MEDICAL	54	0	54
6309	DENT-MED	83	0	83
6473	DENTAL	78	0	78
7175	DENT-MED	108	8	116
7272	INDEP	84	5	89
7307	DENTAL	88	2	90
7525	DENT-MED	91	0	91
7996	DENT-MED	90	0	90
8092	DENTAL	78	0	78
8220	DENTAL	71	0	71
8265	DENT-MED	70	0	70
8339	DENTAL	59	31	90
8558	DENT-MED	98	0	98
8752	MEDICAL	99	0	99
8856	DENTAL	67	0	67
8938	DENT-MED	97	0	97
9064	DENTAL	98	0	98
9281	DENT-MED	58	33	91
9344	DENT-MED	79	0	79
9424	MEDICAL	80	0	80
9445	MEDICAL	61	11	72
9769	DENTAL	96	0	96
9880	DENT-MED	73	2	75
MEAN		81.26(57)	9.47(19)	84.42(57)
MINIMUM		41	2	41
MAXIMUM		148	33	156
MEDIAN		80	6	83

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

TABLE 10
BASIC SCIENCE CLOCK HOURS OF INSTRUCTION
PHYSIOLOGY

DENTAL SCHOOL	INSTRUCTIONAL UNIT	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	TOTAL INSTRUCTION
136	MEDICAL	87	0	87
215	MEDICAL	60	0	60
785	MEDICAL	105	56	161
852	DENTAL	102	9	111
1239	DENT-MED	49	23	72
1437	DENTAL	58	12	70
1448	DENT-MED	97	15	112
1469	DENTAL	93	0	93
1471	MEDICAL	80	0	80
1753	DENTAL	66	0	66
1821	MEDICAL	70	10	80
2336	DENT-MED	75	0	75
2346	MEDICAL	97	26	123
2602	DENT-MED	120	0	120
2849	DENT-MED	119	0	119
2889	DENT-MED	69	0	69
2979	DENTAL	64	16	80
3379	MEDICAL	100	0	100
3835	MEDICAL	91	10	101
3983	DENTAL	80	60	140
4044	MEDICAL	60	0	60
4075	MEDICAL	87	0	87
4495	DENTAL	78	70	148
4664	DENTAL	91	21	112
4897	DENTAL	89	0	89
5066	MEDICAL	85	0	85
5145	DENT-MED	229	22	251
5214	DENT-MED	61	6	67
5361	INDEP	77	0	77
5386	DENTAL	54	4	58
5470	DENTAL	147	1	148
5695	MEDICAL	168	15	183
5886	MEDICAL	86	0	86
6011	DENTAL	82	0	82
6034	MEDICAL	104	2	106
6309	DENT-MED	110	0	110
6473	MEDICAL	109	11	120
7175	MEDICAL	91	42	133
7272	INDEP	80	0	80
7307	DENTAL	92	12	104
7525	MEDICAL	69	0	69
7996	MEDICAL	75	12	87
8092	DENTAL	134	2	136
8220	DENTAL	75	0	75
8265	DENT-MED	232	35	267
8339	DENTAL	63	24	87
8558	DENT-MED	97	24	121
8752	MEDICAL	112	6	118
8856	DENTAL	70	0	70
8938	MEDICAL	198	25	223
9064	DENTAL	118	4	122
9281	DENT-MED	99	0	99
9344	DENT-MED	89	11	100
9424	MEDICAL	70	11	81
9445	MEDICAL	84	36	120
9769	DENTAL	88	0	88
9880	DENT-MED	90	0	90
MEAN		95.18(57)	19.78(32)	106.28(57)
MINIMUM		49	1	58
MAXIMUM		232	70	267
MEDIAN		88	14	93

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.

