

ENDODONTICS PROGRAM SYLLABI

BUIDRE

2008-2009

EN 803: Endodontics III: Preclinical Endodontics

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	1
Prerequisites:	DMD or equivalent
Co-requisites:	N/A

Course Description: This course constitutes the foundation to preparing the student to enter the dental treatment center, and perform endodontic procedures on a patient. The student will participate in endodontic procedures performed on extracted teeth. Lectures and clinical demonstrations by the endodontic faculty cover the range of clinical procedures to be perfected by students during the clinical phases of training.

Root canal anatomy for each tooth is reviewed in detail including the incidence of anatomical variations. Materials and equipment used in Endodontics are reviewed, and their use and maintenance are demonstrated. A variety of non surgical procedures are thoroughly reviewed demonstrated and practiced.

Intended Learning Outcomes: At the end of the course the student will have acquired and mastered new skills in performing Endodontic procedures well beyond the pre-doctoral level. The student will have built enough confidence to begin treating patients at the Dental Health Center, continue their learning in the clinic setting, and able to perform the following procedures covered in this course:

- Rubber dam placement
- Root canal system access
- Working length determination
- Shaping and cleaning techniques
- Root canal system obturation techniques
- Retreatment of previously treated root canal systems
- Perforation repair
- Apexification and apexogenesis
- Post removal
- Separated instrument removal

Pulp Morphology and Access Preparation

Introduction: This portion of the preclinical laboratory is designed to provide the first-year student with an understanding of the morphology of root canal systems and the variations that can be found in these systems. A careful study of root configurations and apices, furcation areas, and pulpal spaces will illustrate many deviations from the "norm" and will help the student

develop a three-dimensional concept of root canal systems. The knowledge acquired during the laboratory will supplement radiographic findings and previous morphologic concepts of the root canal system and enhance the awareness of the internal anatomy of teeth.

Objectives: Each student should be able to:

1. Demonstrate the intricate anatomy of the root canal systems which may be present in each tooth.
2. Synthesize adequate access preparations for each tooth.

Main Points: Each student should be able to:

MP #1 Know the relative number of roots and/or canals in every tooth.

MP #2 Understand the external and internal anatomy of the crowns and roots of every tooth.

MP #3 Understand tooth anatomy, particularly those areas focusing on pulp chamber and canal and root anatomy.

MP #4 Describe the different types of canal configurations (i.e. Weine and Vertucci classification systems) and percentages and incidences of root canal systems in single and multi-rooted teeth.

MP #5 Analyze clinical and roentgenographic data before and during access preparation.

MP #6 Know how to design adequate access preparations.

MP #7 Section maxillary and mandibular anterior and posterior teeth in different planes, followed by methylene blue staining to reveal the canal configuration at different levels.

Cleaning and Shaping and Obturation of the Root Canal System

Introduction: This portion of the preclinical laboratory is designed to provide the first-year student with an understanding of the appropriate technique for cleansing & shaping and obturating a root canal system.

Objectives: Each student should be able to:

1. Demonstrate the ability to properly cleanse and shape a root canal system.
2. Demonstrate the ability to obturate a root canal system using vertical compaction of warm gutta percha.
3. Demonstrate how to remove posts, silver points and instrument fragments from the root canal system.
4. Demonstrate how to parfocal the operating microscope.

Main Points: Each student should be able to:

MP #1 Describe the principles of access preparation and armamentarium.

MP #2 Understand the objectives of cleaning and shaping the root canal system.

MP #3 Understand the objectives of obturation via the warm vertical compaction of gutta-percha.

MP #4 Perform root canal therapy on extracted and mounted teeth.

**This part of the course is four weeks in duration and is limited to the use of hand files and reamers. Rotary instruments used are limited to Gates Glidden drills.

MP #5 Describe NiTi rotary instruments; their design philosophy (i.e flutes, radial land, rake and helical angle, etc.).

MP #6 Understand and demonstrate the concept of crown-down instrumentation (taper and tip size variation) and clinical utilization of NiTi rotary files on extracted teeth.

**This part of the course is also four weeks in duration.

MP #7 Describe and demonstrate the concepts for recovering posts, silver points and instrument fragments from canals, utilizing ultrasonics and post-removal systems.

**This part of the course is covered at a later date to allow for the postdoctoral prosthodontic students to complete their preclinical course.

MP #8 Demonstrate how to parfocal their operating microscope.

Course Topics and Content:

Week 1

Main Point (MP):

MP #1 Know the relative number of roots and/or canals in every tooth

MP #2 Understand the external and internal anatomy of the crowns and roots of every tooth

MP #3 Understand tooth anatomy, particularly those areas focusing on pulp chamber and canal and root anatomy

MP #4 Describe the different types of canal configurations (i.e. Weine's and Vertucci's classification systems) and percentages and incidences of root canal systems in single and multi-rooted teeth

MP #5 Analyze clinical and roentgenographic data before and during access preparation.

MP #6 Know how to design adequate access preparations.

MP #7 Section maxillary and mandibular anterior and posterior teeth in different planes, followed by methylene blue staining to reveal the canal configuration at different levels.

You will use your collected teeth for 4 different exercises:

1. As a class, collect a full set of teeth, #1-#32. Divide them among yourselves and cut 3-4 horizontal sections. Stain the sections with methylene blue, rinse, dry, and then label and mount them on a big piece of cardboard (use tape or beading wax). This will give you a feel for the canal configuration and complexity of each tooth.
2. Leave a few teeth unmounted to use as your first practice teeth. Start with single canal teeth.
3. Mount a number of teeth 40-50 to use for RCT treatment.
4. Post removal and separated instrument removal.
5. We will mount a few teeth later on to use for practice in perforation repair.
6. Please login to the course website on Courseinfo and refer to "Course Documents" for a list of items you will need for these exercises, and to "Assignments" for the corresponding readings which will help you through this portion of the course.

Weeks 2-3

MP #1 Describe the principles of access preparation and instrumentation.

MP #2 Understand the objectives of cleaning and shaping the root canal system.

MP #3 Understand the objectives of obturation via the warm vertical compaction of gutta-percha.

MP #4 Perform root canal therapy on extracted and mounted teeth using hand files and Gates Glidden drills.

Cleaning and shaping the root canal system involves finding all the canals which are present. An important concept in this regard is pre-curving files. Files can be pre-curved with cotton pliers, special file bending instruments and even your finger. Each technique has advantages and disadvantages. Some of our faculty will give demonstrations on their techniques. We will then use plastic blocks to practice “scouting” of canals. Once you are comfortable with your ability to feel and negotiate the canals in the plastic block, go ahead and complete the cleaning and shaping of the block and then obturate it. Being able to see while you are working will give you good feedback.

Once you have completed a plastic block, move on to a few unmounted teeth. After access and coronal flaring you will appreciate the major foramen and how debris and instruments can exit this area and penetrate the periradicular tissues. Follow the suggested technique I have posted under course documents and treat a few unmounted teeth.

Now move on to the mounted teeth. Start with the easier ones and move on to the more difficult ones when you start to feel comfortable. During the first month you will probably average one complete tooth per day.

Weeks 4-9

MP #1 Describe NiTi rotary instruments; their design philosophy (i.e. flutes, radial land, rake and helical angle, etc.).

MP #2 Understand and demonstrate the concept of crown-down instrumentation (taper and tip size variation) and clinical utilization of NiTi rotary files on extracted teeth. **This part of the course is also four weeks in duration.

MP #3 Describe and demonstrate the concepts for recovering posts, silver points and instrument fragments from canals, utilizing ultrasonics and post-removal systems. **This part of the course is covered at a later date to allow for the postdoctoral prosthodontic students to complete their preclinical course.

MP #4 Demonstrate how to parfocal your operating microscope.

During this portion of the course rotary files will be introduced. We will start with 2 systems, K3 and Protaper since they are significantly different in their design and the way they cut. Demonstrations of how to use rotaries will be done. The course documents section of the course info site will have handouts for suggested routines for each type of file. The majority of these last 4 weeks will be used to treat many teeth using rotary nickel-titanium files to augment your hand file technique. Prior to your last week we will demonstrate: perforation repair, separated instrument removal and post removal.

Assignments: The students are required to collect around 100 extracted teeth, sterilize them appropriately and store them in a 0.6% NaOCl solution to be renewed biweekly. The teeth should not include third molars, teeth with immature apices, or broken down crowns.

Specific subject areas are assigned to the students on a weekly or basis. Literature references will be provided and each subject area is reviewed in detail at the end of the week. A hands-on demonstration of the technique is provided by the instructor and covers every step of the procedure. The hands-on session extends over a week or two where students perform the new technique on extracted teeth and review specific issues with the faculty. At the end of the week each student will present 3 finished cases. These cases will be graded. The student also presents cases where difficulties have been encountered and the outcome was compromised. These cases will not be graded.

Methods of Student Evaluation: Specific subject areas are assigned to the students on a weekly or basis. Literature references will be provided and each subject area is reviewed in detail at the end of the week. A hands-on demonstration of the technique is provided by the instructor and covers every step of the procedure. The hands-on session extends over a week or two where students perform the new technique on extracted teeth and review specific issues with the faculty. At the end of the week each student will present 3 finished cases. These cases will be graded. The student also presents cases where difficulties have been encountered and the outcome was compromised. These cases will not be graded.

The faculty assess the cases and discusses the technique in the classroom setting so all students learn from their colleagues' experience. At this time each student should be able to predictably and successfully perform the procedure without the faculty assistance. If that goal is not reached then additional time is allocated for more exercises before moving on to the next procedure.

Student's active participation and motivation to learn count for half of the grade, while the other half depends on the student's performance as demonstrated by his or her submitted completed cases on extracted teeth.

Teaching and Learning Methodologies: Lectures and clinical demonstrations by the endodontic faculty. The student will participate in endodontic procedures performed on extracted teeth.

Course Texts, Recommended Reading, Material and Resources:

Text: Pathways of the Pulp

EN 804: Endodontics IV: Current Concepts in Endodontics

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	2
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: A series of lectures intended to expose the student to the most current information pertaining to such topics as: histology and physiology of the pulpodentinal complex; diagnosis and classification of endodontic pathoses; management of endodontic emergencies, traumatic injuries to the dentition, and fascial space infections of odontogenic origin; the relationship between oral and systemic disease.

Intended Learning Outcomes: At the end of this course, each student should be able to discuss:

- The histology and physiology of the pulpodentinal complex;
- The procedures used in arriving at an endodontic diagnosis;
- The classification of pulpal and periradicular diseases;
- The management of traumatic injuries to the teeth and supporting structures;
- The management of fascial space infections;
- The relationship between oral and chronic systemic diseases;
- The use of antibiotics in the practice of endodontics;
- The effect of coronal leakage on the success of endodontic treatment.

Course Topics and Content:

Lecture

1. Histology & Physiology of the Pulpodentinal Complex
2. Diagnostic Procedures in the Practice of Endodontics
3. Classification of Pulpal & Periradicular Pathoses / Management of Endodontic Emergencies
4. Management of Traumatic Injuries to the Dentition (Part I)
5. Management of Traumatic Injuries to the Dentition (Part II)
6. Management of Fascial Space Infections of Odontogenic Origin (Part I)
7. Management of Fascial Space Infections of Odontogenic Origin (Part II)
8. Relationship Between Endodontic Disease and Systemic Disease (Part I)
9. Relationship Between Endodontic Disease and Systemic Disease (Part II)
10. An Evidence-based Approach to the Use of Antibiotics in Endodontics
11. An Evidence-based Approach to Coronal Leakage and its Effect on the Obturated Root Canal System

Assignments: This course teaches the science behind the endodontic disease process, endodontic diagnosis, and treatment. It requires the student to review the literature pertaining to the assigned topic. The student should come to the lecture with a list of questions that the instructor will address at the end of the lecture after the presentation.

Methods of Student Evaluation: Exam questions will be drawn from lectures and supplemental material when assigned. A written exam at the end of the course will determine the final grade.

Teaching and Learning Methodologies: The primary source of the learning assignments is the lectures, while the Pathways of the Pulp textbook is the main reference for the course.

Student comments and evaluation of the course are taken into consideration and will guide the course director in organizing the course.

Course Texts, Recommended Reading, Material and Resources:

Textbook: Pathways of the Pulp.

EN 805, 806: Endodontics V, VI: Topical Literature

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	2
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: A series of 27 seminars based on intensive and comprehensive readings in the literature of Endodontics covering all facets pertaining to the science and practice of Endodontics. The topical literature seminar course is the didactic element of the program that introduces the student to the foundation of the science of Endodontics. Classic literature is reviewed and discussed.

Intended Learning Outcomes: The general objectives of these seminars is to provide the student with a solid background of the endodontic literature so he/she can better evaluate and scientifically justify the treatment provided to their patients. Specific objectives for this course are listed on each of the respective seminar reading lists within this course syllabus. At the end of the course the student would have accumulated a wealth of knowledge in the science of Endodontics that will permit him/her to have an evidence based approach to treating patients.

Course Topics and Content: Topical Literature Seminars

First-year Students

1. Morphology of the Root Canal System and Access Preparation
2. Preparation of the Root Canal System
3. Obturation of the Root Canal System
4. Management of the Medically Compromised Patient
5. Diagnostic Procedures in the Practice of Endodontics
- 6a. Endodontic-Periodontic Lesions
- 6b. Classification of Pulpal and Periradicular Pathoses / Endodontic Treatment Planning
7. Radiology, Radiographic Techniques and Interpretation
8. Management of Endodontic Emergencies
9. Management of Traumatic Injuries to the Dentition
10. Fascial Space Infections of Odontogenic Origin
11. Surgical Endodontics
12. Endodontic Armamentarium and Materials #1
13. Endodontic Armamentarium and Materials #2
14. Evaluation of Endodontic Healing / Success-Failure
15. Repair of Iatrogenic Problems / Treatment of Resorption Cases / Endodontic Retreatment
16. Microbiological Aspects in Endodontics

Second-Year Students

17. Repair of Iatrogenic Problems/ Treatment of Resorption Cases / Endodontic Retreatment
18. Extraction Replantation / Transplantation of Teeth / Endodontic Implants / Vertical Extrusion / Bleaching
19. Inflammation / Immunology #1 – A review of the Literature
20. Inflammation / Immunology #2 – A review of the Literature
21. Inflammation / Immunology #3 – A review of the Literature
22. Bone Metabolism
23. Lesions of Endodontic Origin
24. Histology and Physiology of the Pulpo-dentinal Complex
25. Pain I - Etiology, Physiology and Theories of Orofacial Pain
26. Pain II - Examination and Different Diagnoses of Orofacial Pain
27. Pain III - Control of Orofacial Pain

Assignments: Each student is responsible for studying the general readings for each seminar. In addition, each student is assigned articles that they will abstract and report on during the seminar. The reports will include a section where the student states his or her comments, grades the article on a scale of 1 to 10 and delivers the take home message of the study. It is the responsibility of each student to provide copies of his/her abstract to the other students. On a rotating base, a student is assigned as chairperson for each seminar.

The chairing student collects the reports from his or her colleague(s), organizes them, adds his/her own assigned reports and binds all the documents in one booklet. Copies are made for the class and the faculty member. The class meets and the chairing student leads the seminar and invites his/her classmates to present their assigned sections. The faculty's role is to ensure that the seminar is proceeding in a comprehensive manner, checks on the accuracy of the reports and initiates open discussions on the topic on hand. Students are expected to present their reports, answer questions and engage in the discussion. During the seminar session critical thinking is encouraged by reviewing in detail the main sections of the study.

Visual aids are encouraged. It is expected that the postdoctoral student will gradually begin to identify and recall authors with topics, titles, results, etc.

Methods of Student Evaluation: The student's level of participation at each seminar counts for one third of the grade. Each time the student chairs a seminar he/she is given a grade, a grade average for all chaired seminars counts for two thirds of the course grade.

Teaching and Learning Methodologies: Instructor-guided, student-led seminars

Course Texts, Recommended Reading, Material and Resources: The literature includes textbooks, and articles published in peer-reviewed journals. Additional recommended readings are also listed.

TOPICAL LITERATURE SEMINAR #1

TOPIC: Morphology of the Root Canal System and Access Preparation

SEMINAR OBJECTIVE: Each student should understand the intricate anatomy of the root canal systems which may be present in each tooth and be able to synthesize adequate access preparations.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #1 - know the relative number of roots and/or canals in every tooth.
- MP #2 - understand the external and internal anatomy of the crowns and roots of each tooth.
- MP #3 - be able to classify root canal systems.
- MP #4 - be able to analyze clinical and roentgenographic data before and during access preparation.
- MP #5 - know the objectives and principles of access preparation.
- MP #6 - know how to design adequate access preparations.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature:

Burns RC, Herbranson EJ. Tooth morphology and access openings. In Cohen S, Burns RC (eds). Pathways of the Pulp. 8th ed. St Louis: Mosby-Yearbook, Inc., 2002:173-229.

Ingle JI, Bakland LK, Peters DL, Buchanan LS, Mullaney TP. Endodontic cavity preparation. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins, 1994:92-153.

Slowey RR. Root canal anatomy. Dent Clin N Am 1979;23:555-73.

Vertucci FJ. Root canal anatomy of the human permanent teeth. Oral Surg 1984;58:589-99.

Christie WH, Thompson GK. The importance of endodontic access in locating maxillary and mandibular molar canals. J Can Dent Assoc 1994;60(6):527-36.

Day TE. Anatomic access openings. J Endodon 1975;1:283.

Janik JM. Access cavity preparation. Dent Clin N Am 1984;28:809-18.

Madjar D, Kusner W, Shifman A. The labial endodontic access: a rational treatment approach in anterior teeth. J Pros Dent 1989;61:317-20.

The following students should abstract and report on the following literature:

The students should also get together before the seminar commences and prepare a chart listing the canal configurations with their respective percentages and authors for each tooth from the literature read.

Kuttler Y. Microscopic investigations of root apexes. *J Am Dent Assoc* 1955;50:544-52.

Benjamin KA, Dowson J. Incidence of two root canals in human mandibular incisor teeth. *Oral Surg* 1974;38:122-6.

Wilcox LR, Walton RE, Case WB. Molar access: shape and outline according to orifice locations. *J Endodon* 1989;14:315-8.

Burch JG, Hulen S. The relationship of the apical foramen to the anatomic apex of the tooth root. *Oral Surg* 1972;34:262-8.

Lyroudia K, Samakovitis G, Pitas I, Lambrianidis T. 3D reconstruction of two C-shaped mandibular molars. *J Endodon* 1997;23:101-5.

Simon JHS. The apex: How critical is it? *Gen Dent* 1994;42(4):330-4.

Vertucci FJ. Root canal anatomy of the mandibular anterior teeth. *JADA* 1974;89:369-71.

Wilcox LR, Walton RE. The shape and location of mandibular premolar access openings. *Int Endod J* 1987;20:223-7.

Vertucci FJ, Seelig A, Gillis R. Root canal morphology of the human maxillary second premolars. *Oral Surg* 1974;38:456-64.

Vertucci FJ. Root canal morphology of mandibular premolars. *J Am Dent Assoc* 1978;97:47-50.

Berutti E, Fedon G. Thickness of cementum/dentin in mesial roots of mandibular first molars. *J Endodon* 1992;18(11):545-8.

Cunningham CJ, Senia ES. A three-dimensional study of canal curvatures in the mesial roots of mandibular molars. *J Endodon* 1992;18:294-300.

Pineda F, Kuttler Y. Mesiodistal and buccolingual roentgenographic investigation of 7,275 root canals. *Oral Surg* 1972;33:101-11.

Peikoff MD, Christie WH, Fogel HM. The maxillary second molar: variations in the number of roots and canals. *Int Endodon J* 1996;29:365-9.

Trope M, Elfenbein L, Tronstad L. Mandibular premolars with more than one root canal in different race groups. *J Endodon* 1986;12:343-5.

Cooke HG, Cox FL. C-shaped canal configurations in mandibular molars. *J Am Dent Assoc* 1979;99:836-9.

Kulild JC, Peters DD. Incidence and configuration of canal systems in the mesiobuccal root of maxillary first and second molars. *J Endodon* 1990;16:311-17.

Ting P, Nga L. Clinical detection of the minor mesiobuccal canal of maxillary first molars. *Int Endod J* 1992;25:304-6.

Stein TJ, Corcoran JF. Anatomy of the root apex and its histologic changes with age. *Oral Surg* 1990;69:238-42.

Skidmore AE, Bjorndal AM. Root canal morphology of the human mandibular first molar. *Oral Surg* 1971;32:778-84.

Vertucci FJ, Gegauff A. Root canal morphology of the maxillary first premolar. *J Am Dent Assoc* 1979;99:194-8.

Stokes AN, Tidmarsh BG. A comparison of diamond and tungsten carbide burs for preparing endodontic access cavities through crowns. *J Endodon* 1988;14:550-3.

Weine FS, Pasiewicz RA, Rice RT. Canal configuration of the mandibular second molar using a clinically oriented in vitro method. *J Endodon* 1988;14:207-13.

Bone J, Moule AJ. The nature of curvature of palatal canals in maxillary molar teeth. *Int Endod J* 1986;19:178-86.

Weine FS, Healy HJ, Gerstein H, Evanson L. Canal configuration in the mesiobuccal root of the maxillary first molar and its endodontic significance. *Oral Surg* 1969;28:419-25.

Eskoz N, Weine FS. Canal configuration of the mesiobuccal root of the maxillary second molar. *J Endodon* 1995;21(1):38-42.

Fogel HM, Peikoff MD, Christie WH. Canal configuration in the mesiobuccal root of the maxillary first molar: A clinical study. *J Endodon* 1994;20(3):135-7.

Mizutani T, Ohno N, Nakamura H. Anatomical study of the root apex in the maxillary anterior teeth. *J Endodon* 1992;18:344-7.

Morfis A, Sylaras SN, Georgopoulou M, Kernani M, Prountzos F. Study of the apices of human permanent teeth with the use of a scanning electron microscope. *Oral Surg* 1994;77(2):172-6.

Baisden MK, Kulild JC, Weller RN. Root canal configuration of the mandibular first premolar. *J Endodon* 1992;18:505-8.

McMullen AF, Himel VT, Sarkar NK. An in vitro study of the effect endodontic access preparation has upon retention of porcelain fused to metal crowns of maxillary central incisors. *J Endodon* 1989;15:154-6.

Carns EJ, Skidmore AE. Configuration and deviations of root canals of maxillary first premolars. *Oral Surg* 1973;36:880-6.

TOPICAL LITERATURE SEMINAR #2

TOPIC: Preparation of the Root Canal System

SEMINAR OBJECTIVE: Each student should apply concepts and principles of root canal instrumentation to optimally prepare the root canal system for obturation.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #1 - know the objectives of root canal preparation.
- MP #2 - understand the principles of root canal preparation.
- MP #3 - understand the physiological factors that must be considered in the establishment of the apical stop.
- MP #4 - select methods of root canal preparation based upon established principles, instrument characteristics, and root canal anatomy.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Ruddle CJ. Cleaning and shaping the root canal system. In Cohen S, Burns RC (eds). Pathways of the pulp. 8th ed. St. Louis: Mosby-Yearbook, Inc., 2002:231-91.

Ingle JI, Bakland LK, Peters DL, Buchanan LS. Endodontic cavity preparation. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins, 1994:156-227.

Marshall J. Crown-down pressureless technique. Oregon Health Sciences Univ 1980.

Buchanan LS. File bending: essential for management of curved canals. Endo Report 1987;2:16-20.

Walton RE. Current concepts of canal preparation. Dent Clin N Amer 1992;36:309-27.

Students should abstract and report on the following literature:

Fairbourn DR, McWalter GM, Montgomery S. The effect of four preparation techniques on the amount of apically extruded debris. J Endodon 1987;13:102-8.

Morgan LF, Montgomery S. An evaluation of the crown-down pressureless technique. J Endodon 1984;10:491-8.

Torabinejad M. Passive step-back technique - A sequential use of ultrasonic and hand instruments. Oral Surg 1994;77(4):398-405.

Goerig AC, Michelich RJ, Schultz HH. Instrumentation of root canals in molars using the step-down technique. J Endodon 1982;8:550-4.

Roane JB, Sabala CL, Duncanson MG. The "balanced force" concept for instrumentation of curved canals. *J Endodon* 1985;11:203-11.

Goodman A, Reader A, Beck M, Melfi R, Meyers W. An in vitro comparison of the efficacy of the step-back technique versus a step-back / ultrasonic technique in human mandibular molars. *J Endodon* 1985;11:249-56.

Reynolds MA, Madison S, Walton RE, Krell KV, Rittman BR. An in vitro histological comparison of the step-back, sonic, and ultrasonic instrumentation techniques in small, curved root canals. *J Endodon* 1987;13:307-14.

Ahmad M, Pitt Ford TR, Crum LA. Ultrasonic debridement of root canals: acoustic streaming and its possible role. *J Endodon* 1987;13:490-9.

Himel VT, Moore RE, Hicks VE. The effects which three endodontic files have on canal shape. *J Endodon* 1995;20:204.

Jensen SA, Walker TL, Hutter JW. Comparison of the cleaning efficacy of passive sonic activation and passive ultrasonic activation after hand instrumentation in molar root canals. *J Endodon* 1999;25:735-8.

Coffae KP, Brilliant JD. The effect of serial preparation versus nonserial preparation on tissue removal in the root canals of extracted mandibular molars. *J Endodon* 1975;1:211-4.

Ruiz-Hubard EE, Gutmann JL, Wagner MJ. A quantitative assessment of canal debris forced periapically during root canal instrumentation using two different techniques. *J Endodon* 1987;13:554-8.

Walmsley AD, Williams AR. Effects of constraint on the oscillatory pattern of endodontic files. *J Endodon* 1989;15:189-94.

Pratton DH, McDonald NJ. Comparison of radiographic and electronic working lengths. *J Endodon* 1996;22:173-6.

Huang H. An experimental study of the principle of electronic root canal measurement. *J Endodon* 1987;13:60-4.

Ahmad M. Observations of acoustic streaming fields around an oscillating ultrasonic file. *Endod Dent Traum* 1992;8:189-94.

Marending M, Lutz F, Barbakow F. Scanning electron microscope appearances of Lightspeed instruments used clinically: a pilot study. *Int Endodon J* 1998;31:57-62.

Welk AR, Baumgartner JC, Marshall JG. An in vivo comparison of two frequency-based electronic apex locators. *J Endodon* 2003;29:497-500.

Weine FS, Kelly RF, Lio PJ. The effect of preparation procedures on original canal shape and on apical foramen shape. *J Endodon* 1975;1:255-62.

Cunningham WT, Martin H. A scanning electron microscope evaluation of root canal debridement with the endosonic ultrasonic synergistic system. *Oral Surg* 1982;53:527-30.

Baumgartner JC, Martin H, Sabala CL, Strittmatter EJ, Wildey WL, Quigley NC. Histomorphometric comparison of canals prepared by four techniques. *J Endodon* 1992;18(11):530-4.

Laufer R, Lutz F, Barbakow F. An in vivo comparison of gradient and absolute impedance electronic apex locators. *J Endodon* 1996;22:260-3.

Southard DW, Oswald RJ, Natkin E. Instrumentation of curved molar root canals with the Roane technique. *J Endodon* 1987;13:479-89.

Hembrough JH, Weine FS, Pisano JV, Eskoz N. Accuracy of an electronic apex locator: A clinical evaluation in maxillary molars. *J Endodon* 1993;19(5):242-6.

Lim SS, Stock CJR. The risk of perforation in the curved canal: anticurvature filing compared with the stepback technique. *Int Endod J* 1987;20:33-9.

Archer R, Reader A, Nist R, Beck M, Meyers WJ. An in vitro evaluation of the efficacy of ultrasound after step-back preparation in mandibular molars. *J Endodon* 1992;18:549-52.

Hornberger B, Wang M, Svec T. A comparative assessment of four root canal preparation techniques. *J Endodon* 1996;22:194.

Luiten DJ, Morgan LA, Baumgartner JC, Marshall JG. A comparison of four instrumentation techniques on apical canal transportation. *J Endodon* 1995;21(1):26-32.

Kyomen SM, Caputo AA, White SN. Critical analysis of the balanced force technique in endodontics. *J Endodon* 1994;20(7):332-7.

Haidet J, Reader A, Beck M, Meyers W. An in vivo comparison of the step-back technique versus a step-back/ultrasonic technique in human mandibular molars. *J Endodon* 1989;15:195-9.

Sepic AO, Pantera EA, Neaverth EJ, Anderson RW. A comparison of flex-R files and K-type files for enlargement of severely curved molar root canals. *J Endodon* 1989;15:240-6.

Calhoun G, Montgomery S. The effects of four instrumentation techniques on root canal shape. *J Endodon* 1988;14:273-7.

Glosson CR, Haller RH, Dove SB, Del Rio CE. A comparison of root canal preparations using Ni-Ti hand, Ni-Ti engine driven, and K-Flex endodontic instruments. *J Endodon* 1995;21(3):146-51.

McKendry D. Comparison of balanced forces, endosonic, and step-back filing instrumentation techniques: quantification of extruded debris. *J Endodon* 1990;16:24-7.

Kobayashi C. Electronic canal length measurement. *Oral Surg* 1995;79(2):226-31.

Kavanagh D, Lumley PJ. An in vitro evaluation of canal preparation using Profile .04 and .06 taper instruments. *Endo Dent Traumatol* 1998;14:16-20.

TOPICAL LITERATURE SEMINAR #3

TOPIC: Obturation of the Root Canal System

SEMINAR OBJECTIVE: Each student should have a thorough ledge of the materials and methods available for obturating the root canal system.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #5 - understand the reason for obturating the root canal system.
- MP #6 - understand the objectives involved in obturating the root canal system.
- MP #7 - understand the underlying principles specific to each of the obturating techniques.
- MP #8 - analyze similarities, differences, advantages and limitations of each obturating technique.
- MP #9 - be able to determine the appropriate obturation technique for varying clinical situations.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Johnson WT, Gutmann JL. Obturation of the cleaned and shaped root canal system. In Cohen S, Hargreaves K (eds). Pathways of the Pulp. 9th ed. St Louis: CV Mosby Company, 2006:358-399.

Weine FS. Endodontic Therapy. 4th ed. St Louis: CV Mosby Company, 1989:370-445.

Ingle JI, West JD. Obturation of the radicular space. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins, 1994:229-319.

Glickman GN, Gutmann JL. Contemporary perspectives on canal obturation. Dent Clin N Am 1992;36:327-42.

Morse DR, Mann C, Esposito JV. Gutta-percha/Eucapercha, Part I: characteristics and an update of the technique. Comp Cont Educ Dent 1987;9:708-18.

Fahid A, Taintor JF. Sectional warm gutta-percha technique. Gen Dent 1985;33:440-4.

Yee FS, Marlin J, Krakow AA, Gron P. Three dimensional obturation of the root canal using injection-molded thermoplasticized dental gutta-percha. J Endodon 1977;3:168-74.

