Recognition — 1989

APPLICATION FOR CONTINUED RECOGNITION OF

ENDODONTICS

AS A DENTAL SPECIALTY

Submitted by:
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XIII. Fifth Report to the President and Congress on the Status of Health Personnel in the United States. U.S. Department of Health and Human Services. DHHS Pub. No. HRS-P-OD-86-1, 1986.

XIV. Furino A. Testimony to Special Committee for Post-Secondary Medicine, Dental and Allied Health Education, 1988.

XV. Endodontics: Marketing Planner for Endodontics. Chicago, IL, American Dental Association, 1987.

XVI. Crall JJ. Preferences for Treatment by Dental Specialists. Journal of Dental Education 1986;50:661-664.

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PART A – SPONSORING ORGANIZATION

American Association of Endodontists

Reference: Requirements for Recognition of Dental Specialties and National Certifying Boards for Dental Specialties, "Introduction,"

"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."

A.1. FOUNDING DATE AND HISTORICAL DEVELOPMENT

[Indicate the year in which the sponsoring organization was founded and summarize its historical development since that date.]

1940-1945 Despite the celebration of the centennial of dentistry in 1940 with justifiable professional pride in noteworthy accomplishments, root canal therapy remained a controversial clinical procedure based principally on empiricism. The prevailing view of the dental profession as a whole was that pulpless teeth were foci of infection and that extraction was the treatment of choice. It was this view that led those practitioners who possessed the audacity and fortitude to practice and teach root canal therapy to consider organizing in order to exchange knowledge and disseminate information. Thus three prominent dentists, W. Clyde Davis of Nebraska, John Hospers of Illinois and Louis I. Grossman of Philadelphia announced the formation of the American Root Therapy Association, a national organization of those interested in root canal treatment. The first meeting of that Association was held on February 25, 1943 in Chicago, Illinois. The first Annual Session of the Association was held in Chicago, Illinois in 1944 at which the name American Association of Endodontists was selected. A Constitution and Bylaws were adopted, officers were elected and a scientific program consisting of seven papers plus discussion was presented. Fifty-four of a membership of one hundred and ninety-three were present at the first Annual Session of the Association. The Annual Session of the Association was canceled in 1945 due to war-time restrictions on travel. The American Association of Endodontists has held annual sessions continuously since 1946.

1946-1949 The Association began publication of the Journal of Endodontia in 1946. In 1949 a new medium for publication began with the addition of a section on Endodontics in the Journal of Oral Surgery, Oral Medicine and Oral Pathology. The American Dental Association's Board of Trustees and House of Delegates approved the affiliation of Endodontics with the Section on Operative Dentistry for annual sessions of that Association. Association membership totaled 324 in 1949.

1950-1956 The American Association of Endodontists published a **Newsletter** from 1951 to 1975. The Association took an active and leading role in the formation of local and regional Endodontic Study Clubs and was cognizant of an increase in the number of members who began limiting their practices to Endodontics. The American Association of Endodontists was incorporated under the general Not-for-Profit Act of the State of Illinois on April 21, 1955 at which time the members numbered 568. The American Board of Endodontics was organized in 1955 and incorporated in Illinois on July 30, 1956. A strong impetus was given Endodontics with the **First International Conference on Endodontics** in 1956. These International Conferences have continued approximately every five years since 1956.

1957-1962 Continuous growth in need and popularity for Endodontic knowledge and treatment resulted in a membership increase to 766.

In 1962 the American Dental Association published and distributed a consumer brochure entitled "Your Teeth Can Be Saved" prepared by the American Association of Endodontists. A section of Endodontics was added to the examination of the National Board of Dental Examiners. The United States Army Institute for Dental Research initiated a **Registry of Periapical Pathology.**

1963-1967 **The ADA House of Delegates voted to recognize Endodontics as a special area of dental practice in 1963. The House of Delegates unanimously approved the American Board of Endodontics as the National Examining Board in the discipline in November 1964. The American Board of Endodontics held its first examination** of 127 qualified candidates on April 29, 1965 in Detroit, Michigan. A second examination of 140 qualified candidates was held in May in Memphis, Tennessee. Thus, Endodontics took its place among the other recognized special areas of dental practice.

Significant activities to foster the development of the specialty continued into the mid-1960s. **The American Association of Endodontists and the Fund for Dental Education sponsored a three-day Conference on the Teaching of Endodontics at the University of Michigan in April 1965** attended by representatives from fifty dental schools in the United States and Canada. The following year the Association began sponsorship of annual **Dental Student Endodontic Awards** for senior dental students, a program which continues today. **The American Association of Endodontists Endowment and Memorial Foundation was incorporated in the State of Illinois in 1966.** Also in 1966, the House of Delegates of The American Dental Association approved a resolution submitted by The American Association of Endodontists amending the ADA Bylaws to include **Endodontics as a section of the annual session** scientific program.

1968-1972 The American Association of Endodontists celebrated its twenty-fifth anniversary as an organization in 1968 with publication of <u>The American Association of Endodontists: A History 1943-1968</u> and an

annual session in New York, New York with an attendance record of 498 members and 53 non-members. The Association hired its first employee, an Assistant to the Secretary, in its twenty-fifth year. In 1968 there were twenty-seven chairmen of Endodontic departments and one hundred twenty-seven Endodontic teachers in the Nation's dental schools as well as sixteen dental schools and six federal services or hospitals offering advanced education and/or graduate programs in Endodontics. The American Dental Association Dental Research Information Center reported 193 Endodontic research projects being conducted by 183 investigators located in facilities at dental schools, The U.S. Navy, The Veterans Administration and The National Institute of Dental Research. Membership in the American Association of Endodontists rose to over 1000 including a new category of Student members which was added in 1966. There were 308 Diplomates of the American Board of Endodontics in 1968.

The next decade of the Association was initiated by the sponsorship of two major conferences, the 1969 **Conference on Advanced Education** held in Chicago which resulted in the preparation of Guidelines for Advanced Education in Endodontics and the 1970 **Conference on the Biology of the Human Dental Pulp** held in September in Memphis, Tennessee and attended by 344 registrants. The proceedings of the Conference on the Biology of the Human Dental Pulp were published in 1973. By 1971 the **Endodontic Section of the American Association of Dental Schools** was organized and began meeting in conjunction with the annual session of the American Association of Endodontists as well as at the annual session of the American Association of Dental Schools. In 1972, a group of Association members, plus non-member scientists with an interest in pulp research, formed a **Pulp Biology Group which was accepted as a Section of the American Association for Dental Research.**

1973-1979 In 1973 the Executive Secretary position was upgraded to Executive Director. In September 1973, the American Association of Endodontists held a Long Range Planning Workshop entitled "Our Association Tomorrow" in Chicago, Illinois. The House of Delegates of the American Dental Association approved the Commission on Dental Accreditation in 1973 and the American Association of Endodontists formally requested the formation of an **Advisory Committee on Endodontics** to assist the Commission in 1974. Endodontics was the first of the Dental Specialties to request an advisory committee and the others followed suit shortly thereafter. The Association assisted the Commission in the development and adoption of new Guidelines for Advanced Education in Endodontics. A Workshop for Directors of Advanced Education Programs was sponsored by the Association in Chicago in February, 1975 which led to a revision of the Guidelines for Advanced Education in Endodontics adopted in 1976. The Endowment and Memorial Foundation sponsored a **Conference on Inflammation** in Monterey, California in September, 1976. Proceedings of this Conference were subsequently published by the Association.

The first issue of the Journal of Endodontics was published by the American Dental Association in 1975. In that same year the American Dental Association took action to recognize the American Association of Endodontists as the official sponsor of the American Board of Endodontics.

In 1978 the Board of Directors adopted a motion to relocate the Central Office of the Association from Atlanta, Georgia to the American Dental Association Building in 1980. The following year (1979) a search was initiated for a new executive director resulting in the hiring of Mrs. Irma S. Kudo in October. Also in 1979, the Endowment and Memorial Foundation sponsored a Conference on Drug Therapy in Chicago and later published these proceedings.

1980-1983 Significant events in the history of the Association occurred in the early 1980s. The Association consisted of 2,634 members, 90% of which limited their practice to Endodontics, (2,167 Active, 51 Affiliate, 68 Life, 21 Retired, 7 Honorary, 1 Associate, 319 Student) in the United States and throughout the world. There were 479 Active Diplomates of the American Board of Endodontics. The Central Office was relocated to the American Dental Association building in Chicago, Illinois. The Constitution and Bylaws were rewritten to include the office of the Executive Director as well as to define the role of the Executive Committee in the management of Association affairs. The Third Edition of the Glossary of Terms Used in Endodontics was published and the Endowment and Memorial Foundation began its Grants-in-Aid program for endodontic research. The Association sponsored a Symposium on Accreditation Review and Critique of the Process in cooperation with the Commission on Dental Accreditation.

The following year (1981) saw publication of Guidelines for Pre-doctoral Education in Endodontics in the Journal of Dental Education (October). This project was initiated by the Association's Education Committee and the Endodontic Section of the American Association of Dental Schools in 1978. The Association sponsored a workshop for advanced education directors in March 1981 and subsequently published the results of this conference. Specifications for Endodontic Filling Materials (American National Standards Institute MD 156.57) were adopted in 1981 following the adoption of specifications for Endodontic Instruments (MD 156.28) in 1976. These actions came about as the result of over twenty years of activity by the Association in concert with manufacturers of endodontic supplies.

In 1982, the Association held a conference of its leadership, past and present, to address issues raised by the American Dental Association's forthcoming report on the Future of Dentistry. This resulted in a publication, " The American Association of Endodontists Response to the Future of Dentistry", forwarded to the American Dental Association and to all interested parties.

Williams & Wilkins Co. of Baltimore, Maryland was contracted to publish the Journal of Endodontics beginning in January 1983. At

that time member subscribers totaled 2809 and non-member subscribers totaled 2879. An internal newsletter for Active members, the Communique, began semi-annual publication in 1983.

The Governance of the Association underwent a major restructuring in 1983 with organization of the Board of Directors into five reference areas: Association Affairs, Membership, Member Services, Communication/Publication, and Education/Development. Caucus meetings of delegates and alternates to the American Dental Association's House of Delegates who were members of the American Association of Endodontists were introduced.

1984-1988 The following year (1984) the Association initiated a **Public Awareness Program.** The Association adopted criteria for the recognition of state "affiliate" organizations in Endodontics, **co-sponsored an International Conference with the Pulp Biology Group of the International Association for Dental Research** in Charlotte, North Carolina and a **Conference on the Application of Basic Science to Pulpal Pain** in New York, New York. The Endowment and Memorial Foundation sponsored an **International Conference on Oral Trauma** in Dallas, Texas in 1984.

Additional significant membership and organizational changes occurred in 1985. The Association adopted a Bylaws change that required all future Active members of the Association to be in the limited practice/teaching of Endodontics. A resolution was adopted by the General Assembly in 1986 that created a plan for state affiliate organizations and restructured the process for nomination and election of Directors and Officers of the Association. In addition, a resolution was passed to make the office of Editor an appointed rather than elective position. Association membership was organized into six districts representing the states of the United States, the District of Columbia, the Commonwealth of Puerto Rico and the Federal Dental Services.

The Association acted in concert with endodontic organizations throughout the world, many of which were inspired by the example of the American Association of Endodontists and whose members held Active or Associate membership in the American Association of Endodontists, to form a new organization, the **International Federation of Endodontic Associations (IFEA).** The organizational meeting and founding of IFEA took place in Boston, Massachusetts, in April 1986 with the American Association of Endodontists acting as a sponsor and Secretariat. The year 1986 also saw the Association approve the publication of the document Quality Assurance Guidelines in Endodontics. Initiated in 1987, District Caucus Meetings and Reference Committee Hearings are held in conjunction with the annual session of the Association. The Public Awareness Program was reconfirmed by the membership and adopted as a continuing program of the Association. As a professional service, a copy of an audio tape **"Endodontic Flare-ups"** produced by the Association was distributed to all its members and to 75,000 members of the American Dental Association. A second tape **"Profound Pulpal Anesthesia"** was produced in 1988 for distribution to referring dentists by AAE members. The Association has produced 6 pamphlets and distributes

200,000 copies of them each year to the public and/or the dental profession free of charge or at cost. The Endowment and Memorial Foundation sponsored a **Conference on Controversies in Dentistry** in Chicago, Illinois in October 1987.

Looking forward to its fiftieth anniversary as an association in 1993, the American Association of Endodontists conducted a Strategic Planning Workshop in March 1988 to consider options for the next five years and beyond. The principles of this strategic plan were adopted by the Board of Directors in April, 1988. The Association is working with the International Federation of Endodontic Associations in planning a **World Congress on Endodontics** to be held in Mexico City in January, 1990. The Association's fiftieth anniversary annual session is scheduled for Chicago, Illinois in April 1993.

At present, the Association has 3435 members (2714 Active, 209 Associate, 150 Life, 92 Retired, 6 Honorary, 251 Student and 13 Disabled) and there are 612 Diplomates of the American Board of Endodontics. Journal subscribers total 3217 members and 2133 non-members world wide. The 1988 Annual Session of the Association held in Anaheim, California had 930 members and 191 non-member dentist registrants in attendance. The Central Office in Chicago, Illinois has an Executive Director and six full time employees.

The American Association of Endodontists has fostered the development, teaching and practice of Endodontics since its origin. The Association has been a positive force and extremely active sponsoring and/or co-sponsoring a multitude of conferences, workshops and symposia for the advancement of the science and practice of Endodontics. Principles and clinical techniques espoused by AAE members are accepted as standards for Endodontics throughout the world. The Association is the prototype for foreign national Endodontic associations. Thus, in forty-five years the Association has grown from the dreams of its founders to an internationally recognized professional organization that has made and will continue to make significant contributions to and provide visionary leadership for dentistry.

A.2. OFFICERS

[Identify current officers of the sponsoring organization.]

The Officers and the Board of Directors of the American Association of Endodontists for the 1988-1989 year are:

President:	Joseph D. Maggio, DDS Oakbrook, IL
President-elect:	Gerald C. Dietz, DDS, MS Birmingham, MI
Vice President:	James C. McGraw, DDS Bellevue, WA
Treasurer:	Stuart B. Fountain, DDS, MSc Greensboro, NC
Secretary:	Eric J. Hovland, DDS Baltimore, MD
Immediate Past-president:	Charles J. Cunningham, DDS Lexington, KY
Editor:	Henry J. Van Hassel, DDS, PhD Portland, OR
Executive Director:	Irma S. Kudo Chicago, IL

Members of the Board of Directors

District I

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Houston, TX

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Santa Rosa, CA

Bill R. Scharwatt, DMD
Portland, OR

A.3. MEMBERSHIP

A.3.a. [Indicate the total number of members in the sponsoring organization for each of the past ten years.]

Year	Total
1979	2,457
1980	2,634
1981	2,701
1982	2,822
1983	2,907
1984	3,049
1985	3,192
1986	3,277
1987	3,315
1988	3,435

A.3.b. [Identify the categories of membership in the sponsoring organization and list the requirements for membership in each category.]

There are seven categories of membership in the American Association of Endodontists.

1. ACTIVE MEMBER--Applicants for Active Membership must be ethically qualified to announce as specialist in, or practice limited to Endodontics according to the Principles of Ethics and Code of Professional Conduct of the American Dental Association.

Active members in good standing prior to January 1, 1985 shall be eligible for continuation of Active Membership notwithstanding educational qualifications in Endodontics.

The following requirements must also be met:

a) membership in the American Dental Association, and conformance to its Principles of Ethics and Code of Professional Conduct, or membership in the recognized dental association of the country of current residence, and conformance to that association's principles of ethics.

b) submission of an application endorsed by two Active Members of the Association.

c) submission of a letter of endorsement by an officer of the applicant's local dental society or, if a full-time faculty member in a dental school or a member of a Federal Dental Health Service, a letter from the head of the institution or commanding officer;

d) Payment of an initiation fee and annual dues in United States currency which must accompany the application.

Continuation of Active Membership in the American Association of Endodontists is contingent upon continued membership in the American Dental Association, or membership in the recognized dental association of the country of current residence.

2. ASSOCIATE MEMBERS--An ethical practicing dentist who has an interest in Endodontics but is not engaged in either the full-time teaching of Endodontics or the limited practice of Endodontics; an ethical practicing dentist outside the United States (non-US citizen) who is engaged in the full-time teaching of Endodontics or the limited practice of Endodontics; a non-dentist whose primary concern and activity is in the area of education, administration or research related to Endodontics; or a pre-doctoral student enrolled in an accredited dental school; shall be elected to Associate membership if the following requirements are met:

   a) membership in the American Dental Association, and conformance to its Principles of Ethics and Code of Professional Conduct, or membership in the recognized dental association of the country of current residence, and conformance to that association's principles of ethics (this requirement is not applicable to non-dentists);

   b) submission of an application endorsed by two Active Members of the Association;

   c) submission of a letter of endorsement by an officer of the applicant's local dental society (non-applicable to non-dentists) or, if a full-time student or faculty member in a dental school or a member of a Federal Dental Health Service, a letter from the head of the institution or commanding officer;

   d) payment of an initiation fee and annual dues in United States currency which must accompany the application.

3. DISABLED ACTIVE MEMBERS--An active member of this Association who is totally disabled for a period of one year, who is unable to engage in the duties of the dental profession and who was an Active Member in good standing at the time the total disability occurred, shall be exempt from the payment of dues and shall remain in good standing during the period of the total disability.

   A totally disabled member, to be exempt from dues payment, shall submit to the secretary a medical certificate attesting to said total disability.

   A temporary disability of over one year's duration also requires a medical certificate that must be renewed annually in order to exempt an individual from dues payment.

4. HONORARY MEMBERS--Honorary Members shall be those elected by the General Assembly because of significant contributions which have furthered the advancement of Endodontics. Honorary Members should not have been members of this Association.

5. LIFE MEMBERS--An Active Member who has been an Active Member for 25 consecutive years, including the period of time in Student Membership, if any, and who has attained the age of 65 years, shall be eligible for Life Membership upon application to, and at the discretion of the Board of Directors.

Life Membership shall become effective on January 1 of the year following acceptance by the Board of Directors.

6. RETIRED MEMBERS--An Active Member in good standing for at least ten consecutive years, including the period of time in Student Membership, if any, who is not qualified for Life Membership, but who has completely retired from teaching and/or practice, shall be eligible to become a Retired Member upon application to, and at the discretion of the Board of Directors.

   Retired Membership shall become effective on January 1 of the year following acceptance by the Board of Directors.

7. STUDENT MEMBERS--A dentist enrolled in an advanced education program in Endodontics accredited by the Commission on Dental Accreditation is eligible for election to Student Membership if the following requirements are met:

   a) submission of an application endorsed by two Active Members of the Association and the chairman of the advanced education program.

   b) submission of the first year's dues with the application.

   At the successful conclusion of the advanced training, the Student Member is required to submit an application for Active Membership to maintain affiliation.