ADA American Dental Association

211 East Chicago Avenue
Chicago, Illinois 60611

Supplement 10

Dental School Curriculum, Clock Hours of Instruction Clinical Sciences

Supplement 10 to the
Annual Report 87/88
Dental Education

Council on Dental Education

TABLE 6
CLINICAL SCIENCE CLOCK HOURS OF INSTRUCTION
DENTAL EMERGENCIES

DENTAL SCHOOL	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	PATIENT CARE		TOTAL INSTRUCTION
			INTRAMURAL	EXTRAMURAL	
136	28	0	30	0	58
215	9	0	51	0	60
785	31	0	48	0	79
852	16	2	19	0	37
1239	27	0	48	0	75
1437	0	0	0	0	0
1448	8	0	20	0	28
1469	21	0	0	0	21
1471	16	0	50	0	66
1753	3	0	29	0	32
1821	14	12	2	0	28
2336	35	0	60	0	95
2346	7	0	90	14	111
2602	4	0	40	0	44
2849	7	0	30	0	37
2889	4	0	0	0	4
2979	6	0	30	0	36
3379	5	0	6	0	11
3835	24	0	10	0	34
3983	11	0	22	0	33
4044	17	0	60	0	77
4075	3	0	28	0	31
4495	6	6	140	0	152
4664	1	0	7	0	8
4897	2	0	120	0	122
5066	6	0	24	0	30
5145	6	0	160	0	166
5214	15	5	24	0	44
5361	30	0	127	0	157
5386	3	0	28	0	31
5470	0	0	69	0	69
5695	8	0	10	0	18
5886	1	0	64	6	71
6011	18	0	60	0	78
6034	28	0	40	50	118
6309	10	0	0	0	10
6473	6	0	0	0	6
7175	3	0	20	0	23
7272	5	0	15	0	20
7307	11	0	92	0	103
7525	13	0	27	0	40
7996	15	0	18	0	33
8092	3	0	60	0	63
8220	16	0	53	0	69
8265	10	0	43	5	58
8339	2	0	0	0	2
8558	0	0	20	0	20
8752	11	0	78	0	89
8856	10	0	25	0	35
8938	6	0	0	0	6
9064	23	0	45	0	68
9281	11	0	40	0	51
9344	8	0	55	0	63
9424	20	0	40	5	65
9445	3	0	0	0	3
9769	22	0	48	0	70
9880	0	0	0	0	0
MEAN	11.85(53)	6.25(4)	46.35(48)	16.00(5)	53.78(55)
MINIMUM	1	2	2	5	2
MAXIMUM	35	12	160	50	166
MEDIAN	10	6	40	6	44

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.
N/AV = NOT AVAILABLE

TABLE 9
CLINICAL SCIENCE CLOCK HOURS OF INSTRUCTION
PATHOLOGY - ORAL

DENTAL SCHOOL	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	PATIENT CARE		TOTAL INSTRUCTION
			INTRAMURAL	EXTRAMURAL	
136	70	8	0	0	78
215	95	0	0	0	95
785	33	21	0	0	54
852	126	0	0	1	127
1239	39	20	0	0	59
1437	46	36	0	0	82
1448	105	1	12	0	118
1469	80	0	4	0	84
1471	52	8	0	0	60
1753	65	22	11	0	98
1821	114	24	0	0	138
2336	143	12	0	0	155
2346	82	33	0	6	121
2602	104	27	0	0	131
2849	116	0	12	0	128
2889	64	31	0	0	95
2979	72	0	0	0	72
3379	50	40	0	0	90
3835	73	0	0	0	73
3983	51	24	8	0	83
4044	91	0	10	0	101
4075	99	0	0	0	99
4495	79	0	0	0	79
4664	93	0	0	0	93
4897	61	0	0	0	61
5066	57	8	65	0	130
5145	58	9	0	0	67
5214	66	0	20	0	86
5361	60	0	0	0	60
5386	103	0	0	0	103
5470	84	17	0	0	101
5695	77	0	15	0	92
5886	81	0	0	1	82
6011	67	0	0	0	67
6034	102	21	15	0	138
6309	94	7	0	0	101
6473	112	0	16	0	128
7175	88	0	0	0	88
7272	69	6	0	0	75
7307	90	0	0	0	90
7525	77	14	0	0	91
7996	104	30	0	0	134
8092	102	0	0	0	102
8220	107	0	18	0	125
8265	65	0	0	0	65
8339	67	38	0	0	105
8558	82	2	0	0	84
8752	99	12	3	0	114
8856	84	0	10	0	94
8938	80	12	0	0	92
9064	49	17	0	0	66
9281	66	0	0	0	66
9344	71	77	0	0	148
9424	56	0	0	0	56
9445	0	0	0	0	0
9769	97	0	0	0	97
9880	67	6	0	0	73
MEAN	80.07(56)	20.10(29)	15.64(14)	2.66(3)	94.54(56)
MINIMUM	33	1	3	1	54
MAXIMUM	143	77	65	6	155
MEDIAN	80	17	12	1	92

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.
N/AV = NOT AVAILABLE

TABLE 12
CLINICAL SCIENCE CLOCK HOURS OF INSTRUCTION
ENDODONTICS

DENTAL SCHOOL	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	PATIENT CARE		TOTAL INSTRUCTION
			INTRAMURAL	EXTRAMURAL	
136	56	35	125	7	223
215	52	45	191	0	288
785	33	54	153	0	240
852	46	76	35	0	157
1239	32	30	75	0	137
1437	39	34	110	0	183
1448	25	50	159	0	234
1469	23	29	0	12	64
1471	46	45	54	0	145
1753	48	27	91	51	217
1821	36	42	140	0	218
2336	35	30	85	12	162
2346	26	50	142	0	218
2602	24	23	70	0	117
2849	35	45	74	0	154
2889	32	39	58	0	129
2979	48	32	42	0	122
3379	30	50	240	0	320
3835	30	46	70	4	150
3983	32	33	62	0	127
4044	32	20	80	20	152
4075	22	47	82	0	151
4495	18	25	132	0	175
4664	51	40	131	0	222
4897	47	21	160	0	228
5066	30	36	162	0	228
5145	39	30	189	0	258
5214	29	42	97	0	168
5361	28	48	231	0	307
5386	40	21	170	0	231
5470	40	55	102	0	197
5695	48	22	48	0	118
5886	21	16	128	1	166
6011	63	28	80	0	171
6034	36	45	85	0	166
6309	44	30	100	0	174
6473	32	24	48	0	104
7175	44	42	183	0	269
7272	67	48	120	0	235
7307	47	30	217	0	294
7525	57	40	120	0	217
7996	38	42	48	0	128
8092	21	20	112	0	153
8220	14	18	200	0	232
8265	87	62	105	7	261
8339	52	45	127	0	224
8558	79	43	104	0	226
8752	15	30	174	0	219
8856	38	42	75	0	155
8938	39	17	61	48	165
9064	24	24	105	0	153
9281	33	33	50	0	116
9344	40	36	80	0	156
9424	23	36	45	5	109
9445	20	36	99	0	155
9769	34	46	95	20	195
9880	29	36	55	10	130
MEAN	37.70(57)	36.68(57)	110.29(56)	16.41(12)	186.19(57)
MINIMUM	14	16	35	1	64
MAXIMUM	87	76	240	51	320
MEDIAN	35	36	101	11	171