Michanowicz A, Czonstkowsky M. Sealing properties of an injection-thermoplasticized low-temperature (70C) gutta-percha: a preliminary study. J Endodon 1984;10:563-6.

Johnson WB. A new gutta-percha filling technique. J Endodon 1978;4:184.

Richert UG, Dixon CM. The controlling of root surgery. In: Trans Eighth Internat Dent Congress Section IIIa. 1931:15-22

The following students should abstract and report on the following literature.

Weisenseel JA, Hicks ML, Pelleu GB. Calcium hydroxide as an apical barrier. J Endodon 1987;13:1-5.

Keane KM, Harrington GW. The use of a chloroform-softened gutta-percha master cone and its effect on the apical seal. J Endodon 1984; 10:57-63.

Gutmann JL, Saunders WP, Saunders EM, Nguyen L. An assessment of the plastic thermafil obturation technique, Part 1. Radiographic evaluation of adaptation and placement. Int Endod J 1993;26:173-8.

Weller RN, Kimbrough WF, Anderson RW. A comparison of thermoplastic obturation techniques: adaptation to the canal walls. J Endodon 1997;23:703-6.

Dalat DM, Spangberg LSW. Comparison of apical leakage in root canals obturated with various gutta-percha techniques using a dye vacuum tracing method. J Endodon 1994;20(7):315-9.

Blum JY, Parahy E, Micallef JP. Analysis of the forces developed during obturation: warm vertical compaction. J Endodon 1997;23:91-6.

Hall MC, Clement DJ, Dove SB, Walker WA. A comparison of sealer placement techniques in curved canals. J Endodon 1996;22:638-42.

Torabinejad M, Ung B, Kettering JD. In vitro bacterial penetration of coronally unsealed endodontically treated teeth. J Endodon 1990;16:566-9.

Torneck CD. Reaction of rat connective tissue to polyethylene tube implants. Part I. Oral Surg 1966;21:379-87.

Gutmann JL, Saunders WP, Saunders EM, Nguyen L. An assessment of the plastic thermafil obturation technique, Part 2. Material adaptation and sealability. Int Endod J 1993;26:179-83.

Pathomvanich S, Edmunds DH. The sealing ability of thermal obturators assessed by four different microleakage techniques. Int Endod J 1996;29:327-34.

DuLac KA, Nielsen CJ, Tomazic TJ, Ferrillo PJ, Hatton JF. Comparison of the Obturation of lateral canals by six techniques. J Endodon 199;25:376-80.

Torneck CD. Reaction of rat connective tissue to polyethylene tube implants. Part II. Oral Surg 1967;24:674-83.

Holland GR. Periapical response to apical plugs of dentin and calcium hydroxide in ferret canines. *J Endodon* 1984;10:71-4.

Hatton JF, Ferrillo PJ, Wagner G, Steward GP. The effect of condensation pressure on the apical seal. *J Endodon* 1988;14:305-8.

Shipper G, Orstavik D, Teixeira FB, Trope M. An evaluation of microbial leakage in roots filled with a thermoplastic synthetic polymer-based root canal filling material (Resilon). *J Endodon* 2004;30:3427.

Stamos DE, Gutmann JL, Gettleman BH. In vivo evaluation of root canal sealer distribution. *J Endodon* 1995;21:177-

Juhlin JJ, Walton RE, Dovgan JS. Adaptation of Thermafil components to canal walls. *J Endodon* 1993;19:130-5.

Telli C, Gulkan P, Gunel H. A critical reevaluation of stresses generated during vertical and lateral condensation of gutta-percha in the root canal. *Endod Dent Traumatol* 1994;10:1-10.

Gencoglu N, Samani S, Gunday M. Evaluation of sealing properties of thermafil and ultrafil techniques in the absence or presence of smear layer. *J Endodon* 1993;19(12):599-603.

LaCombe JS, Campbell AD, Hicks ML, Pelleu GB. A comparison of the apical seal produced by two thermoplasticized injectable gutta-percha techniques. *J Endodon* 1988;14:445-50.

Gutmann JL, Rakusin H, Powe R, Bowles WH. Evaluation of heat transfer during root canal obturation with thermoplasticized gutta-percha. Part II. In vivo response to heat levels generated. *J Endodon* 1987;13:441-8.

Michanowicz AE, Czonstkowsky M, Piesco NP. Low-temperature (70C) injection gutta-percha: a scanning electron microscopic investigation. *J Endodon* 1986;12:64-7.

Skinner RL, Himel VT. The sealing ability of injection-molded thermo-plasticized gutta-percha with and without the use of sealers. *J Endo-don* 1987;13:315-7.

Dang DA, Walton RE. Vertical root fracture and root distortion: effect of spreader design. *J Endodon* 1989;15:294-301.

Haas S, Campbell A, Hicks M, Pelleu GB. A comparison of four root canal filling techniques. *J Endodon* 1989;15:596-601.

Capurro MA, Goldberg F, Balbachan L, Macchi RL. Evaluation of the dimensional stability of different thermoplasticized gutta-percha fillings using simulated glass root canals. *Endod Dent Traum* 1993; 9(4):160-4.

Rohde TR, Bramwell JD, Hutter JW, Roahen JO. An in vitro evaluation of microleakage of a new root canal sealer. *J Endodon* 1996;22:365-8.

Clark DS, ElDeeb ME. Apical sealing ability of metal versus plastic carrier thermafil obturators. *J Endodon* 1993;19:4-9.

Luccy CT, Weller N, Kulild JC. An evaluation of the apical seal produced by lateral and warm lateral condensation techniques. *J Endodon* 1990;16:170-2.

Reader CM, Himel VT, Germain LP, Horn MM. Effect of three obturation techniques on the filling of lateral canals and the main canal. *J Endodon* 1993;19(8):404-8.

Berg B. The endodontic management of multirrooted teeth. *Oral Surg* 1953;6:399.

Chailevanitkul P, Saunders WP, Mackenzie D. The effect of smear layer on microbial coronal leakage of gutta-percha root fillings. *Int Endod J* 1996;29:242-8.

Wiemann AH, Wilcox LR. In vitro evaluation of four methods of sealer placement. *J Endodon* 1991;17:444-7.

Himel VT, Cain CW. An evaluation of the number of condenser insertions needed with warm lateral condensation of gutta-percha. *J Endodon* 1993;19(2):77-82.

Gutmann JL, Creel DC, Bowles WH. Evaluation of heat transfer during root canal obturation with thermoplasticized gutta-percha. Part I. In vitro heat levels during extrusion. *J Endodon* 1987;13:378-83.

Madison S, Wilcox LR. An evaluation of coronal microleakage in endodontically treated teeth. Part III. In vivo study. *J Endodon* 1988;14:455-8.

Rossmeisl R, Reader A, Melfi R, Marquard J. A study of freeze-dried (lyophilized) cortical bone used as an apical barrier in adult monkey teeth. *J Endodon* 1982;8:219-26.

TOPICAL LITERATURE SEMINAR #4

TOPIC: Management of the Medically Compromised Patient

SEMINAR OBJECTIVE: Each student should be able to successfully manage those patients that are medically compromised.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #10 - be able to identify those common systemic diseases which affect endodontic therapy.
- MP #11 - know the basic pathophysiology of these diseases.
- MP #12 - know the current medical therapies which are used by the physician to treat these diseases.
- MP #13 - understand how these diseases can affect endodontic therapy and prognosis.
- MP #14 - be able to apply his/her knowledge of systemic diseases and their respective medical treatment to the management of the medically compromised patient who requires scheduled or emergency endodontic treatment.

SEMINAR FORMAT: This seminar is intended to be an overview of the common diseases/conditions with which a medically compromised patient may present prior to endodontic treatment. These include cardiovascular and pulmonary disease, bleeding disorders, endocrine disease, renal failure, infectious disease (AIDS, hepatitis), alcoholism, cancer and pregnancy. In addition, treatment of the geriatric patient and the patient on steroids will also be discussed.

The chairperson will be responsible for assigning topics and pertinent literature to each student. Each student will then prepare a short written and oral report on the topic. The report should include a description of the disease and any modifications to endodontic therapy that it incurs. In addition, abstracts should be prepared for those articles not fully discussed in the students' respective written reports.

SEMINAR ASSIGNMENTS: All students should read and be prepared to discuss the following general literature.

Jolly DE. Evaluation of the medical history. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):361-80.

D'Ambrosio JA, Raborn GW. Diagnostic considerations of the medically complex patient. Dent Clin N Am 1992;36:841-55.

Shuman SK, Bebeau MJ. Ethical and legal issues in special patient care. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):553-76.

Lockhart PB, Schmidtke MA. Antibiotic considerations in medically compromised patients. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):381-402.

Pyle MA, Faddoul FF, Terezhalmly GT. Clinical implications of drugs taken by our patients. Dent Clin N Am 1993;37:73-90.

Becker DE. Drug interactions in dental practice: A summary of facts and controversies. Comp Cont Ed Dent 1994;15(10):1228-42.

Felder RS, Millar SB. Dental care of the polymedication patient. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):525-36.

Johnson WT, Leary JM. Management of dental patients with bleeding disorders: review and update. Oral Surg 1988;66:297-303.

Patton LL, Ship JA. Treatment of patients with bleeding disorders. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):465-82.

Meiller TF, Overholser CD. The dental patient with hypertension. Dent Clin N Am 1983;27:289-301.

The 1988 report of the Joint National Committee on detection, evaluation, and treatment of high blood pressure. Arch Intern Med 1988;148:1023-38.

Garfunkel AA, Glick M. HIV disease: therapy, related systemic and oral conditions -- an update. Comp Cont Ed Dent 1992;13:284-96.

Greenspan D, Greenspan JS. Oral manifestations of human immuno-deficiency virus infection. Dent Clin N Am 1993;37:21-32

Peterson DE, D'Ambrosio JA. Nonsurgical management of head and neck cancer patients. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):425-445.

Mealey BL, Semba SE, Hallmon WW. The head and neck radiotherapy patient: Patient management and oral complications. Comp Cont Ed Dent 1994;15(4):442-58.

Rees TD. The diabetic dental patient. In Rutkauskas JS (ed). Practical considerations in special patient care. Dent Clin N Am 1994;38(3):447-464.

Skoczylas LJ, Terezhalmly GT, Langlais RP, Glass B. Dental management of the diabetic patient. Comp Cont Ed Dent 1988;9:390-8.

Kilmartin C, Munroe CO. Cardiovascular diseases and the dental patient. J Can Dent Assoc 1986;52:513-8.

Christen AG. Dentistry and the alcoholic patient. *Dent Clin N Am* 1983;27:341-61.

The following literature should be used in preparing the assigned reports.

Herman WW, Konzelman JL, Sutley SH. Current perspectives on dental patients receiving coumarin anticoagulant therapy. *J Am Dent Assoc* 1997;128:327-35.

Rick ME. Diagnosis and management of von Willebrand's syndrome. *Medical Clin N Am* 1994;78(3):609-23.

Benoiel R, Leviner E, Katz J, Tzukert A. Dental treatment for the patient on anticoagulant therapy: prothrombin time value - what difference does it make? *Oral Surg* 1986;62:149-51.

Redding SW, Olive JA. Relative value of screening tests of hemostasis prior to dental treatment. *Oral Surg* 1985;59:34-6.

Mulligan R, Gjerde Weitzel K. Pretreatment management of the patient receiving anticoagulant drugs. *J Am Dent Assoc* 1988;117:479-83.

Katz JO, Terezhalmay GT. Dental management of the patient with hemophilia. *Oral Surg* 1988;66:139-44.

Perry JJ, Alving BM. von Willebrand's Disease. *Am Fam Physician* 1990;41:219-24.

Kelly M. Common laboratory tests - their use in detection and management of patients with bleeding disorders. *Gen Dent* 1990;38:282-5.

Keila S, Kaufman A, Itckowitch D. Uncontrolled bleeding during endodontic treatment as the first symptom for diagnosing von Willebrand's disease. *Oral Surg* 1990;69:243-5.

Petrover MG, Cohen CI. The use of Desmopressin in the management of two patients with von Willebrand's disease undergoing periodontal surgery. 2 case reports. *J Periodontol* 1990;61:239-42.

Spatafore CM, Keyes G, Skidmore AE. Lymphoma: an unusual oral presentation. *J Endodon* 1989;15:438-41.

Shrout M. Managing patients undergoing radiation. *J Am Dent Assoc* 1991;122:69-72.

Spott RJ. Metastatic breast carcinoma disguised as periapical disease in the maxilla. *Oral Surg* 1985;60:327-8.

Seto BG, Beumer J, Kagawa T, Klokkevold P, Wolinsky L. Analysis of endodontic therapy in patients irradiated for head and neck cancer. *Oral Surg* 1985;60:540-5.

Nguyen AH. Dental management of patients who receive chemo- and radiation therapy. *Gen Dent* 1992;40:305-11.

Bender IB, Montgomery S. Nonsurgical endodontic procedures for the patient at risk for infective endocarditis and other systemic disorders. *J Endodon* 1986;12:400-7.

Rubin MM. Infective endocarditis associated with mitral valve prolapse. *J Oral Surg* 1991;49:1106-8.

Wahl MJ. Myths of dental-induced endocarditis. *Comp Cont Ed Dent* 1994;15(9):1100-19.

Wahl MJ. Clinical issues in the prevention of dental-induced endocarditis and prosthetic joint infection. *Prac Perio Aesth Dent* 1994;6(6):25-32.

Giglio JA, Rowland RW, Dalton HP, Laskin DM. Suture removal-induced bacteremia: a possible endocarditis risk. *J Am Dent Assoc* 1992;123:65-70.

Advisory Statement: Antibiotic prophylaxis for dental patients with total joint replacements. American Dental Association; American Academy of Orthopaedic Surgeons. *J Am Dent Assoc* 1997;128:1004-7.

Special Report: Prevention of bacterial endocarditis: recommendations by the American Heart association. *J Am Dent Assoc* 1997;128:1142-51.

Glick M, Trope M, Pliskin ME. Detection of HIV in the dental pulp of a patient with AIDS. *J Am Dent Assoc* 1989;119:649-670.

Pindborg JJ. Classification of oral lesions associated with HIV infection. *Oral Surg* 1989;67:292-5.

Barr CE. Practical considerations in the treatment of the HIV-infected patient. *In* Rutkauskas JS (ed). *Practical considerations in special patient care*. *Dent Clin N Am* 1994;38(3):403-24.

Cooper H. Root canal treatment on patients with HIV infection. *Int Endod J* 1993;26(6):369-71.

Cintron G, Medina R, Reyes AA, Lyman G. Cardiovascular effects and safety of dental anesthesia and dental intervention in patients with recent uncomplicated myocardial infarction. *Arch Inter Med* 1986;146:2203-4.

Farkas JA, Goebel WM. Assessing the risk of angina for dental therapy. *Oral Surg* 1984;58:253-6.

Ichinohe T, Kaneko Y, Nakakuki T, Aida H, Abe H. Systemic management of dental patients with cardiovascular disease. *Anesth Prog* 1989;36:219-21.

Findler M, Galili D, Meidan Z, Yakirevitch V, Garfunkel AA. Dental treatment in very high risk patients with active ischemic heart disease. *Oral Surg* 1993;76(3):289-300.

Glick M. Glucocorticosteroid replacement therapy: a literature review and suggested replacement therapy. *Oral Surg* 1989;67:614-20.

Kalkwarf KL, Hinrichs JE, Shaw DH. Management of the dental patient receiving corticosteroid medications. *Oral Surg* 1982;54:396-400.

Gold SI. Root canal calcification associated with prednisone therapy: a case report. *J Am Dent Assoc* 1989;119:523-5.

Ziccardi VB, Abubaker AO, Sotereanos GC, Patterson GT. Precipitation of an addison crisis during dental surgery: recognition and management. *Comp Cont Ed Dent* 1992;13:518-23.

Levy HM. Dental considerations for the patient receiving dialysis for renal failure. *Spec Care Dent* 1988;8:34-6.

Rhodus NL. Dental management of the renal transplant patient. *Comp Cont Ed Dent* 1993;14(4):518-32.

Ziccardi V. Management of the oral and maxillofacial surgery patient with end-stage renal disease. *J Oral Surg* 1992;50:1207- 1212.

Comfort MB, Wu PC. The reliability of personal and family medical histories in the identification of hepatitis B carriers. *Oral Surg* 1989;67:531-4.

Chohayeb AA. Hepatitis b and hepatitis c: what you should know. *Comp Cont Ed Dent* 1992;13:776-82.

Gier RE, Janes DR. Dental management of the pregnant patient. *Dent Clin N Am* 1983;27:419-28.

Chiodo GT, Rosenstein DI. Dental treatment during pregnancy: a preventive approach. *J Am Dent Assoc* 1985;110:365-7.

van der Bijl P. Therapeutic considerations in the gerodontic patient. *Comp Cont Ed Dent* 1994;15(4):478-90.

Shay K. Identifying the needs of the elderly dental patient: The geriatric dental assessment. In Rutkauskas JS (ed). *Practical considerations in special patient care. Dent Clin N Am* 1994;38 (3):499-24.

McCarthy FM. Safe treatment for the emphysema patient. *J Am Dent Assoc* 1984;108:400-7.

Friedlander AH, Mills MJ, Gorelick DA. Alcoholism and dental management. *Oral Surg* 1987;63:42-6.

Terezhalmay GT, Hall EH. The asplenic patient: a consideration for antimicrobial prophylaxis. *Oral Surg* 1984;57:114-7.

Galili D, Findler M, Garfunkel AA. Oral and dental complications associated with diabetes and their treatment. *Comp Cont Ed Dent* 1994;15(4):496-509.

TOPICAL LITERATURE SEMINAR #5

TOPIC: Diagnostic Procedures in the Practice of Endodontics

SEMINAR OBJECTIVE: Each student should be able to analyze information obtained from medical and dental histories, clinical and radiographic examinations, and the results of appropriate diagnostic tests to make an accurate endodontic diagnosis.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #15 - be able to define diagnosis.
- MP #16 - know the procedure and proper sequence for making an accurate diagnosis.
- MP #17 - understand the importance and know the methods of obtaining adequate medical and dental histories.
- MP #18 - be able to analyze information obtained from radiographic examination and diagnostic tests.
- MP #19 - be able to outline the procedures required for conducting an appropriate clinical examination.
- MP #20 - be able to explain the role of pain in diagnosis of pulpal and periradicular pathoses.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Berman LH, Hartwell GR. Diagnosis. In Cohen S, Hargreaves K.(eds). Pathways of the Pulp. 9th ed. St Louis: CV Mosby Company, 2006:2-39.

Weine F. Endodontic Therapy. 5th ed. St Louis: CV Mosby Company, 1996:28-83.

Bellizzi R, Hartwell GR, Ingle JI, Goerig AC, Neaverth EJ, Marshall FJ, Krasny RM, Frank AL, Gaum C. Diagnostic procedures. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins, 1994:465-523.

Seltzer S, Bender IB. The Dental Pulp. 3rd ed. Philadelphia: JB Lippincott, 1984:361-72.

Walton RE, Torabinejad M. Diagnosis and treatment planning. In Walton RE, Torabinejad M (eds). 2nd ed. Principles and Practice of Endodontics. Philadelphia: WB Saunders, 1996:52-74.

Terezhalmly GT, Schiff T. The historical profile. Dent Clin N Am 1986;30:357-68.

Terezhalmly GT, McDavid PT. The physical examination. Dent Clin N Am 1986;30:369-79.

Terezhalmly GT, Bottomley WK. Radiographic and clinical laboratory procedures. Dent Clin N Am 1986;30:381-90.

Schwartz S, Cohen S. The difficult differential diagnosis. *Dent Clin N Am* 1992;36:279-92.

Mitchell DF, Tarplee RE. Painful pulpitis: a clinical and micro-scopic study. *Oral Surg* 1960;13:1360-70.

The following students should abstract and report on the following literature.

Seltzer S, Bender IB, Zionitz M. The dynamics of pulp inflammation: correlations between diagnostic data and actual histologic findings in the pulp. Part I. *Oral Surg* 1963;16:846-71 and Part II, *Oral Surg* 1963;16:969-77.

Abdel Wahag MH, Kennedy JG. The effect of rate of increase of electrical current on the sensation thresholds of teeth. *J Dent Res* 1987;66:799-801.

Brown RS, Hinderstain B, Teynolds DC, Corio RL. Using anesthetic localization to diagnose oral and dental pain. *J Am Dent Assoc* 1995;126:633-41.

Trowbridge HO, Franks M, Korostoff E, Emling R. Sensory response to thermal stimulation in human teeth. *J Endodon* 1980;6:405-12.

Rowe A, Pitt Ford T. The assessment of pulpal vitality. *Int Endo J* 1990;23:77-83.

Bender IB, Landau A, Fonseca S, Trowbridge HO. The optimum placement-site of the electrode in electric pulp testing of the 12 anterior teeth. *J Am Dent Assoc* 1989;118:305-10.

Keir D, Walker W, Schindler W, Dazey S. Thermally induced pulpalgia in endodontically treated teeth. *J Endodon* 1991;17:38-40.

Ingolfsson AER, Tronstad L, Hersh E, Riva CE. Efficacy of laser doppler flowmetry in determining pulp vitality of human teeth. *Endod Dent Traumatol* 1994;10(2):83-7.

Pantera EA, Anderson RW, Pantera CT. Use of dental instruments for bridging during electric pulp testing. *J Endodon* 1992;18:37-8.

Rickoff B, Trowbridge HO, Baker J, Fuss Z, Bender IB. Effects of thermal vitality tests on human dental pulp. *J Endodon* 1988;14:482-5.

Seltzer S, Bender IB, Nazimov H. Differential diagnosis of pulp conditions. *Oral Surg* 1965;19:383-91.

Abou-Rass M. The stressed pulp condition: an endodontic-restorative diagnostic concept. *J Pros Dent* 1982;48:264-7.

Diaz-Arnold AM, Arnold MA, Wilcox LR. Optical detection of hemoglobin in pulpal blood. *J Endodon* 1996;22:19-22.

Jacobsen JJ. Probe placement during pulp testing procedures. *Oral Surg* 1984;58:242-7.

Bhaskar SN, Rappaport HM. Dental vitality tests and pulp status. *J Am Dent Assoc* 1973;86:409-12.

Ingram TA, Peters DD. Evaluation of the effects of carbon dioxide used as a pulpal test. Part 2. In vivo effects on canine enamel and pulpal tissues. *J Endodon* 1983;9:296-303.

Augsburger RA, Peters DD. In vitro effects of ice, skin refrigerant and CO₂ snow on intrapulpal temperature. *J Endodon* 1981;7:110-16.

Peters DD, Lorton L, Mader CL, Augsburger RA, Ingram TA. Evaluation of the effects of carbon dioxide used as a pulpal test. Part 1. In vitro effect on human enamel. *J Endodon* 1983;9:219-2

Van Hassel HJ, Harrington GW. Localization of pulpal sensation. *Oral Surg* 1969;28:753-60.

Cooley R, Robinson SF. Variables associated with electric pulp testers. *Oral Surg* 1980;50:66-73.

Peters DD, Mader CL, Donnelly JC. Evaluation of the effects of carbon dioxide used as a pulpal test. 3. In vivo effect on human enamel. *J Endodon* 1986;12:13-20.

Hyman JJ, Cohen ME. The predictive value of endodontic diagnostic tests. *Oral Surg* 1984;58:343-6.

Pantera E, Anderson R, Pantera C. Reliability of electric pulp testing after pulpal testing with dichlorodifluoromethane. *J Endodon* 1993;19(6):312-4.

Peters D, Baumgartner JC. Adult pulpal diagnosis. I. Evaluation of the positive and negative responses to cold and electric pulp tests. *J Endodon* 1994;20(10):506-11.

Firriolo FJ, Wang T. Diagnosis of selected pulpal pathoses using an expert computer system. *Oral Surg* 1993;76(3):390-6.

Matthews B, Vongsavan N. Advantages and limitations of laser doppler flow meters. *Int Endod J* 1993;26(1):9-10.

Schnettler JM, Wallace JA. Pulse oximetry as a diagnostic tool of pulpal vitality. *J Endodon* 1991;17:488-90.

Friend LA, Glenwright HD. An experimental investigation into the localization of pain from the dental pulp. *Oral Surg* 1968;25:765-74.

Nissan R, Trope M, Zhang C, Chance B. Dual wavelength spectrophotometry as a diagnostic test of the pulp chamber contents. *Oral Surg* 1992;74:508-14.

Fuss Z, Trowbridge HO, Bender IB, Rickoff B, Sorin S. Assessment of reliability of electrical and thermal pulp testing agents. *J Endodon* 1986;12:301-5.

Ramsay DS, Artun J, Martinen SS. Reliability of pulpal blood-flow measurements utilizing laser doppler flowmetry. *J Dent Res* 1991;70:1427-30.

Ikawa M, Horiuchi H, Ikawa K. Optical characteristics of human extracted teeth and the possible application of photoplethysmography to the human pulp. *Arch Oral Biol* 1994;39 (10):821-7.

Mesaros S, Trope M, Maixner W, Burkes EJ. Comparison of two laser doppler systems on the measurement of blood flow of premolar teeth under different pulpal conditions. *Int Endod J* 1997;30:167-74.

TOPICAL LITERATURE SEMINAR #6a

TOPIC I: Endodontic-Periodontic Lesions

SEMINAR OBJECTIVE: Each student should understand the etiology and course of pulpal and periodontal disease in order that he/she can accurately diagnose and treat interrelated endodontic-periodontic lesions.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #21 - understand the embryology of the pulpal and periodontal tissues.
- MP #22 - be able to identify the etiologic factors associated with pulpal disease.
- MP #23 - be able to identify the etiologic factors associated with periodontal disease.
- MP #24 - understand the clinical procedures used to diagnose lesions of endodontic origin.
- MP #25 - understand the clinical procedures used to diagnose lesions of periodontic origin.
- MP #26 - understand the systems used for classifying endodontic-periodontic lesions.
- MP #27 - understand the clinical procedures available for treating endodontic-periodontic lesions.
- MP #28 - be able to formulate an appropriate treatment plan for managing endodontic-periodontic lesions.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Kerns DG, Glickman GN. Endodontic and Periodontic Interrelationships. In Cohen S, Hargreaves KM. (editors) Pathways of the Pulp (9th ed). 2006. Mosby. St. Louis. pp: 650-667.

Chacker FM. The endodontic-periodontic continuum. Dent Clin N Am 1972;18:393-414.

Harrington GW. The perio-endo question: differential diagnosis. Dent Clin N Am 1979;23:673-90.

Hildebrand CN, Morse DR. Periodontic-endodontic interrelationships. Dent Clin N Am 1980;24:797-812.

Gargiulo AV. Endodontic-periodontic interrelationships: diagnosis and treatment. Dent Clin N Am 1984;28:767-82.

Kalkwark KL, Reinhardt RA. The furcation problem. Dent Clin N Am 1988;32:243-63.

Blair HA. Relationships between endodontics and periodontics. J Periodontol 1973;43:209-13.

Madigan JL. Endodontic-periodontic relationships - a periodontic viewpoint. TIC 1985:5-10.

Clark DM. Endodontic-periodontic relationships - an endodontic viewpoint. TIC 1985:11-12.

Tal H. Differentiating between primary periodontal and endodontic lesions. Gen Dent 1984:433-5.

The following students should abstract and report on the following literature.

Sinai IH, Soltanoff W. The transmission of pathologic changes between the pulp and periodontal structures. Oral Surg 1973;36: 558-68.

Zubrey Y, Kozlovsky A. Two approaches to the treatment of true combined perio-endodontic lesions. J Endodon 1993;19(8):414-6.

Hiatt WH. Pulpal periodontal disease. J Periodontol 1977;48:598-609.

Seltzer S, Bender IB, Zionitz M. The interrelationship of pulp and periodontal disease. Oral Surg 1963;16:1474-90.

Hirsch RS, Clarke NG. Pulpal disease and bursts of periodontal attachment loss. Int Endod J 1993;26(6):362-8.

Paul BF, Hutter JW. The endodontic-periodontal continuum revisited: new insights into etiology, diagnosis and treatment. J Am Dent Assoc 1997;128:1541-7.

Goldberg F, Massone EJ, Soares I, Bittencourt AZ. Accessory orifices: anatomical relationship between the pulp chamber floor and the furcation. J Endodon 1987;13:178-81.

Pitts DL, Natkin E. Diagnosis and treatment of vertical root fractures. J Endodon 1983;9:338-46.

Mazur B, Massler M. Influence of periodontal disease on the dental pulp. Oral Surg 1964;17:592-603.

Vertucci FJ, Williams RG. Furcation canals in the human mandibular first molar. Oral Surg 1974;38:308-14.

Bergenholtz G, Nyman S. Endodontic complications following periodontal and prosthetic treatment of patients with advanced periodontal disease. J Periodontol 1984;55:63-8.

Gutmann J. Prevalence, location and patency of accessory canals in the furcation region of permanent molars. J Periodontol 1978;49:21-6.

Langeland K, Rodrigues H, Dowden W. Periodontal disease, bacteria, and pulpal histopathology. Oral Surg 1974;37:257-70.

Bender IB, Seltzer S. The effect of periodontal disease on the pulp. *Oral Surg* 1972;33:458-74.

Becker W, Becker BE. Periodontal regeneration updated. *J Am Dent Assoc* 1993;124(7):37-43.

Niemann R, Dickenson G, Jackson C, Weardon S, Skidmore A. Dye ingress in molars: furcation to chamber floor. *J Endodon* 1993; 19(6):293-6.

Czarnecki RT, Schilder H. A histological evaluation of the human pulp in teeth with varying degrees of periodontal disease. *J Endodon* 1979;5:242-53.

Vertucci FJ, Anthony RL. A scanning electron microscopic investigation of accessory foramina in the furcation and pulp chamber floor of molar teeth. *Oral Surg* 1986;62:319-26.

Anderegg CR, Metzler DG. Treatment of the palato-gingival groove with guided tissue regeneration. Report of 10 cases. *J Periodontol* 1993;64:72-4.

Wong R, Hirsch RS, Clarke NG. Endodontic effects of root planing in humans. *Endod Dent Traum* 1989;5:193-6

Simon JHS, Glick DH, Frank AL. The relationship of endodontic- periodontic lesions. *J Periodontol* 1972;43:202-8.

TOPICAL LITERATURE SEMINAR #6b

TOPIC II: Classification of Pulpal and Periradicular Pathoses / Endodontic Treatment Planning

SEMINAR OBJECTIVE: Each student should become familiar with current pulpal and periradicular diagnostic terms and how each of the diagnoses are derived.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #29 - be able to analyze the information obtained from the dental history, radiographic and clinical examinations and diagnostic tests.
- MP #30 - be able to classify the disease states of the pulp and periradicular tissues on a clinical basis.
- MP #31 - be able to develop an appropriate endodontic treatment plan.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Berman LH, Hartwell GR. Diagnosis. In Cohen S, Hargreaves KM. (editors) Pathways of the Pulp (9th ed). 2006. Mosby. St. Louis. pp: 34-37.