   Student Membership ceases on the last day of the calendar year in which specialty training is completed. Student Members transferring to Active Membership are required to do so within the calendar year following termination of their Student Membership and must show evidence of membership in the American Dental Association, and conformance to its Principles of Ethics and Code of Professional Conduct, or membership in the recognized dental association of the country of current residence, and conformance to that association's principles of ethics.

   Student Members transferring to Active Membership will be assessed 50% of the initiation fee and 50% of the dues of an Active Member for the first year of Active Membership and 75% of the dues for the second year of Active Membership, and full dues of an Active Member in the years thereafter.

   Advanced education students who were not Student Members of the Association and who apply for Active Membership will be required to pay the full initiation fee and full Active Member dues.

A.3.c. [Identify the number of members in each category of membership.] As of April 1, 1988, the number of members in each category of membership are:

Active members	2,656
Associate members	209
Disabled Active members	13
Honorary members	6
Life members	150
Retired members	92
Student members	251
Applications in process	58
	3,435

A.3.d. [Append a copy of the sponsoring organization's current bylaws and membership roster.]

The Membership Roster which includes the Constitution and Bylaws of the American Association of Endodontists is inserted in the pocket of this folder. (Appendix I)

A.4. OTHER NATIONAL DENTAL ORGANIZATIONS

(for proposed specialties only)

[Identify other national dental organizations whose primary objective is advancement of this area of dental practice.]

Not Applicable

A.5. ACTIVITIES

A.5.a. [List the national meetings, research symposia and continuing education programs offered by the sponsoring organizations over the past ten years.]

Since the founding of the American Association of Endodontists in 1943, the Association has sponsored an annual scientific session for its members (with the exception of the wartime year 1945). During the past ten years, annual sessions have included scientific sessions on Endodontic and related topics, research seminars, half and full day essay programs, limited attendance seminars, roundtable discussion groups, and table and poster clinic presentations. In addition, continuing education courses have been conducted immediately preceding the annual scientific session. The scientific programs, including continuing education courses, offered over the last ten years are listed below. (Copies of the printed programs are included in the Appendix II)

1979 Annual Session — Atlanta, Georgia

Scientific Sessions

1. Bone as a Dynamic Tissue
   Charles Andrew Lockerman Bassett, MD, ScD

2. Surgical Endodontics
   Howard Adilman
   Edwin D. Joy
   Fred Rothenberg, DDS

3. Regulation of the Immune Response and Clinical Implications
   Richard K. Gershon, MD

4. What's New in Drugs and "Bugs"?
   Donald R. Morse, DDS
   Franklin Gurney, DDS, MS

5. Endodontic Surgery: Periodontal Consideration in Flap Design
   Stephen Brown

6. Restoring the Endodontically Treated Tooth
   Arnold S. Weisgold

7. Pulp Therapy for Primary, Immature Permanent and Mature Permanent Teeth
   Ronald Johnson

8. Endodontic Emergencies
   George C. Stewart, DDS

9. Diagnosis and Management of Common Medical Emergencies in the Dental Office
   Louis F. Rose, DDS, MD
   Barry H. Hendler, DDS, MD

10. Polys and Macrophages
    John I. Gallin, MD

11. Endodontic Materials and Devices - Standards and Regulations
    John W. Stanford, PhD
    Frank Lentine
    Dennis Smith, PhD

Research Seminars - 13 papers
Graduate Student Research Seminars - 8 papers
Projected Clinics - 3
Table Clinics - 27 presentations
Audio-visual TV Tape Presentations - 8

1980 Annual Session -- Los Angeles, California

Continuing Education Courses

1. Symposium on Endodontic Surgery

2. Endodontics for the Family Practitioner (Japanese)
   Warren Wakai, DDS - Moderator

3. Endodontics for the Family Practitioner (Spanish)
   David Prensky, DDS - Moderator

Scientific Symposiums

1. Inflammation: The Reaction of the Pulp to Injury
   Henry Trowbridge, DDS, PhD

2. Inflammatory Response to Some Materials Used in Endodontics
   Roberto Holland, CC, DC, LD

3. The Role of Data Processing in Endodontic Practice Management
   Gerald C. Dietz, DDS, MS

4. An Endodontic Computer Program for Practice Management
   Stephen Cohen, DDS

5. Biological Reasons for Treatment Failures in Endodontics
   Calvin Torneck, DDS, MS

6. When is a Failure a Failure?
   Dudley H. Glick, DDS

7. Surgical Correction of Failures
   Raleigh Cummings, DDS

8. Endodontic Future Shock
   Burton Press
   Howard V. Stambler

9. The Clinical Application of Biologic Knowledge
   Harold R. Stanley, DDS, MS
   Manuel I. Weisman, DDS
   Norman A. Jester, DDS
   Frederick L. Cox, DDS
   Jacob B. Freedland, DDS

10. Avoiding Malpractice
    Jack Weichman, DDS

11. Endodontic Related Malpractice
    Edward Zinman, DDS, JD

12. The Role of the Dentist as a Defendant and as an Expert
    Norman Schafler

13. Sensation in the Normal and Inflamed Pulp
    Henry Trowbridge, DDS, PhD

14. Endodontic Root Retention and its Clinical Application in the Overdenture Technique to Maintain Alveolar Bone
    James Kimura, DDS

15. Submergence of Roots
    Carlos E. del Rio, DDS

16. Artificial Tooth Replacement Systems
    Ronald Voss, DDS

17. Calcium Hydroxide - Its Various Uses
    Roberto Holland, CC, DC, LD

18. The Development of Eco-Mechanical Canal Preparation
    Mitsuru Otani, DDS, DSc

19. How to Make Yourself Swindle Proof
    G. Barton Heuler, DDS

Research Seminars -17 papers
Graduate Student Research Seminars - 7 papers
Clinical and Scientific Essays - 9 papers
Table Clinics - 17 presentations
Graduate Student Table Clinics - 9 presentations
Educational Resources - 16 presentations

1981 Annual Session — Philadelphia, Pennsylvania

Continuing Education Course

Pain Control in Endodontics

Ronald Dubner
Richard Graceley
Stanley F. Malamed, DDS
Norman Trieger
Irving L. Fried, DDS

Scientific Symposiums

1. Systemic Status of the Dental/Endodontic Patient and the Utilization of Laboratory Medicine in Endodontics
   Ordie H. King, Jr., DDS, PhD

2. The Effect of Collagen Biosynthesis and Collagen Diseases on the Endodontic Patient
   Arthur Veis, PhD

3. Current Advances in Medicine and their Relationship to Endodontic Practice
   Louis F. Rose, DDS, MD
   Barry H. Hendler, DDS, MD

4. The Philosophy and Selection of Antibiotics Based on Cell Anatomy, Physiology, Target Areas and Effectiveness as it Applies to Endodontics
   Jacob Goldstein, DDS, PhD

5. Endodontic Flare-Ups: Cause and Corrections
   Louis I. Grossman, DDS
   George G. Stewart, DDS
   Samuel R. Rossman, DDS
   Leif Tronstad, DMD, PhD
   Leonard N. Parris, DDS
   Samuel Seltzer, DDS

Research Seminars - 13 papers
Graduate Student Research Seminars -7 papers
Endodontic Roundtable Seminars - 40 papers
Clinical Essays - 18 papers
Table Clinics - 13 presentations
Graduate Student Table Clinics - 14 presentations

1982 Annual Session — Phoenix, Arizona

Continuing Education Course

Inflammation and Immunologic response in Endodontics

Polymorphs - Friend and Foe
Norton Taichman, DDS, PhD

Chemical Mediators in Inflammation and their Clinical Applications
Samuel Seltzer, DDS

Role of Endotoxins and Prostaglandins in Bone Destruction and the Immune Response
Mahmoud Torabinejad, DMD, MSD

The Relationship of Inflammatory and Immunologic Response to Everyday Clinical Problems
Irving J. Naidorf, DDS

Clinical Essays

1. Radiologic Interpretation of Significance in Endodontics
   Eugene Natkin, DDS, MSD

2. Instruments and Materials
   Michael A. Heuer, DDS, MS
   Ivar A. Mjor, BDS, MSD, MS
   Dag S. Orstavik, DMD

3. Principles of Surgical Endodontics
   Donald D. Antrim, DDS, MS

4. Furcation Therapy: A Periodontal Point of View
   William F. Ammons, DDS, MSD

5. Correcting Endodontic Mishaps Without Surgery
   Gerald M. Cathey, DDS, MSD

6. Restorative Considerations Unique to Endodontically Treated Teeth
   John D. Townsend, DDS, MSD, FRCD

7. Vertical Root Fractures
   Harold Gerstein, DDS

8. Preserving Our Roots
   Carol S. Marlin, BA, MA
   Roger P. Desilets, Jr., DDS

Research Seminars -18 papers
Student Research Seminars - 13 papers
Table Clinics - 16 presentations
Graduate Student Table Clinics - 8 presentations
Dental Student Table Clinics - 2 presentations
Endodontic Roundtable Seminars - 19 papers

1983 Annual Session — Hollywood, Florida

Continuing Education Courses

1. How Do Professional Pressures Affect the Household and How Can You Achieve a Harmonious Homelife?
   Leon Lefer

2. Surgery Workshop
   James Gutmann, DDS

3. The Three F's
   Dudley Glick, DDS
   John I. Ingle, DDS
   Charles J. Cunningham, DDS
   James Marshall, DMD, MS

Scientific Sessions

1. Calcium Hydroxide in Endodontic Therapy - An Update
   Leif Tronstad, DMD, PhD
   Raymond T. Webber, DDS, MS

2. Thermatic Condensation: The Evolution of a New Technique
   John T. McSpadden, DDS

3. Injectable Thermoplastic Gutta-Percha
   Jay Marlin, DMD

4. Endosonic Endodontics
   Howard Martin, DMD
   Walter T. Cunningham, DDS, MS

5. The Future of Endodontics
   Herbert Schilder, DDS

6. Laterally Condensed Gutta-Percha--The Standard for Excellence
   Franklin S. Weine, DDS, MSD

7. Neurophysiology of Pain as Related to Diagnosis and Management
   Ronald C. Auvenshine, DDS, PhD

8. Update on the Use of Analgesics in Dentistry
   Stephen A. Cooper, DMD, PhD

Research Seminars - 13 papers
Graduate Research Seminars - 16 papers
Endodontic Roundtable Seminars - 60 papers
Symposiums - 2
Projected Clinics - 16
Table Clinics - 28 presentations
Graduate Student Table Clinics - 8 presentations
Poster Clinics - 8 presentations
Educational Resources - 14 papers

1984 Annual Session -- Toronto, Canada

Continuing Education Course

Biological and Clinical Aspects of Bone Repair and Regeneration

Bone Histophysiology -- An Update
J.N.M. Heersche, MSC, PhD

Principles of Wound Healing in Bone, Including Periodontium
Anthony Melcher, MDS, HDD, PhD

Biological and Clinical Aspects of Bone Repair and Regeneration
James T. Mellonig, DDS, MS

Correction of Intrabony Defects--State of the Art
Gerald M. Bowers, DDS, MS

Scientific Sessions

1. Is the Formation of a New Periodontal Attachment Possible on Endodontically Treated Teeth?
   Gerald M. Bowers, DDS, MS

2. The Pulp: Function and Clinical Disorders
   Henry O. Trowbridge, DDS, PhD

3. Understanding Pulpal Pain
   Henry O. Trowbridge, DDS, PhD

4. Root Canal Obturation Utilizing the PAC-160 Method of Thermoplastic Injection-molding
   G. John Schoeffel, DDS, MS
   Fulton S. Yee, DDS

5. Recent Concepts of Pain Control
   Ronald Melzack, PhD

6. Lasers, Intentional Apical Plugs and Other New Directions in Endodontic Instrumentation/Obturation
   Kenneth L. Zakariasen, DDS, MS, PhD

7. Composite Materials and Techniques for Endodontically Involved Teeth
   Ronald E. Jordan, DDS, MSD

Research Seminars - 22 papers
Graduate Research Seminars - 21 papers
Endodontic Roundtable Seminars - 26 papers
Table Clinics - 14 presentations
Graduate Student Table Clinics - 14 presentations
Poster Clinics - 14 presentations
Graduate Student Poster Clinics - 5 presentations
Dental Student Table Clinics - 3 presentations
Business Sessions - 4

1985 Annual Session -- San Diego, California

Continuing Education Course

Comprehensive Diagnosis and Management of Pain in Endodontic Practice

Pathways of Pain Mechanisms in the Head and Neck
Pierre R. Dow, DDS, MSC

Non-dental Pain: Clinical Examination and Differential Diagnosis
Samuel Seltzer, DDS

Neurological Considerations in the Diagnosis and Management of Head and Neck Pain
Joseph Toglia, MD

Chronic Pain and its Serious Complication for Both the Patient and the Practitioner
John J. Bonica, MD

Scientific Sessions

1. Head, Neck, and TMJ Pain that Mimics Endodontic Pain
   Terry Tanaka, DDS

2. The Status of Implants in an Endodontic Practice
   Larry G. Loos, DDS

3. Uncommon Problems in Your Office
   John W. Beierle, PhD

4. Genetic Engineering in Endodontics
   Harold C. Slavkin, DDS

5. Injection of Thermoplasticized Low-temperature Gutta-Percha
   Andrew E. Michanowicz, DDS
   Mario Czonstkowsky, DDS, MDS
   John P. Michanowicz, DDS

6. An Update on Chelation and Flotation in Endodontic Practice
   George G. Stewart, DDS

7. Thirty-six years of Root Canal Therapy with the Precision Controllable and Biologic Technique
   Yury Kuttler, DDS, MD

8. The Management of Pain in Endodontics-1985
   Stanley Malamed, DDS

Research Seminars - 46 papers
Roundtable Seminars - 18 papers
Table Clinics - 11 Presentations
Graduate Student Table Clinics - 14 presentations
Poster Clinics - 9 presentations
Graduate Student Poster Clinics - 5 presentations
Business Sessions - 5

1986 Annual Session -- Boston, Massachusetts

Continuing Education Course

A Critical Assessment of the Biological Rationale for Modern Endodontic Practice

The Carious Process and Its Pulpal Sequelae: Is It Really All That Simple?
Maury Massler, DDS, MS, DSc

Conserving the Dental Pulp: Can it Be Done? Is it Worth it?
Harold Stanley, DDS

Endo-Perio - or is it Perio-Endo? A Classic Diagnostic Perplexity
I.B. Bender, DDS

Periradicular Pathology: What's Been Going on at the Apex All These Years?
Mahmoud Torabinejad, DMD, MSD

The Proverbial "Endodontic Flare-up": Just How Far Have We Come?
Samuel Seltzer, DDS

The Hollow Tube Theory: Why Do We Really Fill the Root Canal?
Calvin D. Torneck, DDS, MS

Termination of Root Canal Fillings: What is the Correct Formula for Vital and Non-vital Pulps?
Kaare Langeland, DDS, PhD

The One-Visit Endo: The Past, Present, and Future-No Problem!
Seymour Oliet, DDS

Scientific Sessions

1. Cleansing and Shaping of the Root Canal System
   Richard E. Walton, DMD, MS
   John I. Ingle, DMD
   Herbert Schilder, DDS
   Franklin S. Weine, DDS, MSD

2. Endodontic Medicaments and Irrigants
   John W. Harrison, DMD, MS
   Walter T. Cunningham, DDS, MS
   F. James Marshall, DMD, MS
   Larz S. Spangberg, DDS, PhD
   George C. Stewart, DDS

3. Microbiological Considerations in Endodontics
   Charles B. Sabiston, Jr., DDS, PhD
   Gunnar Bergenholtz, DDS, PhD
   Michael B. Griffee, DDS, MSD
   Robert J. Matusow, DMD, MS

4. Root Canal Filling Materials
   Robert J. Rosenberg, DDS, DScD
   Melvin Goldman, DDS
   Carl W. Newton, DDS, MSD
   Seymour Oliet, DDS
   Marshall D. Peikoff, DMD, MScD

5. Root Canal Filling Techniques
   Noah Chivian, DDS
   Roger T. Czarnecki, DDS
   M. Lamar Hicks, DDS, MS
   Milton Siskin, DDS
   Robert A. Uchin, DDS

6. Restoration of Endodontically Treated Teeth
   David J. Baraban, DMD
   William E. Bernier, DDS, MA
   Alfred L. Frank, DDS
   Bruce J. Kramper, DDS, MS
   Herbert F. Spasser, DDS

7. Endodontic Surgery and Intentional Replantation
   Donald E. Arens, DDS, MSD
   James L Gutmann, DDS
   Ronald R. Lemon, DMD
   Alan J. Nevins, DDS

Research Seminars - 20 papers
Graduate Research Seminar - 20 papers
Limited Attendance Seminars - 18 papers
Poster Clinics - 9 presentations
Graduate Student Poster Clinics - 6 presentations
Table Clinics - 10 presentations
Graduate Student Table Clinics - 16 presentations
Business Sessions - 4 presentations

1987 Annual Session — San Antonio, Texas

Continuing Education Course

Advanced Scientific and Clinical Principles of Surgical Endodontics

Biological Basis of Soft Tissue Management Concepts and their Application to Posterior Endodontic Surgery
John W. Harrison, DMD, MS

Periapical Pathosis of Endodontic Importance
Charles E. Tomich, DDS, MSD

Evaluation for Posterior Endodontic Surgery
Donald D. Antrim, DDS, MS

Illustrated Surgical Endodontic Treatment of Posterior Teeth
Donald D. Antrim, DDS, MS

Surgical Management of Large Lesions and Lesions Associated with Vital Pulps
William R. Adams, DDS, MSD

Scientific Sessions

1. Restoration of Endodontically Treated Teeth
   David A. Kaiser, DDS, MSD

2. Infection Control in Endodontics: The Challenge of Hepatitis and AIDS
   James A. Cottone, DMD, MS

3. Microbes, Medication and Malpractice
   Donald R. Morse, DDS

4. Etiological Factors for Endodontic Flare-ups
   Samuel Seltzer, DDS

5. Immunology of Endodontic Flare-ups
   James Kettering, MS, PhD

6. Clinical Management of Endodontic Flare-ups
   Melvin Goldman, DDS

7. Mechanisms of Oral-Facial Pain and its Control
   Barry Sessle, BDS, MSD, PhD

8. It's Only a Little Stress?
   Robert F. Kaltenbach, PhD

9. Non-Surgical Retreatment of Endodontic Failures
   R. Denby Lewis, DDS

10. Surgical Retreatment of Endodontic Failures
    Robert M. Block, DDS, MS

Research Seminars - 19 papers
Graduate Research Seminars - 18 papers
Limited Attendance Seminars - 21 papers
General Interest Sessions - 5 presentations
Table Clinics - 9 presentations
Graduate Student Table Clinics - 17 presentations
Poster Clinics - 4 presentations
Graduate Student Poster Clinics - 8 presentations

1988 Annual Session -- Anaheim, California

Continuing Education Course

Endodontic Success, Failure and Retreatment

Relationship Between Root Canal Filling and Success or Failure of Endodontic Therapy
Calvin D. Torneck, DDS, MS