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.
N/AV = NOT AVAILABLE

TABLE 18
CLINICAL SCIENCE CLOCK HOURS OF INSTRUCTION
PEDIATRIC DENTISTRY

DENTAL SCHOOL	DIDACTIC INSTRUCTION	LABORATORY INSTRUCTION	PATIENT CARE		TOTAL INSTRUCTION
			INTRAMURAL	EXTRAMURAL	
136	26	38	138	26	228
215	39	20	124	0	183
785	31	6	153	3	193
852	66	49	100	0	215
1239	10	10	105	0	125
1437	32	12	110	3	157
1448	15	17	230	0	262
1469	18	10	0	0	28
1471	35	0	231	0	266
1753	15	28	23	27	93
1821	30	32	51	2	115
2336	36	12	25	20	93
2346	41	0	101	46	188
2602	19	16	212	4	251
2849	26	24	177	49	276
2889	38	14	200	0	252
2979	42	6	120	0	168
3379	40	50	90	0	180
3835	30	12	150	20	212
3983	24	32	67	0	123
4044	40	18	24	60	142
4075	23	30	68	0	121
4495	26	75	84	175	360
4664	34	0	124	5	163
4897	41	30	225	0	296
5066	41	0	60	0	101
5145	28	17	103	72	220
5214	9	31	223	0	263
5361	38	12	124	0	174
5386	29	12	54	0	95
5470	34	43	102	0	179
5695	22	18	63	0	103
5886	39	30	86	68	223
6011	38	28	120	0	186
6034	46	14	79	18	157
6309	37	26	100	36	199
6473	13	12	72	136	233
7175	32	26	170	0	228
7272	44	19	52	21	136
7307	31	15	47	0	93
7525	36	27	144	0	207
7996	30	12	84	0	126
8092	34	18	159	0	211
8220	27	34	124	0	185
8265	51	6	90	0	147
8339	30	24	59	0	113
8558	27	24	100	0	151
8752	20	0	165	0	185
8856	12	0	77	0	89
8938	47	10	24	85	166
9064	26	34	102	40	202
9281	33	33	200	0	266
9344	13	0	124	0	137
9424	49	27	50	8	134
9445	29	21	64	0	114
9769	56	6	130	20	212
9880	71	0	55	25	151
MEAN	32.44(57)	22.86(49)	109.61(56)	40.37(24)	176.77(57)
MINIMUM	9	6	23	2	28
MAXIMUM	71	75	231	175	360
MEDIAN	32	20	102	26	179

( ) = NUMBER OF SCHOOLS INCLUDED IN THE MEAN.
N/AV = NOT AVAILABLE

American
Dental
Association

211 East Chicago Avenue
Chicago, Illinois 60611-2678
(312) 440-2500

ADA

DATE: June 22, 1988

TO: Advisory Committee for Advanced Endodontic Education

FROM: Robert N. Czarnecki, assistant director, Educational Surveys and Reports

SUBJECT: Summary Statistics

Robert N. Czarnecki

Appended for your review and consideration, please find a summary of selected data elements from the annual survey of advanced endodontic programs. As requested by Dr. Bakland, on behalf of the advisory committee, these statistics reflect the data collected by the Division of Educational Measurements during the 1987-88 survey cycle.

Should you have any questions regarding the appended tables, please do not hesitate to contact this office.

RNC/tc
Enclosure
cc: Dr. Mario V. Santangelo
Ms. Judith Nix
Dr. Richard Smith

Telex: 247842 (ADA/UR)
Telecopier: (312) 440-7494

ADVANCED ENDODONTIC SUMMARY STATISTICS

The Division of Educational Measurements of the American Dental Association's Council on Dental Education annually surveys advanced endodontic education programs accredited by the Commission on Dental Accreditation. Summarized below are the responses to the Curriculum section of the 1987-88 survey. The survey question and the summary statistics for dental school and non-dental school based programs are provided. Additionally, each question reports the total figure or national average.

14. Estimate the percent of time each student devotes to each of the following areas during the entire program.

Area	Average	Minimum Value	Maximum Value
Clinical			
National	49.80	39	60
Dental School	48.42	39	60
Non-Dental School	54.80	43	60
Didactic			
National	30.24	18	47
Dental School	30.03	18	47
Non-Dental School	31.00	20	42
Research			
National	11.74	5	26
Dental School	12.83	5	26
Non-Dental School	7.80	5	14
Teaching			
National	6.48	1	15
Dental School	7.14	2	15
Non-Dental School	4.10	1	10
Other			
National	1.78	0	15
Dental School	1.63	0	15
Non-Dental School	2.30	0	8

15. Instruction in advanced endodontics can be provided in a variety of settings. Identify the number of clock hours students spend in formal courses, lectures or seminars and on rotation to other services to receive instruction in the following subject areas during the entire program.