Smulson MH. Classification and diagnosis of pulpal pathoses. Dent Clin N Am 1984;28:699-723.

Montgomery S, Ferguson CD. Endodontics: diagnostic, treatment planning, and prognostic considerations. Dent Clin N Am 1986;30:533-48.

Schulz J, Gutterman JR. The diagnostic correlator: an endodontic teaching device. Oral Surg 1975;40:537-47.

Abbey LM. An expert system for oral diagnosis. J Dent Ed 1987;51:475-80.

Johnson WT, Leary JM. Vertical root fractures: diagnosis and treatment. Gen Dent 1984;4:25-9.

Baume LJ. Diagnosis of diseases of the pulp. Oral Surg 1970; 29:102-16.

The following students should abstract and report on the following literature.

Smith JW. Calcific metamorphosis. A treatment dilemma. Oral Surg 1982;54:441-4.

Pitts DL, Natkin E. Diagnosis and treatment of vertical root fractures. J Endodon 1983;9:338-46.
Abou-Rass M. Endodontic treatment finalization-A systemic endodontic-restorative approach. CDA Journal 1993;21(12):33-42.

Abou-Rass M. The problems with "Wait and See" endodontics. CDA Journal 1993;21(12):43-7.

Silvestri AR. The undiagnosed split root syndrome. *J Am Dent Assoc* 1976;92:930-5.

Tamse A. Iatrogenic vertical root fractures in endodontically treated teeth. *Endod Dent Traumat* 1988;4:190-6.

Agar JR, Weller RN. Occlusal adjustment for initial treatment and prevention of the cracked tooth syndrome. *J Prosth Dent* 1988;60:145-7.

Ehrmann E, Tyas M. Cracked tooth syndrome: diagnosis, treatment and correlation between symptoms and post-extraction findings. *Aust Dent J* 1990;35:105-12.

Cameron CE. The cracked tooth syndrome: additional findings. *J Am Dent Assoc* 1976;93:971-5.

Holcomb JB, Gregory WB. Calcific metamorphosis of the pulp; its incidence and treatment. *Oral Surg* 1967;24:825-30.

Meister F, Lommel TJ, Gerstein H. Diagnosis and possible causes of vertical root fractures. *Oral Surg* 1980;49:243-53.

Walton RE, Michelich RJ, Smith GN. The histopathogenesis of vertical root fractures. *J Endodon* 1984;4:48-56.

CLASSICAL LITERATURE SEMINAR #7

TOPIC: Radiology, Radiographic Techniques and Interpretation

SEMINAR OBJECTIVE: Each student should be able to:

- discuss roentgenographic principles in order to optimally expose, process and interpret intraoral radiographs.
- discuss ideal endodontic radiographic techniques which will enhance diagnostic, treatment and evaluation acumen.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #32 - describe the production and properties of x-rays.
- MP #33 - describe the operation of a dental x-ray machine.
- MP #34 - list the factors which influence the radiographic image.
- MP #35 - relate exposure factors to the quality of the radiograph.
- MP #36 - describe the functions of the film processing solution ingredients.
- MP #37 - describe the limitations of radiographs.
- MP #38 - describe the "buccal object" rule.
- MP #39 - list the advantages and disadvantages of the "paralleling" and "bisecting angle" techniques.
- MP #40 - discuss the reliability of radiographic interpretation.
- MP #41 - discuss some of the other radiographic techniques available.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Glickman GN, Pettiette MT. Preparation for treatment. In Cohen S, Hargreaves KM (eds). Pathways of the pulp, 9th ed. St Louis: CV Mosby Company, 2006:97-135.

Walton RE. Endodontic radiography. In Walton RE, Torabinejad M (eds). Principles and practice of endodontics. 3rd ed. Philadelphia: WB Saunders Company, 2002:130-150.

Ingle JI, Walton RE, Malamed S, Coil J, Khademi JA, Kahn FH, Shulman BB, Bahcall JK, Barss JT. Preparation for endodontic therapy. In Ingle JI, Bakland LK (eds). Endodontics. 5th ed. Toronto: BC Decker, 2002:357-404.

X-rays in dentistry. Eastman Kodak Company. 1985.

Fundamentals of dental radiology -----	4-13
Safety -----	14-16
Intraoral radiology basics -----	18-19
Intraoral - bisecting technique (short cone)-----	20-51
Intraoral - paralleling technique (long cone) -----	52-69
Film processing/mounting and viewing -----	98-107
Films -----	108-14

Richards AG. The buccal object rule. *Den Rad & Photo* 1980;53:37-56.

Antrim DD. Reading the radiograph: a comparison of viewing techniques. *J Endodon* 1983;9:502-5.

Slowey RR. Radiographic aids in the detection of extra root canals. *Oral Surg* 1974;37:762-72.

Skidmore AE. The importance of preoperative radiographs and the determination of root canal configuration. *Quintess Inter* 1979;10:55-61.

Bajuscak RE, Hall EH, GiambriSSI LI, Weaver T. Bacterial contamination of dental radiographic film. *Oral Surg* 1993;76(5):661-3.

Stanczyk DA, Paunovich ED, Broome JC, Fatone MA. Microbiologic contamination during dental radiographic film processing. *Oral Surg* 1993;76(1):112-9.

The following students should abstract and report on the following literature.

Brynolf I. Roentgenologic periapical diagnosis. IV. When is one roentgenogram not sufficient. *Swed Dent J* 1970;63:415-23.

** You should also prepare a brief (one page / typewritten) report describing the operation of an x-ray machine and be prepared to present it at the seminar.

Bhakdinaronk A, Manson-Hing LR. Effect of radiographic technique upon prediction of tooth length in intraoral radiography. *Oral Surg* 1981;51:100-7.

** You should also prepare a brief (one page / typewritten) report describing the process by which radiographs are developed and be prepared to present it at the seminar.

Priebe WA, Lazansky JP, Wuehrmann AH. The value of the roentgenographic film in the differential diagnosis of periapical lesions. *Oral Surg* 1954;7:979-83.

Bender IB. Factors influencing the radiographic appearance of bone lesions. *J Endodon* 1997;23:5-14.

Shrout MK, Hall JM, Hildebolt CE. Differentiation of periapical granulomas and radicular cysts by digital radiometric analysis. *Oral Surg* 1993;76(3):356-61.

Lee SJ, Messer HH. Radiographic appearance of artificially prepared periapical lesions confined to cancellous bone. *Int Endodon J* 1986;19:64-72.

Kaffe I, Gratt BM. Variations in the radiographic interpretation of the periapical dental region. *J Endodon* 1988;14:330-5.

Gelfand M, Sunderman EJ, Goldman M. Reliability of radiographic interpretations. *J Endodon* 1983;9:71-5.

Wenzel A, Grondahl HG. Direct digital radiography in the dental office. *Int Dent J* 1995;45(1):27-34.

Jarvis W, Pifer R, Griffin J, Skidmore A. Evaluation of image quality in individual films of double film packets. *Oral Surg* 1990;69:764-7.

Goldman M, Pearson AH, Darzenta N. Endodontic success - Who's reading the radiograph? *Oral Surg* 1972;33:432-7.

Bender IB, Seltzer S. Roentgenographic and direct observation of experimental bone lesions in bone. Part I. *J Am Dent Assoc* 1961;62:152-60.

Sanderink GCH. Imaging: New versus traditional technological aids. *Int Dent J* 1993;43(4):335-42.

Goldman M, Pearson AH, Darzenta N. Reliability of radiographic interpretation. *Oral Surg* 1974;38:287-93.

Bender IB, Seltzer S. Roentgenographic and direct observation of experimental bone lesions in bone. Part II. *J Am Dent Assoc* 1961;62:708-16.

Forsberg J. Radiographic production of endodontic "working length" comparing the paralleling and the bisecting-angle techniques. *Oral Surg* 1987;64:353-60.

Stein TJ, Corcoran JF. Radiographic working length revisited. *Oral Surg* 1992;74:796-800.

Meier AW, Brown CE, Miles DA, Analoui M. Interpretation of chemically created periapical lesions using direct digital imaging. *J Endodon* 1996;22:516-20.

Torabinejad M, Danforth R, Andrews K, Chan C. Absorbed radiation by various tissues during simulated endodontic radiography. *J Endodon* 1989;15:249-53.

Phillips J, Weller N, Kulild J. The mental foramen: part 2. Radiographic position in relation to the mandibular second premolar. *J Endodon* 1992;18:271-4.

Tyndall DA, Kapa SF, Bagnell CP. Digital subtraction radiography for detecting cortical and cancellous bone changes in the periapical region. *J Endodon* 1990;16:173-8.

Gartner AH, Mack T, Somerlott RG, Walsh LC. Differential diagnosis of internal and external root resorption. *J Endodon* 1976;2:329-34.

Mol A, Dunn S, Van der Stelt P. Diagnosing periapical bone lesions on radiographs by means of texture analysis. *Oral Surg* 1992;73(6):746-50.

Powell-Cullingford AW, Pitt Ford TR. The use of E-speed film for root canal length determination. *Int Endod J* 1993;26(5):268-72.

Soh G, Loh FC, Chong YH. Radiation dosage of a dental imaging system. *Quintessence Int* 1993;24(3):189-91.

Tamse A, Kaffe I, Fishel D. Zygomatic arch interference with correct radiographic diagnosis in maxillary molar endodontics. *Oral Surg* 1980;50:563-5.

Phillips J, Weller N, Kulid J. The mental foramen: part III. Size and position on panoramic radiographs. *J Endodon* 1992;18:383-6.

Leddy BJ, Miles DA, Newton CW, Brown CE. Interpretation of endodontic file lengths using radioVisiography. *J Endodon* 1994;20:542-5.

Goerig AC, Neaverth EJ. A simplified look at the buccal object rule in endodontics. *J Endodon* 1987;13:570-2.

Danforth RA, Torabinejad M. Estimated radiation risks associated with endodontic radiography. *Endod Dent Traum* 1990;6:21-5.

Thuntley KH. X-rays: detailed answers to frequently asked questions. *Comp Cont Ed Dent* 1993;14:394-8.

Farman AG, Mendel RW, Von Fraunhofer JA. Ultraspeed versus ectaspeed x-ray film: endodontists' perceptions. *J Endodon* 1988;14:616-19.

TOPICAL LITERATURE SEMINAR #8

TOPIC: Management of Endodontic Emergencies

SEMINAR OBJECTIVE: Each student should understand how to synthesize an optimal treatment plan for the symptomatic, endodontically involved tooth in order that the pain may be relieved and any subsequent treatment facilitated.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #42 - identify oral conditions which qualify as endodontic emergencies.
- MP #43 - classify endodontic emergencies.
- MP #44 - analyze clinical findings and immediate and past dental histories in order to determine the etiology of the endodontically related pain.
- MP #45 - describe the endodontic treatment modalities which are available for the relief of the acute pulpal and/or periradicular emergency conditions.
- MP #46 - describe the techniques available for administering anesthesia to the emergency patient.
- MP #47 - describe a treatment plan for each classification of endodontic emergency.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Rossmann LE, Hasselgran G, Wolcott JF. Diagnosis and management of orofacial dental pain emergencies. In Cohen S, Hargreaves K (eds). Pathways of the pulp. 9th ed. St Louis: CV Mosby Company, 2006:40-58.

Malamed SF. The management of pain and anxiety. In Cohen S, Burns RC (eds). Pathways of the pulp. 6th ed. St Louis: CV Mosby Company, 1994:568-83.

Walton RE, Hutter JW. Endodontic emergencies. In Walton RE, Torabinejad M (eds). Principles and practice of endodontics. 3rd ed. Philadelphia: WB Saunders Company, 2002:295-309.

Walton RE, Reader A. Local anesthesia. In Walton RE, Torabinejad M (eds). Principles and practice of endodontics. 3rd ed. Philadelphia: WB Saunders Company, 2002:99-117.

Ingle JI, Walton RE, Goerig AC, Neaverth EJ, Lambert GL, Lambert C, Zidell JD. Preparation for endodontic therapy. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins, 1994:71-80.

Naidorf IJ. Endodontic flare-ups: bacteriological and immunological mechanisms. J Endodon 1985;11:462-4.

Harrington GW, Natkin E. Midtreatment flare-ups. Dent Clin N Am 1992;31:409-24.

Reed KL. Advanced techniques of local anesthetic injection. Gen Dent 1994;42(3):248-51.

Antrim DD, Bakland LK, Parker MV. Treatment of endodontic urgent care cases. Dent Clin N Am 1986;30:549-72.

Dorn SO, Moodnik RM, Feldman MJ, Borden BG. Treatment of the endodontic emergency: a report based on a questionnaire - part I. J Endodon 1977;3:94-100.

Dorn SO, Moodnik RM, Feldman MJ, Borden BG. Treatment of the endodontic emergency: a report based on a questionnaire - part II. J Endodon 1977;3:153-6.

Gow-Gates GAE. Mandibular conduction anesthesia: a new technique using extraoral landmarks. Oral Surg 1973;36:321-8.

Gow-Gates GAE, Watson JE. Gow-Gates mandibular block - applied anatomy and histology. Anesth Prog 1989;36:193-5.

Watson JE. Appendix: some anatomic aspects of the Gow-Gates technique for mandibular anesthesia. Oral Surg 1973;36:328-30.

Harbert H. Topical ice: a precursor to palatal injections. J Endodon 1989;15:27-8.

Herod EL. Periodontal ligament injection: review of the literature. Quintess Int 1989;20:219-23.

Walton R. The periodontal ligament injection as a primary technique. J Endodon 1990;16:62-6.

Torabinejad M, Walton RE. Managing endodontic emergencies. J Am Dent Assoc 1991;122(5):99-103.

Ayoub ST, Coleman AE. A review of local anesthetics. Gen Dent 1992;40:285-90.

Torabinejad M. Endodontic flare up. AAE Audio Update 1987.

Malamed S, Weine FS. Profound pulpal anesthesia. AAE Audio Update 1988.

Walton RE, Torabinejad M. Managing local anesthesia problems in the endodontic patient. J Am Dent Assoc 1992;123(5):97-102.

The following students should abstract and report on the following literature.

Cohen HP, Cha BY, Spangberg LSW. Endodontic anesthesia in mandibular molars: A clinical study. J Endodon 1993;19(7):370-3.

Fleury A. Local anesthesia failure in endodontic therapy: the acute inflammation factor. Compend Contin Educ 1990;11:210-14.

Chance KB, Lin L, Skribner JE. Clinical trial of intracanal corticosteroid in root canal therapy. J Endodon 1987;13:466-8.

August DS. Managing the abscessed tooth: instrument and close? J Endodon 1977;3:316-18.

Eriksen HM, Aamdal H, Kerkes K. Periodontal ligament anesthesia. A clinical evaluation. Endod Dent Traum 1986;2:267-9.

Schleder JR, Reader A, Beck M, Meyers WJ. The periodontal ligament injection: a comparison of 2% lidocaine, 3% mepivacaine, and 1:100,000 epinephrine to 2% lidocaine with 1:100,000 epinephrine in human mandibular premolars. J Endodon 1988;14:397-404.

August DS. Managing the abscessed open tooth: instrument and close - part 2. J Endodon 1982;8:364-6.

Walton RE. Distribution of solutions with the periodontal ligament injection: clinical, anatomical and histological evidence. J Endodon 1986;12:492-500.

** You should also prepare a brief written (one page / typewritten) and oral report describing the nerve supply from the maxillary teeth to the brain; nerves, their path of innervation and the teeth they innervate.

Torabinejad M, Peters DL, Pechham N, Rentchler LR, Richardson J. Electron microscopic changes in human pulps after intraligamental injection. Oral Surg 1993;76(2):219-24.

Birchfield J, Rosenberg PA. Role of the anesthetic solution in intrapulpal anesthesia. J Endodon 1975;1:26-7.

Bence R, Meyers RD, Knoff RV. Evaluation of 5,000 endodontic treatment incidents of the open tooth. Oral Surg 1980;49:82-4.

Malamed SF. The Gow-Gates mandibular block - evaluation after 4275 cases. Oral Surg 1981;51:463-7.

Gustainis JF, Peterson LJ. An alternative method of mandibular nerve block. J Am Dent Assoc 1981;103:33-6.

** You should also prepare a brief written (one page / typewritten) and oral report describing the nerve supply from the mandibular teeth to the brain; nerves, their path of innervation and the teeth they innervate.

Southard DW, Rooney TP. Effective one-visit therapy for the acute periapical abscess. J Endodon 1984;10:580-3.

Desantis JL, Liebow C. Four common mandibular nerve anomalies that lead to local anesthesia failures. J Am Dent Assoc 1996;127:1081-6.

** You should also prepare a brief written (one page / typewritten) and oral report describing the mechanism of action of local anesthetics. Use diagrams, overheads, etc.

Glassman G, Krasner P, Morse DR, Rankow H, Lang J, Furst ML. A prospective randomized double-blind trial on efficacy of dexamethasone for endodontic interappointment pain in teeth with asymptomatic inflamed pulps. *Oral Surg* 1988;67:96-100.

Hasselgren G, Reit C. Emergency pulpotomy: pain relieving effect with and without the use of sedative dressing. *J Endodon* 1989;15:254-6.

Kim S. Ligamental injection: a physiological explanation of its efficacy. *J Endodon* 1986;12:486-91.

Leonard MS. The efficacy of an intraosseous injection system of delivering local anesthetic. *J Am Dent Assoc* 1995;126(1):81-6.

Jostes JL, Holland GR. The effect of occlusal adjustment on endodontic pain. *J Endodon* 1984;10:34-7.

Peters D. Evaluation of prophylactic alveolar trephination to avoid pain. *J Endodon* 1980;6:518-26.

Knoll-Kohler E, Fortsch G. Pulpal anesthesia dependent on epinephrine dose in 2% lidocaine. *Oral Surg* 1992;73:537-40.

Frommer J, Mele FA, Monroe CW. The possible role of the mylohyoid nerve in mandibular posterior tooth sensation. *J Am Dent Assoc* 1972;85:113-17.

Gatewood RS, Himel VT, Dorn SO. Treatment of the endodontic emergency: a decade later. *J Endodon* 1990;16:284-91.

Weine FS, Healy HJ, Theiss EP. Endodontic emergency dilemma: leave tooth open or keep it closed? *Oral Surg* 1975;40:531-6.

Wong MKS, Jacobsen PL. Reasons for local anesthesia failures. *J Am Dent Assoc* 1992;123:69-73.

Nusstein J, Reader A, Nist R, Beck M, Meyers WJ. Anesthetic efficacy of the supplemental intraosseous injection of 2% lidocaine with 1:100,000 epinephrine in irreversible pulpitis. *J Endodon* 1998;24:487-91.

Joyce AP, Donnelly JC. Evaluation of the effectiveness and comfort of incisive nerve anesthesia given inside or outside the mental foramen. *J Endodon* 1993;19(8):409-11.

Nist RA, Reader A, Beck M, Meyers W. An evaluation of the incisive nerve block and combination inferior alveolar and incisive nerve blocks in mandibular anesthesia. *J Endodon* 1992;18(9):455-9.

Creech JL, Walton RE, Kaltenbach R. Effect of occlusal relief on endodontic pain. *J Am Dent Assoc* 1984;109:64-7.

Rosenberg PA, Babick PJ, Schertzer L, Leung A. The effect of occlusal reduction on pain after endodontic instrumentation. *J Endodon* 1998;24:492-6.

Rimmer A. The flare-up index: A quantitative method to describe the phenomenon. *J Endodon* 1993;19(5):255-6.

Nevins A, Friedman L, Devita R, Schacter W. Local injection of benadryl for the prevention of iatrogenic endodontic flare-ups. *Endod Dent Traum* 1988;4:90-1.

Wallace JA, Michanowicz AE, Mundell RD, Wilson EG. A pilot study of the clinical problem of regionally anesthetizing the pulp of an acutely inflamed mandibular molar. *Oral Surg* 1985;59:517-21.

Sved AM, Wong JD, Donkor P, Horan J, Rix L, Curtin J, Vickers R. Complications associated with maxillary nerve block anesthesia via the greater palatine canal. *Aust Dent J* 1992;37:340-5.

TOPICAL LITERATURE SEMINAR #9

TOPIC: Management of Traumatic Injuries to the Dentition

SEMINAR OBJECTIVE: Each student should learn how to synthesize an optimal treatment plan for each traumatic injury that might occur to the permanent dentition.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #48 - understand the importance of accurate diagnosis and correct treatment of traumatic dental injuries.
- MP #49 - be able to classify traumatic injuries to the dentition.
- MP #50 - be able to analyze clinical findings and immediate and past dental histories in order to determine the best and most effective course of therapy.
- MP #51 - understand the endodontic treatment modalities which are available for teeth which have been traumatized.
- MP #52 - be able to synthesize a treatment plan for treating traumatic injuries to the hard and supporting tissues of the dentition; crown infractions, uncomplicated and complicated crown fractures, horizontal root fractures, concussions, subluxations, intrusions, extrusions and avulsions.

** TRAUMATIC INJURIES TO THE PRIMARY DENTITION WILL BE DISCUSSED DURING THE "PEDIATRIC ENDODONTICS" SEMINAR.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Diangelis AJ, Bakland LK. Traumatic dental injuries: current treatment concepts. J Am Dent Assoc 1998;129:1401-13.

Hovland EJ, Gutmann JL, Dumsha TC. Symposium on Traumatic Injuries. Dent Clin N Am 1995;39(1).

Dumsha TC. Luxation injuries. Dent Clin N Am 1995;39:79-92.

Cvek M. Endodontic management of traumatized teeth. In Andreasen JO, Andreasen FM (eds). Textbook and color atlas of traumatic injuries to the teeth. 3rd ed. St. Louis: Mosby-Yearbook, Inc., 1994;517-85.

Trope M, Blanco L, Chivian N, Sigurdsson A. The role of Endodontics after dental traumatic injuries. In Cohen S, Hargreaves K. (eds) Pathways of the pulp. 9th ed. St Louis: CV Mosby Company, 2006;610-49.

Hovland EJ. Horizontal root fracture: treatment and repair. Dent Clin N Am 1992;36:509-26.

Andreasen JO, Hjorting-Hansen EI. Radiographic and clinical study of 110 human teeth replanted after accidental loss. *Acta Odont Scand* 1966;24:263-86.

Andreasen JO, Hjorting-Hansen E. Replantation of teeth. II. Histological study of 22 replanted anterior teeth in humans. *Acta Odont Scand* 1966;24:287-306.

Van Hassel HJ, Oswald RJ, Harrington GW. Replantation 2. The role of the periodontal ligament. *J Endodon* 1980;6:506-8.

Hammarstrom L, Pierce A, Blomlof L, Feiglin B, Lindskog S. Tooth avulsion and replantation - a review. *Endod Dent Traumatol* 1986;2:1-8.

Oikarinen K. Tooth splinting: a review of the literature and consideration of the versatility of a wire composite splint. *Endod Dent Traumatol* 1990;6:237-50.

Infantino LM, Ingram TA. Root resorption: a review of the causes and treatment. *Gen Dent* 1989;38:478-81.

Antrim DD, Ostrowski JS. A functional splint for traumatized teeth. *J Endodon* 1982;8:328-31.

The following students should abstract and report on the following literature.

Vanderas AP. Effects of intracanal medicaments on inflammatory resorption or occurrence of ankylosis in mature traumatized teeth: a review. *Endod Dent Traumatol* 1993;9(5):175-84.

Cvek M. A clinical report on partial pulpotomy and capping with calcium hydroxide in permanent incisors with complicated crown fractures. *J Endodon* 1978;4:232-7.

Zachrisson BU, Jacobsen I. Long term prognosis of 66 permanent anterior teeth with root fractures. *Scan J Dent Res* 1975;83:345-54.

Krasner P, Person P. Preserving avulsed teeth for replantation. *J Am Dent Assoc* 1992;123(11):80-8.

Andreasen JO. The effect of pulp extirpation or root canal treatment on periodontal healing after replantation of permanent incisors in monkeys. *J Endodon* 1981;7:245-52.

Andreasen JO. Effect of extra-alveolar period and storage media upon periodontal and pulpal healing after replantation of mature permanent incisors in monkeys. *Int J Oral Surg* 1981;10:43-53.

Dumsha TC, Hovland EJ. Evaluation of long-term calcium hydroxide treatment in avulsed teeth in monkeys. *Int Endod J* 1995;28:7-11.

Nasjleti CE, Castelli WA, Caffese RG. The effects of direct splinting times on replantation of teeth in monkeys. *Oral Surg* 1982;53:557-66.

Tronstad L, Andreason JO, Hasselgren G, Kristerson L, Riis I. Ph changes in dental tissues after root canal filling with calcium hydroxide. *J Endodon* 1981;7:17-21.

Zerman N, Cavalleri G. Traumatic injuries to permanent incisors. *Endod Dent Traumatol* 1993;9(2):61-3.

Andreasen FM, Andreasen JO, Boyer T. Prognosis of root-fractured permanent incisors - prediction of healing modalities. *Endod Dent Traumatol* 1989;5:11-22.

Hammarstrom LE, Blomlof LB, Feiglin B, Lindskog SF. Effect of calcium hydroxide treatment on periodontal repair and root resorption. *Endod Dent Traumatol* 1986;2:184-9.

Tronstad L. Root resorption - etiology, terminology and clinical manifestations. *Endod Dent Traumatol* 1988;4:241-52.

Blomlof L, Linskog S, Andersson L, Hedstrom K-G, Hammarstrom L. Storage of experimentally avulsed teeth in milk prior to replantation. *J Dent Res* 1983;62:912-16.

Ravn JJ. Follow-up study of permanent incisors with enamel-dentin fractures after acute trauma. *Scand J Dent Res* 1981;89:355-65.

Hammarstrom L, Blomlof L, Lindskog S. Dynamics of dentoalveolar ankylosis and the associated root resorption. *Endod Dent Traumatol* 1989;5:163-75.

Hiltz H, Trope M. Vitality of human lip fibroblasts in milk, Hank's balanced salt solution and Viaspan storage media. *Endod Dent Traumatol* 1991;7:69-72.

Lengheden A, Blomlof L, Lindskog S. Effect of immediate calcium hydroxide treatment and permanent root-filling on periodontal healing in contaminated replanted teeth. *Scand J Dent Res* 1991;99:139-46.

Andersson L, Bodin I, Sorensen S. Progression of root resorption following replantation of human teeth after extended extraoral storage. *Endod Dent Traumatol* 1989;5:38-47.

Herweijer J, Torabinejad M, Bakland L. Healing of horizontal root fractures. *J Endodon* 1992;18:118-22.

Crona-Larsson G, Bjarnason S, Noren JG. Effect of luxation injuries on permanent teeth. *Endod Dent Traumatol* 1991;7:199-206.

Andreasen JO, Borum MK, Jacobsen HL, Andreasen FM. Replantation of 400 avulsed permanent incisors. 2. Factors related to pulpal healing. *Endod Dent Traumatol* 1995;11:59-68.

Trope M, Yesilsoy C, Koren L, Moshonov J. Effect of different endodontic treatment protocols on periodontal repair and root resorption of replanted dog teeth. *J Endodon* 1992;18:492-6.

Trope M. Periodontal healing of replanted dog teeth stored in Viaspan, milk and Hank's balanced salt solution. *Endod Dent Traum* 1992;8:183-8.

Andreasen JO, Schwartz O. The effect of saline storage before replantation upon dry damage of the periodontal ligament. *Endod Dent Traumatol* 1986;2:67-70.

Trope M. Root resorption of dental and traumatic origin: classification based on etiology. *Pract Periodont Aesth Dent* 1998;10:515-22. (Please see me for a copy of this article)

Patil S, Dumsha TC, Sydiskis R. The effects of storage media on PDL cells in extracted teeth. *Int Endod J* 1994;27:1-5.

Lindskog S, Pierce A, Blomlof L, Hammarstrom L. The role of the necrotic periodontal membrane in cementum resorption and ankylosis. *Endod Dent Traumatol* 1985;1:96-101.

Lindskog S, Blomlof BS, Hammarstrom L. Dentin resorption in replanted monkey incisors. *J Clin Perio* 1988;15:365-70.

Andreasen JO, Borum MK, Jacobsen HL, Andreasen FM. Replantation of 400 avulsed permanent incisors. 3. Factors related to root growth. *Endod Dent Traumatol* 1995;11:69-75.

Hammarstrom L, Blomlof L, Feiglin B, Andersson L, Lindskog S. Replantation of teeth and antibiotic treatment. *Endod Dent Traumatol* 1986;2:51-7.

Andreasen FM, Vestergaard PB. Prognosis of luxated permanent teeth - the development of pulp necrosis. *Endod Dent Traumatol* 1985;1:207-20.

Berude JA, Hicks ML, Sauber JJ, Li S. Resorption after physiological and rigid splinting of replanted permanent incisors in monkeys. *J Endodon* 1988;14:592-600.

Andreasen JO, Borum MK, Jacobsen HL, Andreasen FM. Replantation of 400 avulsed permanent incisors. 4. Factors related to periodontal ligament healing. *Endod Dent Traumatol* 1995;11:76-89.

Lindskog S, Blomlof BS, Hammarstrom L. Evidence for a role of odontogenic epithelium in maintaining the periodontal space. *J Clin Perio* 1988;15:371-3.

Kling M, Cvek M, Mejare I. Rate and predictability of pulp revascularization in therapeutically reimplanted permanent incisors. *Endod Dent Traumatol* 1986;2:83-9.

Andreasen JO, Borum MK, Jacobsen HL, Andreasen FM. Replantation of 400 avulsed permanent incisors. 1. Diagnosis of healing complications. *Endod Dent Traumatol* 1995;11:51-8.

Bjorvatn K, Selvig KA, Klinge B. Effect of tetracycline and SnF on root resorption in replanted incisors in dogs. *Scand J Dent Res* 1989;97:477-82.

TOPICAL LITERATURE SEMINAR #10

TOPIC: Fascial Space Infections of Odontogenic Origin

SEMINAR OBJECTIVES: Each student should be able to:

- (1) describe the anatomic relationships between fascia, muscles and bone in the head and neck in order to predict the possible pathways for the extension of dental infections and to prevent or recognize potentially life threatening situations.
- (2) describe the most effective means we have for treating odontogenic infections.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #53 - know the factors involved in the confinement or localization of dental infections.
- MP #54 - know the factors involved in the spread of dental infections.
- MP #55 - know the possible routes for extension of dental infections in the maxilla and mandible.
- MP #56 - be able to define the boundaries of spaces and potential spaces in the head and neck.
- MP #57 - know the communication(s) between one anatomical location and another in the head and neck.
- MP #58 - know the different types of bacteria involved in the spread of odontogenic infections.
- MP #59 - be able to analyze the potential for the occurrence of life threatening situations based on anatomic considerations.
- MP #60 - know the proper treatment and therapeutic regimens for handling odontogenic space infections; I & D, NSRCT, supportive care (antibiotics, etc.).