Host Response in the Balance of Healing
Mahmoud Torabinejad, DMD, MSD

The Role of Endodontic Treatment in Modern Restorative Dentistry
Marwan Abou-Rass, DDS, MDS, PhD

Techniques of Conservative Retreatment
Paul E. Lovdahl, DDS, MSD

Non-Surgical Repair of Perforation Defects
James B. Roane, DDS, MS

Avoiding and Correcting Surgical Failures
Raleigh R. Cummings, DDS, MS

Endo-Legal Implications
Jack A. Weichman, DDS, JD

Scientific Sessions

1. Troubleshooting the Mandibular Block: How to Improve Your Anesthetic Success Rate
   Stanley Malamed, DDS

2. Biological Effects of Surgical Endodontics
   Raleigh R. Cummings, DDS, MS

3. A Periodontist Looks at Flap Design for Endodontic Surgery
   Roger Stambaugh, DMD, MEd, MS

4. Antimicrobial and Surgical Treatment of Extraradicular Endodontic Infections
   Leif Tronstad, DMD, PhD

5. Infectious Diseases and the Dental Office: Update on AIDS, Hepatitis and Herpes
   Sol Silverman, MA, DDS

6. "Bacteria Busters" - A Clinical Update on Infection Control
   Robert E. Averbach, DDS

7. The Odontoblast - A Cell For All Seasons
   G. Rex Holland, BDS, PhD

8. Matching File Preference with Operator Technique
   Harmeet D. Walia, BDS, MDS, MS

9. High-Technology Radiology: Are Conventional X-Rays Obsolete?
   Samuel Seltzer, DDS
   Steven Seltzer, MD

Research Seminars - 20 presentations
Graduate Research Seminars - 20 papers
Limited Attendance Seminars - 28 presentations
General Interest Sessions -5 presentations
Table Clinics - 7 presentations
Graduate Student Table Clinics - 15 presentations
Poster Clinics - 4 presentations
Graduate Student Poster Clinics - 9 presentations

In addition to the continuing education courses offered immediately preceding the annual sessions, the following continuing education programs were presented:

March, 1979--Toledo, OH

Endodontics for the Practicing Dentist
Harvey B. Weiner, DDS
Manuel I. Weisman, DDS
Paul M. Vanek, DDS

September, 1979--Lincoln, NE

Endodontics for the Family Practitioner
Alfred Frank, DDS

November, 1979--Iowa City, IA

Endodontics for the Family Practitioner
Donald Arens, DDS
Harvey B. Weiner, DDS

November, 1979--San Antonio, TX

First Annual Endodontic Symposium for the Family Practitioner
Raymond Webber, DDS
Thomas Mullaney, DDS, MS
Stephen Cohen, DDS, MA
Joseph Camp, DDS

November, 1980--San Antonio, TX

Second Annual Endodontic Symposium for the Family Practitioner
Russell Grandich, DDS

The American Association of Endodontists, through its Endowment & Memorial Foundation, has sponsored the following national and international conferences on subjects of special interest to the specialty of Endodontics and the dental profession in addition to its annual sessions and continuing education courses listed above: (Copies of the printed programs are included in Appendix III)

Conference on Drug Therapy

September 27-29, 1979, Chicago, IL

Publication: Proceedings of the Conference on Drug Therapy
Edited by Donald Arens, DDS and Howard Martin, DMD

International Conference on Oral Trauma

November 8-10, 1984, Dallas, TX

Publication: Proceedings of the International Conference on Oral Trauma
Edited by James L. Gutmann, DDS and John W. Harrison, DMD, MS

Controversies in Dentistry

October 25-27, 1987, Chicago, IL

Publication: None to date

(This was co-sponsored by the American Association of Endodontists and the AAE Endowment & Memorial Foundation.)

Other Association-sponsored or co-sponsored meetings include:

1980 -	Symposium:	Accreditation review and critique process (in cooperation with the Commission on Dental Accreditation)
1981 -	Workshop:	Advanced education directors in Endodontics
1984 -	International Conference:	Biology of the dental pulp (in cooperation with the Pulp Biology Group of the International Association for Dental Research)

A.5.b. [List journal published or sponsored by the organization over the past ten years.]

The Journal of Endodontics, the leading publication in the field of Endodontics, is a refereed scholarly journal of 640 text pages per year. The Journal publishes original articles on the clinical, basic science and research aspects of Endodontology.

The Journal also contains a news section which complements the Association newsletter, the Communique. The Communique, a semi-annual newsletter, provides current Association news, announcements, official reports, notices, and activities to its members.

The Journal is published monthly by Williams & Wilkins Co. of Baltimore, MD. Advertising accepted by the Journal is evaluated by the Editor and the Editorial Board and may not exceed 25% by volume of any issue published. (Copies of the Journal and Communique are included in Appendix IV)

Special issues of the Journal, published occasionally, include to date:

March, 1981 - GLOSSARY OF ENDODONTIC TERMS
(An annotated glossary of terms used in Endodontics, 3rd edition)

January, 1982 - FESTCHRIFT
(Issue devoted to Dr. Louis I. Grossman)

January, 1985 - FESTCHRIFT
(Issue devoted to Dr. Irving J. Naidorf)

A.5.c. [Indicate whether the organization has sponsored any specific research over the last ten years, either directly or through an affiliated foundation. Identify research projects sponsored.]

The American Association of Endodontists sponsors research through its Endowment & Memorial Foundation. Although a formal Grant-in-Aid program was started in 1980 and is the principal method of sponsorship, research grants were awarded prior to that time. Recipients of these grants and the title of their research are as follows:

1979

Hunter, Richard (Temple University)	Antigenicity and allogenic tooth transplant
Linari, Linda (University of Washington)	Chloroform - carcinogenicity
Pollack, Maja (New York University)	The effect of <u>in-situ</u> pulp devitalization on pulpal and surrounding tissues
Stanley, Harold R. (University of Florida)	Pulp Registry Program
Stern, Michael (University of Texas)	Quantitative immunopathologic study dental granulomatous inflammatory disease

1980

Duncan, Douglas J. (University of Oregon)	Osteogenic potential of processed dentin implanted in the calvaria of dogs
King, Thomas N. (Indiana University)	Gutta percha and lateral condensation
Ringel, Aubrey M. (Indiana University)	A clinical study to determine the antimicrobial effectiveness of chlorhexidine when used as an irrigant in the endodontic treatment of teeth with necrotic pulps
Stanley, Harold R. (University of Florida)	Pulp Registry Program
Torabinejad, Mahmoud (Loma Linda University)	Effects of Prostaglandin E_2 on the periapical tissues of monkeys

1981

Beck-Coon, Robert J. (Indiana University)	An <u>in vitro</u> study of the use of a non-resorbable ceramic hydroxylapatite as an alloplastic graft material in periapical surgery

Carroll, Jeffrey L. (Temple University)	Correlation between prostaglandin concentrations, as determined by radioimmunoassay, and pain symptomotology
Chance, Kenneth B. (University of Medicine and Dentistry of New Jersey)	Response of subcutaneous connective tissue to viable and killed bacteria
Eleazer, Paul D. (Emory University)	The use of protoplast as a root canal filling-host barrier
Ferguson, Stuart A. (Indiana University)	A statistical study of endodontic cases at Indiana University School of Dentistry and in private endodontic practice
Grossman. Louis I. (University of Pennsylvania)	Study of calcium hydroxide as an intracanal medicament
Kost, William J. (Northwestern University)	Do alterations in kVp, image receptor and endodontic file configuration affect subjective visualization and determination of fine endodontic trial length wire measures?
Kramper, Bruce J. (Northwestern University)	A comparative study of wound three types of flap design used in periapical surgery
Miles, Michael J. (Marquette University)	Prostaglandin production in normal human pulp tissue
Nevins, Alan J. (Nassau County Medical Center)	Replantation of enzymatically teeth in monkeys part II
Owen, Rodney L. (Loma Linda University)	Mechanism of hard tissue formation with apically condensed dentinal shavings
Stanley, Harold R. (University of Florida)	Pulp Registry Program
Walton, Richard E. (Medical College of Georgia)	The effectiveness of internal bleaching of tetracycline stained teeth in dogs

1982

Aguirre, Ramon (University of Minnesota)	Radiographic and histologic evaluation of the use of indium foil, amalgam and gutta percha for repairing furcation perforations
Aurelio, James A. (Marquette University)	A bacterial microleakage study of 4 retrograde filling materials

Berg, Mark S. (University of Illinois)	Comparative study of Salvisol, sodium hypochlorite and EDTA-C as adjuncts to chemomechanical preparation of the root canal
Bery, Paul F. (University of Illinois)	Influence of a dentinal plug in the inefficacy of the apical seal in endodontically treated teeth
Burk, Greg A. (Tufts University)	Pulpal response to operative trauma following ligamental injections
Chiueh, Ling-Huey (Northwestern University)	Dose response characteristics of macrophage to metallic ion
Clark, Patricia H. (Indiana University)	The effect of calcium hydroxide, zinc oxide and eugenol, and gutta percha on mechanical perforations in dogs
ElDeeb, Mahmoud (University of Minnesota)	Evaluation of two materials for the aid in the repair of periapical osseous defects
Hanske, David William (University of Minnesota)	A comparative study of the effects various endodontic instruments on the root canal preparation of curved roots
Johns, Laurence and Steven Patterson (Indiana University)	A comparison of the effect of bioinstrumentation versus bioinstrumentation and root canal filling on the periapical tissues in monkeys
Kitzenberg, Stella M. (University of Minnesota)	The effect of the consistency of root canal sealers on the apical seal of endodontic implants
Moss, Gary W. (Loma Linda University)	A microprobe analysis of cellular cememtum in normal and diseased teeth
Ragnarsson, Bjorn R. (University of Illinois)	Collagenase inhibition in hard dental structures
Rajacich, Richard L. (University of Minnesota)	The effects of varied developing and fixing times on radiographic image quality and diagnostic accuracy
Rysz, Thomas J. (University of Illinois)	An evaluation of experimental sampling techniques and anaerobic media adapted for routine endodontic culturing
Sanfilippo, James R. (Tufts University)	The effect of the removal of the smeared layer on marginal seal adaptation using unfilled resin-lined restorative materials

Stanley, Harold R. (University of Florida)	Pulp Registry Program
Zucker, Kenneth J. (University of Minnesota)	Evaluation of the effect of different root canal filling techniques on the filling density and its relation to apical leakage

1983

Carrigan, Patrick J. (Temple University)	A scanning electron microscope evaluation of human dentinal tubules with regards to age and tooth location
DeNardo, Kenneth C. (Indiana University)	Rat connective tissue response to RC-2B and RC-2B without corticosteroid
Eichler, Mary (University of Illinois)	Investigation of the accuracy of the Neosono D-Apex locator
Fuss, Zwika (Albert Einstein Medical Center)	In vivo effects of the application of different thermal stimuli on the pulp
Grossman, Louis I. (University of Pennsylvania)	Study to determine if enamel sealant will seal dentinal tubules of root canal wall
Huynh, Xuan V. (University of Texas)	Localization of systemically induced TRACERS in pulp canal stagnant fluid after pulp extirpation
Ibarrola, Jose Luis (Marquette University)	Osseous reactions to three hemostatic agents
Lin, Louis M. (University of Medicine and Dentistry of New Jersey)	Study of cariously involved teeth associated with periapical and radiolucency
Martell, Bayardo (Temple University)	Comparative tissue toxicity evaluation of gutta percha root canal sealers: Eight and twenty-four hour assays from rat connective tissue
Messer, Harold H. (University of Minnesota)	The distribution of radioactively labeled parachlorophenol following insertion into pulp chambers
Moreinis, Abel (Columbia University)	Attenuation of osseous response in experimental tooth replantation
Morrow, Steven G. (Loma Linda University)	The pathogenicity of bacteroides melaninogenicus in pure and mixed infections on cat periapical tissues

Moskow, Allan (Temple University)	Intracanal use of a corticosteroid solution as an endodontic anodyne
Orahood, James P. (Indiana University)	In vitro study on marginal leakage between temporary sealing materials and restorative materials

1984

Allen, Ronald K. (Indiana University)	A statistical study of endodontic retreatments
Brandell, D. Wylie (Loma Linda University)	A comparison of mineralized and demineralized apical dentinal seals on the formation of apical barriers in monkey teeth
Delivanis, Philip D. (University of Louisville)	The clinical significance of the apical seal
Eleazer, Paul D. (Emory University)	The use of intentionally broken stainless steel instruments as an apical barrier to the inflammatory effect caused by gutta-percha-ZOE root canal filling materials
El-Hosseiny, Fathy M. (University of Pittsburgh)	A long term study of repair in induced fractures on monkeys (baboons)
Francisco, David D. (Loyola University)	Periodontal ligament injection: Investigation of the systemic effects in humans
Fuss, Zvi (Albert Einstein Medical Center)	In vivo effects of the application of different thermal stimuli on the dental pulp
Hempel, Ronald P. (Veterans Admin Medical Center)	The role of L-form bacteria in pulpal and periapical pathology
Herweijer, Jantien A. (Loma Linda University)	The role of the pulp in repair of root fractures
Iqbal, Mian Khalid (University of Minnesota)	Flow properties of gutta percha
Jahde, Eric M. (Louisiana State University)	Evaluation of periapical response to ultrasonic instrumentation in rhesus monkey
Johnson, James David (Northwestern University)	An evaluation of the toxic effects of different concentrations of metal ions found in endodontic materials on macrophages in vitro

Kettering, James D. (Loma Linda University)	Determination of antibody levels in endodontic patients against ten microorganisms using indirect fluorescent antibody and ELISA techniques
King, Thomas N. (Indiana University)	A sterilizer spore test survey to determine the effectiveness of instrument sterilizers in endodontic offices
Lee, Seung-Jong (University of Minnesota)	Radiographic findings of the artificially created periapical lesions
Madison, Sandra (University of Iowa)	The effects of internal bleaching on external root resorption
Mata, Estuardo (Temple University)	The use of penicillin V to prevent post-treatment reaction in asymptomatic chronic periapical areas of pathosis
Nevins, Alan (Nassau County Medical Center)	Identification of pulpal lymphatics using direct perfusion technique
Pedicord, David W. (University of Minnesota)	A comparison of the shape imparted to the root canal using The Endosonic system versus hand instrumentation
Romea, David J. (Temple University)	An evaluation of tri-calcium phosphate as a treatment for endodontic perforations of furcations in molar teeth of humans and rats
Spyropoulos, Spyridon (University of Minnesota)	Hand files vs. newly-designed engine-driven files: The effect on the final preparation shape of several curved root canals
Taylor, Gary N. (Loyola University)	Auto antibody activity in human dental pulp tissue
Torneck, Calvin D. (University of Toronto)	Sensory aspects of tooth development

1985

Chan, Wing-Fan (Northwestern University)	A comparison of the quality of root canal preparations using conventional hand instrumentation and an experimental ultrasonic instrument
Cunnington, Simon A. (Northwestern University)	The design of an animal model system to study the initial tissue response to and the reproducibility of vertical root fractures
El-Hosseiny, Fathy M. (University of Pittsburgh)	A long term histologic study of repair of induced fractures in baboons

Fager, Frank K. (University of Minnesota)	The spread of endodontic medicaments beyond the root apex
Faitlowicz-Gayer, Y. (Nassau County Medical Center)	T helper/suppressor cell ratios and IgE levels within blood samples of patients experiencing acute alveolar abscesses
Higgins, James R. (Indiana University)	A microbiologic and spectrophotometric investigation of the use of paraformaldehyde powder in the sterilization of gutta percha cones
Johnson, Thomas Allen (University of Illinois)	Configuration changes in curved canals following preparation by hand instruments and by ultrasonic filing
Medford, Houck M. (Wake Forest University)	Pulpal death secondary to vascular occlusions from carotid atheromatous plaque
Miles, Derek V. (Medical College of Georgia)	An evaluation of the shape of the root canal space following instrumentation utilizing an endosonic system
Miserendino, Leo J. (Northwestern University)	A standard model of an idealized root canal preparation for teaching and research purposes
Paris, Henry E. (Medical College of Georgia)	The effects of endodontic therapy on the dentin and dentin bonding/composite restoration
Rakusin, Hedley (Baylor College of Dentistry)	Classification of oral sinus tracts of dental pulpal origin
Russin, James T. (Temple University)	The effect of endodontic medicaments and irrigants on endotoxin activity
Selim, Hassan A. (University of Minnesota)	Blood loss during endodontic surgery
Smee, Gregory M. (Temple University)	Comparison of P-30 TM resin bonded ceramic and conventional materials as retrograde sealers
Tagger, Michael (Tel Aviv University)	<u>In vitro</u> testing of the release of OH and Ca ions from set endodontic sealers containing calcium hydroxide
Torgerson, Romona M. (Baylor College of Dentistry)	Evaluation of the effects of sutures and periodontal dressings on the healing of oral soft tissues following endodontic surgery

Walsh, Craig L. (University of Minnesota)	Efficiency of sonic and ultrasonic debridement of root canals
Weisman, Manuel (Medical College of Georgia)	A comparison of radiographs taken with a hemostat and/or held and a new paralleling device with the dental dam in place
White, Robert R. (University of Texas)	A comparison of the bacterial flora in acute apical abscesses and that in the contiguous intact necrotic pulps

1986

Barkan, Michael J. (Albert Einstein Medical Center)	Computer reproduction and analysis of radiographs
Denio, Dale (Loma Linda University)	Location of the inferior alveolar nerve in relationship to the mandibular posterior teeth using radiographic and anatomical analysis
Dodds, Ronald N. (Medical College of Virginia)	A comparison of the sealing ability of various retrofilling materials
Fairbourn, Dennis R. (University of Texas)	The effect of four preparation techniques on the amount of apically extruded debris
Glassman, Gary (Temple University)	A double blind study evaluating the effect of Oral Dexamethasone on post treatment endodontic pain
Goodis, Harold E. (University of California)	Temperature gradients at selected positions in the hard and soft tissues of tooth
Haasch, Gregory (Marquette University)	Bony effects of three hemostatic agents
Holcomb, John B. (Medical College of Virginia)	Evaluation of an atraumatic alveolar trephination procedure to avoid/relieve pain
Kaminsky, Edward S. (Indiana University)	A comparison of root canal debridement using sonic, ultrasonic and hand filing methods
Larsen, Steven S. (Northwestern University)	The development of a computer programmed endodontic bibliography data base capable of problematic search of the literature
Mattison, Gordon D. (University of Florida)	The effect of Eikenella corrodens endotoxin on the periapical tissues of the dog

Pappas, Pamela (Tufts University)	The in vitro effect of several intracanal medicaments on anaerobic organisms found in root canal systems
Rotstein, Ilan (Hadassah School of Medicine)	Bacterial components as causative factors of pulpal and of dental periapical pathosis
Tamse, Aviad (Tel Aviv University)	Effect of apical dentin structure on the smear layer produced in the root canal
Wang, Ming M. (University of Texas)	Presence of systemic antibiotics in pulp-extirpated root canals
Zelikow, Ronald (University of Illinois)	Calcium hydroxide sealers: A leakage study