Subject Area	Average	Minimum Value	Maximum Value
Biochemistry			
National	18.84	0	105
Dental School	19.31	0	105
Non-Dental School	17.20	2	40
Biostatistics & Research Methodology			
National	40.52	10	100
Dental School	43.53	10	100
Non-Dental School	29.70	10	55
Head & Neck Anatomy			
National	40.20	5	110
Dental School	42.36	5	110
Non-Dental School	32.40	10	60
Microanatomy (histology)			
National	37.09	2	124
Dental School	39.67	8	124
Non-Dental School	27.80	2	105
Microbiology & Immunology			
National	39.22	15	96
Dental School	39.78	15	96
Non-Dental School	37.20	18	70
Oral Pathology			
National	51.28	8	140
Dental School	48.50	8	140
Non-Dental School	61.30	11	140
Pharmacology			
National	28.00	8	124
Dental School	29.56	8	124
Non-Dental School	22.40	8	44
Physiology			
National	29.73	0	192
Dental School	25.60	0	150
Non-Dental School	44.20	2	192

19. Indicate the degree to which students are exposed to the following treatment techniques. Please circle the one letter which represents the highest degree of exposure for each treatment modality.

Subject Area	Didactic	Clinical	Pre-Clinical
Lateral Condensation			
National	3	43	0
Dental School	1	9	0
Non-Dental School	2	34	0
Warm Condensation			
National	10	33	3
Dental School	2	7	1
Non-Dental School	8	26	2
Verticle Condensation			
National	11	30	5
Dental School	3	6	1
Non-Dental School	8	24	4
Silver Cone Procedures			
National	27	7	8
Dental School	7	0	2
Non-Dental School	20	7	6
Paste Fill Procedures			
National	31	7	4
Dental School	7	1	1
Non-Dental School	24	6	3
Other			
National	3	17	2
Dental School	2	4	0
Non-Dental School	1	13	2

20. Identify the total number of teeth completed non-surgically by the students during 1986-1987 for each of the following. Additionally, identify the lowest number completed by an individual student who was a 1986-1987 graduate.

Subject Area	TOTAL NUMBER Average	Minimum Value	Maximum Value	MINIMAL NUMBER Average	Minimum Value	Maximum Value
Anterior Teeth						
National	142.24	30	426	35.38	0	250
Dental School	141.81	30	410	31.68	0	250
Non-Dental School	143.80	33	426	49.75	22	77
Premolar Teeth						
National	132.33	30	495	30.28	0	150
Dental School	132.94	30	495	26.77	0	150
Non-Dental School	130.10	30	375	43.88	22	62
Molar Teeth						
National	283.46	40	720	62.31	0	250
Dental School	295.92	84	720	59.19	0	250
Non-Dental School	238.60	40	486	74.38	40	137

21. In which of the following interdisciplinary approaches did students receive instruction or gain clinical consultation expierence during 1986-1987 for the management of dental patients?.

Subject Area	Seminars/ Conferences	Clinical Consultations
Endodontics-Periodontics		
National	46	43
Dental School	10	10
Non-Dental School	36	33
Endodontics-Pediatric Dentistry		
National	37	42
Dental School	10	8
Non-Dental School	27	34
Endodontics- Oral Surgery		
National	32	44
Dental School	10	10
Non-Dental School	22	34
Endodontics-Prosthodontics		
National	39	45
Dental School	10	10
Non-Dental School	29	35
Endodontics-Restorative		
National	35	43
Dental School	10	10
Non-Dental School	25	33

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June 29, 1988

Dear Program Director:

Please forgive the lack of personal address of this letter - I wanted to get it out as quickly as possible along with the Advanced Endodontic Summary Statistics.

The data reported here are for the year 1986-87. Most of it is self-explanatory, but items 19, 20, and 21 need a little explanation. The numbers you see in the columns in item 19 and 21 refer to the number of programs (total:46). In item 20 under columns marked TOTAL NUMBER, the figures refer to total figures for each program (which can have from one to twenty or more students). A more realistic column would appear to be the second one identified as MINIMAL NUMBER, which refers to the lowest number of cases performed by individual students. The Council is constantly attempting to improve the survey instruments so it may be hoped that more valuable figures can be obtained in these areas in the future.

We are indebted to Mr. Robert Czarnecki at the ADA for this summary. The Advisory Committee for Advanced Endodontic Education is glad to provide this for you.

If you have any thoughts or comments with respect to these survey results, please send them to me or to any of the other members of the Advisory Committee (listed under xc below).

Sincerely,

Leif K. Bakland, D.D.S.
Professor of Endodontics
Director, Graduate Endodontics
Associate Dean, Clinical Administration

LKB:ld

xc: Dr. Joseph Tenca
✓Dr. Michael Heuer

Encl.