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Baumgartner JC, Hutter JW, Siquiera JF. Endodontic microbiology and treatment of infections. In Cohen S, Burns RC (eds) Pathways of the Pulp. 9th ed. St Louis: Mosby, 2006;580-609.

Goldberg MH, Topazian RG. Odontogenic infections and deep fascial space infections of dental origin. In Topazian RG, Goldberg MH (eds). Management of infections of the oral and maxillofacial regions. 3rd ed. Philadelphia: WB Saunders Co., 1994.

Peterson LJ. Principles of antibiotic therapy. In Topazian RG, Goldberg MH (eds). Management of infections of the oral and maxillofacial regions. 3rd ed. Philadelphia: WB Saunders Co., 1994.

Peterson LJ. Principles of management and prevention of odontogenic infections. In Peterson LJ, Ellis E, Hupp JR, Tucker MR (eds). Contemporary oral and maxillofacial surgery. 2nd ed. St. Louis: Mosby-Yearbook, 1993:409-35.

Peterson LJ. Complex odontogenic infections. In Peterson LJ, Ellis E, Hupp JR, Tucker MR (eds). Contemporary oral and maxillofacial surgery. 2nd ed. St. Louis: Mosby-Yearbook, 1993:436-51.

Hohl TH, Whitacre RJ, Hooley JR, Williams B. (eds) A self instructional guide: diagnosis and treatment of odontogenic infections. Seattle: Stoma Press, Inc., 1983.

Marciani RD. Odontogenic infections: anatomic and microbiologic considerations. In Peterson LJ (ed). Principles of oral and maxillofacial surgery. Vol 1. Philadelphia: JB Lippincott Co., 1992:149-62.

Marciani RD. Clinical considerations in head and neck infections. In Peterson LJ (ed). Principles of oral and maxillofacial surgery. Vol 1. Philadelphia: JB Lippincott Co., 1992:163-200.

Marciani RD. Antibiotics in head and neck Infections. In Peterson LJ (ed). Principles of oral and maxillofacial surgery. Vol 1. Philadelphia: JB Lippincott Co., 1992:201-22.

Flynn TR. Odontogenic infections. Oral Maxillofac Surg Clin N Amer 1991;3:311-29.

Moenning JE, Nelson CL, Kohler RB. The microbiology and chemotherapy of odontogenic infections. J Oral Maxillofac Surg 1989;47:976-85.

Montgomery EH. Principles and Mechanisms of antibiotic therapy. In Neidle EA, Yagiela JA (eds). Pharmacology and therapeutics for dentistry. 3rd ed. St. Louis: The CV Mosby Company, 1989:493-510.

Montgomery EH. Antibacterial antibiotics. In Neidle EA, Yagiela JA (eds). Pharmacology and therapeutics for dentistry. 3rd ed. St. Louis: The CV Mosby Company, 1989:511-555.

Blomquist IK, Bayer AS. Life threatening deep facial space infections of the head and neck. Infect Des Clin N Am 1988;2:237-64.

Lindner HH. The anatomy of the fasciae of the face and neck with particular reference to the spread and treatment of intraoral infections (Ludwig's) that have progressed into adjacent fascial spaces. Ann Surg 1986;204:705-14.

Piecuch JF. Odontogenic infections. Dent Clin N Am 1982;26:129-45.

The following students should abstract and report on the following literature.

Schein B. Microbiologic considerations in selecting a drug for endodontic abscesses. J Endodon 1986;12:570-2.

Musgrove BT, Malden NJ. Mediastinitis and pericarditis caused by dental infection. Br J Oral Maxillofac Surg 1989;27:423-8.

Pogrel MA. The risk management of infections. Br Dent J, May 9, 1992:354-55.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Buccal Vestibule
Body of the Mandible

Krishnan V, Johnson JV, Helfrick JF. Management of maxillofacial infections: A review of 50 cases. (Includes discussion by Flynn TR) J Oral Surg 1993;51:868-74.

Bainton R. Interaction between antibiotic therapy and contraceptive medication. Oral Surg 1986;61:453-5.

Antibiotic interference with oral contraceptives. ADA Council on Scientific Affairs. J Am Dent Assoc 2002;133:880.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Mental Space
Submental Space

Hudson JW. Osteomyelitis of the jaws: A 50 year perspective. Int J Oral Surg 1993;51:1294-1301.

Taicher S, Garfunkel A, Feinsod M. Reversible cavernous sinus involvement due to minor dental infection. Report of a case. Oral Surg 1978;46:7-9.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Sublingual Space
Submandibular Space

Fekety R, Shah AB. Diagnosis and treatment of Clostridium difficile colitis. J Am Med Assoc 1993;269:71-5.

Hanna CB. Cefadroxil in the management of facial cellulitis of odontogenic origin. *Oral Surg* 1991;71:496-8.

Stroe W, Haug RH, Lillich TT. The changing face of odontogenic infections. *J Oral Maxillofac Surg* 2001;59:739-48.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Ludwig's Angina

Schroeder DC, Sarha ED, Hendrickson DA, Healey KM. Severe infections of the head and neck resulting from gas-forming organisms. *J Am Dent Assoc* 1987;114:65-8.

Henry CH, Hughes CV, Larned DC. Odontogenic Infection of the orbit: report of a case. *J Oral Maxillofac Surg* 1992;50:172-7.

Sklavounos A, Lefakis NJ, Ioannidou H, Patrikiou A. Anaerobic bacteria in dentoalveolar abscesses. *Int J Oral Surg* 1986;15:288-91.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Maxillary Buccal Vestibule
Buccal Space

Giunta JL. Comparison of erysipelas and odontogenic cellulitis. *J Endodon* 1987;13:291-4.

Egbert GW, Simmons AK, Graham LL. Toxic shock syndrome: odontogenic origin. *Oral Surg* 1987;63:167-71.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Submasseteric Space

Barrett AP. Metronidazole in the management of anaerobic neck infection in acute leukemia. *Oral Surg* 1988;66:287-9.

Lynch C, Sinnot J, Holt D, Herold A. Use of antibiotics during pregnancy. *Am Fam Physician* 1991;43:1365-8.

Labriola JD, Mascaro J, Albert B. The microbiologic flora of orofacial abscesses. *J Oral Maxillofac Surg* 1983;41:711-14.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Temporal Spaces
Superficial Temporal Space
Deep Temporal Space

Zeitoun IM, Dhanarajani PJ. Cervical cellulitis and mediastinitis caused by odontogenic infections: report of two cases and review of literature. *J Oral Surg* 1995;53(2):203-8.

Slavkin HC. The Appropriate use of antibiotics in dentistry. Management of opportunistic infections in clinical dentistry. *Quintessence Int* 1997;28:812-15.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Pterygomandibular Space
Parapharyngeal Spaces
Lateral Pharyngeal Space
Retropharyngeal Space

Mizuno I, Mizutani H, Ueda M, Kaneda T. Temporal necrotizing infection of dental origin. *J Oral Surg* 1993;51:79-81.

Topazian RG, Peterson LJ. Letter to the editor. *Oral Surg* 1992;73:621-2.

Harrison JW. The Appropriate use of antibiotics in dentistry. Endodontic indications. *Quintessence Int* 1997;28:827-30.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Cervical Spaces
Pretracheal Space

Carotid Sheath
Prevertebral Space
Danger Space (Space 4)

Kitay D, Ferraro N, Sonis S. Lateral pharyngeal space abscess as a consequence of regional anesthesia. *J Am Dent Assoc* 1991;122:56-9.

Connor JP, Edelson JG. Needle tract infection. *J Oral Surg* 1988;65:401-3.

Owens B, Schuman N. Ludwig's angina. *Gen Dent* 1994;42(1):84-7.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Palatal Swelling
Canine Space (infraorbital Space)

Olson A, MacEdington E, Kulild J, Weller R. Update on antibiotics for the endodontic practice. *Compend Contin Educ Dent* 1990;11:328-32.

Gilmore WC, Jacobus NV, Gorbach SL, Doku HC, Tally FP. Prospective double-blind evaluation of penicillin versus clindamycin in the treatment of odontogenic infection. *J Oral Maxillofac Surg* 1988;46:1065-70.

Alexander RE. The Appropriate use of antibiotics in dentistry. Basic principles of antibiotic therapy and prophylaxis. *Quintessence Int* 1997;28:815-19.

** You should also prepare a brief written and oral report (for presentation at the seminar) describing the; 1) anatomic location, 2) clinical presentation, 3) source of infection, 4) potential spread of infection and 5) risk to the patient of the following spaces/infections. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Periorbital Space
Base of the Upper Lip
Cavernous Sinus Thrombosis

TOPICAL LITERATURE SEMINAR #11

TOPIC: Surgical Endodontics

SEMINAR OBJECTIVE: Each student should evaluate surgical endodontics as a viable treatment modality in order to provide the endodontist with an acceptable treatment alternative when nonsurgical endodontic therapy is contraindicated or not feasible.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #61 - describe the indications and contraindications for surgical endodontics.
- MP #62 - describe the tissues and anatomic landmarks present within the surgical field.
- MP #63 - synthesize treatment plans for endodontic requiring surgical intervention.
- MP #64 - design mucoperiosteal flaps based on procedural, biologic, and anatomic considerations.
- MP #65 - describe the techniques and sequence of procedures used in endodontic surgery.
- MP #66 - recognize the differences in retrofilling materials and indications for their use.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Johnson BR, Witherspoon DE. Periradicular Surgery. In Cohen S, Hargreaves K (eds). Pathways of the pulp. 9th ed. St Louis: CV Mosby Company, 2006:724-85.

Morrow SG, Rubinstein RA. Endodontic surgery. In Endodontics. 5th ed. Ontario: BC Decker, 2002:669-746.

Gutmann JL, Harrison JW. Surgical endodontics. St Louis: Ishiyaku Euro America Inc, 1994.

Gutmann JL, Harrison JW. Posterior endodontic surgery: anatomic considerations and clinical techniques. *Int Endodon J* 1985;18:8-34.

Vreeland DL, Tidwell E. Flap design for surgical endodontics. *Oral Surg* 1982;54:461-5.

Nosonowitz DM. Flap designs for gaining access to periapical lesions. *Oral Surg* 1983;56:537-41.

Friedman S, Lustmann J, Shaharabany V. Treatment results of apical surgery in premolar and molar teeth. *J Endodon* 1991;17:30-3.

Rossmann LE. Endodontic surgery in posterior teeth - its role in maintaining arch integrity. *Comp Cont Ed Dent* 1992;13:630-46.

Omnell KA. Electrolytic precipitation of zinc carbonate in the jaw: an unusual complication after root resection. *Oral Surg* 1959;12:846-52.

Phillips JL, Weller RN, Kulild JC. The mental foramen: part 1. size, orientation and positional relationship to the mandibular second premolar. J Endodon 1990;16:221-3.

The following students should abstract and report on the following literature.

Morse D, Bhambhani S. A dentist's dilemma: nonsurgical endodontic therapy or periapical surgery for teeth with apparent pulpal pathosis and an associated periapical radiolucent lesion. Oral Surg 1990;70:333-40.

Torabinejad M, Watson TF, Pitt Ford TR. Sealing ability of a mineral trioxide aggregate when used as a root end filling material. J Endodon 1993;19(12):591-5.

Finn MD, Schow SR, Schneiderman ED. Osseous regeneration in the presence of four common hemostatic agents. J Oral Surg 1992;50: 608-12.

** You should also prepare a written and oral report (for presentation at the seminar) describing the anatomy and physiology of the hard and soft tissues (alveolar mucosa, gingiva, alveolar bone, etc.) involved in endodontic surgery. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Jeansonne BG, Boggs WS, Lemon RR. Ferric sulfate hemostasis: effect on osseous wound healing. II. With curettage and irrigation. J Endodon 1993;19:174-6.

Wuchenich G, Meadows D, Torabinejad M. A comparison between two root end preparation techniques in human cadavers. J Endodon 1994;20(6):279-82.

Frank A, Glick D, Patterson S, Weine F. Long-term evaluation of surgically placed amalgam fillings. J Endodon 1992;18:391-8.

Gilheany PA, Figdor D, Tyas MJ. Apical dentin permeability and microleakage associated with root end resection and retrograde filling. J Endodon 1994;20(1):22-6.

** You should also prepare a written and oral report for presentation at the seminar) describing the maxillary and mandibular anatomical landmarks (maxillary sinus, mental foramen, mandibular canal, etc.) that are of concern when performing endodontic surgery.

Bondra DL, Hartwell GR, MacPherson MG, Portell FR. Leakage in vitro with IRM, high copper amalgam, and EBA cement as retrofilling materials. J Endodon 1989;15:157-60.

Saad AY, Abdellatif EM. Healing assessment of osseous defects of periapical lesions associated with failed endodontically treated teeth with use of freeze dried bone allograft. Oral Surg 1991;71:612-17.

Gutmann JL, Saunders WP, Nguyen L, Guo IY, Saunders EM. Ultrasonic root-end preparation, Part I. SEM analysis. Int Endod J 1994;27(6):318-24.

- Torabinejad M, Rastegar AF, Kettering JD, Pitt-Ford TR. Bacterial leakage of mineral trioxide aggregate as a root-end filling material. *J Endodon* 1995;21(3):109-12.
- Kramper BJ, Kaminski EJ, Osetek EM, Heuer MA. A comparative study of the wound healing of three types of flap design used in periapical surgery. *J Endodon* 1984;10:17-25.
- Lin L, Chance K, Skovlin F, Skribner J, Langeland K. Oroantral communication in periapical surgery of maxillary posterior teeth. *J Endodon* 1985;11:40-4.
- Saunders WP, Saunders EM, Gutmann JL. Ultrasonic root-end preparation, Part 2. Microleakage of EBA root-end fillings. *Int Endod J* 1994;27(6):325-9.
- Torabinejad M, Higa RK, Pitt-Ford TR. Dye leakage of four root end filling materials: Effects of blood contamination. *J Endodon* 1994;20(4):159-63.
- Nedderman TA, Hartwell GR, Portell FR. A comparison of root surfaces following apical root resection with various burs; scanning electron microscopic evaluation. *J Endodon* 1988;14:423-7.
- Coen T, Wong M. Varnishes: the effect of a second coat on apical root leakage of retrofill amalgams. *J Endodon* 1992;18:97-9.
- Haasch GC, Gerstein H, Austin BP. Effects of two hemostatic agents on osseous healing. *J Endodon* 1989;15:310-14.
- Becker W, Becker BE. Periodontal regeneration updated. *J Am Dent Assoc* 1993;124(7):37-43.
- Kellert M, Chalfin H, Solomon C. Guided tissue regeneration: An adjunct to endodontic surgery. *J Am Dent Assoc* 1994;125(9):1229-33.
- McDonald N, Dumsha T. An evaluation of the retrograde apical seal using dentine bonding materials. *Int Endod J* 1990;23:156-62.
- Hepso HU, Fjornland T, Dkoglund LA. Side-effects and patient acceptance of 0.2% versus 0.1% chlorhexidine used as post-operative prophylactic mouthwash. *Int J Oral Surg* 1988;17:17-20.
- Gutmann JL, Pitt-Ford TR. Management of the resected root end: A clinical review. *Int Endod J* 1993;26(5):273-83.
- Owadally ID, Chong BS, Pitt-Ford TR, Watson TF. The sealing ability of IRM with the addition of hydroxyapatite as a retrograde root filling. *Endod Dent Traum* 1993;9(5):211-5.
- Dorn S, Gartner A. Retrograde filling materials: a retrospective success-failure study of amalgam, EBA and IRM. *J Endodon* 1990;16:391-4.

Eberhardt JA, Torabinejad M. The distance between the maxillary sinus and the apices of the maxillary posterior teeth. *Oral Surg* 1992;73:345-6.

Craig K, Harrison J. Wound healing following demineralization of resected root ends in periradicular surgery. *J Endodon* 1993;19(7):339-47.

Owadally ID, Chong BS, Pitt-Ford TR, Wilson RF. Biological properties of IRM with the addition of hydroxyapatite as a retrograde filling material. *Endod Dent Traum* 1994;10(5):228-32.

Chong BA, Pitt-Ford TR, Watson TF. Light-cured glass ionomer cement as a retrograde root seal. *Int Endod J* 1993;26:218-44.

Lemon RR, Steele PJ, Jeansonne BG. Ferric sulfate hemostasis: effect on osseous wound healing. I. Left in situ for maximum exposure. *J Endodon* 1993;19:170-3.

TOPICAL LITERATURE SEMINAR #12

TOPIC: Endodontic Armamentarium and Materials #1

SEMINAR OBJECTIVES: Each student should acquire an in-depth knowledge of the armamentarium and materials used in endodontics. A basic understanding of the physical, chemical and biological properties of the materials is necessary to use them effectively and efficiently in the practice of endodontics.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #67 - describe the physical differences between the instruments used in cleaning and shaping the root canal system.
- MP #68 - describe how different instruments are manufactured.
- MP #69 - describe the physical and chemical differences of the filling materials, sealers and temporary restorations used in endodontics.
- MP #70 - synthesize a rationale for the choice and use of instruments and materials which are part of the practice of endodontics.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Tamse A, Ben-Amar A, Grover A. Sealing properties of temporary filling materials used in endodontics. J Endodon 1982;8:322-5.

Grossman LI. Physical properties of root canal cements. J Endodon 1976;2:166-75.

Rice RT, Gilbert BO. The choice of a root canal sealer. Comp Cont Educ Dent 1988;184-8.

Branstetter J, von Fraunhofer JA. The physical properties and sealing action of endodontic sealer cements: a review of the literature. J Endodon 1982;8:312-16.

Sorin SM, Oliet S, Pearlstein F. Rejuvenation of aged (brittle) endodontic gutta-percha cones. J Endodon 1979;5:233-8.

The following students should abstract and report on the following literature.

Schilder H, Goodman A, Aldrich W. The thermomechanical properties of gutta-percha. I. The compressibility of gutta-percha. Oral Surg 1974;37:946-53.

Felt RA, Moser JB, Heuer MA. Flute design of endodontic instruments: its influence on cutting efficiency. J Endodon 1982;8:253-9.

Goodman A, Schilder H, Aldrich W. The thermomechanical properties of gutta-percha. II. The history and molecular chemistry of gutta-percha. Oral Surg 1974;37:954-61.

- Camps JJ, Pertot WJ. Torsional and stiffness properties of nickel-titanium K files. *Int Endodon J* 1995;28:239-43.
- Walia H, Brantley WA, Gerstein H. An initial investigation of the bending and torsional properties of Nitinol root canal files. *J Endodon* 1988;14:346-51.
- Schilder H, Goodman A, Aldrich W. The thermomechanical properties of gutta-percha. III. Determination of phase transition temperatures for gutta-percha. *Oral Surg* 1974;38:109-14.
- Markowitz K, Moynihan M, Liu M, Kim S. Biologic properties of eugenol and zinc oxide-eugenol. *Oral Surg* 1992;73:729-37.
- Esposito PT, Cunningham CJ. A comparison of canal preparation with nickel-titanium and stainless steel instruments. *J Endodon* 1995;21(4):173-6.
- Deveau E, Hidelbert P, Neut C, Boniface B, Romond C. Bacterial microleakage of cavities with IRM and TERM. *Oral Surg* 1992;74:634-43.
- Spangberg L, Pascon EA. The importance of material preparation for the expression of cytotoxicity during in vitro evaluation of biomaterials. *J Endodon* 1988;14:247-50.
- Kazemi RB, Safavi KE, Spangberg LSW. Dimensional changes of endodontic sealers. *Oral Surg* 1993;76(6):766-71.
- Miserendino LJ, Moser JB, Heuer MA, Osetek EM. Cutting efficiency of endodontic instruments. Part I: a quantitative comparison of the tip and fluted regions. *J Endodon* 1985;11:435-41.
- Luebke NH, Brantley WA. Torsional and metallurgical properties of rotary endodontic instruments. II. Stainless steel Gates Glidden drills. *J Endodon* 1991;17:319-23.
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- Tepel J, Schafer E, Hoppe W. Properties of endodontic hand instruments used in rotary motion. Part 3. Resistance to bending and fracture. *J Endodon* 1997;23:141.
- Shoha SD, Glickman G. Evaluation of rotary NiTi systems in conventional filing: degree of apical extrusion. *J Endodon* 1996;22:194.
- Marciano J, Michalesco P, Abadie MJ. Stereochemical structure characterization of dental gutta-percha. *J Endodon* 1993;19(1): 31-4.
- Orstavik D. Physical properties of root canal sealers: measurement of flow, working time, and compressive strength. *Int Endodon J* 1983;16:99-101.
- Barkholder RA, Stark MM. Sealing ability of intermediate restorations and cavity design used in endodontics. *Oral Surg* 1990;69:99-101.
- Kolokruis I, Arvanitoyannis I, Robinson C, Blanshard JM. Effect of moisture and aging on gutta-percha. *J Endodon* 1992;18:583-8.
- Caicedo R, von Fraunhofer JA. The properties of endodontic sealer cements. *J Endodon* 1988;14:527-34.
- Cormier CJ, von Fraunhofer JA, Chamberlain JH. A comparison of endodontic file quality and file dimensions. *J Endodon* 1988;14:138-42.
- Luebke NH, Brantley WA, Sabri ZI, Luebke FL, Lausten LL. Physical dimensions, torsional performance, bending properties, and metallurgical characteristics of rotary endodontic instruments. VI. Canal master drills. *J Endodon* 1995;21(5):259-63.
- Luebke NH, Brantley WA. Physical dimensions and torsional properties of rotary endodontic instruments. I. Gates Glidden drills. *J Endodon* 1990;16:438-41.
- Willey W, Senia ES, Montgomery S. Another look at root canal instrumentation. *Oral Surg* 1992;74:499-507.
- Beach CW, Calhoun JC, Bramwell JD, Hutter JW, Miller GA. Clinical evaluation of bacterial leakage of endodontic temporary filling materials. *J Endodon* 1996;22:459-62.
- Himel VT, Moore RE, Hicks VE. The effects which three endodontic files have on canal shape. *J Endodon* 1994;20:204.
- Lee YC, Yang SF, Hwang YF, Chueh LH, Chung KH. Microleakage of endodontic temporary restorative materials. *J Endodon* 1993;19(10):516-20.

TOPICAL LITERATURE SEMINAR #13

TOPIC: Endodontic Armamentarium and Materials #2

SEMINAR OBJECTIVE: Each student should acquire an in depth knowledge of the armamentarium and materials used in endodontics. A basic understanding of the physical, chemical and biological properties of the materials is necessary to use them effectively and efficiently in the practice of endodontics.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #71 - describe the physical and chemical differences of the irrigating solutions and medicaments used in endodontics.
- MP #72 - describe the rationale for using chelating agents during cleaning and shaping the root canal system.
- MP #73 - describe how the smear layer is formed in the root canal, what it is comprised of, and what effect its presence or removal has on the apical seal.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Fouad A, Levin L. Pulpal reaction to caries and dental procedures. In Cohen S, Burns RC (eds). Pathways of the Pulp. 8th ed. St. Louis: CV Mosby Company 2002;514-40.

Mader CL, Baumgartner JC, Peters DD. Scanning electron microscope investigation of the smeared layer on root canal walls. J Endodon 1984;10:477-83.

Spangberg LSW. Intracanal medication. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkens, 1994;627-40.

Walton RE. Intracanal medicaments. Dent Clin N Am 1984;28:783-96.

Harrison JW. Irrigation of the root canal system. Dent Clin N Am 1984;28:798-808.

Krell KV, Madison S. The use of the messing gun in placing calcium hydroxide powder. J Endodon 1985;11:233-4.

Webber RT, Schwiebert KA, Cathey GM. A technique for placement of calcium hydroxide in the root canal system. J Am Dent Assoc 1981;103:417-20.

Chong BS, Pitt Ford TR. The role of intracanal medication in root canal treatment. Int Endod J 1992;25:97-106.

Madison S, Anderson RW. Medications and temporaries in endodontic treatment. Dent Clin N Am 1992;36:343-56.

Gergely JM, Difiore PM. Intracanal medication in endodontic treatment: A survey of endodontic programs. *Gen Dent* 1993;328-31.

The following students should abstract and report on the following literature.

Teplitsky PE, Chenail BL, Mack B, Machnee CH. Endodontic irrigation - a comparison of endosonic and syringe delivery systems. *Int Endod J* 1987;20:233-41.

Cameron JA. The use of sodium hypochlorite activated by ultrasound for the debridement of infected, immature root canals. *J Endodon* 1986;12:550-4.

Porkaew P, Retief D, Barfield R, Lacefield W, Soong S. Effects of calcium hydroxide paste as an intracanal medicament on apical seal. *J Endodon* 1990;16:369-74.

Morgan R, Carnes D, Montgomery S. The solvent effect of calcium hydroxide irrigating solution on bovine pulp tissue. *J Endodon* 1991;17:165-8.

Svec TA, Harrison JW. Chemomechanical removal of pulpal and dentinal debris with sodium hypochlorite and hydrogen peroxide versus normal saline solution. *J Endodon* 1977;3:49-53.

Hasselgren G, Olsson B, Cvek M. Effects of calcium hydroxide and sodium hypochlorite on the dissolution of necrotic porcine muscle tissue. *J Endodon* 1988;14:125-7.

Ohara P, Torabinejad M, Kettering JD. Antibacterial effects of various endodontic irrigants on selected anaerobic bacteria. *Endod Dent Traum* 1993;9(3):95-100.

Haikel Y, Gorce F, Allemann C, Voegel JC. In vitro efficiency of endodontic irrigation solutions on protein desorption. *Int Endod J* 1994;27(1):16-20.

Baker NA, Eleazer PD, Averbach RE, Seltzer S. Scanning electron microscopic study of the efficacy of various irrigating solutions. *J Endodon* 1975;1:127-35.

Gergneux M, Ciucchi B, Dietschi JM, Holz J. The influence of the smear layer on the sealing ability of canal obturation. *Int Endodon J* 1987;20:228-32.

McDonald MN, Vire DE. Chloroform in the endodontic operatory. *J Endodon* 1992;18:301-3.

Foster KH, Kulild JC, Weller RN. Effect of smear layer removal on the diffusion of calcium hydroxide through radicular dentin. *J Endodon* 1993;19(3):136-40.

McComb D, Smith DC. A preliminary scanning electron microscope study of root canals after endodontic procedures. *J Endodon* 1975;1:238-42.

Messer HH, Chen RS. The duration of effectiveness of root canal medicaments. *J Endodon* 1984;10:240-5.

Baumgartner JC, Mader CL. A scanning electron microscopic evaluation of four root canal irrigation regimens. *J Endodon* 1987;13:147-57.

Safavi KE, Nichols FC. Effect of calcium hydroxide on bacterial lipopolysaccharides. *J Endodon* 1993;19(2):76-8.

Goldberg F, Spielberg C. The effect of EDTAC and the variation of its working time analyzed with scanning electron microscope. *Oral Surg* 1982;53:74-7.

Hand RE, Smith ML, Harrison JW. Analysis of the effect of dilution on the necrotic tissue dissolution property of sodium hypochlorite. *J Endodon* 1978;4:60-4.

Rosenfeld EF, James GA, Burch BS. Vital pulp tissue response to sodium hypochlorite. *J Endodon* 1978;4:140-6.

White R, Goldman M, Lin P. The influence of the smeared layer upon dentinal tubule penetration by endodontic filling materials. Part II. *J Endodon* 1987;13:369-74.

Teplitzky P. McSpadden compactor. Vertical condensation technique to deliver calcium hydroxide. *J Can Dent Assoc* 1986;52:779-81.

Griffiths BM, Stock CJR. The efficiency of irrigants in removing root canal debris when used with an ultrasonic preparation technique. *Int Endod J* 1986;19:277-84.

Galvan DA, Ciarlone AE, Pashley DH, Kulild JC, Primack PD, Simpson MD. Effect of smear layer removal on the diffusion permeability of human roots. *J Endodon* 1994;20(2):83-6.

Dautel-Morazin A, Vulcain JM, Bonnaure-Mallet M. An ultrastructural study of the smear layer: Comparative aspects using secondary electron image and backscattered electron image. *J Endodon* 1994;20(11):531-4.

Ciarlone A, Pashley D. Medication of the dental pulp: a review and proposals. *Endod Dent Traumatol* 1992;8:1-5.

Ciucchi B, Khettabi M, Holz J. The effectiveness of different endodontic irrigation procedures on the removal of the smear layer: a scanning electron microscopic study. *Int Endod J* 1989;22:21-8.

Goldberg F, Abramovich A. Analysis of the effect of EDTAC on the dentinal walls of the root canal. *J Endodon* 1977;3:101-5.

Baumgartner JC, Ibay AC. The chemical reactions of irrigants used for root canal debridement. *J Endodon* 1987;13:47-51.

Sjogren U, Figdor D, Spangberg L, Sundqvist G. The antimicrobial effect of calcium hydroxide as a short-term intracanal dressing. *Int Endod J* 1991;24:119-25.

Gettleman B, Messer H, El Deeb M. Adhesion of sealer cements to dentin with and without the smear layer. *J Endodon* 1991;17(1):15-20.

Foreman PC, Barnes IE. A review of calcium hydroxide. *Int Endod J* 1990;23:283-97.

Yamada RS, Armas A, Goldman M, Lin PS. A scanning electron microscopic comparison of a high volume flush with several irrigating solutions: part 3. *J Endodon* 1983;9:137-42.

Abou-Rass M, Piccinino MV. The effectiveness of four clinical irrigation methods on the removal of root canal debris. *Oral Surg* 1982;54:323-8.

Metzler RS, Montgomery S. The effectiveness of ultrasonics and calcium hydroxide for the debridement of human mandibular molars. *J Endodon* 1989;15:373-8.

Berutti E, Marini R. A scanning electron microscopic evaluation of the debridement capability of sodium hypochlorite at different temperatures. *J Endodon* 1996;22:467-70.

TOPICAL LITERATURE SEMINAR #14

TOPIC: Evaluation of Endodontic Healing / Success-Failure

SEMINAR OBJECTIVE: Each student should understand the clinical, radiographic, anatomic, and treatment aspects of endodontic cases in order to accurately predict the post-treatment course and long-term result of nonsurgical and surgical endodontic therapy.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #74 - describe the reasons why some cases are not successful.
- MP #75 - describe the process of wound healing following periradicular surgery.
- MP #76 - develop criteria for evaluating the healing or nonhealing of periradicular lesions.
- MP #77 - develop criteria for relating clinical and radiographic criteria to success or failure to heal.
- MP #78 - describe the relationship between the patient's overall health and his/her prognosis of endodontic.
- MP #79 - develop categories for the causes of why endodontic cases fail to heal.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Ingle JI, Beveridge EE, Glick DH, Weichman JA. Modern endodontic therapy. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins 1994;21-45.