1987

Abott, Allyson A. (Temple University)	The prophylactic use of antibiotics in teeth with necrotic pulps and asymptomatic periapical radiolucencies
Al-Khatib, Zuhair Z. (Temple University)	The antibacterial effect of different types of sealers in root canals
Altomare, Robert H. (University of Minnesota)	The effects of overinstrumentation: A histological comparison of hand and ultrasonic overinstrumentation.
Baumgartner, J. Craig (University of Maryland)	Biosynthesis of Immunoglobulins and their reaction with microorganisms found in the root canal system
Chen, Melody (Tufts University)	The comparison of three methods of filling the root canal
Chen, Nah Nah (Loma Linda University)	Early changes in hypoxic pulps
Choate, Thomas W. (Baylor College of Dentistry)	Evaluation of soft tissue wound healing following mucoperiosteal flap reflection
Cohen, Steven J. (Temple University)	Teflon as an apical plug - a leakage study
Freeman, Kim (University of Texas)	The effect of continuously infused $Ca(OH)_2$, $Ba(OH)_2$, and Tetracycline on the healing of bone
Gold, Ari (Tufts University)	The effect of smeared layer removal on apical leakage

Guba, Phil P. (Indiana University)	Xeroradiographic interpretation of experimental lesions
Hartwick, David W. (Temple University)	A comparison of the incidence of postoperative pain following instrumentation by ultrasonic or by conventional means
Jeng, Huey-Wen (University of Minnesota)	Cytotoxicity of pulpotomy agents
Jitsumyo, Aileen (Loma Linda University)	The effect of nonsteroidal anti-inflammatory agents on the synthesis of selected arachidonic acid metabolites in inflamed pulps
Limsombutanon, Somchai (Northwestern University)	An evaluation of the biocompatibility of composite retrofilling material with the cellular milieu of the peritoneal cavity of rat
Mangkornkarn, Chutima (Baylor University)	Evaluation of Periradicular tissue healing following endodontic surgery
Melton, Darlene C. (University of Iowa)	Effects of chlorhexidine on wound healing in ferrets
Mohorn, Harold W. (University of Iowa)	The effects of topical application of epidermal growth factor on oral wound healing
Morrison, Scott W. (Indiana University)	The effects of steam sterilization on usage cutting efficiency of endodontic instruments; an <u>in vitro</u> study
Panietz, Karen R. (Indiana University)	A comparison of volumetric and radiographic density using lateral condensation, vertical condensation and heated lateral condensation of gutta percha
Terry, Bruce R. (Temple University)	Magnetic resonance imaging: diagnosis of jaw lesions
Turner, Jeffrey E. (Medical College of Georgia)	Microleakage of temporary endodontic restorations in teeth restored with amalgam: An <u>in vitro</u> study utilizing a fluid filtration technique
Wadsworth, Gary G. (Temple University)	pH changes of calcium hydroxide in root canals <u>in vivo</u>
Yahya, Abdulla S. (University of Minnesota)	The effect of using sonic, ultrasonic, and hand instrumentation on the prepared canal shape and instrumentation time

1988

Baumgartner, J. Craig (United States Army)	Use of the Dot-Elisa Assay to detect antibodies to bacteroides in the sera of endodontic and periodontic patients
Carnes, David (University of Texas)	Comparative effects of calcitonin and dichloromethylenebiphosphonic acid (Cl_2 MBP) on root resorption after replantation of extracted teeth
Kettering, James D. (Loma Linda University)	The role of antibodies in determining the etiology of periapical lesions
Reeh, Ernest S. (University of Minnesota)	A stress analysis comparison of three restoration techniques: amalgam, cast onlay and bonded posterior composites for endodontically treated teeth
Stec, Edward J. (University of Minnesota)	Response of periapical tissue to topical corticosteroid after deliberate overinstrumentation
Torabinejad, Mahmoud (Loma Linda University)	The effects of pulpal inflammation on the neural function of the inferior alveolar nerve

THE PULP REGISTRY

The Endowment and Memorial Foundation has sponsored the pulp registry at the University of Florida from 1970 to 1984. Dentists throughout the world have been encouraged to submit extirpated pulps or extracted teeth with informative histories which have been difficult to diagnose clinically and which represented treatment failures or clinical oddities. Through histopathologic evaluations answers to problematic cases may be found. Since that time, over 3,000 cases have been accessioned and processed. Nineteen publications have resulted with the most recent being a collection of thirty cases that can be used for teaching and lecturing purposes.

The Pulp Registry provides the histopathologic basis for the clinical practice of the specialty of Endodontics. The Registry is a significant contribution to the Dental profession.

SCIENTIFIC AWARDS

The American Association of Endodontists encourages scholarly scientific activity by recognizing significant achievements toward the advancement of the specialty of Endodontics. Potential candidates for recognition are identified by the Honors and Awards Committee of the AAE and the final selection of the award recipient is made by the Association's Board of Directors.

The Louis I. Grossman Award is given for cumulative publication of significant research studies which have made an extraordinary contribution to Endodontology. Recipients since 1979 include:

Samuel Seltzer, 1980
Harold R. Stanley, 1981
Kaare Langeland, 1982
Henry J. Van Hassel, 1984

The Ralph F. Sommer Award is given for recognition to the principal author(s) of a publication of specific significance to the science and art of Endodontology. Recipients since 1979 include:

Calvin D. Torneck, 1984
Alfred L. Frank, 1985
Mahmoud Torabinejad, 1986
John I. Ingle, 1987

Honorary Membership has been normally conferred upon non-member individuals who have made significant contributions which have fostered the advancement of the specialty of Endodontics:

Mary Crowley
Louis I. Grossman
Maynard Hine

Oscar A. Maisto
Maury Massler
Harold R. Stanley
Henry O. Trowbridge

Graduate Student Awards

The Association encourages scientific and clinical research by offering awards to graduate students who present at the annual session. These awards are offered for original research presented in the Research Seminar, Table Clinic and Poster Clinic format. Separate awards are given for scientific and clinical research.

The Research and Scientific Affairs Committee invites submission of abstracts for review and those selected are presented at the Research Seminar or the Poster Clinic. The Annual Session Committee invites applications for Table Clinic presentations through graduate program directors.

Graduate Student Research Awards presented during the past ten years:

1979 - Immunopathologic study of human periapical inflammatory disease - Michael Stern, University of Texas Dental Branch

1980 - Carcinogenic potential of chloroform as used in Endodontics - Linda Linari, University of Washington

Effects of endotoxin on the periapical tissues of cat - Thomas Dwyer & Mahmoud Torabinejad, Loma Linda University

1981 - Radiopharmaceutical uptake in lesions of endodontic origin in rats: a longitudinal study - Kenneth Serota, Marjorie Jeffcoat & Michael Kaplan, Forsyth Dental Center

1982 - The <u>in vitro</u> ability of several materials to seal the apex in apical surgery - David P. Aulozzi, Marquette University

Pulpal prognosis of extrusive luxation injuries in permanent teeth with closed apices - Thomas Dumsha, University of Maryland

The effects of age on human pulp collagen synthesis - Christen J. Nielsen, University of Oregon

1983 - 1987 Ninety-seven presentations.

The Research Committees for the Annual Sessions during this period presented an award to each graduate presenter.

1988 - Endodontic versus restorative procedures: which is the major factor weakening the tooth? - Ernest S. Reeh, University of Minnesota

Graduate Student Table Clinic and Poster Clinic Awards presented during the past ten years:

1979 - A simple chairside anaerobic culturing technique - Michael B. Griffee, Indiana University

1980 - Evaluation of endodontic procedures using a cleared teeth model - Don Robertson & Michael McKee, University of North Carolina

1981 - A technique for staining extracted teeth: a research and teaching aid for bleaching - William F. Freccia, Walter Reed Army Medical Center

1982 - A functional splint for traumatized teeth - Martin D. Hickey, Naval Dental School

Reading the x-ray: a comparison of viewing techniques - Jeffrey W. Hutter & Augustyne V. Hill Jr., Naval Dental School

1983 - Removing "stubborn" silver cones; a new use for the ultrasonic scale - Keith V. Krell & Michael W. Fuller, University of Iowa

Rubber dam isolation of fixed prostheses - Martin Hickey, Naval Dental School

Methods of vertical extrusion - Barry Burkett, Naval Dental School

1984 - Anatomical pathways for the spread of infection - John B. Ross & Hedley Rakusin, Baylor College of Dentistry

1985 - Solving isolation problems -John D. Bramwell, Naval Dental School

1986 - Endosonics: the advantage in Endodontics - David Stamos & Michael L. Squitieri, Marquette University

1987 - Fabrication of a disposable CO_2 pencil - Jan LaCombe, Naval Dental School

The retrograde filling-does a dry field really matter? - Randall Calvert and Jerome Yamada, Northwestern University

A study of the relationship of the mandibular canal to the apices of the mandibular posterior teeth in dried human mandibles - Dale Denio, Loma Linda University

Demonstration of inflammatory changes to nerve tissue in rat dental pulp using CGRP immunocytochemistry - Charles Kimberly, University of Washington

1988 - The effect of aggressive therapy on the healing response to vertical root fractures in dogs' teeth - Ronald C. Markarian, Northwestern University

Cutting efficiency test for endodontic instruments - Cindy R. Lambert, Northwestern University

Demonstration of acute phase proteins in human dental pulp and in serum - Martha E. Proctor, Northwestern University

Pulpal nerve response to severe dentin injury in rats - Patrick E. Taylor, University of Washington

The practitioner's approach to treatment of acute odontogenic episodes - William D. Jarvis & Clara M. Spatafore, West Virginia University

Extraoral ice-pack application effects on intraoral temperatures - Bruce C. Justman, University of Iowa

Anatomic and histologic features of "C" shaped mandibular second molars - Darlene C. Melton, University of Iowa

A.6. SCIENTIFIC ADVANCES

[Identify scientific advances (procedures, techniques, materials) developed in this area of practice by members of the sponsoring organization during the past ten years.]

The Advances cited in this section have been categorized under ten headings. Both clinical and scientific advances are included under each section. The references cited in each section are not all inclusive but each paper cited over the last decade includes an American Association of Endodontists member as either the principal author or co-author.

The citations are categorized under the following headings:

CYTOTOXICITY STUDIES

LONGITUDINAL SUCCESS STUDIES

ADVANCES IN TECHNIQUES/PROCEDURES

INFLAMMATION, IMMUNOLOGY, MICROBIOLOGY AND PATHOLOGY

ADVANCES IN MATERIALS/INSTRUMENTS

ANATOMY AND MORPHOLOGY

PULPAL RESPONSE/VITAL PULP THERAPY

RESTORATION OF ENDODONTICALLY TREATED TEETH

DIAGNOSIS

PAIN AND PAIN CONTROL

1. CYTOTOXICITY STUDIES

Traditionally, research is conducted on the toxicity of materials introduced into the body through the root canal system. Both long term and short term evaluations are conducted on Endodontic irrigants, sealers, medicaments and filling materials.

2. LONGITUDINAL SUCCESS STUDIES

Research studies are conducted in the efficacy of Endodontic therapy. Various treatment modalities used in clinical practice are evaluated. Factors affecting prognosis are constantly evaluated in these investigations.

3. ADVANCES IN TECHNIQUES/PROCEDURES

This area of research develops the scientific bases for the rationale for incorporating new techniques and procedures into the clinical practice of Endodontics. Commonly accepted concepts are challenged and advances are made.

4. INFLAMMATION, IMMUNOLOGY, MICROBIOLOGY AND PATHOLOGY

In recent years great emphasis has been placed on the immunologic aspects of pulpal and periapical disease. Studies are conducted to determine the causal relationship between specific microorganisms with their immunologic implications and the disease process.

5. ADVANCES IN MATERIALS/INSTRUMENTS

Considerable research has been conducted, in recent years, on the newly developed root canal instrumentation systems and root canal filling material delivery systems. The use of sonic and ultrasonic energy for the cleansing and shaping of the root canal spaces has received particular attention as has the use of thermoplasticizing systems for the delivery of gutta percha.

6. ANATOMY AND MORPHOLOGY

Root canal morphology, aberrations in canal anatomy and the incidence, prevalence and location of multiple canals and accessory canals are continuously studied as advanced technologies permit more sophisticated research. Of particular interest to the practitioner, is the impact that these aberrations have on the prognosis following root canal treatment. Pulp studies related to the neural and circulatory anatomy and physiology are also conducted to arrive at a better understanding of the factors that contribute to pulp health and vitality.

7. PULP RESPONSE/VITAL PULP THERAPY

The effect on dental pulps of an ever increasing number of new dental restorative materials stimulates considerable scientific interest. Research efforts continue to examine this area helping the clinician to select the appropriate materials and techniques to ensure that the pulp is protected during restorative procedures.

8. RESTORATION OF ENDODONTICALLY TREATED TEETH

The partnership between specialists and the general practitioners is underscored by the direct relationship between the prognosis of endodontically treated teeth and their proper restoration. Studies continue to identify those restorative practices that influence the survival rate of endodontically treated teeth.

9. DIAGNOSIS

The differential diagnosis of dentinal, pulpal, periradicular and periodontal pain is the primary focus of the Endodontist. Continued clinical and scientific investigations of the complex dental apparatus and oral symptomatology combine to facilitate patient care.

10. PAIN AND PAIN CONTROL

Differential diagnosis of craniofacial pain of odontogenic and non-odontogenic origin has become an ever increasing and important aspect of Endodontic practice. Pre- and post-operative medications for the relief of inter-appointment pain are often studied. Research in this area continues to shed new light on the issues relative to pain free dentistry.

1. CYTOTOXICITY STUDIES

Traditionally, research is conducted on the toxicity of materials introduced to the body through the root canal system. Both long and short term evaluations are conducted on endodontic irrigants, sealers, medicaments and filling materials.

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2. LONGITUDINAL SUCCESS STUDIES

Research studies are conducted on the efficacy of endodontic therapy. Various treatment modalities used in clinical practice are evaluated. Factors affecting a successful prognosis are constantly monitored by these investigations.

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Adams WR, Patterson SS, Swartz ML. The effect of the apical dentinal plug on broken endodontic instruments. J Endodon 1979;5:121-128.

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3. ADVANCES IN TECHNIQUES/PROCEDURES

This research provides a scientifically based rationale for new techniques and procedures. Accepted concepts are challenged and advances made.

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6. ANATOMY AND MORPHOLOGY

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A.7. OTHER INFORMATION

[Provide any other information which demonstrates that the sponsoring organization meets the definition specified in the requirements.]

Requirements

The American Association of Endodontists and its members provide the following additional services which benefit the Profession and the lay public:

1. Sponsors the American Board of Endodontics.

2. Sponsors the Endowment and Memorial Foundation.

3. Maintains the Endodontic Archives and the index to the Endodontic Literature.

4. Sponsors public and professional awareness programs.

5. Publishes patient information pamphlets.

6. Establishes and publishes Quality Assurance Guidelines for Endodontics.

7. Publishes the Annotated Glossary of terms used in Endodontics.

8. Nominates individuals to serve on the Advisory Committee on Advanced Dental Education in Endodontics, site visit consultants to the Commission on Dental Accreditation and its Committee B (Committee on Advanced Dental Education).

9. Appoints individuals to serve on the Appeals Committee of the Commission on Dental Accreditation.

10. Assists in the development of curriculum guidelines for predoctoral endodontic education.

11. Develops curriculum standards for Advanced Education in Endodontics.

12. Members author, co-author and/or edit textbooks and monographs which benefit all in the profession.

1. Sponsors the American Board of Endodontics

The Association has sponsored the American Board of Endodontics since its founding in 1955 (incorporated 1956). The purpose of the Board is to contribute to the advancement of Endodontics by elevating the standards of endodontic practice within the dental profession through the certification of candidates in the special area of Endodontics. Certification as a Diplomate is accomplished by successful completion of both a written and an oral examination as well as documented case histories showing a broad range of treatment modalities. The nine directors of the American Board of Endodontics are elected by the membership of the AAE at its General Assembly meeting at the Annual Session (three each year to serve a maximum of two-three year terms). The American Association of Endodontists has financially supported the Board during litigation to protect the Board's certifying powers.

As of July 1, 1988, the Board has certified a total of 801 Diplomates. Ninety-seven percent (97.2%) of the Active (Registered) Diplomates are Active Members of the American Association of Endodontists.

2. Sponsors the Endowment and Memorial Foundation

The Endowment and Memorial Foundation was established in 1966. Its purpose is to promote and support the advancement of Endodontics by:

a) Providing funding for Endodontic research.

b) Guaranteeing student loans for advanced education students.

c) Conducting professional education programs.

3. Maintains the Endodontic Archives and Index to the Endodontic Literature

The Association's Endodontic Archives and Index of the Endodontic literature was established with support from the AAE Endowment and Memorial Foundation. The Archives house both historic and current material of interest and value. Materials pertinent to the specialty are accepted on a continual basis. The Index to the Endodontic Literature is updated regularly and currently has catalogued more than 5700 bibliographic citations. Both the Archives and the Index to the Endodontic literature are housed in the Association's Central Office.

4. Sponsors Public and Professional Awareness Programs

The Public and Professional Awareness Program is a continuing activity of the Association to increase the identification of the Endodontist and Endodontics within the dental profession and to the public. The specific goals are:

a) To increase public and professional awareness of Endodontics and the role of the Endodontist in oral health care delivery.

b) To promote a positive relationship between the general practitioner and the endodontist.

c) To assist individual AAE members in promoting Endodontics and their practices.

The program components include the development of educational materials, practice promotion tools such as a slide presentation, and media materials for the general public and the dental community. Spokesperson training, followed by national and regional media placement activities, have continued throughout the four years of the program. During this program, two audio tapes on timely endodontic topics have been produced and distributed at no cost to the general dental community. The first tape, "Endodontic Flare-ups" was mailed directly to 75,000 members of the American Dental Association. The second tape "Profound Pulpal Anesthesia" was completed in April 1988 and has been distributed by the individual members of the AAE to their general practitioner colleagues. A Symposium on Referrals in Dentistry was sponsored by the Association as part of this program.

During the four-year public and professional awareness campaign, the Association's public relations firm has been awarded a prestigious Silver Trumpet Award for the Association's program.

5. **Publishes patient information pamphlets**

The Association publishes numerous pamphlets designed to improve the patient's understanding of Endodontic treatment. The pamphlets are available for purchase at cost by the dental profession and are sent free of charge in response to public request for information.

Patient information pamphlets presently offered by the Association include the following: (# distributed since 1985) (Copies of the pamphlets are included in Appendix V)

a) Bleaching Discolored Teeth (33,400)

b) When Retreatment of Endodontic Therapy is Necessary (77,400)

c) You have been Referred to an Endodontist (93,700)

d) Endodontists: Specialist in Saving Teeth (113,700)

e) After Your Endodontic Treatment (124,830)

f) Saving Teeth Through Endodontic Therapy (361,300)

6. **Establishes and publishes Quality Assurance Guidelines for Endodontics**

In 1987 the AAE developed and published Quality Assurance Guidelines in response to a public and professional need. As the recognized sponsoring organization of the national certifying board in this special area of dental practice, the Association has the expertise

and professional responsibility necessary to assist the dental profession and the public in the establishment of the standard of care in this specialty area of dentistry. (Appendix VI)

In receiving care of a specialized nature, patients need and deserve treatment that meets the standard of care generally given by competent practitioners trained in that area of specialization. The Quality Assurance Guidelines address two essential elements: the appropriateness of the treatment modality and the quality or level of treatment rendered.