Characteristics of Predoctoral Endodontic Education in the United States and Canada

Robert W. Mendel, D.D.S., M.A.
James P. Scheetz, Ph.D.

Abstract. A survey was conducted to assess the current state of predoctoral endodontic education programs in United States and Canadian dental schools. The investigation focused on faculty characteristics, the learning climate for endodontics, and problems of administration. Comparison was made between current learning conditions in the schools and desirability of these conditions. Comparisons also were made between large and small schools. Endodontic program directors identified numerous conditions associated with the enhancement of learning. Problems reported were inadequate time to pursue research and scarcity of full-time faculty in some programs.

It has been suggested that predoctoral endodontic education should prepare the student to understand, recognize, and successfully treat teeth which are or might be pulpally involved.[1] While a student's ability to accomplish this depends on the content of the endodontic courses presented, it also is a function of the climate under which student learning takes place. The climate for learning includes those characteristics of education, other than the curriculum, that affect the student's ability to learn. For example, the manner and sequence in which the content is presented; the numbers, knowledge, and attitude of the faculty; and the adequacy of the preclinical laboratory facilities could be classified as characteristics of a learning climate. Various characteristics of the learning climate of endodontic programs have been studied in U.S. and Canadian schools.[2-4] These reports have included data on the number of hours of total endodontic instruction in the curriculum,[2] the hours devoted to endodontic preclinical instruction,[3] the number of pulpally-involved teeth completed,[2,3] and the length of time required to complete treatment on each tooth.[3] Another study[4] reported on the state of endodontic faculty manpower throughout the United States.

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The extent to which learning climate conditions exist in U.S. and Canadian schools has not been determined nor has the prevalence of problems in administration of predoctoral endodontic programs been explored. Information from such an investigation could be useful to administrators and faculty members in expanding or improving existing endodontic programs or establishing new programs. The study might also be of use as a model for gathering similar information about other disciplines.

The purposes of this investigation were

1. To determine program administrative status plus numbers, distribution, and teaching responsibility of predoctoral endodontic faculty in U.S. and Canadian dental schools.
2. To assess characteristics of the learning climate in which predoctoral endodontic courses are offered in these schools.
3. To determine the prevalence of problems in predoctoral endodontic programs.
4. To compare the current status of some components of the predoctoral endodontic programs with the desirability of these components in the opinions of predoctoral endodontic program directors.
5. To compare endodontic programs in large and small schools.

Methods

A questionnaire was developed that addressed the topics identified in the purposes mentioned previously. The questionnaire was sent to the persons responsible for administration of predoctoral endodontic education programs in U.S. and Canadian dental schools. Information was gathered about program administration, faculty, the learning climate which included preclinical laboratory instruction, number of instruction hours, and endodontic graduation requirements. Answers to multiple-choice questions were analyzed by determining the percentage of respondents

who chose each option. For items requesting the respondent to supply a number, means and standard deviations were calculated.

Fourteen potential problems in predoctoral endodontic programs were listed. Respondents were asked to rate the severity of each problem in their program according to a five-point scale in which a severe problem was rated "1" and a rating of "5" indicated a problem did not exist. Means and standard deviations of the responses were calculated.

The current status of components of predoctoral programs was compared with the desirability of these components. Each director was asked to respond to a series of 25 questions paired with similar statements. The question in each pair referred to the presence or absence of a departmental policy, a teaching or testing method, an educational philosophy, or a clinical facility. The statement expressed an opinion of the value of the component mentioned in the question and requested the respondent to indicate if there was strong agreement, agreement, no opinion, disagreement, or strong disagreement with the statement. Responses to the statement were graded "1" for strong agreement through "5" for strong disagreement. Means and standard deviations were determined for each statement and were used to determine which of the five levels of agreement most nearly reflected the overall view.

A comparison of characteristics of endodontic programs in large and small schools was made. The mean number of students in U.S. and Canadian D.D.S./D.M.D. programs (398.1) was determined through a report from the American Dental Association (ADA).[5] Schools with 398 or more students were placed in the large schools group while the other schools were assigned to the small schools group. Comparisons between the groups with respect to characteristics of the learning climate were made.

Results

Sixty-seven questionnaires were returned from the 70 dental schools. This represented a return rate of 96 percent.

Administrative and Faculty Characteristics. Forty-eight of the schools (78 percent) reported the existence of separate endodontic departments where the chairperson is responsible directly to the dean or to the chairperson of a division composed of several departments. Seventeen schools have endodontic programs administered through an endodontic section of a department. One school has formal endodontic courses, but no formal endodontic administrative unit, while one school teaches endodontics only as a portion of other courses.

More than half (33 of 57) of the U.S. dental schools responding to the questionnaire reported the existence of advanced education programs in endodontics. At the time of the survey, none of the ten Canadian schools had such programs. Table 1 displays the distribution of full-time faculty in the predoctoral endodontic programs while Table 2 shows the number of schools that have various combinations of full-time and part-time faculty assigned to the programs.

There is a wide variation among the schools in the percentage of predoctoral teaching done by full-time faculty, part-time faculty, and graduate/postgraduate students as shown in Table 3.