Stabholz A, Friedman S, Tamse A. Endodontic failures and re-treatment. In Cohen S, Burns RC (eds). Pathways of the pulp. 6th ed. St Louis: The CV Mosby Company 1994;690-728.

Harrison JW. Healing of surgical wounds in oral mucoperiosteal tissues. J Endodon 1991;17(8):401-8.

Thomas DW, O'Neill ID, Harding KG, Shepherd JP. Cutaneous wound healing: A current perspective. J Oral Maxillofac Surg 1995;53:442-7.

Seltzer S. Repair following root canal therapy. In Endodontology. 2nd ed. Philadelphia: Lea & Febiger 1988;389-438.

Seltzer S. Root canal failures. In Endodontology. 2nd ed. Philadelphia: Lea & Febiger 1988;439-70.

Frostell G. Factors influencing the prognosis of endodontic therapy. In Grossman LI (ed). Transactions of the Third International Conference on Endodontics. Philadelphia: University of Pennsylvania, 1963:161-73.

Stabholz A, Walton RE. Evaluating success and failure. In Walton RE, Torabinejad M. Principles and practice of endodontics. 2nd ed. Philadelphia: WB Saunders Company 1996;324-35.

Ashkenaz PJ. One-visit endodontics. Dent Clin N Am 1984;28:853-64.

Gutmann JL. Clinical, radiographic, and histologic perspectives on success and failure in endodontics. Dent Clin N Amer 1992;36:379-92.

Lovdahl PE. Endodontic retreatment. Dent Clin N Amer 1992;36:473-90.

The following students should abstract and report on the following literature.

Brynolf J. A histologic and roentgenological study of the periapical region of human incisors. Odontol Revy 1967;18:Supp 11

Swartz DB, Skidmore AE, Griffin JA. Twenty years of endodontic success and failure. J Endodon 1983;9:198-202.

Andreasen JO, Rud J. Correlation between histology and radiography in the assessment of healing after endodontic surgery. Int J Oral Surg 1972;1:161-73.

Davis MS, Bucher JF. Periapical and intracanal healing following incomplete root canal fillings in dogs. Oral Surg 1971;31:662-75.

Sieraski SM, Corcoran JF. Osseous healing kinetics after apicoectomy in monkeys: I. An isodensitometric interpretation of radiographic images. J Endodon 1984;10:233-9.

Arwill T, Persson G, Thilander H. The microscopic appearance of the periapical tissue in cases classified as "uncertain" or "unsuccessful" after apicoectomy. Odontol Revy 1974;25:27-42.

Buckley M, Spangberg LSW. The prevalence and technical quality of endodontic treatment in an American subpopulation. Oral Surg 1995;79:92-100.

Craig K, Harrison J. Wound healing following demineralization of resected root ends in periradicular surgery. J Endodon 1993;19(7):339-47.

Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery. I. The incisional wound. J Endodon 1991;17:425-35.

** Using the above article, you should prepare a written and oral report (for presentation at the seminar) describing the healing of a surgical incision. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery. II. The dissectional wound. J Endodon 1991;17:544-52.

** Using the above article, you should prepare a written and oral report (for presentation at the seminar) describing the healing of a dissectional wound. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Bender IB, Seltzer S, Soltanoff W. Endodontic success - a reappraisal of criteria. Part I and II. *Oral Surg* 1966;22:780-802.

Crump MC, Natkin E. Relationship of broken root canal instruments to endodontic case prognosis: a clinical investigation. *J Am Dent Assoc* 1970;80:1341-7.

Rud J, Andreasen JO, Moller Jensen JE. Radiographic criteria for the assessment of healing after endodontic surgery. *Int J Oral Surg* 1972;1:195-214.

Lin LM, Pascon EA, Skribner J, Gangler P, Langeland K. Clinical, radiographic and histologic study of endodontic treatment failures. *Oral Surg* 1991;71:603-11.

Seltzer S, Bender IB. Cognitive dissonance in endodontics. *Oral Surg* 1965;20:505-16.

Seltzer S, Bender IB, Smith J, Freedman I, Nazimov H. Endodontic failures - an analysis based on clinical, roentgenographic and histologic findings. Part I and II. *Oral Surg* 1967;23:500-30.

Block RM, Bushell A, Rodriguez H, Langeland K. A histopathologic, histobacteriologic, and radiographic study of periapical endodontic surgical specimens. *Oral Surg* 1976;42:656-78.

Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery. III. The osseous excisional wound. *J Endodon* 1992;18:76-81.

** Using the above article, you should prepare a written and oral report (for presentation at the seminar) describing the healing of an osseous excisional wound. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

Fouad AF, Walton RE, Rittman BR. Healing of induced periapical lesions in ferret canines. *J Endodon* 1993;19(3):123-9.

Van Nieuwenhuysen JP, Aouar M, D'Hoore W. Retreatment or radiographic monitoring in endodontics. *Int Endo J* 1994;27:75-81.

Seltzer S, Bender IB, Turkenkoph S. Factors affecting successful repair after root canal therapy. *J Am Dent Assoc* 1963;67:651-62.

Smith CS, Setchell DJ, Harty FJ. Factors influencing the success of conventional root canal therapy -- A five year retrospective study. *Int Endo J* 1993;26(6):321-33.

Lin LM, Skribner JE, Gaengler P. Factors associated with endodontic treatment failures. *J Endodon* 1992;18:625-7.

West NM, Revere JH. A surgical bony defect: the "Sunburst", a possible mistaken identity. *J Endodon* 1984;10:75-7.

Matsumoto T, Nagai T, Ida K, Ito M, Kwai Y, Horiba N, Sato R, Nakamura H. Factors affecting successful prognosis of root canal treatment. *J Endodon* 1987;13:239-42.

Allen RK, Newton CW, Brown CE. A statistical analysis of surgical and nonsurgical endodontic retreatment cases. *J Endodon* 1989;15:261-6.

Rud J, Andreasen JO, Moller Jensen JE. A follow-up study of 1000 cases treated by endodontic surgery. *Int J Oral Surg* 1972;1:215-28.

Saunders WP, Saunders EM. Coronal leakage as a cause of failure in root canal therapy: A review. *Endod Dent Traum* 1994;10:105-8.

Sjogren U, Hagglund B, Sundqvist G, Wing K. Factors affecting the long-term results of endodontic treatment. *J Endodon* 1990;16:498-504.

Reit C. Decision strategies in endodontics: on the design of a recall program. *Endod Dent Traumatol* 1987;3:233-9.

Akerblom A, Hasselgren G. The prognosis for endodontic treatment of obliterated root canals. *J Endodon* 1988;14:565-7.

Oliet S. Single-visit endodontics: a clinical study. *J Endodon* 1983;9:147-52.

Weine FS. Nonsurgical re-treatment of endodontic failures. *Comp Cont Educa Dent* 1995;16(3):324-35.

Weiger R, Axmann-Krcmar D, Lost C. Prognosis of conventional root canal treatment reconsidered. *Endod Dent Traumatol* 1998;14:1-9.

TOPICAL LITERATURE SEMINAR #15

TOPIC: Repair of Iatrogenic Problems / Treatment of Resorption Cases / Endodontic Retreatments

SEMINAR OBJECTIVE: Each student should understand how to correctly diagnose, treatment plan, and provide therapy for those difficult cases which present to the endodontist.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #80 - describe the proper treatment for correcting iatrogenic perforations of the root canal system.
- MP #81 - describe the diagnostic, histophysiologic, and treatment regimens for internal and external resorption.
- MP #82 - describe the armamentarium available and different treatment regimens for retreating endodontic cases.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Bakland LK. Root resorption. *Dent Clin N Amer* 1992;36:491-508.

Frank RJ. Endodontic mishaps: Their detection, correction, and prevention. In Ingle JI, Bakland LK (eds). *Endodontics*. 4th ed. Baltimore: Williams & Wilkens 1994;820-9.

Trope M, Chivian N. Root resorption. In Cohen S, Burns RC (eds). *Pathways of the pulp*. 6th ed. St Louis: The CV Mosby Company 1994;486-512.

Carr GB. Retreatment. In Cohen S, Burns RC (eds). *Pathways of the pulp*. 7th ed. St Louis: The CV Mosby Company 1998;791-834.

Frank AL. External-internal progressive resorption and its nonsurgical correction. *J Endodon* 1981;7:473-6.

Stabholz A, Friedman S, Tamse A. Endodontic failures and re-treatment. In Cohen S, Burns RC (eds). *Pathways of the pulp*. 6th ed. St Louis: The CV Mosby Company 1994;690-728.

Frank AL. Resorption, perforations, and fractures. *Dent Clin N Am* 1974;18:465-88.

Frank AL. Calcium hydroxide: the ultimate medicament. *Dent Clin N Am* 1979;23:691

Plack WF, Vire DE. Retrieval of endodontic silver points. *Gen Dent* 1984;32:124-7.

Meister RC, Meister F, Haasch GC, Gerstein H. Etiology and treatment of internal and external resorption. *Gen Dent* 1987;35:402-7.

Tronstad L. Root resorption - etiology, terminology and clinical manifestations. *Endo Dent Traumatol* 1988;4:241-52.

Infantino LM, Ingram TA. Root resorption: a review of the causes and treatment. *Gen Dent* 1989;38:478-81.

Crane D. Posts, points and instruments: how to retrieve them, part I. *Compend Cont Educ Dent* 1990;11:563-6.

Goon WWY. Innovative uses of ultrasonic energy for the elimination of problematic root canal obstructions. *Comp Cont Ed Dent* 1992;13:650-8.

Moos H. Root resorption. Special Report. NDS Bethesda. Feb 92.

Lovdahl PE. Endodontic retreatment. *Dent Clin N Amer* 1992;36:473-90.

Alhadainy HA. Root perforations: A review of the literature. *Oral Surg* 1994;78:368-74.

The following students should abstract and report on the following literature.

Friedman S, Stabholz A, Tamse A. Endodontic retreatment - case selection and technique. Part 3. Retreatment techniques. *J Endodon* 1990;16:543-9.

Wedenberg C, Zetterqvist L. Internal resorption in human teeth - a histological, scanning electron microscopic, and enzyme histochemical study. *J Endodon* 1987;13:255-9.

Himel VT, Alhadainy HA. Effect of dentin preparation and acid etching on the sealing ability of glass ionomer and composite resin when used to repair furcation perforations over plaster of paris barriers. *J Endodon* 1995;21(3):142-5.

Duggins LD, Clay JR, Himel VT, Dean JW. A combined endodontic retrofill and periodontal guided tissue regeneration technique for the repair of molar endodontic furcation perforations: report of a case. *Quintess Intern* 1994;25:10914

Jeng H-W, ElDeeb ME. Removal of hard paste fillings from the root canal by ultrasonic instrumentation. *J Endodon* 1987;13:295-8.

Hartwell G, England M. Healing of furcation perforations in primate teeth after repair with decalcified freeze-dried bone: longitudinal study. *J Endodon* 1993;19(7):357-61.

Goon WWY. Efficient amalgam core elimination and root preservation with ultrasonic instrumentation. *J Prosthet Dent* 1992;68(2):261-4.

Heithersay GS. Invasive cervical resorption: an analysis of potential predisposing factors. *Quintessence Int* 1999;30:83-95.

Wedenberg C, Lindskog S. Experimental internal resorption in monkey teeth. *Endod Dent Traumatol* 1985;1:221-7.

Spriggs K, Gettleman B, Messer HH. Evaluation of a new method for silver point removal. *J Endodon* 1990;16:335-8.

Buoncristiani J, Seto BG. Evaluation of ultrasonic and sonic instruments for intraradicular post removal. *J Endodon* 1994;20(10):486-9.

Wilcox LR. Endodontic retreatment: ultrasonics and chloroform as the final step in reinstrumentation. *J Endodon* 1989;15:125-8.

Heithersay GS. Clinical, radiographic, and histopathologic features of invasive cervical resorption. *Quintessence Int* 1999;30:27-37.

Pitt Ford TR, Torabinejad M, McKendry DJ, Hong C, Kariyawasam SP. Use of mineral trioxide aggregate for repair of furcal perforations. *Oral Surg* 1995;79(6):756-63.

Delzangles B. Scanning electron microscopic study of apical and intracanal resorption. *J Endodon* 1989;14:281-5.

Arens DE, Torabinejad M. Repair of furcal perforations with mineral trioxide aggregate. Two case reports. *Oral Surg* 1996;82:84-8.

Alhadainy HA, Himel VT. Evaluation of the sealing ability of amalgam, Cavit, and glass ionomer cement in the repair of furcation perforations. *Oral Surg* 1993;75:362-6.

Stamos DE, Gutmann JL. Revisiting the post puller. *J Endodon* 1991;17:466-8.

Wedenberg C, Lindskog S. Evidence for a resorption inhibitor in dentin. *Scand J Dent Res* 1987;95:205-11.

Balla R, Lomonaco C, Skribner J, Lin L. Histological study of furcation perforations treated with tricalcium phosphate, hydroxylapatite, amalgam and Life. *J Endodon* 1991;17:234-8.

Brezniak N, Wasserstein A. Root resorption after orthodontic treatment: Part 2. Literature review. *Am J Orthod* 1993;103:138-43.

Frank AL, Bakland LK. Nonendodontic therapy for supraosseous extracanal invasive resorption. *J Endodon* 1987;13:348-55.

Wedenberg C, Lindskog S. Macrophage colonization of infected and noninfected dental tissues in vitro. *Scand J Dent Res* 1986;94: 311-19.

Benenati FW, Roane JB, Biggs JT, Simon JH. Recall evaluation of iatrogenic root perforations repaired with amalgam and gutta-percha. *J Endodon* 1986;12:161-6.

Alhadainy HA, Himel VT. Comparative study of the sealing ability of light-cured versus chemically cured materials placed into furcation perforation. *Oral Surg* 1993;76(3):338-42.

Walia H, Streiff J, Gerstein H. Use of a hemostatic agent in the repair of procedural errors. *J Endodon* 1988;14:465-8.

Mattison GD, Delivanis HP, Delivanis PD. Orthodontic root resorption of vital and endodontically treated teeth. 1984;10:354-8.

Moloney LG, Feik SA, Ellender G. Sealing ability of three materials used to repair lateral root perforations. *J Endodon* 1993;19(2):59-62.

Mandel E, Friedman S. Endodontic retreatment: a rational approach to root canal reinstrumentation. *J Endodon* 1992;18:565-69.

Wilcox LR, Krell KV, Madison S. Endodontic retreatment: evaluation of gutta-percha and sealer removal and canal reinstrumentation. *J Endodon* 1987;13:453-7.

Lemon RR. Nonsurgical repair of perforation defects: internal matrix concept. *Dent Clin N Amer* 1992;36:439-58.

Hulsmann M. Methods for removing metal obstructions from the root canal. *Endod Dent Traum* 1993;9(6):223-37.

Lee SJ, Monsef M, Torabinejad M. Sealing ability of a mineral trioxide aggregate for repair of lateral root perforations. *J Endodon* 1993;19(11):541-4.

TOPICAL LITERATURE SEMINAR #16

TOPIC: Microbiologic Aspects of Endodontics

SEMINAR OBJECTIVES: Each student should be able to describe the role that microorganisms play in pulpal and periradicular pathosis in order to select those treatment procedures that will ensure the most favorable prognosis.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #83 - describe basic properties and types of microorganisms.
- MP #84 - identify microorganisms found in pulpal and periradicular pathoses.
- MP #85 - describe the pathways by which microorganisms can infect the pulp and periradicular area.
- MP #86 - relate intracanal microorganisms to those found in the periradicular tissues.
- MP #87 - correlate specific microorganisms with the signs and symptoms of pulp and periradicular pathoses.
- MP #88 - describe the effect that specific treatment procedures have on the sterilization of the root canal system.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Baumgartner JC, Hutter JW. Endodontic microbiology and treatment of infections. In Cohen S, Burns RC, eds. Pathways of the pulp. 9th ed. St Louis: The CV Mosby Company 2006.

Sugita EI. Microbiology of endodontics. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins 1994:608-26.

Sugita EI, Bakland LK. Asepsis in endodontic practice. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins 1994:680-8.

Seltzer S. Bacteremias related to endodontics. In Endodontology, 2nd ed. Philadelphia: Lea & Febiger, 1988:326-56.

Baumgartner JC. Endodontic microbiology. In Walton RE, Torabinejad M. Principles of endodontics. 2nd ed. Philadelphia: WB Saunders Co. 1996:277-291.

Pisano JV, Weine FS. Microbiology of endodontics. In Weine FS. Endodontic therapy. 5th ed. St Louis: Mosby-Yearbook 1996:693-712.

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Robinson HBG, Boling LR. The anachoretic effect of pulpitis. I. Bacteriologic studies. J Am Dent Assoc 1941;28:168-82.

Takehashi S, Stanley HR, Fitzgerald RJ. The effects of surgical exposures of dental pulps in germ-free and conventional laboratory rats. *Oral Surg* 1965;20:340-8.

Sundqvist G. Bacteriologic studies of necrotic dental pulps. Umea University Odontological Dissertations, No 7, Larrson and Co, Tryckeri, 1976, Umea.

Smith EL. How penicillin works. *J Endodon* 1976;2:149-52.

Smith EL. Antibiotics that interfere with bacterial protein synthesis. *J Endodon* 1976;2:339-42.

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Baumgartner JC. Microbiologic and pathologic aspects of endodontics. *Curr Sci* 1991;1:737-43.

Trowbridge HO, Stevens BH. Microbiologic and pathologic aspects of pulpal and periapical disease. *Curr Sci* 1992;2:85-92.

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Miller CH. Cleaning, sterilization and disinfection: Basics of microbial killing for infection control. *J Am Dent Assoc* 1993;124:48-56.

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Baumgartner JC, Falkler WA Jr, Bernie RS, Suzuki JB. Serum IgG reactive with oral anaerobic microorganisms associated with infections of endodontic origin. *Oral Microbial Immunol* 1992;7:106-10.

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The following students should abstract and report on the following literature.

Gharbia S, Haapasalo M, Shah H, et. al. Characterization of *Prevotella intermedia* and *Prevotella nigrescens* isolates from periodontic and endodontic infections. *J Periodontol* 1994;65:56-61.

Sundqvist G. Ecology of the root canal flora. *J Endodon* 1992;18:427-30.

- Sjogren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J* 1997;30:297-306.
- Allard U, Stromberg U, Stromberg T. Endodontic treatment of experimentally induced apical periodontitis in dogs. *Endod Dent Traumatol* 1987;3:240-4.
- Sjogren U, Figdor D, Spangberg G. The antimicrobial effect of calcium hydroxide as a short-term intracanal dressing. *Int Endod J* 1991;24:119-25.
- Sundqvist G, Johansson E, Sjogren U. Prevalence of black-pigmented *Bacteroides* species in root canal infections. *J Endodon* 1989;15:13-19.
- Debelian G, Olsen I, Tronstad L. Anaerobic bacteremia and fungemia in patients undergoing endodontic therapy: an overview. *Ann Periodontol* 1998;3:281-7.
- Baumgartner JC, Watkins JB, Bae KS, Xia T. Association of black-pigmented bacteria with endodontic infections. *J Endodon* 1999;25:413-15.
- Drake DR, Wiemann AH, Rivera EM, Walton RE. Bacterial retention in canal walls in vitro: Effect of smear layer. *J Endodon* 1994;20(2):78-82.
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- Walton RE, Ardjmand K. Histological evaluation of the presence of bacteria in induced periapical lesions in monkeys. *J Endodon* 1992;18:216-21.
- Seltzer S, Farber P. Microbiologic factors in endodontology. *Oral Surg* 1994;78(5):634-45.
- Kiryu T, Hoshino E, Iwaku M. Bacteria invading periapical cementum. *J Endodon* 1994;20(4):169-72.
- Baumgartner JC, Faulker WA. Bacteria in the apical 5mm of infected root canals. *J Endodon* 1991;17:380-3.
- Sunde P, Olsen I, Linde P, Tronstad L. Extraradicular infection: a methodological study. *Endod Dent Traumatol* 2000;16:84-90.
- Van Winkelhoff AJ, Carlee AW, de Graaff J. *Bacteroides endodontalis* and other black-pigmented *Bacteroides* species in odontogenic abscesses. *Infect Immun* 1985;49:494-7.
- Shah HN, Collins MD. Proposal for reclassification of *Bacteroides asaccharolyticus*, *Bacteroides gingivalis*, and *Bacteroides endodontalis* in a new genus, *Porphyromonas*. *Int J Syst Bacteriol* 1988;38:128-31.

Iwu C, MacFarlane T, MacKenzie D, Stenhouse D. The microbiology of periapical granulomas. *Oral Surg* 1990;69:502-5.

Haapasalo M, Ranta H, Ranta K, Shah H. Black-pigmented *Bacteroides* spp. in human apical periodontitis. *Infect Immun* 1986;53:149

Fabricius L, Dahlen G, Ohman AE, Moller AJR. Predominant indigenous oral bacteria isolated from infected root canals after varied times of closure. *Scand J Dent Res* 1982;90:134-44.

Safavi KE, Spangberg LS, Langeland K. Root canal dentinal tubule disinfection. *J Endodon* 1990;16:207-10.

Olsen I. Chemotaxonomy of bacteroides: A review. *Acta Odontol Scand* 1994;52:354-67.

Molven O, Olsen I, Kerekes K. Scanning electron microscopy of bacteria in the apical part of root canals in permanent teeth. *Endod Dent Traumatol* 1991;7:226-9.

Horiba N, Maekawa Y, Abe Y, Ito M, Matsumoto T, Nakamura H. Correlations between endotoxin and clinical symptoms or radiolucent areas in infected root canals. *Oral Surg* 1991;71:492-5.

Tronstad L, Barnett F, Riso K, Slots J. Extraradicular endodontic infections. *Endod Dent Traumatol* 1987;3:86-90.

Xia T, Baumgartner JC. Isolation and identification of *Prevotella tanneriae* from endodontic infections. *Oral Microbiol Immunol* 2000;15:273-5.

Wayman BE, Murata SM, Almeida RJ, Fowler CB. A bacteriological and histological evaluation of 58 periapical lesions. *J Endodon* 1992;18:152-5.

Abou-Rass M, Bogen G. Microorganisms in closed periapical lesions. *Int Endod J* 1998;31:39-47.

Fors UGH, Berg JO, Sandberg H. Microbiological investigation of saliva leakage between the rubber dam and tooth during endodontic treatment. *J Endodon* 1986;12:396-9.

Griffie MB, Patterson SS, Miller CH, Kafrawy AH, Newton CW. The relationship of *Bacteroides melaninogenicus* to symptoms associated with pulpal necrosis. *Oral Surg* 1980;50:457-61.

Sundqvist G, Figdor D, Persson S, Sjogren U. Microbiologic analysis of teeth with failed endodontic treatment and the outcome of conservative retreatment. *Oral Surg* 1998;85:86-92.

Hahn C-L, Falkler WA, Minah GE. Microbiological studies of carious dentine from human teeth with irreversible pulpitis. *Arch Oral Biol* 1991;36:147-53.

Van Winkelhoff AJ, Van Steenberghe TJ, De Graff J. Porphyromonas (Bacteroides) endodontalis: Its role in endodontal infections. J Endodon 1992;18:431-433.

Schonfeld SE, Greening AB, Glick DH, Frank AL, Simon JH, Herles SM. Endotoxic activity in periapical lesions. Oral Surg 1982;53:82-7.

Bae KS, Baumgartner JC, Shearer TR, David LL. Occurrence of Prevotella nigrescens and Prevotella intermedia in infections of endodontic origin. J Endodon 1997;23:620-3.

Tronstad L, Barnett F, Cervone F. Periapical bacterial plaque in teeth refractory to endodontic treatment. Endodon Dent Traumatol 1990;6:73-7.

Delivanis PD, Snowden RB, Doyle RJ. Localization of blood-borne bacteria in instrumented unfilled and canals. Oral Surg 1981;52: 430-2.

TOPICAL LITERATURE SEMINAR #17

To be distributed at a later date.

TOPICAL LITERATURE SEMINAR #18

TOPIC: Extraction Replantation / Transplantation / Endodontic Implants / Vertical Extrusion / Bleaching

SEMINAR OBJECTIVE: Each student should understand the endodontic adjunct treatments; extraction replantation, transplantation, endodontic implants, vertical extrusion and bleaching.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #89 - understand the indications for extraction replantation, transplantation, endodontic implants, vertical extrusion and bleaching.
- MP #90 - understand the contraindications for extraction replantation, transplantation, endodontic implants, vertical extrusion and bleaching.
- MP #91 - understand the prognosis of and other treatment options available for extraction replantation, transplantation, endodontic implants, vertical extrusion and bleaching.
- MP #92 - understand the clinical procedures for extraction replantation, transplantation, endodontic implants, vertical extrusion and bleaching.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Sheets CG, Paquette JM, Wright RS. Tooth whitening modalities for pulpless and discolored teeth. In Cohen S, Burns RC (eds). Pathways of the pulp. 8th ed. St. Louis; CV Mosby Company, 2002:749-64.

Weine FS, Potashnick SR. Endodontic-orthodontic relationships. In Weine FS. Endodontic therapy. 5th ed. St Louis; CV Mosby Company, 1996:674-93.

Spasser HF. A simple bleaching technique using sodium perborate. NY Dent J 1961;27:332-4.

Nutting EC, Poe G. A new combination for bleaching teeth. J S Calif Dent Assoc 1963;31:289-91.

Simon JHS. Root extrusion: rationale and techniques. Dent Clin N Am 1984;28:909-22.

Lythgoe JR, Torabinejad M, Simon JHS. Extrusion techniques for the general dentist. Gen Dent 1980;28:42-8.

Madison S. Endodontic adjuncts. In Walton R, Torabinejad M (eds). Principles and practice of endodontics. Philadelphia; WB Saunders Company 1989:447-61.

Andreasen FM, Andreasen JO. Root fractures. In Andreasen JO, Andreasen FM (eds). Textbook and color atlas of traumatic injuries to the teeth. 3rd ed. Copenhagen; Munksgaard/Mosby Year-Book Inc. 1994:306-7.

Andreasen JO, Kristerson L, Tsukiboshi M, Andreasen FM. Autotransplantation of teeth to the anterior region. In Andreasen JO, Andreasen FM, eds. Textbook and color atlas of traumatic injuries to the teeth. 3rd ed. Copenhagen; Munksgaard/Mosby Year-Book, Inc. 1994:671-90.

Andreasen JO. Atlas of replantation and transplantation of teeth. Philadelphia; WB Saunders Company 1992:100-221.

Nappen DL, Kohlan DJ. Orthodontic extrusion of premolar teeth: an improved technique. *J Pros Dent* 1989;61:545-54.

Feiglin B. Problems with the endodontic-orthodontic management of fractured teeth. *Int Endod J* 1986;19:57-63.

Murchison DF, Swartz RS. The use of removable appliances for forced eruption of teeth. *Quintessence Int* 1986;17:497-501.

Stroster T. Forced eruption: clinical considerations. *Gen Dent* 1990;38:376-80.

Heithersay GS. Combined endodontic-orthodontic treatment of transverse root fractures in the region of the alveolar crest. *Oral Surg* 1973;36:404-15.

The following students should abstract and report on the following literature.

Eliasson S, Laftman AC, Strinberg L. Autotransplanted teeth with early-stage endodontic treatment: a radiographic evaluation. *Oral Surg* 1988;65:598-603.

Ingber JS. Forced eruption. Part II. A method of treating nonrestorable teeth: periodontal and restorative considerations. *J Periodontol* 1976;47:203-16.

Weiger R, Kuhn A, Lost C. Radicular penetration of hydrogen peroxide during intra-coronal bleaching with various forms of sodium perborate. *Int Endod J* 1994;27(6):313-7.

Lewinstein I, Hirschfeld Z, Stabholz A, Rotstein I. Effect of hydrogen peroxide and sodium perborate on the microhardness of human enamel and dentin. *J Endodon* 1994;20(2):61-3.

Schendel K, Schwartz O, Andreasen JO, Hoffmeister B. Reinnervation of autotransplanted teeth. A histological investigation in monkeys. *Int J Oral Surg* 1990;19:247-9.

Madison S, Bjorndal A. Clinical application of endodontic implants. *J Pros Dent* 1988;59:603-8.

Biggerstaff RH, Sinks JH, Carazola JL. Orthodontic extrusion and biologic width realignment procedures: methods for reclaiming nonrestorable teeth. *J Am Dent Assoc* 1986;112:345-8.

Lemon RR. Simplified esthetic root extrusion techniques. *Oral Surg* 1982;54:93-9.

- Messkoub M. Intentional replantation: a successful alternative for hopeless teeth. *Oral Surg* 1991;71:743-7.
- Skoglund A, Tronstad L. Pulpal changes in replanted and autotransplanted immature teeth of dogs. *J Endodon* 1981;7:309-16.
- Titely KC, Torneck CD, Ruse ND, Krmec D. Adhesion of a resin composite to bleached and unbleached human enamel. *J Endodon* 1993;19(3):112-5.
- Koenig KH, Nguyen NT, Barkhordar RA. Intentional replantation: a report of 192 cases. *Gen Dent* 1988;36:327-31.
- Simon JHS, Lythgoe JB, Torabinejad M. Clinical and histologic evaluation of extruded endodontically treated teeth in dogs. *Oral Surg* 1980;50:361-71.
- Skoglund A, Tronstad L, Wallenius K. A microangiographic study of vascular changes in replanted and autotransplanted teeth in young dogs. *Oral Surg* 1978;45:17-28.
- Ho S, Goerig AC. An in vitro comparison of different bleaching agents in the discolored tooth. *J Endodon* 1989;15:106.
- Schwartz O, Groisman M, Attstrom R, Andreasen JO. Transmission electron microscopy of supra-alveolar periodontal healing of auto- and allotransplanted teeth in monkeys. *Endod Dent Traumatol* 1990;6:26-32.
- Maniatopoulos C, Pilliar RM, Smith DC. Evaluation of the retention of endodontic implants. *J Prosthet Dent* 1988;59:438-46.
- Haywood VB. History, safety, and effectiveness of current bleaching techniques and applications of the nightguard vital bleaching technique. *Quintessence Int* 1992;23:471-88.
- Nosonowitz DM, Stanley HR. Intentional replantation to prevent predictable endodontic failures. *Oral Surg* 1984;57:423-32.
- Rotstein I. Role of catalase in the elimination of residual hydrogen peroxide following tooth bleaching. *J Endodon* 1993;19(11):567-9.
- Lownie JF, Cleaton-Jones PE, Fatti P, Lownie MA. Autotransplantation of maxillary canine teeth, a follow-up of 35 cases up to 4 years. *Int J Oral Surg* 1986;15:282-7.
- Smith J, Wayman B. Successful autotransplantation. *J Endodon* 1987;13:77-80.
- Small BW. Bleaching with 10 percent carbamide peroxide: An 18-month study. *Gen Dent* 1994;42(2):142-6.