In addition to distribution to the Association membership, the Quality Assurance Guidelines have been distributed, on request, to other dental specialties, constituent dental societies, individual practitioners, and third-party payers.

7. **Publishes the Annotated Glossary of terms used in Endodontics**

The Association has published and periodically updates a Glossary of terms used in Endodontics as a reference for the dental profession. The fourth edition of the Glossary was issued in 1984 as a separate publication and is designed to enhance communication among clinicians, researchers, and students. (Appendix VII)

8. **Nominates individuals to serve on the Advisory Committee on Advanced Dental Education in Endodontics, site visit consultants to the Commission on Dental Accreditation and its Committee B (Committee on Advanced Dental Education)**

The American Association of Endodontists nominates two advisors and the American Board of Endodontics nominates two advisors who are appointed by the Commission on Dental Accreditation to serve a maximum of two, three-year terms on the Advisory Committee on Advanced Dental Education for Endodontics. The AAE and ABE underwrite the financial responsibility attendant to the convening of this Committee twice each year.

The Association nominates an individual to serve a two-year term on the Commission on Dental Accreditation. This position rotates among the other recognized Specialties, so Endodontics is represented on the Commission for two of every eight years. The Commission appointment carries with it a concomitant appointment to serve on Committee B (Committee on Advanced Education). Individuals who serve as site visit consultants to the Commission are nominated by the Association and appointed by the Commission on Dental Accreditation. These AAE active members serve as site visit consultants to Advanced Education Programs in the accreditation process. Currently, fourteen members of the Association serve the Commission on Dental Accreditation for Endodontics in this capacity.

Periodically, the AAE and the E&M Foundation provide funding for training workshops for site visit consultants and program directors when appropriate.

9. **Appoints individuals to serve on the Appeals Committee of the Commission on Dental Accreditation**

The American Association of Endodontists appoints one of its members to serve a single four-year term on the Appeals Board of the Commission on Dental Accreditation.

10. **Assists in the development of curriculum guidelines for predoctoral endodontic education**

The American Association of Endodontists, in cooperation with the Endodontic Section of the American Association of Dental Schools, developed Guidelines for Predoctoral Endodontic Education between 1978 and 1980.

The American Association of Endodontists provided the financial support for a workshop by the Endodontic Section of the American Association of Dental Schools in Dallas in 1984. The purpose of the workshop was to rewrite the pre-doctoral Guidelines. All of the workshop participants except the facilitator were members of the AAE. (Appendix VIII)

11. **Develops curriculum standards for Advanced Education in Endodontics**

An Ad Hoc Committee of AAE members wrote the Standards for advanced education in Endodontics in 1983-84 and submitted the proposed Standards to the ADA Commission on Dental Accreditation. The Commission approved those Standards for Advanced Education Programs in Endodontics effective on January 1, 1985 and revised, with input from AAE, in May 1985 and February 1987. (Appendix IX)

12. **Members author, co-author and/or edit textbooks and monographs which benefit all in the profession**

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Trowbridge, H.O., and Emling, R.C., Inflammation: A Review of the Process. 2nd ed. Bristol: Comsource Systems, 1983.

Van Hassel, H.J. (Editor), Endodontics. Dental Clinics of North America. Philadelphia: W.B. Saunders, 1979.

Weine, F.S., Endodontic Therapy. 3rd ed. St. Louis: C.V. Mosby, 1982.

In addition members have authored and/or co-authored a significant number of chapters in dental texts and monographs.

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
   c) 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 apiocoectomy, 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.

B.3. Reference: "In order to be recognized as a specialty, substantial public need and demand for services which cannot be adequately met by general practitioners or specialists in other areas must be documented."

The following references and resources were used in developing section B.3.a.

Reference:

Endodontic Rerecognition Survey and Instructions

Dental Product Report Survey

(Appendix XI)

Resources:

1. Personal communication: Blue Cross/Blue Shield
2. Personal communication: Health Insurance Associates of America
3. Personal communication: Prudential Insurance Co. of America
4. Personal communication: Delta Dental Plans
   a) Delta Dental Plan of New Jersey, Inc.
   b) Washington Dental Service
   c) Delta Service of Massachusetts
   d) Delta Dental Plans of California
   e) Michigan Delta Dental

B.3.a. Need

B.3.a.i. [Cite epidemiological studies (national, regional and/or state) which indicate the incidence and/or prevalence of conditions in the specialty or proposed specialty.]

In the absence of published studies dealing with the incidence and/or prevalence of conditions diagnosed and/or treated by endodontists, the American Association of Endodontists conducted a survey to acquire this information. This survey, known as the Endodontic Rerecognition Survey (ERS), was completed by 120 participating endodontists. The data supplied by the participants represented specific information on 22,469 consecutive Endodontic cases. Each participant utilized a standardized reporting form and recorded information on each case in the following categories: Referral Patterns, Source of Referral, Tooth Category, Severity of Conditions and Type of Procedures (Appendix XI - Reporting form and Instructions included.)

In addition to data gathered from the ERS, additional information from third party payers was analyzed in order to provide a larger sample and to determine the percentages of Endodontic procedures in relation to the total number of all dental procedures, the percentage of total dollars paid for Endodontic procedures and percentages of various Endodontic procedures performed by the endodontist vs. the general dentist.

The above cited references and resources revealed the following information relative to the incidence of Endodontic conditions diagnosed and/or treated:

1. According to data from resources 1,2,3 and 4, Endodontic procedures accounted for 2.1 - 2.2% of all dental procedures submitted for payment from a sample of 165,183 dental procedures.

2. Endodontic procedures accounted for an average of 7% of the total dollars billed for third party payment (excluding orthodontics). If projections by the American Dental Association are correct to the extent that in excess of 30 billion dollars will be spent on dental services in 1988-1989, then using the stated percentage, over 2.1 billion dollars will be spent on Endodontic procedures.

3. A breakdown of Endodontic services provided by endodontists from data collected from in excess of 200,000 Endodontic procedures submitted for payment to third party payers and an additional 22,469 cases reported in the ERS revealed the incidence of conditions diagnosed and/or treated by the specialist in the following categories:

single canals	12-22%
two canals	24-30%
three canals	35-45%
four canals	42-56%
apicoectomy	46-75%
apexification	69-73%

An interpretation of these percentages would indicate that as the procedures became more difficult a greater percentage of the cases are being treated by the Endodontist.

B.3.a.ii. [Cite data that indicate the severity of conditions diagnosed and/or treated by practitioners in the specialty or proposed specialty, e.g. morbidity or mortality statistics, descriptive information.]

Information gathered from the ERS revealed the following breakdown of conditions diagnosed and/or treated by the endodontist:

1. In the sample of 22,469 teeth, 10,605 teeth or 47.2% presented with or were found to have one or more of the following complications. (Percentage of each individual condition appears in parenthesis opposite the reported complications.)

Calcified canals	(16.8)
Retreatment of previous root canal treatment	(10.0)
Inability to properly diagnose	(7.2)
Inability of referring dentist to control pain and/or swelling	(6.1)
Perio-endo complication	(5.8)
Medically compromised patient	(4.3)
Ledged or dilacerated canal	(3.9)
Cracked tooth	(2.8)
Inability to obtain adequate anesthesia	(2.9)
Resorption	(2.5)
Perforations (iatrogenic)	(1.8)
Separated instruments	(1.4)
Incomplete root formation	(1.4)
Fractured root	(1.1)

2. In the sample of 22,469 teeth reported in the survey, 17,638 teeth or 78.5 percent were posterior teeth. This data is consistent with information gathered from third party payers as presented in B.3.a.i. of this section and would indicate that as the number, location and complexity of the root canal systems increase, a greater percentage of these cases are being referred to the endodontist.

3. In the sample of 22,469 teeth referred to the endodontist, 2,517 teeth or 11.2 percent of the treatment was initiated by the referral service but presented difficulties beyond their ability to complete treatment, i.e. mid-treatment referral.

B.3.a.iii. [Project the need for practitioners in the specialty or proposed specialty over the next ten years, taking into account disease trends, demographic changes and other pertinent factors.]

References:

Changing treatments of the postflouride generation. J. Amer. Dent. Assoc. 112:313-321, 1986. (Appendix XII)

Fifth Report to the President and Congress on the Status of Health Personnel in the United States. U.S. Department of Health and Human Services, Public Health Service. DHHS Pub. No. HRS-P-OD-86-1, 1986. (Appendix XIII)

Furino, Antonio: Testimony to Special Committee For Post Secondary Medicine, Dental, and Allied Health Education, 1988 (Appendix XIV)

Resources:

Strategic Plan, Report of The American Dental Associations Special Committees on The Future of Dentistry. Chicago, IL.: American Dental Association, 1983.

Graves, R.C. and Stamm, J.W.: Oral Health in the United States: Prevalence of dental caries. J. Dent. Educ. 49(6) 341-351, 1985.

Oral Health of United States Adults: National Findings U.S. Department of Health and Human Services. NIH Publication No. 87-2868, 1987.

Research and Action Program For Improving The Oral Health In Adults and Older Americans, "A Draft". NIDR, 1988.

The need for Endodontic specialty services over the next ten years is likely to increase steadily. Based on current data and opinions, the aging population, retention of natural dentition and continued oral health maintenance therapy are significant factors that will influence the future increase in the need for Endodontics.

As stated in the Report of the American Dental Association's Special Committee on the Future of Dentistry, "the public's need for professional dental services is great and will not appreciably diminish throughout the remainder of the century." Graves, in a summary of oral health in the United States, reported that "even though a reasonable case can be made for the suggestion that caries trends will continue downward and that as adult age groups age they will maintain relatively lower DMFT scores ... the treatment needs of our current adult population will continue at high levels for decades. For example, current 35 to 44-year olds have experienced decay in about half of their teeth." This is a group that will largely remain dentulous and require considerable treatment for an average of another 35-40 years of life. The ADA Future of Dentistry report further states that as people retain more teeth, older adults may experience greater numbers of tooth fractures and may need more replacement restorations, more Endodontics, periodontics, orthodontics care and more removable partial dentures.

The 1987 Oral Health in U.S. Adults National Findings report showed a significant decrease in the number of edentulous persons. This trend results in more teeth potentially in need of Endodontic procedures.

The NIDR report on Research and Action Program for Improving The Oral Health in Adults and Older Americans states, "Given the contributions of root caries and recurrent caries, the pattern of dental caries in adults differs from that found in children. Since the traditional DMF index was

not developed to measure recurrent caries or root caries, the present knowledge about caries experience in adults and how to prevent it is incomplete." They conclude that, "in general, clinical estimates of the prevalence and extent of recurrent caries tend to underestimate the actual situation, at least in cross-sectional studies." So that even though we are seeing a decrease in caries in children, that trend, at least presently, has not been shown to effect the present adult population.

Dr. Antonio Furino, Director, Center for Studies in Health Economics at the University of Texas Health Science Center at San Antonio reported that all recent epidemiologic studies indicate an increase in dental needs with the exception of coronal caries in children and young adults, simple extractions, and, only in the distant future, full dentures and removable partial dentures. He reports that unprecedented increases are expected in the demand for Endodontics.

The American Dental Association 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.

The need for Endodontic services is clearly present and will continue. The need for Endodontic specialists during the next ten years is well documented through the referral patterns discussed in B.3.b.iv. and v. and in the section on demand, B.3.b.vi.

B.3.b. Demand

B.3.b.i. [Indicate the number of dentists currently in practice who have received two or more years of advanced education in the specialty or proposed specialty. (This should not include continuing education.)]

Two thousand eleven (2,011) dentists currently in practice received two or more years of advanced education in Endodontics. (Source: American Association of Endodontists)

B.3.b.ii. [Indicate the number of dentists currently devoting full time to the practice of the specialty or proposed specialty.]

Two thousand two hundred fifteen (2,215) dentists are currently devoting full time to the practice of Endodontics. (Source: American Association of Endodontists)

B.3.b.iii. [Indicate the number of advanced education programs of two years or more in length in the specialty or proposed specialty for each of the past five years. Indicate the first year enrollment and number of graduates of these programs for each of the past five years.]

The following information was provided by the Council on Dental Education of the American Dental Association.

Number of advanced education programs in Endodontics of two years or more for each of the past five years:

1984	1985	1986	1987	1988
49	48	48	48	45

First year enrollment:

1984	1985	1986	1987	1988
139	123	131	126	130

Number of graduates:

1984	1985	1986	1987	1988
145	127	132	135	123

(Source: Council on Dental Education of the American Dental Association)

B.3.b.iv. [Describe referral patterns, including identification of who normally refers patients to practitioners in the specialty or proposed specialty and the frequency of referrals.]

The following references and resources were used in developing section B.3.b.iv.:

References:

Endodontic Rerecognition Survey and Instructions (See sec. 3.a. and Appendix XI)

1987- A Survey on Endodontic Procedures Performed by General Practitioners, Dental Products Report, December, 1987. (Appendix XI)

Resources:

Personal communication: Delta Dental Plans

Delta Dental Plan of New Jersey, Inc.

Washington Dental Service

Delta Service of Massachusetts

Delta Dental Plan of California

Michigan Delta Dental

Patients are referred to the endodontist primarily from three referral sources: general dentists, other dental specialists and previous patients. Results from ERS indicate that 88.8% of all patients referred to the endodontist are referred by the general dentist. Specialists in other dental disciplines account for 7% of all referrals to the endodontist while previous patients account for 2.2% of all referrals.

The types of referral can be further divided into direct and mid-treatment referrals. A direct referral would be defined as a tooth requiring Endodontic treatment in which there was no intention or effort by the referral source to provide that treatment. Direct referrals comprise 88.2% of all cases referred to the endodontist.

A mid-treatment referral would be defined as a tooth requiring the completion of Endodontic treatment which was initiated by another dentist whose original intention was to provide the entire Endodontic treatment. Mid-treatment referrals account for 11.2% of all referrals to the endodontist according to the ERS.

A survey conducted and reported by Dental Products Report, December, 1987 provided a detailed breakdown of referral patterns from 680 general dentists. The following summarizes the data reflecting the referral patterns of the survey respondents specific to Endodontic treatment:

1. General dentists referring all Endodontic cases accounted for 11.7% of the survey respondents.

AGE	PERCENTAGE
<31	2.0
>40	72.0

2. General Dentists providing some Endodontic treatment.

AGE	PERCENTAGE
<31	98.0
31 - 40	94.1
41 - 50	87.9
>50	71.4

3. General dentists referring Endodontic cases based on tooth involved:

TOOTH	PERCENTAGE
Anterior	33.8
Premolar	48.8
Molar	77.9

A significant 11.7% of all survey respondents referred all their Endodontic cases to the specialist. The largest percentage of cases being referred to the endodontist by all age groups were the more complex root canal systems of bicuspids and molars which is consistent with data from sec. B.3.a.i.

B.3.b.v. [Cite data which indicate the type and volume of services provided by practitioners in the specialty or proposed specialty.]

The type and volume of services provided by endodontists is reflected in data gained from the ERS along with information obtained from third party payers as identified as resource material for section B.3.b.iv. The following table summarizes data from 22,469 cases reported by 120 endodontists.

Non-surgical Endodontics	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 procedure	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%

Information obtained from third party payers identified as a resource in section B.3.b.iv. provided a comparison with data from the ERS relative to a breakdown of the non-surgical Endodontic procedures.

Type of Procedure	Percentage Treated by Endodontist	
	Third Party	ERS
Single canal	12-22	21.5
Two canals	24-30	22.2
Three canals	35-38	56.2 (3/4 canal
Four canals	42-56	molars)

B.3.b.vi. [Project demands for practitioners in the specialty or proposed specialty over the next ten years, taking into account disease trends, demographic changes, socio-economic projections and other pertinent factors.]

References:

Changing treatments of the postflouride generation. J. Amer. Dent. Assoc., 112:313-321, 1986 (Appendix XII)

Furino, Antonio: Testimony to Special Committee For Post Secondary Medicine, Dental, and Allied Health Education, 1988. (Appendix XIV)

Endodontics: Marketing Planner For Endodontists. Chicago, Illinois, American Dental Association, 1987. (Appendix XV)

Resources:

Dentistry in the 80's: A changing mix of services. J. Amer. Dent. Assoc., 116:617-624, 1988.

Christensen, G.J. The future of dental practice. J. Dent. Educ., 50: 114-118, 1986.

Oral Health of United States Adults: National Findings U.S. Department of Health and Human Services. NIH Publication No. 87-2868, 1987.

Bailit, H. Environmental issues in dentistry. Reflections on the practice of dentistry in the 21st Century. PEW National Dental Education Program monograph, 1987.

Crall, J.J. Preferences for treatment by dental specialists. J. Dent. Educ., 50: 661-664, 1986.

The demand for Endodontic services has been projected to increase in the next 10 years. An elevation in the level of awareness for improved health status and higher expectations regarding oral health along with an increasing adult population are the most significant contributing factors to the increased demand. The public's demand for an improved overall lifestyle will also impact on dental services, particularly the retention of the natural dentition as an important sign of physical well-being.

The American Dental Association projections of Endodontic cases anticipate an increase from 17,390,000 root canal treatments in 1979 to 30,540,000 root canals treatments by the year 2,000. During the period 1977 to 1986 dental claims filed with Delta Dental Plans of California demonstrated Endodontic services increased 5.7%. In a survey of 5,125 dentists, Christensen reported "substantial increases in Endodontics over a 5 year period from 1980 to 1985. Demand for Endodontic services continue to increase as the public becomes more aware that Endodontics is an alternative to extraction and the Nation's dentists increasingly incorporate Endodontics into their treatment plans.

There is an increasing societal interest in wellness and a major part of that trend is the desire by the public to retain their natural dentition. Dr. John Stamm, Director, Dental Research Center of the University of North Carolina, reported in the Journal of the American Dental Association's symposium on the Postflouride Generation that "Although the true incidence of Endodontic involvement may not increase, the desire to retain the natural dentition will lead more people to seek Endodontic care."

Dr. Stamm further reported, "Because adults are tending to keep their natural dentition longer, restorations are likely to require replacements more often. The half life of an amalgam restoration in the permanent dentition has been estimated to lie somewhere between 8 and 10 years." Each restoration replacement results in tooth structure loss and pulp damage, and thus increases the demand for Endodontic treatment.

As reported in the 1987 National Findings on Oral Health of United States Adults, "There has been a gradual and significant decrease in the number of edentulous persons over the past 25 years." With adults having more teeth present, there are more teeth available for and potentially more teeth in need of Endodontic treatment.