Components of the Learning Climate. All schools reported some attempt to simulate mouth conditions in the laboratory and all used extracted human teeth. Thirty-five schools (53 percent) mounted these teeth in casts that simulated human dental arches; 18 schools (28 percent) mounted the casts on articulators. Twenty-one schools (32 percent) used the rubber dam for tooth isolation in the laboratory. Eleven schools taught apicoectomy on extracted anterior teeth and seven simulated apicoectomy on posterior teeth. Retrograde amalgams were placed in extracted teeth in ten schools while two schools offered a laboratory exercise in surgical hemisection of posterior teeth.

Many more schools fostered the development of endodontic surgical skills in the clinic than taught them in the laboratory. Forty-six schools allowed predoctoral students to perform surgical endodontic procedures on anterior teeth;

Table 1. Distribution of Full-time Faculty in Predoctoral Endodontic Programs

Number of Schools (N = 64)	Percent of Schools	Number of Full-time Faculty
8	12.5	0
20	31.3	1
16	25.0	2
7	10.9	3
7	10.9	4
5	7.8	5
1	1.6	6

No Response = 3

Table 2. Faculty Assignment To Predoctoral Endodontic Programs

Number of Part-time Faculty	Number of Full-time Faculty								Total Number Schools
	0	1	2	3	4	5	6	NR	
0-5	5	7	5	5	5	4	1	1	33
6-10	2	8	6	1	1	1	—	—	19
11-15	1	2	1	1	1	—	—	—	6
16-20	—	3	—	—	—	—	—	—	3
21 or more	—	—	1	—	—	—	—	—	1
No Response	—	—	3	—	—	—	—	2	5
Total Number Schools	8	20	16	7	7	5	1	3	67

hree schools required them. Eighteen schools permitted predoctoral students to do surgery on posterior teeth; no schools required these procedures.

The present study indicates that 78 percent of U.S. and Canadian dental students begin their clinical endodontic experience within six months of the end of their preclinical laboratory training. Sixty-five percent of the schools reported that three-fourths or more of their students begin treating endodontic patients within those six months. Three-fourths or more of the students in four schools must wait longer for clinical experience.

Mean clock hours of instruction in U.S. and Canadian schools was 160, of which 103 were devoted to clinical instruction. An analysis of the hours of instruction in the predoctoral endodontic programs is shown in Table 4. Most schools offer the bulk of their preclinical didactic and laboratory instruction in the sophomore year, and provide clinical instruction in the junior and senior years, often combined with concurrent didactic courses.

Analysis by a *t*-test indicates that students in programs with a separate endodontic department fill a significantly greater number of canals (2.6 more) than do students in predoctoral programs where there is no separate endodontic department. The minimum endodontic graduation requirements of U.S. and Canadian schools in canals and molars, and the average number of canals and molars actually completed by graduating seniors is shown in Table 5. The number of molar canals is included among the total number of canals. Students complete about one more canal and one more molar than is required.

Problems of Predoctoral Programs. Of the 14 potential problems that program directors were asked to rate, 13 had mean scores greater than three; collectively the program directors do not view these potential problems as seriously disruptive to their programs.

Lack of time to pursue research interests (mean=2.90) was identified as the most serious problem. Other problems of most concern were inadequate funds to recruit full-time

Table 3. Percentage of Teaching In Predoctoral Endodontic Programs

Percentage of Teaching	Number of Schools	Percent of Schools
Full-time Faculty, %		
0-25	17	26%
26-50	18	28%
51-75	11	17%
76-100	19	29%
	N = 65	
Part-time Faculty, %		
0-25	29	45%
26-50	16	25%
51-75	10	15%
76-100	10	15%
	N = 65	
Graduate/Postgraduate Students, %		
0-10	21	64%
11-20	7	21%
21-30	2	6%
31-40	3	9%
	N = 33*	

N = Number of schools responding to the question
*Thirty-three schools have advanced education programs

Table 4. Hours of Instruction in Predoctoral Endodontic Programs

	Preclinical Didactic Instruction	Preclinical Laboratory Instruction	Didactic Instruction Concurrent with Clinic	Clinical Instruction
Freshman Year	No instruction 53 Schools* Instruction 13 Schools Mean = 6.3 hours Range = 1-22 hours	No instruction 62 Schools* Instruction 4 Schools Mean = 31.3 hours Range = 18-48 hours	No instruction 66 Schools	No instruction 65 Schools* Instruction 1 School 1 School = 1 hour
*N = 66 Schools				
Sophomore Year	No instruction 14 Schools* Instruction 52 Schools Mean = 15.6 hours Range = 1-32 hours	No instruction 17 Schools* Instruction 49 Schools Mean = 37.7 hours Range = 6-90 hours	No instruction 60 Schools* Instruction 6 Schools Mean = 14.5 hours Range = 8-29 hours	No instruction 49 Schools** Instruction 15 Schools Mean = 13.0 hours Range = 2-30 hours
*N = 66 Schools	**N = 64 Schools			
Junior Year	No instruction 43 Schools* Instruction 23 Schools Mean = 18.4 hours Range = 3-35 hours	No instruction 53 Schools* Instruction 13 Schools Mean = 36.5 hours Range = 16-72 hours	No instruction 22 Schools** Instruction 42 Schools Mean = 14.9 hours Range = 1-50 hours	No instruction 2 Schools*** Instruction 54 Schools Mean = 51.9 hours Range = 12-175 hours
*N = 66 Schools	**N = 64 Schools	***N = 56 Schools		
Senior Year	No instruction 59 Schools* Instruction 7 Schools Mean = 11.6 hours Range = 3-16 hours	No instruction 64 Schools* Instruction 2 Schools 1 School = 4 hours 1 School = 18 hours	No instruction 34 Schools** Instruction 29 Schools Mean = 10.0 hours Range = 1-24 hours	No instruction 0 Schools*** Instruction 54 Schools Mean = 51.2 hours Range = 10-150 hours
*N = 66 Schools	**N = 64 Schools	***N = 54 Schools		