Larsen RM, Patten JR, Wayman BE. Endodontic endosseous implants: case reports and update of materials. *J Endodon* 1989;15:496-500.

Grossman LI. Intentional replantation of teeth: a clinical evaluation. *J Am Dent Assoc* 1982; 633-9.

Malmgren O, Malmgren B, Frykholm A. Rapid orthodontic extrusion of crown, root and cervical root fractured teeth. *Endod Dent Traumatol* 1991;7:49-54.

Madison S, Walton R. Cervical root resorption following bleaching of endodontically treated teeth. *J Endodon* 1990;16:570.

Schatz JP, Joho JP. Autotransplantation and loss of anterior teeth by trauma. *Endod Dent Traum* 1993;9(1):36-9.

Bender IB, Rossman LE. Intentional replantation of endodontically treated teeth. *Oral Surg* 1993;76(5):623-9.

Plainfield S. A viable alternative: tooth transplantation. *J Prosthet Dent* 1983;50:667-71.

Lee CQ, Cobb CM, Zargartalebi F, Hu N. Effect of bleaching on microhardness, morphology, and color of enamel. *Gen Dent* 1995;43(2):158-62.

Lovdahl PE. Periodontal management and root extrusion of traumatized teeth. *Dent Clin N Am* 1995;39:169.

TOPICAL LITERATURE SEMINAR #19

TOPIC: Inflammation / Immunology #1 - A review of the literature

SEMINAR OBJECTIVE: Each student should understand the inflammatory and immune reactions in order to understand the response of the pulpal and periradicular tissues to injury.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #93 - understand how the microcirculation of the pulp plays a role in the inflammatory process.
- MP #94 - understand the processes of aggregation, margination / pavementing, emigration / diapedesis, chemotaxis, phagocytosis, etc.
- MP #95 - understand the cells involved in the acute inflammatory response.
- MP #96 - understand the source, process of activation, and function of the non-specific mediators of inflammation.
- MP #97 - understand the endogenous anti-inflammatory process.
- MP #98 - understand the inflammatory and immune responses of the pulp to caries and dental procedures.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Trowbridge HO, Emling RC. Inflammation: a review of the process. 5th ed. Chicago; Quintessence Publishing Company, 1997:3-76.

Jontell M, Okiji T, Dahgren U, Bergenholtz G. Immune defense mechanisms of the dental pulp. Crit Rev Oral Biol Med 1998;9:179-200.

Nair R. Pathobiology of Primary Apical Periodontitis. In Cohen S, Burns RC (eds). Pathways of the pulp. 9th ed. St Louis; CV Mosby Company, 2006:541-579.

The following students should abstract and report on the following literature.

Kogushi M, Nakamura S, Kishi Y, Kim S, Takahashi K. A study of leukocyte extravasation in early inflammatory changes in the pulp. J Endodon 1988;14:475-81.

Jontell M, Gunraj MN, Bergenholtz G. Immunocompetent cells in the normal dental pulp. J Dent Res 1987;66:1149-53.

Bergenholtz G. Pathogenic mechanisms in pulpal disease. J Endodon 1990;16:98-101.

Pulver WH, Taubman MA, Smith DJ. Immune components in normal and inflamed human dental pulp. Arch Oral Biol 1977;22:103-11.

- Jontell M, Bergenholtz G, Scheynius A, Ambrose W. Dendritic cells and macrophages expressing class II antigens in the normal rat incisor pulp. *J Dent Res* 1988;67:1263-6.
- Bergenholtz G. Inflammatory response of the dental pulp to bacterial irritation. *J Endodon* 1981;7:100-4.
- Adamkiewicz VW, Pekovic DD. Experimental pulpal Arthus allergy. *Oral Surg* 1980;50:450-6.
- Trowbridge M, Daniels T. Abnormal immune response to infection of the dental pulp. *Oral Surg* 1977;43:902-9.
- Kendell K, Powell G, Diemer R. Humoral antibodies to anaerobic bacteria isolated from patients with pulpal-periapical disease. *Oral Surg* 1982;53:194-7.
- Huang GT, Chugal N, Potente AP, Zhang X. Constitutive Expression of interleukin-8 and intercellular adhesion molecule-1 in human dental pulps. *Int J Oral Biol* 1999;24:163-8.
- Shinoda S, Murayama Y, Okada H. Immunopathological role of pulpal tissue components in periapical pathosis. I. Detection of "new" antigens in modified dog pulpal extracts. *J Endodon* 1986;12:388-95.
- Takahashi K. Changes in the pulpal vasculature during inflammation. *J Endodon* 1990;16:92-7.
- Bergenholtz G, Nagaoka S, Jontell M. Class II antigen expressing cells in experimentally induced pulpitis. *Int Endod J* 1991;24:8-14.
- Hahn C, Falkler WA. Antibodies in normal and diseased pulps reactive with microorganisms isolated from deep caries. *J Endodon* 1992;18:28-31.
- Okiji T, Morita I, Sunada I, Murota S. The role of leukotriene B4 in neutrophil infiltration in experimentally induced inflammation of rat tooth pulp. *J Dent Res* 1991;70:34-7.
- Trowbridge HO. Pathogenesis of pulpitis resulting from dental caries. *J Endodon* 1981;7:52-60.
- Andreasen FM. Histological and bacteriological study of pulps extirpated after luxation injuries. *Endod Dent Traumatol* 1988;4:170-81.
- Langeland K. Tissue response to dental caries. *Endod Dent Traumatol* 1987;3:149-71.
- Kim S. Microcirculation of the dental pulp in health and disease. *J Endodon* 1985;11:465-71.
- Falkler WA, Martin SA, Tolba M, Siegel MA, Mackler BF. Reaction of pulpal immunoglobulins to oral microorganisms by an enzyme-linked immunosorbent assay. *J Endodon* 1987;13:260-6.

Cohen JS, Reader A, Fertel R, Beck FM, Meyers WJ. A radioimmunoassay determination of the concentrations of prostaglandins E2 and F2 (alpha) in painful and asymptomatic human dental pulps. *J Endodon* 1985;11:330-5.

Bergenholtz G, Warfvinge J. Migration of leukocytes in dental pulp in response to plaque bacteria. *Scand J Dent Res* 1982;90:354-62.

Yip MCM, Nakamura H, Greenspan JS. Immunohistochemical localization of cellular cyclic AMP in normal human pulp. *J Endodon* 1983;9:523-6.

Kim S. Neurovascular interactions in the dental pulp in health and inflammation. *J Endodon* 1990;16:48-53.

Proctor ME, Turner DW, Kaminski EJ, Osetek EM, Heuer MA. Determination and relationship of C-reactive protein in human dental pulps and in serum. *J Endodon* 1991;17:265-70.

TOPICAL LITERATURE SEMINAR #20

TOPIC: Inflammation / Immunology #2 - A review of the literature

SEMINAR OBJECTIVE: Each student should understand the inflammatory and immune reactions in order to understand the response of the pulpal and periradicular tissues to injury.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #99 - understand which immunoglobulins and other factors of the immune response are found in periradicular lesions.
- MP #100 - understand the immunologic response of the periradicular tissues to inflamed pulp tissue, trauma, and bacteria.
- MP #101 - understand the immunologic response of the systemic circulation to odontogenic pathosis.
- MP #102 - understand various laboratory methods for detecting immunologic components.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

(*** : Review is strongly recommended)

*** Torabinejad M. Mediators of acute and chronic periradicular lesions. Oral Surg 1994;78:511-21.

*** Metzger Z. Macrophages in periapical lesions. Endod Dent Traumatol 2000;16:1-8.

Trowbridge HO, Emling RC. Inflammation: a review of the process. 5th ed. Chicago; Quintessence Publishing Company, 1997

Torabinejad M, Eby WC, Naidorf IJ. Inflammatory and immunological aspects of the pathogenesis of human periapical lesions. J Endodon 1985;11:479-88.

The following students should abstract and report on the following literature.

Cooper MD. Current concepts - B-lymphocytes: normal development and function. N Eng J Med 1987;317:1452-5.

Marton IJ, Kiss C. Characterization of inflammatory cell infiltrate in dental periapical lesions. Int Endod J 1993;26:131-6.

Kettering J, Torabinejad M, Jones S. Specificity of antibodies present in human periapical lesions. J Endodon 1991;17:213-16.

Torabinejad M, Kettering JD. Identification and relative concentration of B and T lymphocytes in human chronic periapical lesions. *J Endodon* 1985;11:122-5.

Naidorf IJ. Immunoglobulins in periapical granulomas: a preliminary report. *J Endodon* 1975;1:15-18.

Stern MH, Dreizen S, Mackler BF, Selbst AG, Levy BM. Quantitative analysis of cellular composition of human periapical granuloma. *J Endodon* 1981;7:117-22.

Kopp W, Schwarting R. Differentiation of T-lymphocyte subpopulations, macrophages, and HLA-DR-restricted cells of apical granulation tissue. *J Endodon* 1989;15:72-5.

Likic A, Arsenjevic N, Vujanic G, Ramic Z. Quantitative analysis of the immunocompetent cells in periapical granulomas: correlation with histologic characteristics of the lesions. *J Endodon* 1990;16:119-22.

Yu MY, Stashenko P. Identification of inflammatory cells in developing rat periapical lesions. *J Endodon* 1987;13:535-40.

Perrini N, Foni L. Mast cells in human periapical lesions: ultrastructural aspects and their physiopathological implications. *J Endodon* 1985;11:197-202.

Johnston RB. Current concepts - immunology: monocytes and macrophages. *N Eng J Med* 1988;318:747-52.

Piattelli A, Artese L, Rosini S, Quaranta M, Musiani P. Immune cells in periapical granuloma: morphological and immunohistochemical characterization. *J Endodon* 1991;17:26-9.

Nilsen R, Johannessen AC, Skaug N, Matre R. In situ characterization of mononuclear cells in human dental periapical inflammatory lesions using monoclonal antibodies. *Oral Surg* 1984;58:160-5.

Tani N, Tominaga N, Osada T, Watanabe K, Umemoto T. Immunobiological activities of bacteria isolated from the root canals of postendodontic teeth with persistent periapical lesions. *J Endodon* 1992;18:58-62.

Kuntz DD, Genco RJ, Guttuso J, Natiella JR. Localization of immunoglobulins and the third component of complement in dental periapical lesions. *J Endodon* 1977;3:68-73.

Barnes GW, Langeland K. Antibody formation in primates following introduction of antigens into the root canal. *J Dent Res* 1966;45:1111-14.

Stern MH, Dreizen S, Mackler BJ, Levy BM. Antibody producing cells in human periapical granulomas and cysts. *J Endodon* 1981;7:447-52.

Wallstrom JB, Torabinejad M, Kettering J, McMillan P. Role of T cells in the pathogenesis of periapical lesions. *Oral Surg* 1993;76(2):213-8.

Kettering JD, Torabinejad M. Presence of natural killer cells in human chronic periapical lesions. *Int Endod J* 1993;26(6):344-7.

Torabinejad M, Theofilopoulos AN, Kettering JD, Bakland LK. Quantitation of circulating immune complexes, immunoglobulins G and M, and C3 complement component in patients with large periapical lesions. *Oral Surg* 1983;55:186-90.

** You should also prepare a brief written report and oral presentation on the following methods used for detecting immune components:
Complement fixation
Direct and indirect immunofluorescence

Kettering JD, Torabinejad M. Concentrations of immune complexes IgG, IgM, IgE, and C3 in patients with acute apical abscesses. *J Endodon* 1984;10:417-21.

** You should also prepare a brief written report and oral presentation on the following methods used for detecting immune components:
Immunoelectrophoresis and radioimmunoassay (RIA)

Stashenko P, Wang C, Tani-Ishii N, Yu SM. Pathogenesis of induced rat periapical lesions. *Oral Surg* 1994;78:494-502.

Akamine A, Hashiguchi I, Toriya Y, Maeda K. Immunohistochemical examination of the localization of macrophages and plasma cells in induced rat periapical lesions. *Endod Dent Traum* 1994;10:121-8.

** You should also prepare a brief written report and oral presentation on the following methods used for detecting immune components:
Hemagglutination
Enzyme-linked immunosorbent assay (ELISA)

Torabinejad M, Kettering JD. Detection of immune complexes in human dental periapical lesions by anticomplement immunofluorescence technique. *Oral Surg* 1979;48:256-61.

Cymerman JJ, Cymerman DH, Walters J, Nevins AJ. Human T-lymphocyte subpopulations in chronic periapical lesions. *J Endodon* 1984;10:9-11.

** You should also prepare a brief written report and oral presentation on the following methods used for detecting immune components:
Monoclonal antibody production and assays for complement components

Torabinejad M, Kettering JD, Bakland L. Localization of IgE immunoglobulin in human dental periapical lesions by the peroxidase-antiperoxidase method. *Arch Oral Biol* 1981;26:677-81.

McNicholas S, Torabinejad M, Blankenship J, Bakland L. The concentration of prostaglandin E2 in human periradicular lesions. *J Endodon* 1991;17:97-100.

** You should also prepare a brief written report and oral presentation on the following methods used for detecting immune components.
Single radial immunodiffusion and immuno-double diffusion

TOPICAL LITERATURE SEMINAR # 21

TOPIC: Inflammation / Immunology #3 - A review of the Literature

SEMINAR OBJECTIVE: Each student should understand the inflammatory and immune reactions in order to understand the response of the pulpal and periradicular tissues to injury.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #103 - understand the effects that endotoxin has on the periradicular tissues.
- MP #104 - understand the cells involved in the chronic inflammatory response.
- MP #105 - understand the role prostaglandins, leukotrienes and cytokines play in the inflammatory / immunologic response.
- MP #106 - understand the inflammatory / immunologic mechanisms of bone resorption.
- MP #107 - understand the similarities and differences between acute and chronic inflammation.
- MP #108 - understand how healing relates to the inflammatory / immunologic response.
- MP #109 - understand the role that the inflammatory / immunologic response plays in endodontic flare-ups.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

(*** : Review is strongly recommended)

*** Torabinejad M. Mediators of acute and chronic periradicular lesions. Oral Surg 1994;78:511-21.

*** Lerner UH. Regulation of bone metabolism by the kallikrein-kinin system, the coagulation cascade, and the acute-phase reactants. Oral Surg 1994;78:481-93.

Trowbridge HO, Emling RC. Inflammation: a review of the process. 4th ed. Chicago; Quintessence Publishing Company, 1993.

Smulson MH, Hagen JC, Ellenz SJ. Pulpoperiapical pathology and immunologic considerations. In Weine FS. Endodontic therapy. 5th ed. St Louis; Mosby-Year Book, Inc., 1996:187-202.

Simon JHS. Periapical pathology. In Cohen S, Burns RC (eds). Pathways of the pulp. 6th ed. St Louis; CV Mosby Company, 1994:337-62.

Kettering JD, Torabinejad M. Microbiology and immunology. In Cohen S, Burns RC (eds). Pathways of the pulp. 6th ed. St Louis; CV Mosby Company, 1994:363-76.

Baumgartner JC. Microbiologic and pathologic aspects of endodontics. *Current Opinion in Dentistry* 1991;1:737-43.

Clark RAF. Basics of cutaneous wound repair. *J Dermatol Surg Oncol* 1993;19:693-706.

Torabinejad M, Eby WC, Naidorf IJ. Inflammatory and immunological aspects of the pathogenesis of human periapical lesions. *J Endodon* 1985;11:479-88.

Naidorf IJ. Endodontic flare-ups: bacteriological and immunological mechanisms. *J Endodon* 1985;11:462-4.

Frisk RK. Cytokines. Special Report. Naval Dental School, 1992.

Goodell GG. Cell-mediated cytotoxicity; Its mechanisms and effects. Special Report. Naval Dental School, 1995.

Chau JYM. Growth factors and wound healing. Special Report. Naval Dental School, 1995.

The following students should abstract and report on the following literature.

Dinarello C, Mier JW. Lymphokines. *N Eng J Med* 1987;317:940-5.

Safavi K, Rossomando E. Tumor necrosis factor identified in periapical tissue exudates of teeth with apical periodontitis. *J Endodon* 1991;17:12-14.

Jandinski JJ. Osteoclast activating factor is now interleukin-1 beta: historical perspective and biological implications. *J Oral Path* 1988;17:145-52.

Henderson WR. The roles of leukotrienes in inflammation. *Ann Intern Med* 1994;121(9):684-97.

Trowbridge HO. Immunological aspects of chronic inflammation and repair. *J Endodon* 1990;16:54-61.

Stashenko P. The role of immune cytokines in the pathogenesis of periapical lesions. *Endod Dent Traumatol* 1990;6:89-95.

Dinarello CA. The role of interleukin-1 in disease. *New Eng J Med* 1993;328(10):106-13.

Barkhordar RA, Hussain MZ, Hayaski C. Detection of interleukin-1 beta in human periapical lesions. *Oral Surg* 1992;73:334-6.

Wang C. Characterization of bone-resorbing activity in human periapical lesions. *J Endodon* 1993;19:107-11.

Galli SJ. New concepts about the mast cell. *N Engl J Med* 1993;328(4):257-65.

- Dwyer TG, Torabinejad M. Radiographic and histologic evaluation of the effect of endotoxin on the periapical tissues of the cat. *J Endodon* 1981;7:31-5.
- Miller GA, DeMayo T, Hutter JW. Production of interleukin-1 by polymorphonuclear leukocytes resident in periradicular tissue. *J Endodon* 1996;22:346-51.
- Reichlin S. Neuroendocrine-immune interactions. *N Engl J Med* 1993;329(17):1246-53.
- Nevins A, Friedman L, Devita R, Schacter W. Local injection of benadryl for the prevention of iatrogenic endodontic flare-ups. *Endod Dent Traumatol* 1988;4:90-1.
- Mattison GD, Haddix JE, Kehoe JC. The effect of *Eikenella corrodens* endotoxin on periapical bone. *J Endodon* 1987;13:559-65.
- Lim GC, Torabinejad M, Kettering J, Linkhardt TA, Finkleman RD. Interleukin 1B in symptomatic and asymptomatic human periradicular lesions. *J Endodon* 1994;20(5):225-7.
- Sandberg AL, Raisz LG, Goodson JM, Simmons HA, Mergenhagen SE. Initiation of bone resorption by the classical and alternate C pathways and its mediation by prostaglandins. *J Immunol* 1977;119:1378-81.
- Torabinejad M, Cotti E, Jung T. Concentrations of leukotriene B4 in symptomatic and asymptomatic periapical lesions. *J Endodon* 1992;18:205-8.
- Seltzer S, Naidorf II. Flare-ups in endodontics. II. Therapeutic measures. *J Endodon* 1985;11:559-67.
- Torabinejad M, Kettering JD, McGraw JC, Cummings RR, Dwyer TG, Tobias TS. Factors associated with endodontic interappointment emergencies of teeth with necrotic pulps. *J Endodon* 1988;14:261-6.
- Trope M. Flare-up rate of single-visit endodontics. *Int Endod J* 1991;24:24-7.
- Goldman M, Rankin C, Mehlman R, Santa C. The immunologic implications and clinical management of the endodontic flare-up. *Comp Cont Educ Dent* 1988;9:126-30.
- Wang CY, Stashenko P. Characterization of bone-resorbing activity in human periapical lesions. *J Endodon* 1993;19(3):107-11.
- Stashenko P, Wang CY, Riley E, Wu Y, Ostroff G, Niederman R. Reduction of infection-stimulated periapical bone resorption by the biological response modifier PGG glucan. *J Dent Res* 1995;74(1):323-30.
- Pitts DL, Williams BL, Morton TH. Investigation of the role of endotoxin in periapical inflammation. *J Endodon* 1982;8:10-18.

Seltzer S, Naidorf IJ. Flare-ups in endodontics: I. etiological factors. J Endodon 1985;11:472-8.

CLASSICAL LITERATURE SEMINAR # 22

TOPIC: Bone Metabolism

SEMINAR OBJECTIVE: Each student should understand the histology and physiology of bone in order to predict how the hard tissue in the periradicular area responds to various homeostatic and pathologic influences.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #110 - know the gross and microscopic anatomy of bone.
- MP #111 - know the cells of bone and their respective functions.
- MP #112 - understand Vitamin D and its role in calcium and phosphate absorption.
- MP #113 - understand the effect that parathyroid hormone and calcitonin have on calcium and phosphate concentrations in the extracellular fluid.
- MP #114 - understand the effect that other hormones have on bone.
- MP #115 - understand the mechanisms involved in bone diseases.
- MP #116 - understand the overall homeostasis of bone; deposition and resorption.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Manolagas SC, Jilka RL. Bone marrow, cytokines, and bone remodeling. Emerging insights into the pathophysiology of osteoporosis. *N Engl J Med* 1995 Feb 2;332(5):305-11.

Fraser DR. Vitamin D. *Lancet* 1995 Jan 14;345(8942):104-7.

Odell WD, Heath H. Osteoporosis: pathophysiology, prevention, diagnosis, and treatment. *Dis Mon* 1993; 39(11):789-867. (The title of this periodical is Disease A Month.)

Pierce AM. Experimental basis for the management of dental resorption. *Endodon Dent Traumatol* 1989;5:255-65.

Kawaguchi H, Pilbeam CC, Harrison JR, Raisz LG. The role of prostaglandins in the regulation of bone metabolism. *Clin Orthop* 1995;313:36-46.

Blair HC, Schlesinger PH, Ross FP, Teitelbaum SL. Recent advances toward understanding osteoclast physiology. *Clin Orthop* 1993;294:7-22.

Gambert SR, Schultz BM, Hamdy RC. Osteoporosis: clinical features, prevention, and treatment. *Endocrin Metab Clin N Am* 1995;24(2):317-71.

Gupta KL, Rolla AR. Endocrine causes of bone disease. *Endocrin Metab N AM* 1995;24(2):373-93.

Hamdy RC. Clinical features and pharmacologic treatment of Paget's disease. *Endocrin Metab Clin N Am* 1995;24(2):421-36.

Ballock RT, Roberts AB. The role of TGF-B in bone growth and bone repair. In McKay I, Leigh I (eds). *Growth factors: A practical approach*. Oxford: Oxford University Press, 1993:85-8, 103-7.

Seltzer S. Bone anatomy and physiology. In Seltzer S. *Endodontology*. 2nd ed. Philadelphia: Lea & Febiger, 1988:81-117.

Seltzer S. Bone diseases of significance to the endodontist. In Seltzer S. *Endodontology*. 2nd ed. Philadelphia: Lea & Febiger, 1988:118-169.

Seltzer S. Tooth and bone resorption. In Seltzer S. *Endodontology*. 2nd ed. Philadelphia: Lea & Febiger, 1988:170-181.

Whitson SW. Bone. In Ten Cate AR. *Oral Histology. Development, structure and function*. 2nd ed. St Louis: CV Mosby Company, 1985:108-128.

Guyton AC. *Textbook of medical physiology*. 8th ed. Philadelphia: WB Saunders Company, 1991:868-81.

Martin TJ, Ng KW, Suda T. Bone cell physiology. *Endocrinology and Metabolism Clinics of North America*. 1989;18:833-58.

*

The following articles are also excellent review articles for preparing your written and oral reports.

Watrous DA, Andrews BS. The metabolism and immunology of bone. *Semin Arthritis Rheum* 1989;19:45-65.

Miller A. Collagen: the organic matrix of bone. *Phil Trans R Soc Lond* 1984;304:455-77.

Gowen M, Mundy GR. Actions of recombinant interleukin 1, interleukin 2, and interferon (gamma) on bone resorption in vitro. *J Immunol* 1986;136:2478-82.

Sandhu H, Kwong-Hing A, Herskovits M, Singh I. The early effects of surgical sympathectomy on bone resorption in the rat incisor socket. *Arch Oral Biol* 1990;35:1003-7.

Students should abstract and report on the following literature.

Anan H, Akamine A, Maeda K. An enzyme histochemical study of the behavior of rat bone cells during experimental apical periodontitis. J Endodon 1993;19:83-6.

- ** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:
- Parathyroid Hormone
 - Calcitonin

Saito S, Ngan P, Rosol T, Saito M, Shimizu H, Shinjo N, Shanfeld J, Davidovitch Z. Involvement of PGE synthesis in the effect of intermittent pressure and interleukin-1 beta on bone resorption. J Dent Res 1991;70:27-33.

- ** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:
- Collagen
 - Osteonectin

Wang CY, Stashenko P. Kinetics of bone-resorbing activity in developing periapical lesions. J Dent Res 1991;70:1362-6.

- ** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:
- Bone formation and remodeling
 - Deposition (intramembranous / endochondral)
 - Resorption

Holland R, Valle GF, Taintor JF, Ingle JJ. Influence of bony resorption on endodontic treatment. Oral Surg 1983;55:191-203.

- ** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:
- Macroscopic structure of bone
 - Supporting alveolar bone
 - Alveolar bone proper

Vaes G. Cellular biology and biochemical mechanisms of bone resorption. Clinical Orthopedics and Related Research 1988;231:239-60.

Kikuchi K, Okamoto T, Nishino M, Takeda E, Kuroda Y, Miya OM. Vitamin D-dependent rickets Type II: Report of three cases. J Dent Child 1988;55:465-8.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Microscopic structure of bone
Osteones, lamellae, Haversian systems, etc.

Ferreira BA, Barbosa ALB. Garres's osteomyelitis: a case report. *Int Endod J* 1992;25:165-8.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Bone cells:
osteoblasts
osteocytes
osteoclasts

Bender IB, Naidorf IJ. Dental observations in Vit D - Resistant Rickets with special reference to periapical lesions. *J Endodon* 1985;11:514-20.

Westbrook SD. Dental management of patients receiving hemodi-alysis and kidney transplants. *J AM Dent Assoc* 1978;96:464-8.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Diseases of Bone
Metabolic Diseases
(Hyperparathyroidism / hypoparathyroidism / Rickets / Osteomalacia /
Osteoporosis)

Roberts WB, Garetto LP, Arbuckle GR, Simmons KE, Decastro RA. What are the risk factors of osteoporosis? Assessing bone health. *J Am Dent Assoc* 1991;122(2):59-61.

Takahashi T, Kurihara K, Takahashi K, Kumegawa M. An ultrastructural study of phagocytosis in bone by osteoblastic cells from fetal mouse calvaria in vitro. *Arch Oral Biol* 1986;31(10):703-6.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Diseases of Bone
Paget's Disease
Periapical Cemental Dysplasia
Fibrous Dysplasia

Lindskog S, Blomlof L, Hammarstrom L. Comparative effects of parathyroid hormone on osteoclasts and cementoclasts. *J Clin Perio* 1987;14:386-9.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Vitamin D

Haga CS, Stern PH. Responses to osteoblastic cells (UMR 106) exposed to elevated extracellular calcium. *J Endodon* 1993;19(9): 462-5.

Pinero GJ, Farach-Carson MC, Devoll RE, Aubin HE, Brunn JC, Butler WT. Bone matrix proteins in osteogenesis and remodelling in the neonatal rat mandible as studied by immunolocalization of osteopontin, bone sialoprotein, A2HS-glycoprotein, and alkaline phosphatase. *Arch Oral Biol* 1995;40(2):145-55.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Thyroid, adrenal cortical, testicular, pituitary, and ovarian hormones

Hamasaki A, Nagata T, Ishida H, Wakano Y. Actions of parathyroid hormone on cultured human dental pulp cells. *J Endodon* 1992;18: 482-7.

Horowitz MC. Cytokines and estrogen in bone: anti-osteoporotic effects. *Science* 1993 Apr 30;260(5108):626-7.

** You should also prepare a written and oral report describing the role that the following topics play in bone metabolism. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation:

Growth factors
TGFB1, TGFB2
BMP
PDGF

TOPICAL LITERATURE SEMINAR #23

TOPIC: Lesions of Endodontic Origin

SEMINAR OBJECTIVE: Each student should understand the pathophysiology of periradicular lesions in order to accurately diagnose, treat, and assess their healing potential.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #117 - be able to classify periradicular lesions of endodontic origin.
- MP #118 - know the differential diagnosis of periradicular lesions of endodontic origin.
- MP #119 - know the frequency of occurrence of periradicular lesions of endodontic origin.
- MP #120 - be able to describe in detail the histopathologic appearance of periradicular lesions of endodontic origin.
- MP #121 - understand the phenomenon of epithelial proliferation in periradicular granulomas.
- MP #122 - understand the theories of periradicular cyst formation.
- MP #123 - understand the inflammatory and immunologic mechanisms involved in periradicular lesion formation.
- MP #124 - be able to compare the healing potential of periradicular granulomas and cysts.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Smulson MH, Hagen JC, Ellenz SJ. Pulpoperiapical pathology and immunologic considerations. In Weine FS. Endodontic therapy. 5th ed. St Louis: Mosby-Year Book, 1996:166-202.

Nair PNR. Pathobiology of Primary Apical Periodontitis. In Cohen S, Hargreaves KM. (eds). Pathways of the Pulp. 9th ed. St Louis, CV Mosby Company, 2006:541-79.

Torabinejad M, Walton RE. Periradicular lesions. In Ingle JI, Bakland LK (eds). Endodontics. 5th ed. Hamilton: BC Decker, 2002:175-202.

Seltzer S. Periapical granuloma and radicular cyst. In Endodontology. 2nd ed. Philadelphia: Lea & Febiger, 1988:195-236.

Wood NK. Periapical lesions. Dent Clin N Am 1984;28:725-66.

Toller P. Origin and growth of cysts of the jaws. Ann Roy Coll Surg Engl 1967;20:306-36.

Gonzales M. Large periapical radiolucent lesions: their occurrence, diagnosis, and treatment. A special report. Naval Dental School. March 1992.

The following students should abstract and report on the following literature.

Hoehn MM, LaBounty GL, Strittmatter EJ. Conservative treatment of persistent periradicular lesions using aspiration and irrigation. *J Endodon* 1990;16:182-6.

Weiner S, McKinney RV, Walton RE. Characterization of the periapical surgical specimen. *Oral Surg* 1982;53:293-302.

Bando Y, Henderson B, Meghji S, Poole S, Harris M. Immunocyto-chemical localization of inflammatory cytokines and vascular adhesion receptors in radicular cysts. *J Oral Pathol Med* 1993 May;22(5):221-7.

Stockdale CR, Chandler NP. The nature of the periapical lesion - a review of 1108 cases. *J Dent* 1988;16:123-9.

Neaverth EJ, Burg HA. Decompression of large periapical lesions. *J Endodon* 1982;8:175-82.

Spatafore CM, Griffin JA, Keyes GG, Weardon S, Skidmore AE. Periapical biopsy report: an analysis over a 10 year period. *J Endodon* 1990;16:239-41.

Bhaskar SN. Periapical lesions - types, incidence and clinical features. *Oral Surg* 1966;21:657-71.