Additionally, Dr. Bailit has stated that the edentulous have very low rates of utilization so that as these numbers decrease, demand for dental services should increase. Dr. Bailit also reported to leaders in dental education that the sociodemographic trends indicate that "in addition to more teeth, the elderly will be more affluent and educated than in the past. This should also increase their demand for dental care."

Dr. Antonio Furino testified that not only are the growing adult and older populations retaining more teeth, but are harboring higher expectations about their oral health. He further reports that an increasing population growth combined with an increasing teeth retention rate simply overwhelms the increase in the number of dentists." This "multiplier effect" of population increases, amplified by greater tooth retention is not a passing phenomenon but a new trend that will affect dentistry and public health plans for many generations." In his estimates of disease prevalence among the population at risk in relation to present and future demand for dental services, he projects unprecedented increases in the demand for Endodontic services.

The demand for services for the specialty treatment of Endodontics should increase over the next 10 years.

The referral patterns cited in B.3.b.iv. and B.3.b.v. demonstrate that the Endodontic specialist is providing a high percentage of the Nation's Endodontic procedures, especially the more difficult procedures (molar Endodontics, periapical surgery, apexification, perforations and retreatments). With an increasing public demand for retaining their natural dentition and with an increasing aging population with previous caries and restorations, there will be an even greater demand for specialty trained Endodontic practitioners. Older adults present the added case difficulties of treating teeth with calcified canals and obliterated pulp chambers, preparing access through extensive restorations and crowns, monitoring medical complications, and performing surgical procedures on strategic teeth. This increasing case difficulty coupled with an expectation that all teeth should be saved will require a large group of advanced specialty trained practitioners to meet the demand.

Dr. James Crall in his paper on Preferences for Treatment by Dental Specialists states that factors such as 1) greater patient sophistication in terms of awareness of the array of services available and levels of training possessed by practitioners offering these services 2) malpractice suits and costs, 3) quality control measures and 4) higher levels of third party payments may lead to an increase in specialist utilization. These factors could increase the demand for Endodontic specialists.

B.3.c. Other Information

B.3.c.i [Cite editorials, journal articles and/or organizational policy statements supporting the need and/or demand for practitioners in the specialty or proposed specialty. No more than five of the documents cited should be appended.]

Changing treatment needs of the postflouride generation. J Am Dent Assoc 1986;112:314-321. (Appendix XII)

Fifth report to the president and congress on the status of health personnel in the United States. U.S. Department of Health and Human Services, Public Health Service. DHHS pub. No. HRS-P-OD-86-1, 1986. (Appendix XIII)

Furino A. Testimony to special committee for post secondary medicine, dental and allied health education, 1988. (Appendix IV)

Crall JJ. Preferences for treatment by dental specialists. J Dental Education 1986;50:661-664. (Appendix XVI)

Chivian N. Endodontics: an overview. Dental Clinics of North America 1984;28:637-649. (Appendix XVII)

Resources:

Strategic Plan, Report of the American Dental Association's Special Committees on the Future of Dentistry. Chicago, Illinois: American Dental Association, 1983.

Graves, R.C. and Stamm, J.W., Oral Health in the United States: Prevalence of Caries. J. Dent. Educ., 49:341-351, 1985.

Oral Health of United States Adults: National Findings, United States Department of Health and Human Services. NIH publication No. 87-2868, 1987.

B.3.c.ii. [Provide any other information which demonstrates compliance with this criterion.]

B.4. Reference: "...a specialty must incorporate some aspect of clinical practice, i.e., individuals in the specialty must provide health services for the public."

B.4.a. [Identify the principal health services provided to the public by individuals in this area of practice.]

The principal health services provided to the public are diagnostic, preventive, emergency and treatment services for diseases of the pulp and periradicular tissues.

Typical clinical services provided by Endodontists include but are not limited to:

1. Diagnosis and treatment of pulpal and periradicular pathosis.

2. Diagnosis and treatment of pain both of odontogenic and non-odontogenic origin.

3. Diagnosis and treatment of infections of pulpal and periradicular origin.

4. Emergency treatment of teeth with pulpitis and/or pulp necrosis.

5. Emergency treatment of teeth with periradicular infections.

6. Emergency treatment of trauma to teeth involving damage to pulp tissue, coronal and root fractures and partially or totally avulsed teeth.

7. Apexification procedures on immature permanent teeth.

8. Replantation procedures both for avulsed teeth and teeth treated with planned intentional replantation.

9. Non-surgical Endodontics by means of cleansing, shaping, and three dimensional obturation of root canal systems.

10. Surgical Endodontic procedures including:

    a) Apicoectomy and curettage

    b) Reverse root end fillings

    c) Repair of root perforation of both iatrogenic and idiopathic origin

    d) Hemisections and root amputations

11. Bleaching of both vital and non-vital teeth

12. Endodontic endosseous implants

13. Post space preparation, post cementation, and/or post and core build-up following Endodontic procedures

14. Diagnosis, completion of and/or retreatment of all of the above after previous unsuccessful Endodontic intervention

15. Consultations as requested

Additional services provided by endodontists as necessary adjuncts to their principal health services are:

1. The taking and interpretation of dental and medical histories

2. The full range of pulp testing procedures for uncovered and fully covered teeth.

3. The exposing, processing and interpretation of dental radiographs

4. The obtaining and interpretation of biopsies and cultures when indicated

The Requirements for Advanced Specialty Education Programs in Endodontics lists the treatment modalities included in the scope of the specialty. (Appendix IX)

A trend toward increasing complexity of procedures performed by endodontists has been observed on a national level. This complexity manifests itself in two ways. First, experience shows that the more difficult cases are being referred to Endodontists (refer to B.3.a.ii). Second, there is an increase in the number of cases referred in which treatment has been attempted, unsuccessfully, prior to referral. This phenomenon is gradually reshaping the nature of Endodontic clinical case loads in specialty practice.

Another trend is the referral of increasingly older and more medically compromised patients. A positive outcome of this trend for Endodontists is the clinical success of cases that were considered impossible to treat successfully only a decade or two ago.

B.4.b. Practice Settings:

[Identify the setting in which these health services provided to the public, e.g. private office, hospital, laboratory, institutional setting, etc.]

The vast majority of Endodontic procedures are provided in private practice settings. Nonetheless, significant amounts of services are provided through federal dental facilities, dental, educational institutions, hospitals, nursing homes and in closed panel, HMO settings.

A survey conducted by the American Association of Endodontists in 1984 indicated the following general breakdown of settings:

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

It should be noted that there is considerable overlap regarding the settings where endodontists provide clinical services. For example, many endodontists in private practice also teach part-time and/or see patients in hospital settings. Also, endodontists primarily attached to educational institutions also treat patients either in faculty practice clinics or part-time in private practice settings outside the educational institution.

Trends in practice settings occur over time. An established trend is for endodontists who practice privately to do so in small groups. Recent trends show the establishment of larger multi-location practices and for small numbers of endodontists to be employed, full-time, in closed panels, HMO's, etc.

B.5 Reference: "Formal advanced education programs of at least two years beyond the predoctoral curriculum must exist to provide the special knowledge and skills required for practice of the specialty."

B.5.a. Operational Advanced Education Programs

[List all the currently operational advanced education programs in the specialty or proposed specialty, indicating:

i. the name of the sponsoring institution

ii. the name and educational background of the program director

iii. the mandatory length of the program for full-time students

iv. the nature of the certificate or degree awarded]

Responses are included in the chart below.

INFORMATION ON ACCREDITED ENDODONTIC PROGRAMS:
1987 - 1988

Sponsoring Institution	Program Director	Board Status*	Mandatory Length (In Mos.)	Nature of Award**
Univ of Alabama	R. Barfield	EE	24	C
Univ. of So. Calif.	M. Abou-Rass	BE	24	C
Loma Linda Univ.	L. Bakland	B	21	B
Univ. of Connecticut	K. Safavi	B	24	B
Medical College of Georgia	R. Anderson	B	24	C
Loyola Univ.	F. Weine	B	21	B
Northwestern Univ.	E. Osetek	B	24	B
Univ. of Illinois	J. VanCura	B	21	C
Indiana Univ.	C. Brown	B	21	B
Univ. of Iowa	K. Krell	B	24	B
Univ. of Louisville	D. Green	B	22	C
Louisiana State Univ	V. Himel	B	24	B
Univ. of Maryland	T. Dumsha	B	24	C
Boston Univ.	H. Schilder	B	21	B
Tufts Univ.	M. Goldman	B	23	C
Univ. of Detroit	H. Steiman	B	21	B
Univ. of Michigan	J. Corcoran	EE	22	B
Univ. of Minnesota	M. ElDeeb	B	21	B
Univ. of Nebraska	G. James	B	20	B
Univ. of New Jersey	L. Lin	B	21	C
Columbia Univ.	S. Kim	EE	36	B
New York Univ.	H. Blechman	B	22	C
S.U.N.Y.-Buffalo	G. Cogar	B	24	B
Univ. of North Carolina	S. Madison	B	24	B
Ohio State Univ.	W. Meyers	BE	24	B
Oregon Hlth Sci.	F. Marshall	B	24	B
Temple Univ.	I. Sinai	B	21	B

Univ. of Pennsylvania	F. Barnett	B	24	B
Univ. of Pittsburgh	A. Michanowicz	B	30	B
Baylor Col. of Dentistry	J. Harrison	B	23	C
Univ. of Texas Houston	J. Ludington	BE	24	B
Univ. of Texas San Antonio	E. Senia	B	23	C
Va. Commonwealth	R. Dodds	B	24	C
Univ. of Washington	G. Harrington	EE	24	B
West Virginia Univ.	A. Skidmore	B	24	B
Marquette Univ.	N. Luebke	BE	24	B
V.A. Med. Ctr. Long Beach	J. Simon	B	24	C
Walter Reed - Army	G. Labounty	B	24	C
Fort Gordon	R. Weller	B	24	C
V.A. Med. Ctr. Indianapolis	C. Newton	B	24	B
US Navy Bethesda	A. Campbell	B	24	C
Nassau County Medical Ctr.	A. Nevins	B	24	C
V.A. Med. Ctr. New York	H. Blechman	B	24	C
Albert Einstein Medical Ctr.	L. Rossman	B	24	C
US Air Force Wilford Hall	J. Doran	B	24	C

* "B" = Board Certified; "BE" = Board Eligible; "EE" = Educationally Eligible
** "C" = Certificate; "D" = Degree; "B" = Certificate/Degree

Source The information presented reflects institutional responses to the 1987-88 Annual Survey of Advanced Endodontic Programs, of the Division of Educational Measurements, Council on Dental Education, American Dental Association with an update as of May 1988.

B.5.b. Minimum Curricular Requirements

[Provide a description of minimum biomedical, behavioral and clinical science requirements for advanced education programs in the specialty or proposed specialty.]

Biomedical, behavioral, and clinical science requirements for advanced specialty education programs in Endodontics has been extracted from the Commission on Dental Accreditation approved Requirements for Advanced Specialty Education Programs in Endodontics. (Appendix IX)

The Advanced Dental Specialty programs in Endodontics must be designed to provide special knowledge and skills beyond the D.D.S. and D.M.D. training with the principal objective being to develop competent diagnosticians and clinicians. An additional objective is to develop teachers and researchers.

All Endodontic programs must provide a complete two academic year sequence of progressive experience.

Didactic Program

An acceptable postdoctoral program in Endodontics must provide instruction in the application of the relevant biomedical sciences. Ideally, these biomedical science requirements can best be met with a series of well-planned educational activities specifically designed for the needs of

the postdoctoral student in Endodontics. A minimum of 15 percent of the two-year program must be devoted to biomedical science instruction. Instruction in the biomedical sciences may be provided by formal courses, seminars, conferences, reading assignments, and hospital and laboratory assignments. The goals, objectives and content of these educational experiences must be carefully planned and monitored by the program director to avoid deficiencies and unnecessary repetition. The courses presented should be specifically designed for postdoctoral students and not simply be a repetition for predoctoral biomedical science courses. This does not imply that predoctoral material cannot be used to supplement and form a review for the advanced course. Instruction in the biomedical sciences must include:

a) head and neck anatomy
b) oral pathology
c) biochemistry
d) pharmacology
e) microbiology and immunology
f) physiology
g) microanatomy (histology)
h) biostatistics and research methodology

The amount of time (clock hours) devoted to each biomedical science will not be equal. Decisions as to what emphasis is placed in any particular area will vary according to the individual program's particular objectives and resources.

Instruction must provide knowledge of Endodontics at the in-depth level in:

a) diagnosis of pulpal and periradicular pathosis in primary and permanent dentition
b) vital pulp therapy
c) Endodontic emergency procedures
d) nonsurgical Endodontic procedures
e) surgical Endodontic procedures
f) coronal bleaching and restoration of endodontically teeth
g) evaluation of Endodontic therapy

Instruction must provide knowledge of Endodontics at the understanding level in:

a) medical emergencies
b) management of medically compromised patients
c) behavioral science applied to dentistry

Instruction must provide knowledge at the familiarity level of Endodontics and other related disciplines to include:

a) history of Endodontics
b) teaching methodology
c) scientific writing
d) hospital protocol
e) practice management, jurisprudence and ethics
f) physical evaluation

g) transplantation of teeth
h) marsupialization
i) periodontics
j) prosthodontics
k) restorative dentistry
l) pedodontics
m) biomaterials science

Seminars and conferences dealing with various phases of Endodontic diagnosis and therapy in which postdoctoral students take an active part, including literature and book reviews as well as clinical pathological conferences, must be held on a regularly scheduled basis as part of the teaching program. Students in postdoctoral programs in Endodontics must also actively participate in seminars or conferences in which they present or participate in the preparation of diagnostic data, treatment planning and presentation of the results of patient treatment. Students in postdoctoral programs in Endodontics must also be given specific assignments which require the use of the library.

Clinical Program

A minimum of 40 percent and a maximum of 60 percent of program time must be devoted to clinical care in a two-year program. The program must enable the student to develop proficiency in the diagnosis of pain of pulpal and periradicular origin. The program must include an effective recall system.

The program must provide clinical experience which enables students to achieve competence in:

a. Taking and recording an appropriate medical history, conducting a systematic extraoral and intraoral examination, and determining the relationship between the general and oral health status of the patient and the Endodontic therapy.

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

c. Differential diagnosis of oral and maxillofacial pain.

d. Discriminating between periradicular lesions of pulpal origin, periradicular lesions of non-pulpal origin and normal anatomical structures which resemble periradicular lesions.

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

f. Recognizing and providing appropriate treatment to enhance the reparative potentials of the vital dental pulp and avoid the necessity for root canal therapy and rendering appropriate treatment where indicated. These procedures include but are not limited to:

   i. Desensitization of dentin

ii. Protection of the dental pulp by means of liners, bases, and/or sedative interim restorations

iii. Indirect cappings of the dental pulp

iv. Direct capping of the dental pulp

v. Vital pulpotomy procedures

g. Providing appropriate emergency treatment procedures to relieve pain and/or resolve swelling.

h. Performing the technical procedures involved in root canal treatment for anterior and posterior teeth.

i. Recognizing and correcting procedural errors in access preparation, instrumentation and obturation.

j. Determining whether Endodontic therapy has succeeded or failed and identifying probable causes of failures.

k. Performing the diagnostic and technical procedures involved in surgical Endodontic therapy including:

i. Incision, drainage and trephination

ii. Periradicular curettage, apicoectomy, or retrofilling as is appropriate for the case

iii. Hemisection or root amputation as is appropriate for the case

iv. Surgical repair of perforations

l. Determining those teeth amenable to bleaching procedures and performing those bleaching procedures appropriate to the case.

m. Recommending appropriate restoration of endodontically treated teeth and providing the space for proper retention and resistance form for the appropriate restoration.

Advanced Endodontic students should provide Endodontic services and demonstrate experience in:

a. Evaluating the effects of impact injury to teeth including pulp testing, coronal color changes, pulp chamber and/or root calcification or resorptions and pulpal necrosis as well as performing therapy where indicated for intact teeth, coronally fractured teeth, root fractured teeth, partially displaced teeth and avulsed teeth.

b. Clinical management of medically compromised patients

c. Intentional tooth replantations

d. Endodontic endosseous implants

e. Crown lengthening and forced eruption procedures

f. Root end closure and apexogenesis procedures

Students should be provided with experience in the fabrication and placement of posts and cores in endodontically treated teeth. This experience should be provided in consultation with the individual who will be completing the restoration.

Complete and comprehensive records of history, diagnosis and treatment must be maintained for each patient and available for review.

Although a single Endodontic technique may be emphasized, the students must be exposed to and instructed in a variety of techniques. Outside consultations should be used when necessary to meet this requirement.

Consultation with the other dental specialties, particularly with periodontics, pedodontics, oral surgery, and prosthodontics must be provided.

Teaching

Teaching experience is also a learning experience for the student because it enhances the student's ability to organize and evaluate material and to communicate information to others. Opportunities should be provided for teaching predoctoral students in both demonstration and lectures. These opportunities should be limited so as not to interfere with the postdoctoral educational process and must not exceed 10 percent of the total clock hours in a two-year program.

Research

The application of research methods and the evaluation of investigative data develop intellectual growth, a creative attitude, a better interpretation of scientific literature and a desire for continued study. Students should be encouraged to engage in an investigative project. Such research may take the form of investigation in laboratories or clinics, or comprehensive summaries of scientific literature or the preparation of statistical analyses based on clinical case records.

Students in advanced programs in Endodontics must be introduced to the methods of scientific investigation. The advanced program should involve the student personally in research for these purposes. The advanced student in Endodontics should prepare at least one review paper based upon thorough library research. The topic should be of the student's own choosing and have the approval of the major advisor.

Supporting Documentation: Commission on Dental Accreditation approved Requirements for Advanced Specialty Education Programs in Endodontics. Effective January 1, 1985 and revised May, 1985 and February, 1987.

B.5.c. Sample Curricula

[Provide a representative sample of curricula currently used in several existing programs. The examples provided should reflect the various methods of structuring advanced education in the specialty or proposed specialty.]

This information is not required of currently recognized specialties.

B.5.d. Other Information

[Provide any other information which demonstrates compliance with the criterion.]

The body of knowledge and levels of skill required for the practice of the specialty of Endodontics can be obtained only through accredited, two year advanced specialty programs in Endodontics. Undergraduate Endodontic programs, general practice residency programs, advanced general dentistry programs and continuing education programs clearly do not provide the depth, experiences, or body of knowledge necessary to practice the specialty of Endodontics.

It should be noted that greater than one half of the Advanced Specialty Programs in Endodontics also offer graduate degrees in addition to Endodontic advanced education certification.

The quality of Endodontic program directors is evidenced by 80 percent being Diplomates of the American Board of Endodontics, 11 percent being board eligible and the remaining 9 percent educationally eligible.

Supporting Documentation:

i. Curricular Guidelines for Undergraduate Endodontics (Appendix VIII)

ii. Standards for General Practice Residency and Advanced General Dentistry programs

iii. Commission on Dental Accreditation approved Requirements for Advanced Specialty Education Programs in Endodontics. Effective January 1, 1985 and Revised May, 1985 and February, 1987 (Appendix IX)

APPLICATION FOR CONTINUED RECOGNITION OF

ENDODONTICS

AS A DENTAL SPECIALTY

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ACKNOWLEDGMENTS

The American Association of Endodontists acknowledges the following individuals for their contributions to the preparation of this material.