faculty (mean=3.09), an inadequate number of faculty trained in research methods (mean=3.39), and the absence of an adequate number of faculty with advanced endodontic education (mean=3.55).

The least pressing problems as rated by the program directors were lack of enthusiasm by students (mean=4.67), reduced enthusiasm by the faculty responsible for teaching predoctoral students (mean=4.60), poor communication between the program director and dental school administrators (mean=4.49), and poor clinical facilities (mean=4.31).

Current Status Versus Desirability of Learning Climate Components. A comparison of the presence of learning climate components with the desirability of these components in the opinion of the program directors is shown in Table 6. A rating of 1.00 indicates strong desirability while 5.00 shows strong undesirability. Eighteen of the 25 learning climate components were present in more than 75 percent of the schools.

Comparison of Characteristics of Large and Small Schools. Characteristics of endodontic programs in large and small schools are shown in Table 7. Differences between the groups are greatest with respect to the existence of a separate endodontic department, the presence of an advanced endodontic program, the number of part-time faculty, and the percentage of predoctoral teaching assigned to full-time and part-time faculty.

A greater percentage of predoctoral teaching is done by full-time faculty in small schools, although the average number of full-time faculty in the two groups is about the same. The bulk of the teaching load in large schools is assumed by part-time faculty who average nearly four more individuals than in small schools.

Although program directors as a group identified few serious problems other than lack of research time, individual directors did report serious problems with faculty shortages and research. These included: insufficient number of faculty with advanced education, not enough full-time faculty to teach predoctoral students, lack of funds for faculty recruitment, scarcity of faculty trained in research, and a dearth of adequate research facilities. Several small schools as well as several large schools have three to six full-time endodontic faculty plus three or more part-time faculty, yet they report serious problems associated with faculty and/or research. Several other schools, some in each size category, have endodontic faculty consisting entirely of from two to nine part-time faculty, yet they report no serious problems in faculty shortage and/or research.

Discussion

Number of Faculty. The present study shows that 44 percent of U.S. and Canadian schools have one or less full-time faculty assigned to predoctoral endodontics; this contrasts with the 59 percent of schools with one or less full-time

Table 5. Endodontic Graduation Requirements and Treatment Completed by Graduation

	Minimum Endodontic Graduation Requirements		Number of Canals/Molars Completed by Graduation	
	Number of Schools	Percent of Schools	Number of Schools	Percent of Schools
Number of Canals				
Less than 6	0	–	3	5
6-9	16	25	3	5
10-13	24	37	19	31
14-17	10	15	15	23
18-21	7	11	19	31
22-25	2	3	2	3
26-29	0	–	1	2
No requirements	6	9		
	Mean = 13.5 canals Range = 6-24 canals		Mean = 14.9 canals Range = 5-27 canals	
Number of Molars				
1-2	43	66	23	39
3-4	10	15	25	43
5-6	3	5	8	14
7-8	0	–	1	2
9-10	0	–	1	2
No requirements	9	14		
	Mean = 2.1 molars Range = 1-5 molars		Mean = 3.2 molars Range = 1-10 molars	

endodontic faculty reported by Beveridge in 1972.[4] Although numbers of part-time faculty exceed those serving full-time, the present study suggests that endodontic instruction is being provided by a greater percentage of full-time faculty than at the time of the Beveridge study.

Instruction Hours and Clinical Work Completed. The number of total clock hours of endodontic instruction and the number of hours of clinical instruction in the United States and Canada appears to have increased slightly in recent years. A study of the ADA Council on Dental Education[2] reported a mean of 146 total clock hours in 1976 compared with 160 hours in the present study while the average number of hours of clinical instruction reported increased from 94 to 103. The average minimum graduation requirements in canals and in molars were about the same in the two studies, but the average number of canals completed dropped from 19.6 in the ADA study to 14.9 (Table 5) in the current study while the number of completed molars remained the same. The ADA study reported number of teeth while the present study reported number of canals. It was assumed that two canals were the equivalent of one tooth in comparing the results. This may contribute to the difference in number of canals between the studies.