Seltzer S, Soltanoff W, Bender IB. Epithelial proliferation in periapical lesions. *Oral Surg* 1969;27:111-21.

Bhaskar SN. Nonsurgical resolution of radicular cysts. *Oral Surg* 1972;34:458-67.

Eliasson S, Halvarsson C, Ljungheimer C. Periapical condensing osteitis and endodontic treatment. *Oral Surg* 1984;57:195-9.

Shrout MK, Hall JM, Hildebolt CE. Differentiation of periapical granulomas and radicular cysts by digital radiometric analysis. *Oral Surg* 1993;76:356-61.

Torabinejad M. The role of immunological reactions in apical cyst formation and the fate of epithelial cells after root canal therapy: a theory. *Int J Oral Surg* 1983;12:14-22.

Freedland JB. Conservative reduction of large periapical lesions. *Oral Surg* 1970;29:455-64.

LaLonde ER, Luebke RG. The frequency and distribution of periapical cysts and granulomas - an evaluation of 800 specimens. *Oral Surg* 1968;25:861-8.

Pulver WH, Taubman MA, Smith DJ. Immune components in human dental periapical lesions. *Arch Oral Biol* 1978;23:435-43.

- Valderhaug J. A histologic study of experimentally induced radicular cysts. *Int J Oral Surg* 1972;1:137-47.
- Ten Cate AR. The epithelial cell rest of Malassez and the genesis of the dental cyst. *Oral Surg* 1972;34:956-64.
- Natkin E, Oswald RJ, Carnes LI. The relationship of lesion size to diagnosis, incidence and treatment of periapical cysts and granulomas. *Oral Surg* 1984;57:82-94.
- Bender IB. A commentary on General Bhaskar's hypothesis. *Oral Surg* 1972;34:469-75.
- Walton RE, Garnish JJ. The histology of periapical inflammatory lesions in permanent molars in monkeys. *J Endodon* 1986;12:49-53.
- Baumgartner JC, Picket AB, Muller JT. Microscopic examination of oral sinus tracts and their associated periapical lesions. *J Endodon* 1984;10:146-52.
- Contos JG, Corcoran JF, Laturno SAL, Chiego DJ, Regezi JA. Langerhans cells in apical periodontal cysts: an immunohistochemical study. *J Endodon* 1987;13:52-5.
- Fish EW. Bone infection. *J Amer Dent Assoc* 1939;26:691-712.
- Harris M, Toller P. The pathogenesis of dental cysts. *Brit Med Bull* 1975;31:159-63.
- Reit C, Grondahl H. Management of periapical lesions in endodontically treated teeth. *Swed Dent J* 1984;8:1-7.
- Yamasaki M, Kumazawa M, Kohsaka T, Nakamura H, Kameyama Y. Pulpal and periapical tissue reactions after experimental pulpal exposure in rats. *J Endodon* 1994;20(1):13-7.
- Lin L, Langeland K. Innervation of the inflammatory periapical lesions. *Oral Surg* 1981;51:535-43.
- Nobuhara W, Del Rio C. Incidence of periradicular pathoses in endodontic treatment failures. *J Endodon* 1993;19:315-8.
- White S, Sapp P, Seto B, Mankovich N. Absence of radiometric differentiation between periapical cysts and granulomas. *Oral Surg* 1994;78(5):650-4.
- Simon JHS. Incidence of periapical cysts in relation to the root canal. *J Endodon* 1980;6:845-8.
- Maalouf EM, Gutman JL. Biological perspectives on the non-surgical endodontic management of periradicular pathosis. *Int Endod J* 1994;27(3):154-61.
- Waldron CA. Fibro-osseous lesions of the jaws. *J Oral Surg* 1993;51:828-35.

Matsuo T, Ebisu S. Interleukin-1A and interleukin-1B in periapical exudates of infected root canals: correlations with the clinical findings of the involved teeth. *J Endodon* 1994;20(9):432-35.

TOPICAL LITERATURE SEMINAR #24

TOPIC: Histology and Physiology of the Pulpodentinal Complex

SEMINAR OBJECTIVE: Each student should understand the histology and physiology of the dentin and dental pulp in order to understand the functions and reactions of the pulpodentinal complex during homeostasis and pathosis.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #125 - understand the embryologic origins of teeth and the different stages of tooth development.
- MP #126 - know the cellular and intercellular elements of the dental pulp.
- MP #127 - understand the histologic appearance of each element of the dental pulp.
- MP #128 - understand the physical and physiologic functions of each element of the dental pulp.
- MP #129 - understand the interdependence of cellular and intercellular elements of the dental pulp.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Hargreaves KM, Goodis HE (editors). Seltzer and Bender's Dental Pulp. Chicago: Quintessence Publishing Co., 2002:13-40, 41-62, 63-94, 95-122, 123-150, 151-180.

Trowbridge HO, Kim S, Suda H. Structure and function of the dentin and pulp complex. In Cohen S, Burns RC (eds). Pathways of the pulp. 8th ed. St Louis: CV Mosby Company 2002:411-56.

Kim S, Trowbridge HO, Suda H. Pulpal reaction to caries and dental procedures. In Cohen S, Burns RC (eds). Pathways of the pulp. 8th ed. St Louis: CV Mosby Company 2002:573-602.

Ten Cate AR. Oral histology: development, structure, and function. 3rd ed. St Louis: CV Mosby Company 1989:157-96.

(SUPPLEMENTAL READING)

Kramer IRH. The vascular architecture of the human dental pulp. Arch Oral Biol 1969;2:177-89.

Bernick S. Lymphatic vessels of the human dental pulp. J Dent Res 1977;56:70-7.

Pohto P, Antila R. Innervation of blood vessels in the dental pulp. Int Dent J 1972;22:228-39.

Cutright DE, Bhaskar SN. Pulpal vasculature as demonstrated by a new method. Oral Surg 1969;27:678-83.

Kim S. Regulation of pulpal blood flow. J Dent Res 1985;64 (Special Issue):590-6.

Thomas HF. The extent of the odontoblast process in human dentin. J Dent Res 1979;58:2207-18.

Beveridge EE, Brown AC. The measurement of human dental intra-pulpal pressure and its response to clinical variables. Oral Surg 1965;19:655-68.

Stanley HR, White CL, McCray L. The rate of tertiary (reparative) dentin formation in the human tooth. Oral Surg 1966;22:59-.

Itoh K. The distribution of nerves in human deciduous and permanent teeth. Arch Histolog Jap 1976;39:379-99.

Weinstock M, Leblond CP. Synthesis, migration and release of precursor collagen by odontoblasts as visualized by radioautography after 3H-proline administration. J Cell Biol 1974;60:92.

Van Hassel HJ. Physiology of the human dental pulp. Oral Surg 1971;32:126-35.

The following students should abstract and report on the following literature.

Mangkornkarn C, Steiner JC. In vivo and in vitro glycosamino-glycans from human dental pulp. J Endodon 1992;18:327-31.

Bishop MA, Malhotra M. An investigation of lymphatic vessels in the feline dental pulp. Am J Anat 1990;187:247-53.

Holland GR. The odontoblast process: form and function. J Dent Res 1985;64 (Special Issue):499-514.

Linde A. The extracellular matrix of the dental pulp and dentin. J Dent Res 1985;64 (Special Issue):523-9.

Heyeraas KJ. Pulpal hemodynamics and interstitial fluid pressure: balance of transmucrovascular fluid transport. J Endodon 1989;15:468-72.

Ruch JV. Odontoblast differentiation and the formation of the odontoblast layer. J Dent Res 1985;64 (Special Issue):489-98.

Narhi M. Role of intradental A- and C-type nerve fibers in dental pain mechanisms. Proc Finn Dent Soc 1992;88:507-16.

Kim S, Dorscher-Kim J. Hemodynamic regulation of the dental pulp in a low compliance environment. J Endodon 1989;15:404-8.

- Sigal MJ, Pitaru S, Aubin JE, Ten Cate AR. A combined scanning electron microscopy and immunofluorescence study demonstrating that the odontoblast process extends to the dentinoenamel junction in human teeth. *Anat Rec* 1984;210:453-62.
- Turner DF. Immediate physiological response of odontoblasts. *Proc Finn Dent Soc* 1992;88:55-63.
- Moss-Salentijn L, Hendricks-Klyvert M. Calcified structures in human dental pulps. *J Endodon* 1988;14:184-9.
- Takahashi K, Kishi Y, Kim S. A scanning electron microscope study of the blood vessels of dog pulp using corrosion resin casts. *J Endodon* 1982;8:131-5.
- Butler WT, Ritchie H. The nature and functional significance of dentin extracellular matrix proteins. *Int J Dev Biol* 1995 Feb;39(1):169-79.
- Koling A. Structural relationships in the human odontoblast layer as demonstrated by freeze-fracture electron microscopy. *J Endodon* 1988;14:239-46.
- Carrigan PJ, Morse DR, Furst ML, Sinai IH. A scanning electron microscopic evaluation of human dentinal tubules according to age and location. *J Endodon* 1984;10:359-63.
- Thesleff I, Vaahtokari A. The role of growth factors in determination and differentiation of the odontoblast cell lineage. *Proc Finn Dent Soc* 1992;88:357-68.
- Inoue H, Kurosaka Y, Abe K. Autonomic nerve endings in the odontoblast/predentin border and predentin of the canine teeth of dogs. *J Endodon* 1992;18(4):149-51.
- Olgart LM, Edwall B, Gazelius B. Neurogenic mediators in control of pulpal blood flow. *J Endodon* 1989;15:409-12.
- Thomas HF. The lamina limitans of human dentinal tubules. *J Dent Res* 1984;63:1064-66.
- Tonder KJH, Kvinnsland I. Micropuncture measurements of interstitial fluid pressure in normal and inflamed dental pulp in cats. *J Endodon* 1983;9:105-9.
- Heyeraas KJ, Kvinnsland I, Byers M, Jacobsen EB. Nerve fibers immunoreactive to protein gene product 9.5, calcitonin gene-related peptide, substance P, and neuropeptide Y in the dental pulp, periodontal ligament, and gingiva in cats. *Acta Odontol Scand* 1993;51:207-21.
- Fitzgerald M, Chiego DJ, Heys DR. Autoradiographic analysis of odontoblast replacement following pulp exposure in primate teeth. *Arch Oral Biol* 1990;35(9):707-15.
- Shuttleworth CA, Berry L, Kielty CM. Microfibrillar components in dental pulp: presence of both type IV collagen- and fibrillin-containing microfibrils. *Arch Oral Biol* 1992;37:1079-84.

Yoshihara N, Yoshihara K, Nakamura H, Iwaku M, Ozawa H. Immuno-electron-microscopic study of the localization of fibronectin in the odontoblast layer of human teeth. *Arch Oral Biol* 1994;39(5):395-9.

Wakisaka S. Neuropeptides in the dental pulp: distribution, origins, and correlation. *J Endodon* 1990;16:67-9.

Pashley DH. Mechanistic analysis of fluid distribution across the pulpodentin complex. *J Endodon* 1992;18:72-5.

Johnson DC. Innervation of teeth: qualitative, quantitative, and developmental assessment. *J Dent Res* 1985;64 (Special Issue):555-63.

Nagata T, Kido J, Hamasaki A, Ishida H, Wakano Y. Regulation of glycosaminoglycan synthesis by parathyroid hormone and prostaglandin E2 in cultured dental pulp cells. *J Endodon* 1991;17:594-7.

Thomas HF. The dentin-predentin complex and its permeability; anatomical overview. *J Dent Res* 1985;64 (Special Issue):607-12.

Fristad I, Heyeraas KJ, Kvinnsland I. Nerve fibres and cells immunoreactive to neurochemical markers in developing rat molars and supporting tissues. *Arch Oral Biol* 1994;39(8):633-46.

Byers MR, Newhaus SJ, Gehrig JD. Dental sensory receptor structure in human teeth. *Pain* 1982;13:221-35.

Lohinai Z, Balla I, Marczis J, Vass Z, Kovach AGB. Evidence for the role of nitric oxide in the circulation of the dental pulp. *J Dent Res* 1995;74(8):1501-6.

Okamura K, Kobayashi I, Matsuo K, Taniguchi K, Ishibashi Y, Izumi T, Sakai H. Ultrastructure of the neuromuscular junction of vasomotor nerves in the microvasculature of human dental pulp. *Arch Oral Biol* 1994;39(3):171-6.

TOPICAL LITERATURE SEMINAR #25

TOPIC: PAIN I - Etiology, Physiology, and Theories of Orofacial Pain

SEMINAR OBJECTIVE: Each student should understand the anatomic, physiologic, and theoretical aspects of the initiation, transmission, modulation, interpretation, and expression of sensory impulses in the peripheral and central nervous systems in order to formulate explanations for the occurrence and character of oral and perioral pain.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #130 - know the structure of the neuron
- MP #131 - understand receptor potentials, impulse initiation, neural transmission, and synapse.
- MP #132 - understand the neurophysiology of pain.
- MP #133 - know the pathway of sensory conduction from a neural receptor in the dental pulp to the cerebral cortex.
- MP #134 - understand the content and development of the major theories of pain.
- MP #135 - understand the relationship between the theories of pain and pulpal pain, periradicular pain, and post- treatment pain.
- MP #136 - understand the relationship between inflammation and pain.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Hargreaves KM, Goodis HE (editors). Seltzer and Bender's Dental Pulp. Chicago: Quintessence Publishing Co., 2002:181-204.

Lund JP, Lavigna GJ, Dubner R, Sessle BJ (eds) Orofacial pain: From basic science to clinical management. Chicago: Quintessence, 2001.

Hargreaves K, Dubner R. Mechanisms of pain and analgesia. In Dionne RA, Phero JC. (eds). Management of Pain and Anxiety in Dental Practice. New York: Elsevier, 1991:17-40.

Hargreaves KM, Roszkowski MT, Swift JQ. Bradykinin and inflammatory pain. Agents Actions Suppl 1993;41:65-73.

Bennett GJ, Sessle BJ. Basic science issues related to improved diagnoses for chronic orofacial pain. Anesth Prog 37:108-12.

Maixner W, Fillingim R, Booker D, Sigurdsson A. Sensitivity of patients with painful temporomandibular disorders to experimentally evoked pain. Pain 1995;63:341-51.

Pashley DH. Dentin permeability, dentin sensitivity, and treatment through tubule occlusion. J Endodon 1986;12:465-74.

Brannstrom M. The cause of postrestorative sensitivity and its prevention. J Endodon 1986;12:475-81.

Kim S. Hypersensitive teeth: desensitization of pulpal sensory nerves. J Endodon 1986;12:482-5.

Kim S. Neurovascular interactions in the dental pulp in health and inflammation. J Endodon 1990;16:48-55.

The following students should prepare a written and oral report on the following topics. The use of charts, diagrams, overheads, etc. is strongly encouraged for the oral presentation.

- Anatomical pathways of peripheral and cranial pain nerve fibers.
- Trace the pathway of pain fibers from mandibular/maxillary teeth to the brain.
- Anatomy of the spinal cord, pons, medulla, spinal caudalis, etc.
- Theories of pain: Specificity, Pattern, Gate Control
- Theories of dentin sensitivity/hypersensitivity
- Postrestorative sensitivity
- Classification, morphology, and physiology of nerve fibers in the pulp
- The etiology of dental pain (The role that inflammation plays in pain)
- Physiology of the action potential: Cytology of the nerve fiber, neural transmitters, propagation of the action potential.
- Referred pain

The following students should abstract and report on the following literature

Grutzner EH, Garry MG, Hargreaves KM. Effect of injury on pulpal levels of immunoreactive substance P and calcitonin gene-related peptide. J Endodon 1992;18:553-7.

Hargreaves KM, Bowles WR, Garry MG. An in vitro method to evaluate regulation of neuropeptide release from dental pulp. J Endodon 1992;18:597-600.

Ahlquist ML, Franzen OG. Inflammation and dental pain in man. Endod Dent Traumatol 1994;10:201-9.

Kerezoudis NP, Olgart L, Edwall B, Gazelius B, Nomikos GG. Activation of sympathetic fibers in the pulp by electrical stimulation of rat incisor teeth. Arch Oral Biol 1992;37:1013-1019.

Yu XM, Sessle BJ, Vernon H, Hu JW. Administration of opiate antagonist naloxone induces recurrence of increased jaw muscle activities related to inflammatory irritant application to rat temporomandibular joint region. J Neurophysiol 1994 Sep;72(3):1430-3.

Byers MR, Taylor PE, Khayat BG, Kimberly CL. Effects of injury and inflammation on pulpal and periapical nerves. J Endodon 1990;16:78-84.

Brannstrom M. The hydrodynamic theory of dentinal pain: sensation in preparations, caries, and the dentinal crack syndrome. *J Endodon* 1986;12:453-7.

Andersen OK, Gracely RH, Arendt-Nielsen L. Facilitation of the human nociceptive reflex by stimulation of A beta-fibres in a secondary hyperalgesic area sustained by nociceptive input from the primary hyperalgesic area. *Acta Physiol Scand* 1995 Sep;155(1):87-97.

Mengel MKC, Stiefenhofer AE, Jyvasjarvi E, Kniffki KD. Pain sensation during cold stimulation of the teeth: Differential reflection of A-delta and C fibre activity? *Pain* 1993;55(2):159- 69.

TOPICAL LITERATURE SEMINAR #26

TOPIC: Pain II - Examination and Differential Diagnosis of Orofacial Pain

SEMINAR OBJECTIVE: Each student should analyze the factors influencing orofacial pain in order to arrive at a proper diagnosis.

MAIN POINTS: At the conclusion of the seminar, each student should be able to:

- MP #137 - classify orofacial pain based on anatomical and regional locations.
- MP #138 - classify orofacial pain based on symptomatology.
- MP #139 - distinguish the characteristics of somatic pain.
- MP #140 - identify the characteristics of neurogenous pain.
- MP #141 - differentiate the characteristics of psychogenic pain.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Eversole LR, Chase PF. In Cohen S, Burns RC. (Eds) Pathways of the Pulp 8th edition. St Louis: Mosby, 2002:77-90.

Okeson JP (ed). Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management. Chicago: Quintessence Publishing Co., Inc. 1996:19-44,53-88,185-210.

Okeson JP. Bell's Orofacial Pain. 5th ed. Chicago: Quintessence Publishing Co., Inc. 1995:123-478.

Marbach JJ. Orofacial phantom pain: theory and phenomenology. J Am Dent Assoc 1996;127:221-9.

Lipton JA, Ship JA, Larach-Robinson D. Estimated prevalence and distribution of reported orofacial pain in the United States. J Am Dent Assoc 1993;124:115-22.

Pertes RA, Heir GM. Chronic orofacial pain, a practical approach to differential diagnosis. Dent Clin N Am 1991;35(1);123-40.

Graff-Radford SB. Headache problems that can present as toothache. Dent Clin N Am 1991;35(1);155-70.

Grzesiak RC. Psychologic considerations in temporomandibular dysfunction. Dent Clin N Am 1991;35(1);209-26.

Austin DG, Cubillos L. Special considerations in orofacial pain. Dent Clin N Am 1991;35(1);227-44.

Bonica JJ. The management of pain. 2nd ed. Philadelphia: Lea & Febiger, 1990:649-811.

McDonald J, Phero J. Evaluation of chronic pain conditions of the head and neck: a multidisciplinary approach. In Dionne RA, Phero JC. (eds) Management of pain and anxiety in dental practice. New York: Elsevier 1991: 361-82.

Ingle JI, Glick DH. Differential diagnosis and treatment of dental pain. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins 1994:547-8.

Jaeger B. Differential Diagnosis and management of craniofacial pain. In Ingle JI, Bakland LK (eds). Endodontics. 4th ed. Baltimore: Williams & Wilkins 1994:550-607.

The following students should abstract and report on the following literature.

Bouquot JE, Roberts AM, Person P, Christian J. Neuralgia-inducing cavitation osteonecrosis (NICO). Oral Surg 1992;73:307-20.

Francica F, Brickman J, LoMonaco CJ, Lin LM. Trigeminal neuralgia and endodontically treated teeth. J Endodon 1988;14(7):360-2.

Heir GM, Fein LA. Lyme disease: Considerations for dentistry. J Orofacial Pain 1996;10:74-86.

Drummond PD. Vascular changes in atypical facial pain. Headache 1988;28:121-3.

Klausner JJ. Epidemiology of chronic facial pain: Diagnostic usefulness in patient care. J Am Dent Assoc 1994;125(12):1604-11.

Moncada E, Graff-Radford SB. Benign indomethacin-responsive headaches presenting in the orofacial region: Eight case reports. J Orofacial Pain 1995;9:276-84.

Marbach JJ, Hulbrock J, Hohn C, Segal AG. Incidence of phantom tooth pain: an atypical facial neuralgia. Oral Surg 1982;53(2): 190-3.

Pinsawasdi P, Seltzer S. The induction of trigeminal neuralgia-like symptoms by pulp-periapical pathosis. J Endodon 1986;12(2): 73-5.

Kleier DJ. Referred pain from a myofascial trigger point mimicking pain of endodontic origin. J Endodon 1985;11(9):408-11.

Bouquot JE, Christian J. Long-term effects of jawbone curettage on the pain of facial neuralgia. J Oral Maxillofac Surg 1995;53:387-97.

Schnurr RF, Brooke RI. Atypical Odontalgia: update and comment on long-term follow-up. Oral Surg 1992;73:445-8.

Reeh E, ElDeeb ME. Referred pain of muscular origin resembling endodontic involvement. Oral Surg 1991;71:223-7.

Bates RE, Stewart CM. Atypical odontalgia: phantom tooth pain. *Oral Surg* 1991;72:479-83.

Boyczuk EM, Solomon MP, Gold BD. Unremitting pain to the mandible secondary to metastatic breast cancer: a case report. *Comp Cont Educ Dent* 1991;12(2):104-9.

Blau JN. Common headaches: type, duration, frequency and implications. *Headache* 1990;30:701-4.

Sivers JE, Johnson GK. Diagnosis of Eagle's syndrome. *Oral Surg* 1985;59:575-7.

Miller DA, Wyrwa EB. Ear pain: a dental dilemma. *Comp Cont Ed Dent* 1992;13(8):676-84.

Sandler NA, Ziccardi V, Ochs M. Differential diagnosis of jaw pain in the elderly. *J Am Dent Assoc* 1995;126:1263-72.

Kant KS. Pain referred to teeth as the sole discomfort in undiagnosed mediastinal lymphoma: report of case. *J Am Dent Assoc* 1989;118:587-8.

Fricton JR, Kroening R, Haley D, Siegert R. Myofascial pain syndrome of the head and neck: a review of clinical characteristics of 164 patients. *Oral Surg* 1985;60:615-23.

Mohl ND, Ohrbach R. The dilemma of scientific knowledge versus clinical management of temporomandibular disorders. *J Prosthet Dent* 1992;67(1):113-20.

Batchelder BJ, Krutchkoff DJ, Amara J. Mandibular pain as the initial and sole clinical manifestation of coronary insufficiency: report of a case. *J Am Dent Assoc* 1987;115:710-12.

Senia ES, Cunningham KW, Marx RE. The diagnostic dilemma of barodontalgia: report of two cases. *Oral Surg* 1985;60:212-17.

Jensen MP, McFarland CA. Increasing the reliability of pain intensity measurement in chronic pain patients. *Pain* 1993;55(2): 195-203.

Huntley TA, Wiesenfeld D. Delayed diagnosis of the cause of facial pain in patients with neoplastic disease: a report of eight cases. *J Oral Surg* 1994;52(1);81-5.

Gross GS. Diagnostic anesthesia. Guidelines for the practitioner. *Dent Clin N Am* 1991;35:141-53.

TOPICAL LITERATURE SEMINAR #27

TOPIC: PAIN III - Pharmacologic Control of Orofacial Pain

SEMINAR OBJECTIVE: Each student should analyze the factors influencing orofacial pain in order to prevent, diminish or control the pain associated with it.

MAIN POINTS: At the conclusion of the seminar, each student should:

- MP #142 - know the available modalities for treating patients with orofacial pain.
- MP #143 - list the available methods of preventing and controlling pain of odontogenic origin.
- MP #144 - describe the pharmacologic action of drugs used to control pain of odontogenic origin.
- MP #145 - understand the medical complications and drug interactions associated with the pharmacologic agents used to control pain.

SEMINAR ASSIGNMENTS: All students should review and be prepared to discuss the following literature.

Hargreaves K, Hutter JW. Endodontic pharmacology. In Cohen S, Burns R. Pathways of the pulp. 8th ed. St Louis: Mosby 2002:665-82.

Advances in the diagnosis and treatment of endodontic pain. In Trope M. Endodontic Topics. Blackwell Munksgaard 2002; Vol 3:1-136.

Hargreaves KM, Seltzer S. In Hargreaves KM, Goodis, H. eds. Seltzer and Bender's Dental Pulp. Chicago: Quintessence, 2002:205-26.

Feinmann C, Peatfield R. Orofacial neuralgia: Diagnosis and treatment guidelines. Drugs 1993;42(2):263-8

Kacso G, Terezhalmay G. Acetylsalicylic acid and acetaminophen. Dent Clin N Am 1994;38(4):633-44.

Dionne RA, Gordon SM. Nonsteroidal anti-inflammatory drugs in acute pain. Dent Clin N Am 1994;38(4):645-68.

Truelove EL. The chemotherapeutic management of chronic and persistent orofacial pain. Dent Clin N Am 1994;38(4):669-88.

Cowan FF. Dental Pharmacology. 2nd ed. Philadelphia: Lea & Febiger 1994:164-203.

Dionne RA, Phero JC (eds). Management of pain and anxiety in dental practice. New York: Elsevier 1991:109-34, 135-52, 153-80, 205-38.

Bonica JJ. The management of pain. 2nd ed. Philadelphia: Lea & Febiger, 1990:1640-75, 1700-56, 1852-61.

Okeson JP. Bell's Orofacial Pain. 5th ed. Chicago: Quintessence Publishing Co, Inc 1995:185-215

Myslinski NR, Myers DE. Drugs used in the treatment of facial pain. In Holroyd SV, Wynn RL, Requa-Clark B. Clinical pharmacology in dental practice. 4th ed. St Louis: C.V. Mosby Company 1988:392-400.

Cunningham CJ, Mullaney TP. Pain control in endodontics. Dent Clin N Am 1992;36:393-408.

Malamed SF. Local Anesthetics: Dentistry's most important drugs. J Am Dent Assoc 1994;125(12):1571-6

The following students should abstract and report on the following literature.

Nevins A, Verhelle R, Feldman MJ, Berman D. Local prophylactic benadryl injections in an attempt to reduce postinstrumental pain. J Endodon 1994;20(6):296-8.

Schleder JR, Reader A, Beck M, Meyers WJ. The periodontal ligament injection: a comparison of 2% lidocaine, 3% mepivacaine, and 1:100,000 epinephrine to 2% lidocaine with 1:100,000 epinephrine in human mandibular premolars. J Endodon 1988;14:397-404.

Kim S. Ligamental injection: a physiological explanation of its efficacy. J Endodon 1986;12:486-91.

Dionne R. Oral sedation. Compendium. 1998;19:868-77.

Erich D, Lundgren JP, Dionne RA, Nicoll B, Hutter JW. Comparison of Triazolam, Diazepam, and placebo as outpatient premedication for endodontic patients. J Endodon 1997;23:181-4.

Replogle K, Reader A, Nist R, et. al. Anesthetic efficacy of the intraosseous injection of 2% lidocaine with 100,000 epinephrine and 3% mepivacaine in mandibular first molars. Oral Surg 1997;83:30-7.

Forbes JA, Kehm CJ, Grodin CD, et al. Evaluation of ketorolac, ibuprofen, acetaminophen, and an acetaminophen-codeine combination in postoperative oral surgery pain. Pharmacotherapy 1990;10(6pt2):94S-105S.

Keiser K, Hargreaves KM. Building effective strategies for the management of endodontic pain. Endodontic Topics 2002;3:93-105. (Please see me for a copy of this article)

Schwesinger WH, Reynolds JC, Harshaw DH, Frakes LA. Transnasal butorphanol and intramuscular meperidine in the treatment of postoperative pain. Advances in Therapy 1992;9:123-9.

Diamond S, Freitag FG, Diamond ML, Urban G. Transnasal butorphanol in the treatment of migraine headache pain. *Headache Quarterly* 1992;3:160-7.

Habib S, Matthews R, Scully C, Levers B, Shepard J. A study of the comparative efficacy of four common analgesics in the control of postsurgical dental pain. *Oral Surg* 1990;70:559-63.

Kaufman E, Hargreaves K, Dionne R. Comparison of oral triazolam and nitrous oxide with placebo and intravenous diazepam for outpatient premedication. *Oral Surg* 1993;75:156-64.

Curtis P, Gartman LA. Utilization of ketorolac tromethamine for control of severe odontogenic pain. *J Endodon* 1994;20(9):457-9.

Flath RK, Hicks ML, Dionne RA, Pelleu GB. Pain suppression after pulpectomy with preoperative flurbiprofen. *J Endodon* 1987;13:339-47.

Keiser K, Hargreaves KM. Strategies for managing the endodontic pain patient. *J Tenn Dent Assoc* (Please see me for a copy of this article)

Dionne R. To tame the pain? *Compendium* 1998;19(4):426-31.

Sisk AL, Grover BJ. A comparison of preoperative and postoperative naproxen sodium for suppression of postoperative pain. *J Oral Surg* 1990;48:674-8.

Sokol DJ, Sokol S, Sokol CK. A review of noninvasive therapies used to deal with anxiety and pain in the dental office. *J Am Dent Assoc* 1985;110:217-22.

Walton RE. Distribution of solutions with the periodontal ligament injection: clinical, anatomical and histological evidence. *J Endodon* 1986;12:492-500.

Likar R, Sittl R, Gragger K, Pipam W, Blannig H, Breschan C, Schalk, HV, Stein C, Schafer M. Peripheral morphine analgesia in dental surgery. *Pain* 1998;76:145-50.

Gordon NC, Heller PH. Interactions between fluoxetine and opiate analgesia for postoperative dental pain. *Pain* 1994;58(7):85-8.

Dionne RA. New approaches to preventing and treating postoperative pain. *J Am Dent Assoc* 1992;123:27-34.

Gerschman JA, Giebartowski J. Effect of electronic dental anesthesia on pain threshold and pain tolerance levels of human teeth subjected to stimulation with an electric pulp tester. *Anesth Prog* 1991;38:45-9.

Saxen MA. The clinical pharmacology of ketorolac. *Comp Cont Ed Dent* 1992;13:504-11.

Pashley DH. Systemic effects of intraligamental injections. *J Endodon* 1986;12:501-4.

Patten JR, Patten J, Hutchins MO. Adjunct use of dexamethasone in postoperative dental pain control. *Comp Cont Educa Dent* 1992;13: 580-9.