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PART A - SPONSORING ORGANIZATION

American Association of Endodontists

Reference: Requirements for Recognition of Dental Specialties and National Certifying Boards for Dental Specialties, "Introduction,"

"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."

A.1. FOUNDING DATE AND HISTORICAL DEVELOPMENT

[Indicate the year in which the sponsoring organization was founded and summarize its historical development since that date.]

A.2. OFFICERS

[Identify current officers of the sponsoring organization.]

The Officers and the Board of Directors of the American Association of Endodontists for the 1988-1989 year are:

A.3. MEMBERSHIP

A.3.a. [Indicate the total number of members in the sponsoring organization for each of the past ten years.]

Year	Total
1979	2,457
1980	2,634
1981	2,701
1982	2,822
1983	2,907
1984	3,049
1985	3,192
1986	3,277
1987	3,315
1988	3,435

A.3.b. [Identify the categories of membership in the sponsoring organization and list the requirements for membership in each category.]

There are seven categories of membership in the American Association of Endodontists.

A.3.c. [Identify the number of members in each category of membership.] As of April 1, 1988, the number of members in each category of membership are:

Active members	2,656
Associate members	209
Disabled Active members	13
Honorary members	6
Life members	150
Retired members	92
Student members	251
Applications in process	58
	3,435

A.3.d. [Append a copy of the sponsoring organization's current bylaws and membership roster.]

The Membership Roster which includes the Constitution and Bylaws of the American Association of Endodontists is inserted in the pocket of this folder. (Appendix I)

A.4. OTHER NATIONAL DENTAL ORGANIZATIONS

(for proposed specialties only)

[Identify other national dental organizations whose primary objective is advancement of this area of dental practice.]

Not Applicable

A.5. ACTIVITIES

A.5.a. [List the national meetings, research symposia and continuing education programs offered by the sponsoring organizations over the past ten years.]

Since the founding of the American Association of Endodontists in 1943, the Association has sponsored an annual scientific session for its members (with the exception of the wartime year 1945). During the past ten years, annual sessions have included scientific sessions on Endodontic and related topics, research seminars, half and full day essay programs, limited attendance seminars, roundtable discussion groups, and table and poster clinic presentations. In addition, continuing education courses have been conducted immediately preceding the annual scientific session. The scientific programs, including continuing education courses, offered over the last ten years are listed below. (Copies of the printed programs are included in the Appendix II)

A.5.b. [List journal published or sponsored by the organization over the past ten years.]

The Journal of Endodontics, the leading publication in the field of Endodontics, is a refereed scholarly journal of 640 text pages per year. The Journal publishes original articles on the clinical, basic science and research aspects of Endodontology.

The Journal also contains a news section which complements the Association newsletter, the Communique. The Communique, a semi-annual newsletter, provides current Association news, announcements, official reports, notices, and activities to its members.

The Journal is published monthly by Williams & Wilkins Co. of Baltimore, MD. Advertising accepted by the Journal is evaluated by the Editor and the Editorial Board and may not exceed 25% by volume of any issue published. (Copies of the Journal and Communique are included in Appendix IV)

Special issues of the Journal, published occasionally, include to date:

March, 1981 - GLOSSARY OF ENDODONTIC TERMS
(An annotated glossary of terms used in Endodontics, 3rd edition)

January, 1982 - FESTCHRIFT
(Issue devoted to Dr. Louis I. Grossman)

January, 1985 - FESTCHRIFT
(Issue devoted to Dr. Irving J. Naidorf)

A.5.c. [Indicate whether the organization has sponsored any specific research over the last ten years, either directly or through an affiliated foundation. Identify research projects sponsored.]

The American Association of Endodontists sponsors research through its Endowment & Memorial Foundation. Although a formal Grant-in-Aid program was started in 1980 and is the principal method of sponsorship, research grants were awarded prior to that time. Recipients of these grants and the title of their research are as follows:

A.6. SCIENTIFIC ADVANCES

[Identify scientific advances (procedures, techniques, materials) developed in this area of practice by members of the sponsoring organization during the past ten years.]

The Advances cited in this section have been categorized under ten headings. Both clinical and scientific advances are included under each section. The references cited in each section are not all inclusive but each paper cited over the last decade includes an American Association of Endodontists member as either the principal author or co-author.

The citations are categorized under the following headings:

1. CYTOTOXICITY STUDIES

Traditionally, research is conducted on the toxicity of materials introduced into the body through the root canal system. Both long term and short term evaluations are conducted on Endodontic irrigants, sealers, medicaments and filling materials.

2. LONGITUDINAL SUCCESS STUDIES

Research studies are conducted in the efficacy of Endodontic therapy. Various treatment modalities used in clinical practice are evaluated. Factors affecting prognosis are constantly evaluated in these investigations.

3. ADVANCES IN TECHNIQUES/PROCEDURES

This area of research develops the scientific bases for the rationale for incorporating new techniques and procedures into the clinical practice of Endodontics. Commonly accepted concepts are challenged and advances are made.

4. INFLAMMATION, IMMUNOLOGY, MICROBIOLOGY AND PATHOLOGY

In recent years great emphasis has been placed on the immunologic aspects of pulpal and periapical disease. Studies are conducted to determine the causal relationship between specific microorganisms with their immunologic implications and the disease process.

5. ADVANCES IN MATERIALS/INSTRUMENTS

Considerable research has been conducted, in recent years, on the newly developed root canal instrumentation systems and root canal filling material delivery systems. The use of sonic and ultrasonic energy for the cleansing and shaping of the root canal spaces has received particular attention as has the use of thermoplasticizing systems for the delivery of gutta percha.

6. ANATOMY AND MORPHOLOGY

Root canal morphology, aberrations in canal anatomy and the incidence, prevalence and location of multiple canals and accessory canals are continuously studied as advanced technologies permit more sophisticated research. Of particular interest to the practitioner, is the impact that these aberrations have on the prognosis following root canal treatment. Pulp studies related to the neural and circulatory anatomy and physiology are also conducted to arrive at a better understanding of the factors that contribute to pulp health and vitality.

7. PULP RESPONSE/VITAL PULP THERAPY

The effect on dental pulps of an ever increasing number of new dental restorative materials stimulates considerable scientific interest. Research efforts continue to examine this area helping the clinician to select the appropriate materials and techniques to ensure that the pulp is protected during restorative procedures.

8. RESTORATION OF ENDODONTICALLY TREATED TEETH

The partnership between specialists and the general practitioners is underscored by the direct relationship between the prognosis of endodontically treated teeth and their proper restoration. Studies continue to identify those restorative practices that influence the survival rate of endodontically treated teeth.

9. DIAGNOSIS

The differential diagnosis of dentinal, pulpal, periradicular and periodontal pain is the primary focus of the Endodontist. Continued clinical and scientific investigations of the complex dental apparatus and oral symptomatology combine to facilitate patient care.

10. PAIN AND PAIN CONTROL

Differential diagnosis of craniofacial pain of odontogenic and non-odontogenic origin has become an ever increasing and important aspect of Endodontic practice. Pre- and post-operative medications for the relief of inter-appointment pain are often studied. Research in this area continues to shed new light on the issues relative to pain free dentistry.

A.7. OTHER INFORMATION

[Provide any other information which demonstrates that the sponsoring organization meets the definition specified in the requirements.]

Requirements

The American Association of Endodontists and its members provide the following additional services which benefit the Profession and the lay public:

1. Sponsors the American Board of Endodontics

The Association has sponsored the American Board of Endodontics since its founding in 1955 (incorporated 1956). The purpose of the Board is to contribute to the advancement of Endodontics by elevating the standards of endodontic practice within the dental profession through the certification of candidates in the special area of Endodontics. Certification as a Diplomate is accomplished by successful completion of both a written and an oral examination as well as documented case histories showing a broad range of treatment modalities. The nine directors of the American Board of Endodontics are elected by the membership of the AAE at its General Assembly meeting at the Annual Session (three each year to serve a maximum of two-three year terms). The American Association of Endodontists has financially supported the Board during litigation to protect the Board's certifying powers.

As of July 1, 1988, the Board has certified a total of 801 Diplomates. Ninety-seven percent (97.2%) of the Active (Registered) Diplomates are Active Members of the American Association of Endodontists.

2. Sponsors the Endowment and Memorial Foundation

The Endowment and Memorial Foundation was established in 1966. Its purpose is to promote and support the advancement of Endodontics by:

a) Providing funding for Endodontic research.

b) Guaranteeing student loans for advanced education students.

c) Conducting professional education programs.

3. **Maintains the Endodontic Archives and Index to the Endodontic Literature**

The Association's Endodontic Archives and Index of the Endodontic literature was established with support from the AAE Endowment and Memorial Foundation. The Archives house both historic and current material of interest and value. Materials pertinent to the specialty are accepted on a continual basis. The Index to the Endodontic Literature is updated regularly and currently has catalogued more than 5700 bibliographic citations. Both the Archives and the Index to the Endodontic literature are housed in the Association's Central Office.

4. **Sponsors Public and Professional Awareness Programs**

The Public and Professional Awareness Program is a continuing activity of the Association to increase the identification of the Endodontist and Endodontics within the dental profession and to the public. The specific goals are:

a) To increase public and professional awareness of Endodontics and the role of the Endodontist in oral health care delivery.

b) To promote a positive relationship between the general practitioner and the endodontist.

c) To assist individual AAE members in promoting Endodontics and their practices.

The program components include the development of educational materials, practice promotion tools such as a slide presentation, and media materials for the general public and the dental community. Spokesperson training, followed by national and regional media placement activities, have continued throughout the four years of the program. During this program, two audio tapes on timely endodontic topics have been produced and distributed at no cost to the general dental community. The first tape, "Endodontic Flare-ups" was mailed directly to 75,000 members of the American Dental Association. The second tape "Profound Pulpal Anesthesia" was completed in April 1988 and has been distributed by the individual members of the AAE to their general practitioner colleagues. A Symposium on Referrals in Dentistry was sponsored by the Association as part of this program.

During the four-year public and professional awareness campaign, the Association's public relations firm has been awarded a prestigious Silver Trumpet Award for the Association's program.

5. **Publishes patient information pamphlets**

The Association publishes numerous pamphlets designed to improve the patient's understanding of Endodontic treatment. The pamphlets are available for purchase at cost by the dental profession and are sent free of charge in response to public request for information.

Patient information pamphlets presently offered by the Association include the following: (# distributed since 1985) (Copies of the pamphlets are included in Appendix V)

a) Bleaching Discolored Teeth (33,400)

b) When Retreatment of Endodontic Therapy is Necessary (77,400)

c) You have been Referred to an Endodontist (93,700)

d) Endodontists: Specialist in Saving Teeth (113,700)

e) After Your Endodontic Treatment (124,830)

f) Saving Teeth Through Endodontic Therapy (361,300)

6. **Establishes and publishes Quality Assurance Guidelines for Endodontics**

In 1987 the AAE developed and published Quality Assurance Guidelines in response to a public and professional need. As the recognized sponsoring organization of the national certifying board in this special area of dental practice, the Association has the expertise and professional responsibility necessary to assist the dental profession and the public in the establishment of the standard of care in this specialty area of dentistry. (Appendix VI)

In receiving care of a specialized nature, patients need and deserve treatment that meets the standard of care generally given by competent practitioners trained in that area of specialization. The Quality Assurance Guidelines address two essential elements: the appropriateness of the treatment modality and the quality or level of treatment rendered.

In addition to distribution to the Association membership, the Quality Assurance Guidelines have been distributed, on request, to other dental specialties, constituent dental societies, individual practitioners, and third-party payers.

7. **Publishes the Annotated Glossary of terms used in Endodontics**

The Association has published and periodically updates a Glossary of terms used in Endodontics as a reference for the dental profession. The fourth edition of the Glossary was issued in 1984 as a separate publication and is designed to enhance communication among clinicians, researchers, and students. (Appendix VII)

8. **Nominates individuals to serve on the Advisory Committee on Advanced Dental Education in Endodontics, site visit consultants to the Commission on Dental Accreditation and its Committee B (Committee on Advanced Dental Education)**

The American Association of Endodontists nominates two advisors and the American Board of Endodontics nominates two advisors who are appointed by the Commission on Dental Accreditation to serve a maximum of two, three-year terms on the Advisory Committee on Advanced Dental Education for Endodontics. The AAE and ABE underwrite the financial responsibility attendant to the convening of this Committee twice each year.

The Association nominates an individual to serve a two-year term on the Commission on Dental Accreditation. This position rotates among the other recognized Specialties, so Endodontics is represented on the Commission for two of every eight years. The Commission appointment carries with it a concomitant appointment to serve on Committee B (Committee on Advanced Education). Individuals who serve as site visit consultants to the Commission are nominated by the Association and appointed by the Commission on Dental Accreditation. These AAE active members serve as site visit consultants to Advanced Education Programs in the accreditation process. Currently, fourteen members of the Association serve the Commission on Dental Accreditation for Endodontics in this capacity.

Periodically, the AAE and the E&M Foundation provide funding for training workshops for site visit consultants and program directors when appropriate.

9. **Appoints individuals to serve on the Appeals Committee of the Commission on Dental Accreditation**

   The American Association of Endodontists appoints one of its members to serve a single four-year term on the Appeals Board of the Commission on Dental Accreditation.

10. **Assists in the development of curriculum guidelines for predoctoral endodontic education**

    The American Association of Endodontists, in cooperation with the Endodontic Section of the American Association of Dental Schools, developed Guidelines for Predoctoral Endodontic Education between 1978 and 1980.

    The American Association of Endodontists provided the financial support for a workshop by the Endodontic Section of the American Association of Dental Schools in Dallas in 1984. The purpose of the workshop was to rewrite the pre-doctoral Guidelines. All of the workshop participants except the facilitator were members of the AAE. (Appendix VIII)

11. **Develops curriculum standards for Advanced Education in Endodontics**

    An Ad Hoc Committee of AAE members wrote the Standards for advanced education in Endodontics in 1983-84 and submitted the proposed Standards to the ADA Commission on Dental Accreditation. The Commission approved those Standards for Advanced Education Programs in Endodontics effective on January 1, 1985 and revised, with input from AAE, in May 1985 and February 1987. (Appendix IX)

12. **Members author, co-author and/or edit textbooks and monographs which benefit all in the profession**

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."

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 behavioral and/or biomedical science in which advanced knowledge beyond that included in the predoctoral curriculum is required for practice of the specialty or proposed specialty.]

Advanced Education Programs in Endodontics provide instruction in the application of the relevant biomedical sciences. Biomedical science instruction is conducted through a series of well-planned formal courses, conferences, seminars, reading assignments, and hospital or laboratory assignments. These activities are specifically designed for post doctoral students and are not a repetition of predoctoral biomedical courses. Included in the content of biomedical instruction are the following:

1. Head and neck anatomy
2. Micro anatomy (Histology)
3. Oral pathology
4. Biochemistry
5. Pharmacology
6. Microbiology and Immunology
7. Physiology
8. Physical evaluation/Medical emergencies

Advanced education programs provide instruction in biostatistics and research methodology. They provide instruction at the knowledge level in principles of behavioral science as applied to dentistry and to Endodontics in particular as well as the management of medically compromised patients. Graduates of advanced education programs in Endodontics are familiar with the history of Endodontics, teaching methodology, practice management and jurisprudence and ethics as applied to the discipline. Familiarity with scientific writing and hospital protocol are also required.

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 graduate of an Advanced Program in Endodontics must have current in-depth knowledge and be clinically proficient and/or competent to meet the needs of patients referred to them for consultation and/or treatment.

COMPARISON OF THE EDUCATION OF GENERAL DENTISTS (GP) and ADVANCED DENTAL EDUCATION STUDENTS IN ENDODONTICS (ADE)

Area of Knowledge or Skill	Requirement			Level of Knowledge			Level of Skill		
	Must	*Should*	*May*	*In-depth*	*Understand*	*Familiar*	*Proficient*	*Competent*	*Experience*
Endodontic Diagnosis and Treatment Planning	ADE	GP		ADE	GP		ADE	GP	
Causes and Prevention of Pulpal Disease and their Sequlae	GP ADE			ADE	GP			GP ADE	
Vital Pulp Therapy	ADE	GP		ADE	GP			ADE	GP
Emergency Treatment for Endodontics	ADE	GP		ADE	GP			ADE	GP
Endodontic Treatment Modalities (general)	ADE	GP		ADE	GP	GP			
Endodontic Treatment Modalities (specific) Uncomplicated single root teeth Uncomplicated multi-root teeth Complicated single and multi-root teeth	 GP/ADE ADE ADE	 GP GP		 ADE ADE ADE	 GP GP	 GP GP	 ADE ADE	 GP GP ADE	 GP
Procedural Errors in Treatment	ADE	GP		ADE	GP			ADE	GP
Prognosis of Endodontic Treatment	ADE	GP		ADE	GP			ADE	GP
Surgical Endodontic Therapy	ADE	GP		ADE		GP		ADE	GP
Coronal Bleaching/Restoration of Root Canal Treated Teeth	ADE	GP	GP	ADE		GP		ADE	GP
Endodontic Related Procedures: i.e. traumatic injuries to teeth, medically compromised patient, core tooth replantations, endosseous root implants, root end closures, apexogenesis, crown lengthening, or forced eruption.		ADE GP	GP		ADE	GP			GP ADE

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

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 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. Among the specific areas of advanced knowledge required for the practice of Endodontics and not included in the other recognized special areas of dental practice are the following:

1. Gross, microscopic and ultrastructural anatomy of the dental pulp and related structures; i.e. dentin and tooth development.
2. Pulpal pathology and its sequelae.
3. Pulpal microbiology and periradicular microbiology as related to pulpal pathology.
4. Biochemistry of the dental pulp and dentin in health and disease.
5. Physiology of pulpal neural and vascular systems and their relationship to oral and maxillofacial pain.
6. Pharmacotherapeutics as related to pulpal and periradicular disease.
7. Biologic materials as related to Endodontic practice.
8. Armamentarium specifically designed for and unique to Endodontics.
9. Practice administration as well as the interpersonal skills essential for conduct of a referral based dental service as related to Endodontic practice.

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.]

The following advanced skills required for the practice of Endodontics are not included within the scope of other recognized specialties:

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. Diagnosis and emergency treatment for the pre-operative, inter-appointment and post-operative relief of symptoms associated with pulpal pathology and/or its treatment.
4. Diagnosis and treatment relating to traumatic injuries to the teeth including avulsion and replantation, partial avulsion as well as management of post-trauma and post-treatment events.
5. Non-surgical Endodontic services, including but not limited to root canal therapy, interim and post-treatment temporary restoration, endosseous implants and related intracoronal and intraradicular techniques.
6. Surgical treatment of endodontically related pathoses.
7. Assessment of the restorative requirements of endodontically treated teeth.
8. Evaluation of Endodontic therapy rendered.
9. Endodontic-Endosseous implants.
10. Intentional replantation.