Learning Climate Components. Three learning climate components, i.e., use of self-instructional material, reduc-

Table 6. Current Status Versus Desirability of Learning Components

Learning Climate Component	Percent of Schools in Which Present	Opinion of Desirability 1-5 Scale	Learning Climate Component	Percent of Schools in Which Present	Opinion of Desirability 1-5 Scale
Faculty attempts to integrate preclinical and clinical instruction.	100	1.31	Students told of grade immediately after clinical procedure.	70	1.69
Students orientated to clinic prior to patient treatment.	91	1.46	Students permitted to discuss examination with instructors.	98	1.42
Requirement for series of check-offs in patient treatment.	100	1.39	Early information about graduation requirements given to students.	98	1.34
Students feel free to question faculty advice.	97	1.34	Clinical work beyond requirements cannot lower grade.	92	1.58
Number of clinical check-offs reduced as competence increases.	58	2.24	Grades may be raised by clinical work beyond requirements.	82	1.76
Students required to discuss conclusions of patient treatment with faculty.	92	1.41	Additional academic credit given for clinical work beyond requirements.	64	1.94
Specific number of cubicles assigned to endodontics.	65	1.85	Clinical requirement credit given for extra-mural procedures.	35	2.90
Instruction in patient management given in non-clinical setting.	80	1.70	Students informed of criteria for grading clinical procedures.	97	1.36
Self-instruction material used to teach problem solving.	38	1.96	Formal mechanism exists for informing students of their clinical progress.	76	1.61
Students receive adequate amount of endodontic problem-solving instruction.	74	2.22*	Clinical grades based on number of procedures as well as quality.	83	1.82
Students tested on problem-solving ability.	94	1.39	Students must integrate material from several sources to answer examination questions.	88	1.57
Grades determined by achievement of specified standards.	94	1.41	Graduates of last five years use endodontic therapy in practice.	85	1.54
Attempts made to achieve consistent evaluation of students.	89	1.42			

*Program chairmen believe that amount should be increased.

Table 7. Characteristics of Endodontic Programs in Large Schools and Small Schools

Characteristic	N = 26 Large Schools	N = 41 Small Schools
	Percent	
Separate endodontic department	81	66
Presence of advanced endodontic program	69	37
Predoctoral teaching:		
Graduate students	8	5
Part-time faculty	51	39
Full-time faculty	41	56
	Mean	
Number of full-time faculty	2.2	1.9
Number of part-time faculty	8.9	5.2
Hours of instruction	163.3	158.9
Clinical graduation requirements:		
Canals	12.9	13.9
Molars	1.9	2.2
Clinical work completed		
Canals	14.4	15.2
Molars	3.0	3.4

tion in number of clinical checkoffs, and clinical credit for extramural work, are present in less than 60 percent of the endodontic programs. Program directors endorse use of self-instructional material, but the time and expense needed to develop it may be a reason for its limited use. Clinical checkoff reduction and clinical credit for extramural work may not be as well received as other components because some endodontic professors may be reluctant to surrender detailed supervision of predoctoral students to practitioners outside the school or to the students themselves.

Differences in Large and Small Schools. Large schools may find a separate endodontic department more efficient administratively while some small schools may not have developed their endodontic programs to the extent where departmental status is beneficial. This may account partially for the greater percentage of separate departments among the large schools. The greater percentage of advanced endodontic programs in large schools may be partially due to a demand for specialists and the increased availability of trained part-time faculty in the heavily populated cities and states surrounding some of the larger schools. This availability may account for the increased number of part-time faculty in the large schools as well as the larger percentage of the teaching load they carry. Students in smaller schools may average slightly more canals completed because these schools are less likely to have advanced students who may provide treatment otherwise provided by predoctoral students.

Problems and Faculty Numbers. The results section referred to the existence of large and small schools with enviable combinations of full-time/part-time endodontic faculty yet serious problems in faculty shortage and research. Other schools with no full-time endodontic faculty reported few of these problems. The following variables may contribute to an explanation of these contrasts: research and teaching philosophy of the school, availability of funding for research and faculty salaries, quality of research facilities, number of full-time equivalents in the department, availability of part-time teachers/researchers, and time available for research.

Conclusions

1. The number of schools with separate endodontic departments, the widespread presence of endodontics in the curricula, and many advanced training programs in U.S. and Canadian dental schools indicate that endodontics is an integral part of predoctoral dental education as well as a widely practiced specialty.
2. The percentage of endodontic predoctoral education provided by full-time faculty has increased slightly in the past five years along with the total hours of instruction.
3. Endodontic programs have been successful in introducing students to clinical practice soon after preclinical training, and appear to be making progress in their attempts to simulate mouth conditions in the laboratory.
4. Program directors are convinced of the utility of learning climate components such as dental cubicles organized for endodontics, didactic reinforcement of clinical learning, and criterion-based evaluation.

5. Program directors believe that their schools graduate students competent in endodontics.

6. Lack of time for research is the most serious problem for program directors. Lesser problems center around other research constraints, availability of qualified faculty, and funding.

7. There appears to be a maldistribution of endodontic faculty in some schools with programs being understaffed with full-time faculty and overstaffed with part-time faculty.

8. Endodontics in large schools tends to have departmental status more frequently and a greater percentage of advanced training programs, but a lower proportion of full-time to part-time faculty than in the small schools.

9. Students in schools with separate endodontic departments fill more canals than students where another administrative status is in effect.

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