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 of the recognized specialties.]

The basic sciences studied by endodontists are common to most dental specialties since all eight recognized dental specialties share common links in areas of biomedical and behavioral science. Sound principles of the scientific method in research design and biostatistics are also mutually shared by all specialties. Since all specialties are composed of dentists, there is a common shared knowledge of clinical dental science. However, by focusing on the dental pulp, specific aspects of the basic sciences are integrated into the clinical practice of Endodontics, and this creates a specialty area unique from others.

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

B.3. Reference: "In order to be recognized as a specialty, substantial public need and demand for services which cannot be adequately met by general practitioners or specialists in other areas must be documented."

B.3.a. Need

B.3.a.i. [Cite epidemiological studies (national, regional and/or state) which indicate the incidence and/or prevalence of conditions in the specialty or proposed specialty.]

1. According to data from resources 1,2,3 and 4, Endodontic procedures accounted for 2.1 - 2.2% of all dental procedures submitted for payment from a sample of 165,183 dental procedures.

2. Endodontic procedures accounted for an average of 7% of the total dollars billed for third party payment (excluding orthodontics). If projections by the American Dental Association are correct to the extent that in excess of 30 billion dollars will be spent on dental services in 1988-1989, then using the stated percentage, over 2.1 billion dollars will be spent on Endodontic procedures.

3. A breakdown of Endodontic services provided by endodontists from data collected from in excess of 200,000 Endodontic procedures submitted for payment to third party payers and an additional 22,469 cases reported in the ERS revealed the incidence of conditions diagnosed and/or treated by the specialist in the following categories:

single canals	12-22%
two canals	24-30%
three canals	35-45%
four canals	42-56%
apicoectomy	46-75%
apexification	69-73%

B.3.a.ii. [Cite data that indicate the severity of conditions diagnosed and/or treated by practitioners in the specialty or proposed specialty, e.g. morbidity or mortality statistics, descriptive information.]

Information gathered from the ERS revealed the following breakdown of conditions diagnosed and/or treated by the endodontist:

1. In the sample of 22,469 teeth, 10,605 teeth or 47.2% presented with or were found to have one or more of the following complications. (Percentage of each individual condition appears in parenthesis opposite the reported complications.)

Calcified canals	(16.8)
Retreatment of previous root canal treatment	(10.0)
Inability to properly diagnose	(7.2)
Inability of referring dentist to control pain and/or swelling	(6.1)
Perio-endo complication	(5.8)
Medically compromised patient	(4.3)
Ledged or dilacerated canal	(3.9)
Cracked tooth	(2.8)
Inability to obtain adequate anesthesia	(2.9)
Resorption	(2.5)
Perforations (iatrogenic)	(1.8)
Separated instruments	(1.4)
Incomplete root formation	(1.4)
Fractured root	(1.1)

2. In the sample of 22,469 teeth reported in the survey, 17,638 teeth or 78.5 percent were posterior teeth. This data is consistent with information gathered from third party payers as presented in B.3.a.i. of this section and would indicate that as the number, location and complexity of the root canal systems increase, a greater percentage of these cases are being referred to the endodontist.

3. In the sample of 22,469 teeth referred to the endodontist, 2,517 teeth or 11.2 percent of the treatment was initiated by the referral service but presented difficulties beyond their ability to complete treatment, i.e. mid-treatment referral.

B.3.a.iii. [Project the need for practitioners in the specialty or proposed specialty over the next ten years, taking into account disease trends, demographic changes and other pertinent factors.]

Dr. Antonio Furino, Director, Center for Studies in Health Economics at the University of Texas Health Science Center at San Antonio reported that all recent epidemiologic studies indicate an increase in dental needs with the exception of coronal caries in children and young adults, simple extractions, and, only in the distant future, full dentures and removable partial dentures. He reports that unprecedented increases are expected in the demand for Endodontics.

The American Dental Association projections of Endodontic cases anticipate an increase from 17,390,000 root canal treatments in 1979 to 30,540,000 root canals treatments by the year 2,000. During the period 1977 to 1986 dental claims filed with Delta Dental Plans of California demonstrated Endodontic services increased 5.7%. In a survey of 5,125 dentists, Christensen reported "substantial increases in Endodontics over a 5 year period from 1980 to 1985. Demand for Endodontic services continue to increase as the public becomes more aware that Endodontics is an alternative to extraction and the Nation's dentists increasingly incorporate Endodontics into their treatment plans.

As reported in the 1987 National Findings on Oral Health of United States Adults, "There has been a gradual and significant decrease in the number of edentulous persons over the past 25 years." With adults having more teeth present, there are more teeth available for and potentially more teeth in need of Endodontic treatment.

B.3.b. Demand

B.3.b.i. [Indicate the number of dentists currently in practice who have received two or more years of advanced education in the specialty or proposed specialty. (This should not include continuing education.)]

Two thousand eleven (2,011) dentists currently in practice received two or more years of advanced education in Endodontics. (Source: American Association of Endodontists)

B.3.b.ii. [Indicate the number of dentists currently devoting full time to the practice of the specialty or proposed specialty.]

Two thousand two hundred fifteen (2,215) dentists are currently devoting full time to the practice of Endodontics. (Source: American Association of Endodontists)

B.3.b.iii. [Indicate the number of advanced education programs of two years or more in length in the specialty or proposed specialty for each of the past five years. Indicate the first year enrollment and number of graduates of these programs for each of the past five years.]

Number of advanced education programs in Endodontics of two years or more for each of the past five years:

1984	1985	1986	1987	1988
49	48	48	48	45

First year enrollment:

1984	1985	1986	1987	1988
139	123	131	126	130

Number of graduates:

1984	1985	1986	1987	1988
145	127	132	135	123

(Source: Council on Dental Education of the American Dental Association)

B.3.b.iv. [Describe referral patterns, including identification of who normally refers patients to practitioners in the specialty or proposed specialty and the frequency of referrals.]

Patients are referred to the endodontist primarily from three referral sources: general dentists, other dental specialists and previous patients. Results from ERS indicate that 88.8% of all patients referred to the endodontist are referred by the general dentist. Specialists in other dental disciplines account for 7% of all referrals to the endodontist while previous patients account for 2.2% of all referrals.

The types of referral can be further divided into direct and mid-treatment referrals. A direct referral would be defined as a tooth requiring Endodontic treatment in which there was no intention or effort by the referral source to provide that treatment. Direct referrals comprise 88.2% of all cases referred to the endodontist.

A mid-treatment referral would be defined as a tooth requiring the completion of Endodontic treatment which was initiated by another dentist whose original intention was to provide the entire Endodontic treatment. Mid-treatment referrals account for 11.2% of all referrals to the endodontist according to the ERS.

A survey conducted and reported by Dental Products Report, December, 1987 provided a detailed breakdown of referral patterns from 680 general dentists. The following summarizes the data reflecting the referral patterns of the survey respondents specific to Endodontic treatment:

1. General dentists referring all Endodontic cases accounted for 11.7% of the survey respondents.

AGE	PERCENTAGE
<31	2.0
>40	72.0

2. General Dentists providing some Endodontic treatment.

AGE	PERCENTAGE
<31	98.0
31 - 40	94.1
41 - 50	87.9
>50	71.4

3. General dentists referring Endodontic cases based on tooth involved:

TOOTH	PERCENTAGE
Anterior	33.8
Premolar	48.8
Molar	77.9

A significant 11.7% of all survey respondents referred all their Endodontic cases to the specialist. The largest percentage of cases being referred to the endodontist by all age groups were the more complex root canal systems of bicuspids and molars which is consistent with data from sec. B.3.a.i.

B.3.b.v. [Cite data which indicate the type and volume of services provided by practitioners in the specialty or proposed specialty.]

The type and volume of services provided by endodontists is reflected in data gained from the ERS along with information obtained from third party payers as identified as resource material for section B.3.b.iv. The following table summarizes data from 22,469 cases reported by 120 endodontists.

Non-surgical Endodontics	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 procedure	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%

Information obtained from third party payers identified as a resource in section B.3.b.iv. provided a comparison with data from the ERS relative to a breakdown of the non-surgical Endodontic procedures.

Type of Procedure	Percentage Treated by Endodontist	
	Third Party	ERS
Single canal	12-22	21.5
Two canals	24-30	22.2
Three canals	35-38	56.2 (3/4 canal
Four canals	42-56	molars)

B.3.b.vi. [Project demands for practitioners in the specialty or proposed specialty over the next ten years, taking into account disease trends, demographic changes, socio-economic projections and other pertinent factors.]

The demand for Endodontic services has been projected to increase in the next 10 years. An elevation in the level of awareness for improved health status and higher expectations regarding oral health along with an increasing adult population are the most significant contributing factors to the increased demand. The public's demand for an improved overall lifestyle will also impact on dental services, particularly the retention of the natural dentition as an important sign of physical well-being.

There is an increasing societal interest in wellness and a major part of that trend is the desire by the public to retain their natural dentition. Dr. John Stamm, Director, Dental Research Center of the University of North Carolina, reported in the Journal of the American Dental Association's symposium on the Postflouride Generation that "Although the true incidence of Endodontic involvement may not increase, the desire to retain the natural dentition will lead more people to seek Endodontic care."

Dr. Stamm further reported, "Because adults are tending to keep their natural dentition longer, restorations are likely to require replacements more often. The half life of an amalgam restoration in the permanent dentition has been estimated to lie somewhere between 8 and 10 years." Each restoration replacement results in tooth structure loss and pulp damage, and thus increases the demand for Endodontic treatment.

B.3.c. Other Information

B.3.c.i [Cite editorials, journal articles and/or organizational policy statements supporting the need and/or demand for practitioners in the specialty or proposed specialty. No more than five of the documents cited should be appended.]

B.3.c.ii. [Provide any other information which demonstrates compliance with this criterion.]

B.4. Reference: "...a specialty must incorporate some aspect of clinical practice, i.e., individuals in the specialty must provide health services for the public."

B.4.a. [Identify the principal health services provided to the public by individuals in this area of practice.]

The principal health services provided to the public are diagnostic, preventive, emergency and treatment services for diseases of the pulp and periradicular tissues.

Typical clinical services provided by Endodontists include but are not limited to:

1. Diagnosis and treatment of pulpal and periradicular pathosis.

2. Diagnosis and treatment of pain both of odontogenic and non-odontogenic origin.

3. Diagnosis and treatment of infections of pulpal and periradicular origin.

4. Emergency treatment of teeth with pulpitis and/or pulp necrosis.

5. Emergency treatment of teeth with periradicular infections.

6. Emergency treatment of trauma to teeth involving damage to pulp tissue, coronal and root fractures and partially or totally avulsed teeth.

7. Apexification procedures on immature permanent teeth.

8. Replantation procedures both for avulsed teeth and teeth treated with planned intentional replantation.

9. Non-surgical Endodontics by means of cleansing, shaping, and three dimensional obturation of root canal systems.

10. Surgical Endodontic procedures including:

    a) Apicoectomy and curettage

    b) Reverse root end fillings

    c) Repair of root perforation of both iatrogenic and idiopathic origin

    d) Hemisections and root amputations

11. Bleaching of both vital and non-vital teeth

12. Endodontic endosseous implants

13. Post space preparation, post cementation, and/or post and core build-up following Endodontic procedures

14. Diagnosis, completion of and/or retreatment of all of the above after previous unsuccessful Endodontic intervention

15. Consultations as requested

Additional services provided by endodontists as necessary adjuncts to their principal health services are:

1. The taking and interpretation of dental and medical histories

2. The full range of pulp testing procedures for uncovered and fully covered teeth.

3. The exposing, processing and interpretation of dental radiographs

4. The obtaining and interpretation of biopsies and cultures when indicated

The Requirements for Advanced Specialty Education Programs in Endodontics lists the treatment modalities included in the scope of the specialty. (Appendix IX)

A trend toward increasing complexity of procedures performed by endodontists has been observed on a national level. This complexity manifests itself in two ways. First, experience shows that the more difficult cases are being referred to Endodontists (refer to B.3.a.ii). Second, there is an increase in the number of cases referred in which treatment has been attempted, unsuccessfully, prior to referral. This phenomenon is gradually reshaping the nature of Endodontic clinical case loads in specialty practice.

Another trend is the referral of increasingly older and more medically compromised patients. A positive outcome of this trend for Endodontists is the clinical success of cases that were considered impossible to treat successfully only a decade or two ago.

B.4.b. Practice Settings:

[Identify the setting in which these health services provided to the public, e.g. private office, hospital, laboratory, institutional setting, etc.]

The vast majority of Endodontic procedures are provided in private practice settings. Nonetheless, significant amounts of services are provided through federal dental facilities, dental, educational institutions, hospitals, nursing homes and in closed panel, HMO settings.

A survey conducted by the American Association of Endodontists in 1984 indicated the following general breakdown of settings:

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

It should be noted that there is considerable overlap regarding the settings where endodontists provide clinical services. For example, many endodontists in private practice also teach part-time and/or see patients in hospital settings. Also, endodontists primarily attached to educational institutions also treat patients either in faculty practice clinics or part-time in private practice settings outside the educational institution.

Trends in practice settings occur over time. An established trend is for endodontists who practice privately to do so in small groups. Recent trends show the establishment of larger multi-location practices and for small numbers of endodontists to be employed, full-time, in closed panels, HMO's, etc.

B.5 Reference: "Formal advanced education programs of at least two years beyond the predoctoral curriculum must exist to provide the special knowledge and skills required for practice of the specialty."

B.5.a. Operational Advanced Education Programs

[List all the currently operational advanced education programs in the specialty or proposed specialty, indicating:

i. the name of the sponsoring institution

ii. the name and educational background of the program director

iii. the mandatory length of the program for full-time students

iv. the nature of the certificate or degree awarded]

Responses are included in the chart below.

B.5.b. Minimum Curricular Requirements

[Provide a description of minimum biomedical, behavioral and clinical science requirements for advanced education programs in the specialty or proposed specialty.]

Biomedical, behavioral, and clinical science requirements for advanced specialty education programs in Endodontics has been extracted from the Commission on Dental Accreditation approved Requirements for Advanced Specialty Education Programs in Endodontics. (Appendix IX)

The Advanced Dental Specialty programs in Endodontics must be designed to provide special knowledge and skills beyond the D.D.S. and D.M.D. training with the principal objective being to develop competent diagnosticians and clinicians. An additional objective is to develop teachers and researchers.

All Endodontic programs must provide a complete two academic year sequence of progressive experience.

B.5.c. Sample Curricula

[Provide a representative sample of curricula currently used in several existing programs. The examples provided should reflect the various methods of structuring advanced education in the specialty or proposed specialty.]

This information is not required of currently recognized specialties.

B.5.d. Other Information

[Provide any other information which demonstrates compliance with the criterion.]

The body of knowledge and levels of skill required for the practice of the specialty of Endodontics can be obtained only through accredited, two year advanced specialty programs in Endodontics. Undergraduate Endodontic programs, general practice residency programs, advanced general dentistry programs and continuing education programs clearly do not provide the depth, experiences, or body of knowledge necessary to practice the specialty of Endodontics.

It should be noted that greater than one half of the Advanced Specialty Programs in Endodontics also offer graduate degrees in addition to Endodontic advanced education certification.

The quality of Endodontic program directors is evidenced by 80 percent being Diplomates of the American Board of Endodontics, 11 percent being board eligible and the remaining 9 percent educationally eligible.

Supporting Documentation:

i. Curricular Guidelines for Undergraduate Endodontics (Appendix VIII)

ii. Standards for General Practice Residency and Advanced General Dentistry programs

iii. Commission on Dental Accreditation approved Requirements for Advanced Specialty Education Programs in Endodontics. Effective January 1, 1985 and Revised May, 1985 and February, 1987 (Appendix IX)

INFORMATION ON ACCREDITED ENDODONTIC PROGRAMS: 1987 - 1988

Sponsoring Institution	Program Director	Board Status*	Mandatory Length (In Mos.)	Nature of Award**
Univ of Alabama	R. Barfield	EE	24	C
Univ. of So. Calif.	M. Abou-Rass	BE	24	C
Loma Linda Univ.	L. Bakland	B	21	B
Univ. of Connecticut	K. Safavi	B	24	B
Medical College of Georgia	R. Anderson	B	24	C
Loyola Univ.	F. Weine	B	21	B
Northwestern Univ.	E. Osetek	B	24	B
Univ. of Illinois	J. VanCura	B	21	C
Indiana Univ.	C. Brown	B	21	B
Univ. of Iowa	K. Krell	B	24	B
Univ. of Louisville	D. Green	B	22	C
Louisiana State Univ	V. Himel	B	24	B
Univ. of Maryland	T. Dumsha	B	24	C
Boston Univ.	H. Schilder	B	21	B
Tufts Univ.	M. Goldman	B	23	C
Univ. of Detroit	H. Steiman	B	21	B
Univ. of Michigan	J. Corcoran	EE	22	B
Univ. of Minnesota	M. ElDeeb	B	21	B
Univ. of Nebraska	G. James	B	20	B
Univ. of New Jersey	L. Lin	B	21	C
Columbia Univ.	S. Kim	EE	36	B
New York Univ.	H. Blechman	B	22	C
S.U.N.Y.-Buffalo	G. Cogar	B	24	B
Univ. of North Carolina	S. Madison	B	24	B
Ohio State Univ.	W. Meyers	BE	24	B
Oregon Hlth Sci.	F. Marshall	B	24	B
Temple Univ.	I. Sinai	B	21	B
Univ. of Pennsylvania	F. Barnett	B	24	B
Univ. of Pittsburgh	A. Michanowicz	B	30	B
Baylor Col. of Dentistry	J. Harrison	B	23	C
Univ. of Texas Houston	J. Ludington	BE	24	B
Univ. of Texas San Antonio	E. Senia	B	23	C
Va. Commonwealth	R. Dodds	B	24	C
Univ. of Washington	G. Harrington	EE	24	B
West Virginia Univ.	A. Skidmore	B	24	B
Marquette Univ.	N. Luebke	BE	24	B
V.A. Med. Ctr. Long Beach	J. Simon	B	24	C
Walter Reed - Army	G. Labounty	B	24	C
Fort Gordon	R. Weller	B	24	C
V.A. Med. Ctr. Indianapolis	C. Newton	B	24	B
US Navy Bethesda	A. Campbell	B	24	C
Nassau County Medical Ctr.	A. Nevins	B	24	C
V.A. Med. Ctr. New York	H. Blechman	B	24	C
Albert Einstein Medical Ctr.	L. Rossman	B	24	C
US Air Force Wilford Hall	J. Doran	B	24	C

* "B" = Board Certified; "BE" = Board Eligible; "EE" = Educationally Eligible
** "C" = Certificate; "D" = Degree; "B" = Certificate/Degree

Source The information presented reflects institutional responses to the 1987-88 Annual Survey of Advanced Endodontic Programs, of the Division of Educational Measurements, Council on Dental Education, American Dental Association with an update as of May 1988.