Reitz J, Reader A, Nist R, Beck M, Meyer WJ. Anesthetic efficacy of the intraosseous injection of .9 ml of 2% lidocaine (1:100,000 epinephrine) to augment an inferior alveolar nerve block. *Oral Surg* 1998;86:516-23.

Morse DR, Esposito J, Furst M. Comparison of prophylactic and on-demand diflunisal for pain management of patients having one-visit endodontic therapy. *Oral Surg* 1990;69:729-36.

Cooper S. Treating acute pain: Do's and don'ts, pros and cons. *J Endodon* 1990;16(2);85-91.

Hargreaves KM, Swift JQ, Roszkowski MT, Bowles WR, Garry MG, Jackson DL. Pharmacology of peripheral neuropeptide and inflammatory mediator release. *Oral Surg* 1994;78:503-10.

Hargreaves KM, Swift JQ, Roszkowski MT, Bowles W, Garry MG, Jackson DL. Pharmacology of peripheral neuropeptide and inflammatory mediator release. *Oral Surg* 1994;78;503-10.

Hersch EV. Local anesthetics in dentistry: clinical considerations, drug interactions, and novel formulations. *Compend Cont Educ Dent* 1993;14:1020-8.

Dionne R. Lidocaine and cancer: risk or rumor? *Compendium*. Nov 1998; 19(11):1118-22.

Dionne R. Preemptive vs preventive analgesia: which approach improves clinical outcomes? *Compendium* 2000;21(1):48-56.

Hersh EV. The efficacy and safety of Ketoprofen in postsurgical dental pain. *Compend Contin Educ Dent* 1991;12:234-42.

Hersh EV, Houpt MI, Cooper SA, Feldman RS, Wolff MS, Levin LM. Analgesic efficacy and safety of an intraoral lidocaine patch. *J Am Dent Assoc* 1996;127:1627-34.

Dionne R. Cox-2 inhibitors: better than ibuprofen for dental pain? *Compendium* 1999;20(6):518-24.

Strassels S. The Cox-2 inhibitors. *J Mass Dent Soc* 1999; 48(3): 43-4.

Vander Elst E. How pharmaceuticals are developed. *J Am Dent Assoc* 1994;125(Special Supplement)(Jan):40S-44S.

Jackson D, Moore P, Hargreaves KM. Preoperative nonsteroidal anti-inflammatory drugs for the prevention of postoperative pain. *J Am Dent Assoc* 1989;119:641-7.

Reisman D, Reader A, Nist R, Beck M, Weaver J. Anesthetic efficacy of the supplemental intraosseous injection of 3% mepivacaine in irreversible pulpitis. *Oral Surg* 1997;84:676-82.

EN 811, 812: Seminar: Endodontic Diagnosis and Treatment Planning

Course Instructor: Dr. Ralph Hawkins

Office Hours: Sunday – Thursday 9:00 am to 4:00 pm

Credit Hours: 1

Prerequisites: DMD or equivalent

Co-requisites: None

Course Description: Develops logical approaches to endodontic diagnosis and treatment planning procedures. Includes discussion of a wide range of endodontic problems not usually encountered in clinical courses.

Intended Learning Outcomes: At the conclusion of this seminar series, each student should be able to:

- (1) discuss the process used in evaluating diagnostic data when arriving at a diagnosis, and formulating a treatment plan, treatment procedures, and outcomes assessment.
- (2) assess the need for surgical revision and to nonsurgical re-treatment modalities and
- (3) arrive at a diagnosis and appropriate treatment plan for cases which do not fall under the scope of “normal” clinical cases

Course Topics and Content: This course is taught as a series of presentations of common and unusual cases demonstrating the process of endodontic diagnosis and treatment planning including evaluation of failed cases.

Assignments: There are no specific assignments for the course. Class attendance and participation is required.

Methods of Student Evaluation: Attendance counts for half of the grade while participation counts for the rest.

Teaching and Learning Methodologies: Unusual clinical cases are presented using Power Point. As the clinical situation unfolds the students’ critical thinking and knowledge are continuously challenged by the instructor. Differential diagnosis, treatment plan options, and methods of treating the case on hand are reviewed and discussed. Student should demonstrate active participation based on knowledge of the Endodontic sciences.

Course Texts, Recommended Reading, Material and Resources:

No review material or assignments are required.

EN 814: Seminar: Restoration of Endodontically Involved Teeth

Course Instructor:	Dr. Nawaf AlDousari
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	0.5
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: Presentation of rationale and operative procedures best employed in restoring endodontically treated teeth and in using them as long-term abutments for prosthetic appliances.

Intended Learning Outcomes:

At the conclusion of this course, each student should be:

- (1) able to relate the role of the ferrule effect to the prognosis of restored pulpless teeth
- (2) able to evaluate the restorability of a tooth that requires endodontic therapy
- (3) familiar with the various types of prefabricated posts available
- (4) familiar with the indications and contraindications of various foundation materials and techniques
- (5) familiar with the mechanical and physical properties of currently available core materials
- (6) familiar with the biomechanics of restored pulpless teeth
- (7) familiar with the various cementing media for posts
- (8) knowledgeable of the role of complete crowns and onlay restorations as protective restorations for posterior pulpless teeth

Course Topics and Content:

- Biomechanics of unrestored and restored endodontically treated teeth
- Evaluation of the prognosis of carious or restored teeth
- Posts and cores
- Buildup of endodontically treated teeth
- Cements
- Effect of restorations on endodontically treated teeth

Assignments: There are no specific assignments. Students are expected to attend and participate in all class meetings.

Methods of Student Evaluation: The final grade is based on class participation.

Teaching and Learning Methodologies: Lecture and class participation

Course Texts, Recommended Reading, Material and Resources:

There is no required reading for the course

EN 815: Surgical Endodontics

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	0.5
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: Comprehensive series of lectures and laboratory exercises designed to provide the student with the knowledge and technical skills to perform proficiently surgical endodontic procedures. The most current techniques and state-of-the-art instruments and materials available for endodontic surgery are discussed and used in the laboratory exercises.

Intended Learning Outcomes: At the completion of this course the students are expected to have a comprehensive, evidence based, knowledge of the current principles of endodontic microsurgery. Students should be able to make diagnosis, case selection, and treatment planning for surgical cases. Students will be able to perform surgical endodontics using the microscope and state-of-the-art technologies and techniques with proficiency and excellence.

Course Topics and Content:

The didactic course consists of the following four lectures:

1. Endodontic Microsurgery Part 1:
 - a. Conventional endodontic success rate and the need for surgery
 - b. Case selection
 - c. Indications and contraindications
 - d. Comparison of traditional apical surgery and microsurgery
 - e. Classification of microsurgical cases
 - f. Presurgical evaluation and premedication

2. Endodontic Microsurgery Part 2:
 - a. Microsurgical instruments
 - b. Use of the surgical microscope
 - c. Anesthesia and hemostasis
 - d. Soft tissue management
 - i. Flap design
 - ii. Retraction
 - iii. Suturing
 - e. Management of mental nerve
 - f. Management of maxillary sinus

3. Endodontic Microsurgery Part 3:

- a. Osteotomy and apical root resection
 - b. The resected root surface and isthmus
 - c. Retropreparation
 - d. Retrofilling materials and techniques
4. Endodontic Microsurgery Part 4:
- a. Tooth replantation
 - b. Surgical sequelae and complications
 - c. Success of microsurgery
 - d. Selected cases

The pre-clinical Hands-on microsurgery lab exercise:

Objectives:

1. Hands on experience
2. Familiarity with micro-surgical instruments
3. Performing all aspects of apical microsurgery

Outline:

1. Bench exercise:
 - Extracted teeth
 - Using the microscope
 - Apical root resection, staining, and microscopic inspection is performed
 - Identify and treat apical root anatomy (isthmus)
 - Ultrasonic retropreparation
 - Retrofilling with MTA and Super EBA

2. Manikin Exercise:
 - Apical microsurgery performed on a mounted Columbia surgical typodont
 - Perform surgery on teeth 8, 12, and 14
 - Flap design
 - Elevation and retraction
 - Identification of the apex
 - Microscope positioning for surgery
 - Apical surgery
 - Suturing

Assignments: Students must come to each session having done appropriate reading and, for the laboratory phase, with the necessary materials to participate in the exercises.

Methods of Student Evaluation:

Grading:

- Didactic course % 60 of the grade
- Preclinical course % 40

Teaching and Learning Methodologies: lectures and laboratory exercises

Course Texts, Recommended Reading, Material and Resources:

Required texts:

- Periradicular Surgery, Bradford R. Johnson and David E. Witherspoon. Pathways of the pulp, Cohen & Hargreaves, 9th edition, 2006
- Endodontic microsurgery, Kim, S. Pathways of the pulp, Cohen & Burns, 8th edition, 2002.
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Required literature review:

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A Note on Surgical Root Canal Treatment Cases:

1. In order to help bring you to the level of clinical proficiency, the following policy is in place:
As one of the requirements for receiving your Certificate in Endodontics, you will be required to complete 12 (twelve) surgical root canal cases. The cases completed must involve reflection of a flap, removal of a bone and resection of a root end.

In addition, each of the surgical cases must be documented using the Case Presentation format of the American Board of Endodontics.
2. Only second-year or third-year students perform surgical root canal treatment. However, in order for the first-year students to gain experience in performing surgical root canal treatment prior to their second year, the second-year students should schedule their surgical appointment at a time when their first-year students are available to assist them in the surgery. Once the appointment has been scheduled, it would be up to the second-year student to notify his/her student about the appointment and the first-year student to make him/herself available.
3. The intent of the above requirement is that it will provide you with the incentive to seek out those cases in which surgical root canal treatment is indeed indicated and will provide the best outcome for the tooth and the patient.

EN 821, 822, 823: Seminar: Current Literature

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	2
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: Monthly seminars that comprehensively review the most recent scientific and dental literature pertaining to the practice of Endodontics.

This seminar series addresses the information management and critical thinking requirements of the American Dental Association Commission on Dental Accreditation that requires students to be able to locate, understand, and critically evaluate dental literature.

The objectives of the literature seminars are to:

1. Introduce the students to the various journals that have articles pertinent to dentistry and the specialty of endodontics;
2. Provide awareness for both students and faculty of current advances in the field of endodontics;
3. Provide new articles for updating the Topical Literature seminars;
4. Broaden the student's perspective of endodontics and endodontic related information.

Intended Learning Outcomes:

At the conclusion of the course, each student should be able to:

Main Points

- MP#1: review the current literature published in peer reviewed dental and health related journals
- MP#2: develop the intellectual skills to evaluate a published paper and compare the content to other articles published previously
- MP#3: analyze the content of the publication and discuss the strength and weaknesses of the study design
- MP#4: discuss the study results and applicability to endodontic practice
- MP#5: know the definition of a well-designed study
- MP#6: discern if clearly definable and relevant goals are sought
- MP#7: recognize when adequate controls are in place
- MP#8: determine if samples are selected randomly
- MP#9: determine if measurements are made blindly and without bias
- MP#10: understand what constitutes appropriate statistical analysis
- MP#11: perform a thorough literature search to address a clinical question

At the end of the course the student will be knowledgeable of the latest research and clinical trends in Endodontics as well as develop the critical thinking necessary to understand and critique research designs in preparation to his or her professional life as a clinician.

Course Topics and Content: The current literature seminars course is the didactic element of the program that reinforces the student's critical thinking. It initiates the lifelong learning process that the graduating student will rely on to enhance their private practice and keeps their knowledge up to date outside the school setting.

On a monthly basis the student is assigned 5 articles to read and report on. The reviewed journals include but are not limited to: the Journal of Endodontics, the International Endodontic Journal, Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontology. For each assigned article the student should also research the literature and fetch another study that covers the same topic and report on it. The reports will include a section where the student states his or her comments and delivers the take home message of the study.

During the seminar session where the class meets with the instructor, critical thinking is encouraged by reviewing in detail and analyzing the study designs, methods and materials along with the discussion and conclusion sections.

Assignments: See Course Topics and Content above

Methods of Student Evaluation: The student's active participation in the classroom counts for half of the grade while the quality of the reports and their presentation count for the second half of the grade.

Teaching and Learning Methodologies: Instructor-guided, student-led literature review seminar.

Course Texts, Recommended Reading, Material and Resources: Current literature to be reviewed as selected by the student.

Template for Assigned Current Literature Review Article

STUDENT NAME

SEMINAR DATE

ARTICLE REFERENCE (*Using JOE style for citation. Copy and paste assigned article from assignment list.*)

INTRODUCTION: (*Aim of the study.*)

MATERIALS AND METHODS: (*Brief description: mention sample size, etc.*)

RESULTS: (*You can scan tables or create your own table from the study data, etc.*)

CONCLUSION: (*Author(s)'s conclusion.*)

COMMENTS (*What you learned or would like to discuss during the seminar i.e.: critique of study design, is the conclusion defended by the study outcome? Would you change your clinical practice based on the results of this study? Etc.*)

Template for Chosen Current Literature Review Article

STUDENT NAME

SEMINAR DATE

ARTICLE REFERENCE (*Type in the reference of the article you have chosen using JOE style for citation.*)

INTRODUCTION: (*Aim of the study.*)

MATERIALS AND METHODS: (*Brief description: mention sample size, etc.*)

RESULTS: (*You can scan tables or create your own table from study data, etc.*)

CONCLUSION: (*Author(s)'s conclusion.*)

COMMENTS (*What you learned or would like to discuss during the seminar i.e.: critique of study design, is the conclusion defended by the study outcome? How does this article relate to the assigned one? Etc.*)

EN 824, 825, 826: Seminar: Case Presentation

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	1
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: Monthly seminars that provide the opportunity for the postdoctoral endodontic student to present and discuss his/her clinical cases. Relevant scientific literature along with the clinical experience of the faculty is stressed in justifying the rationale for diagnosis, treatment planning, and management.

Intended Learning Outcomes:

The Case Presentation Seminars are held once a month throughout the academic year. Each of the students presents cases on a rotating basis according to a published schedule. The objectives of these seminars are for students to:

1. Develop a sound rationale for clinical treatment, and
2. Defend their course of treatment based on scientific literature.

Additional objectives:

- Foster a dialogue between the preceptor and the student
- Strengthen the students skills in treatment planning and case presentations
- Provide an opportunity for students to develop skills in digital photography and the creation of a powerpoint case presentation
- Create an environment for students to develop critical thinking skills by developing a well thought out treatment plan, exploring the options and defending the case to the school-based faculty

Course Topics and Content:

Each presenter is expected to defend his/her course of treatment based upon the best available scientific evidence, clinical experience expertise and patient preference.

The first year student starts treating patients in September and has 4 full months to document and complete clinical cases. Clinical Faculty will be assisting the student in documenting their cases. Starting January and on a monthly basis each student is required to present 2 clinical cases using PowerPoint and a specific format. The student is required to review the literature pertinent to the presented cases and report on the medical condition of the patient, the anatomical considerations of the treated tooth, and the treatment rendered. The clinical diagnosis, the technique used, the outcome and prognosis of the case are reviewed, compared to recent literature, and discussed in

class with colleagues and faculty. The faculty input is critical in expanding the students' knowledge of a specific procedure by suggesting different techniques and challenging the students' thinking process.

During their second and third year the students will be able to perform more cases and therefore are expected to present 3 cases per seminar.

Assignments:

The use of the literature along with clinical experience is stressed in providing a rationale for treatment. A critical review of each presented case is accomplished through the active participation of both students and faculty. Students present their cases in the following manner:

1. All cases must be thoroughly documented and presented on PowerPoint.
2. Radiographs are mounted for projection and must be of good quality and diagnostic value.
3. All case histories must be presented in a logical fashion including a chief complaint, medical history, dental history, clinical exams, radiographs, diagnosis and prognosis.
4. Include clinical slides where appropriate.

Case Presentation

Competencies/subcompetencies addressed:

1. Graduates must be competent in treatment planning and case presentation for patients throughout their lifecycle.
 - a. Develop a comprehensive, properly sequenced treatment plan including appropriate referrals, based on evaluation of all diagnostic data and the personal and economic capabilities of the patient.
 - b. Assess critically and apply new treatment modalities as they relate to the development and modification of patient's treatment plan.
2. Graduates must be competent to evaluate critically and incorporate new dental procedures when these procedures have been proven effective.
 - a. Access information dealing with clinical dentistry, basic sciences and behavioral science topics using available resources.
 - b.

Timetable for Completing the Case Presentation

Week 1	Orient to clinic
Week 2-3	Select patient and gather all of the necessary documentation required for creating the treatment plan; information pertaining to the patient's extraoral & intraoral clinical examination, diagnostically complete radiographic examination, extraoral and intraoral photographs and mounted diagnostic casts.
Week 3- 4	Develop treatment plan and after discussing it with your externship preceptor, present the treatment plan to your patient.

Week 5- 9 Begin treatment making sure that necessary photographs and radiographs are taken to document the treatment provided.

Week 10 Present your case presentation to your preceptor and have the preceptor sign off on the case.

Methods of Student Evaluation:

The level of participation in the lively classroom discussion based on sound clinical knowledge counts for half of the grade while the quality of the slide presentation and review of the literature count for the second half of the grade. The students are graded each time they present and the average grade is calculated at the end of the course.

Teaching and Learning Methodologies: Clinical Case presentation and discussion

Course Texts, Recommended Reading, Material and Resources:

No required text. Students refer to pertinent literature to support treatment decisions

Outline for Case Presentation

1. Title of Case: Provide a title, student name, externship site, date
2. Patient Information: Patient's age, gender, ethnicity
3. Chief Complaint: Use the patient's own words as to why he/she came to the dental clinic. Include the history of the present dental conditions (History of the present illness: HPI) if appropriate.
4. Medical History: Include only significant diseases, conditions and medications. Be prepared to discuss the patient's medical condition(s) and medications he/she is taking. Include the patient's past medical history.
5. Dental History: Include patient's oral hygiene, previous dental treatment, any oral habits such as smoking (# of packs/day and number of years), alcohol (# of drinks/day) and adverse dental experiences (if applicable)
6. Socio-economic Issues: Include patient's educational level, ability to pay for dental services, ability to communicate, physical limitations, medical compromises, and patient's values regarding health care and health care providers. Each of these factors may have a profound effect on the treatment plan being considered.
7. Extraoral Exam: Include head, neck, lymph nodes, TMJ and associated muscles. Describe positive findings.
Photos: Extra oral photo of mouth in rest position and in a smile
8. Intraoral Exam: Include lips, cheeks, tongue, floor of mouth, vestibule, salivary glands, palate, tori, tuberosities, oropharynx and muscle attachments.

Photos: Occlusal palatal arch and occlusal lingual arch

9. Occlusal Evaluation- Static: Include angles classification, horizontal overlap, vertical overlap, and VDO

Photos: Right MIP

Anterior MIP

Left MIP

(Your photos must be of mounted casts)

LINE UP ALL THE REST!!

10. Occlusal Evaluation – Dynamic:

Right – Lateral Contact Working/non-working

Left -- Lateral Contact Working/non-working

11. Occlusal Evaluation – Dynamic:

Anterior Guidance Contact Anterior/Posterior

(Your photos must be of mounted casts)

12. Clinical/Radiographic Findings MAXILLARY RIGHT:

Chart Teeth 1 through 5 (facial and palatal),

Radiographs: 2 PA's of teeth 1 to 3 and 3 to 5

2 BW's of teeth 1 to 3 and 3 to 5

Photos: Teeth 1 through 5 (palatal aspect)

Right MIP

13. Clinical Radiographic Findings MAXILARY ANTERIOR:

Chart Teeth 6 through 11 (facial and palatal)

Radiographs: 3 PA's of teeth 6 to 8, 8 to 10 and 9 to 11

Photos: Anterior guidance (close-up)

Anterior palatal view of teeth 6 to 11

14. Clinical/Radiographic Findings MAXILLARY LEFT

Chart Teeth 12 through 16 (facial and palatal)

Radiographs 2 PA's of teeth 12 to 14 and teeth 14 to 16

2 BW's of teeth 12 to 14 and teeth 14 to 16

Photos: Teeth 12 through 16 (palatal aspect)

Left MIP

15. Clinical/Radiographic Findings MANDIBULAR RIGHT

Chart: Teeth 28 through 32 (facial and lingual)

Radiographs 2 PA's of teeth 28 to 30 and 30 to 32

2 BW's of teeth 28 to 30 and 30 to 32

Photos: Right MIP

Lingual lower right 28 through 32

16. Clinical/Radiographic Findings MANDIBULAR ANTERIOR

Chart: Teeth 22 through 27 (facial and lingual)

Radiographs: 3PA's of teeth 22 to 24, 23 to 26, and 25 to 27
Photos: Close-up of anterior guidance
Lingual view of teeth 22 to 27

17. Clinical /Radiographic Findings MANDIBULAR LEFT

Chart: Teeth 17 through 21 (facial and lingual)
Radiographs 2 PA's of teeth 17 to 19 and teeth 19 to 21
2 BW's of teeth 17 to 19 and 19 to 21
Photos: Left MIP
Lingual lower left 17 through 21

18. Diagnostic Procedures Needed: List the procedures, tests, and/or consultations that are needed in order to establish a diagnosis or formulate a treatment plan (endodontic tests, diagnostic casts/wax-ups, orthodontic consult, etc.)

19. List of Problems List of problems with priorities. Discuss the clinical significance of the problem, what caused it, how serious it is, and the likely outcome if it is not treated.

20. Diagnoses: Use accepted diagnostic terminology (endodontic and periodontic).

21. Etiology: List the etiology for each of the problems/diagnoses you have identified

22. Treatment Plan: List the general goals of treatment, i.e. re-establish
Considerations: posterior occlusion, replace missing teeth, eliminate active periodontal disease, improve esthetics

23. Treatment Plan: Assess your patient's risk for oral diseases and list the preventive strategies that should be included in the overall treatment plan.
Considerations: Present an "ideal" treatment plan (as if the patient's medical, functional and economic conditions were ideal), an alternative "appropriate" treatment plan (keeping in mind the patient's medical, functional and economic status, and remembering that "appropriate treatment" is one where the benefits outweigh the risks by a wide margin) and the actual treatment plan for your patient. Include the advantages and disadvantages of each of the plans with respect to costs, clinical efficacy, and patient compliance. When discussing each treatment plan, use an evidence-based approach. In developing the "ideal" treatment plan, assume that your patient is healthy and can afford the care. However, with the alternative plan, you MUST take into consideration the appropriateness of the proposed treatment with respect to the patient's medical history, mental status, age and ability to comply with the treatment plan you propose.

24. Ideal Treatment Plan - Phase 1

Emergent Problems

Diagnostic Procedures

List procedures needed to make a diagnosis

The objective of this phase is to correct the acute problems and stabilize the patient so that he/she is pain free and can begin sequenced treatment. Some procedures may be required to permit proper diagnosis, treatment solutions and prognosis.

25. Ideal Treatment Plan – Phase 2

Intermediate (Provisional) Treatment

Intermediate problem solution and control of environmental factors. List procedures needed as pre-treatment for terminal treatment

The objective of this phase is to correct the active disease entities so that they do not continue to progress. Complete initial therapies that will have an influence on the definitive treatment proposed. Evaluation of the control of environmental factors, patient's ability and willingness to participate in their maintenance. Consider the need to alter the plan of treatment based on the outcome of the first two phases of treatment. Prepare the patient for definitive treatment if that is part of the plan of treatment.

26. Ideal Treatment Plan - Phase 3

Terminal or Comprehensive problem solution – Final Restoration

List procedures that occur later or last in the sequence

The objective of this phase is to complete definitive procedures that will restore the oral condition to optimal health

27. Ideal Treatment Plan – Phase 4

Outcomes of Treatment

List how you will evaluate the effectiveness of specific treatment modalities; specifically, what will you do to evaluate the treatment? What measurements should be taken, what instruments should be used, what radiographs should be taken, and what exactly should you be looking for. How does the treatment you provide change how the patient lives, whether the patient has pain or discomfort, eats, interacts with other people, and so on?

Recall/Prevention

Discuss how often you would like to see the patient to evaluate the outcome of treatment and describe what type of preventive regimen you recommend for this patient.

The objective of this phase is to assess the success of therapy, evaluate the reasons for failure if they occur, and reinforce proper maintenance.

28. Ideal Sequenced Comprehensive Treatment Plan

Using the data on slides 24-27, list all the steps in the ideal treatment plan in chronological order. This slide should be included in your case presentation so the faculty can view the entire treatment plan. However, when you get to this slide, just show the slide without repeating verbally what you just presented in phases I, II, III, and IV of the ideal treatment plan.

29. Alternative Treatment Plan

Present an alternative treatment plan that takes into consideration the patient's ability to pay for treatment. Use a different color font for ONLY those items that have been changed for the alternative treatment plan. This will make it easier for the faculty to understand the differences between the two treatment plans

30. Evidenced-based Treatment (Evidence supporting one treatment/material over another) – Provide evidence from the scientific literature to determine why you chose or would choose one type of treatment versus another. Cite articles, for example, on tooth survival or restoration survival or other measures of success for one type of restoration versus another.

31. Actual Treatment Plan: Present the actual treatment plan you provided at your externship site and discuss why that treatment plan was chosen. Consider all the constraints such as finances, age, health, patient acceptance that altered the “ideal” treatment plan.

ONLY if treatment has been provided on the case, should photos be taken and included in the case presentation.

32. Treatment Phase I and II: Photo or radiograph showing treatment

33. Treatment Phase III and IV: Photo or radiograph showing treatment

34. References: List scientific articles that support your approach to treatment

35. Full Series or Panorex Radiographs Insert the radiographs at the end of your case presentation. Placing the radiographs at the end allows the faculty to see the patient's entire dentition as a way to recap the case.

Evaluation of the Case Presentation will include:

- Selection of patient
- Documentation of required data
- Quality and completeness of required photos and radiographs
- Appropriateness and critical review of multiple treatment plans
- Soundness of rationale for actual treatment
- Case reviewed with preceptor and a clinical faculty member prior to presentation
- Presentation of case
- Mounted diagnostic casts on the articulator brought to presentation
- Proper use of dental terminology in the presentation
- Appropriate scientific evidence used to support clinical decision making

Selecting a Patient for the Case Presentation

- The case should be multi-disciplinary, to include 3 disciplines. Select a case that is not routine or straight-forward. A case with one or two teeth that need endodontic treatment, post, crown lengthening and a crown should not be considered as a multi-disciplinary case. In most instances this is rather simple and does not present an opportunity for

discussion with faculty. A good case for a presentation involves one or more edentulous spaces, compromised teeth, occlusal / VDO concerns and periodontal problems, as well as medical and/or socioeconomic factors. These types of cases provide the opportunity for discussing several different diagnoses and treatment options. A simple case is less impressive than a complex case that requires critical thinking. The faculty want to see insight into the student's thought process of treatment planning, not how well he/she can do a class II amalgam.

Developing Multiple Treatment Plan Options

- Faculty are aware that most patients who come to the externship sites cannot afford the ideal treatment, but it is very important in the student's development to create a treatment plan that includes the ideal treatment for each case.
- Each case should include three plans: an ideal plan, an alternative "appropriate" treatment plan and the actual treatment plan. The ideal treatment plan will help the student to consider what current advances in the dental field can be provided to the patient (regardless of time and money) to achieve a successful outcome. This is the standard of care you should strive to offer your patients when you are in practice. An alternative plan helps the student learn what other options are available to successfully complete the care but at a lower financial or health burden to the patient. The actual treatment plan helps the faculty to see what was actually planned for the patient and how the student is following through with his/her planned treatment. During the presentation, students must provide an explanation of how they arrived at each treatment plan and the evidence to back their decision.

Completing Treatment on the Case

The faculty recognizes that there are both time and scheduling constraints within each externship site that may limit the amount of work completed by a student. Completing treatment on a patient is not expected or required for the case presentation. In fact, sometimes the more ideal the treatment plan, the longer it will take to complete the case (e.g., implants, crown lengthening procedures). The major emphasis of the case presentation should be on diagnosis and treatment planning. This engages the student's critical thinking and requires them to integrate ideas from all different disciplines of dentistry. However, if treatment is rendered, there should be clinical photographs and a statement by the student of how the case is being followed up after he/she leaves the externship site.

Taking Clinical Photographs of the Case

Once you have selected a patient for the case presentation, you must get your preceptor's approval. Work with the front office staff to schedule your patient when you have an assistant available to help you with the mirrors and retractors. Make sure you have charged batteries in the camera and the flash unit. Check the camera ahead of time to be sure the camera has a reader card. Keep the guide for taking clinical photographs with you during the session. Schedule the patient for a 2-hour appointment to complete the examination, charting, radiographs, diagnostic casts and pictures. Thereafter, appointments should be made on a regular basis to begin treatment.

Mounted Casts

In order for the faculty to review the case and follow along with the student's presentation, it is *essential* that mounted diagnostic casts be brought to the case presentation. This is the most important piece of information the student can bring to the presentation. Make sure that the casts are clean, free of defects and bubbles and properly trimmed and mounted.

Survey and Design

Whenever a removable partial denture is treatment planned, there must be an image of the proposed survey and design in the presentation. This is evidence of the student's ability to properly design a cast RPD and provide the faculty an opportunity to review the design. An alternative to including it in the presentation would be to properly draw the design on the initial casts, using all the appropriate symbols and colors. Also, any diagnostic wax-up should be photographed and included in the presentation.

Preparation for the Presentation

- Dress professionally on the day of the presentation.
- Possess a good working knowledge of how to use a PowerPoint program. Know how to go back and forth through the program because after you present, the faculty will ask you to go to a certain slide and you will need to find it quickly.
- Make eye contact with the audience; speak slowly and loud enough for everyone to hear.
- Point to images on the large screen by using the laser pointer we will have available for you
- Practice the presentation several times to be familiar with the contents of each slide.
- Use correct dental terminology when presenting your case and during the questions and answers. (Do not use terms such as fillings, cavities, gums, nerve of a tooth.) Describe the location by using mesial, distal, lingual, buccal, maxillary or mandibular arch. Always remember that when you speak to professional colleagues, you use dental terminology. When you speak to patients, use commonly used dental terms such as fillings, gums, nerve of a tooth, etc.
- Time the presentation to be no longer than 20 minutes in order to allow 10 minutes for questions and answers.
- Check each slide to be sure that you have spelled every word correctly. Also, check to make sure you have the right tooth numbers listed in the treatment plan. For example, if a tooth is marked to be extracted, make sure you have the right tooth number on the slide.
- Check to make sure the pictures you took of a particular quadrant or sextant are not inverted in the powerpoint. For example, a picture of the lower left should not be placed in the upper right slide in the powerpoint template.
- Radiographs must be clear enough to be easily read on a powerpoint. If there is any doubt, do not include them in the presentation. Rather, bring a duplicate set to the presentation for the faculty to view.

Remember, the Case Presentation gives you an opportunity to demonstrate how well you have been able to integrate patient information into a well thought out and cohesive plan. Take the time to do your very best on this project. In the process, you will learn a great deal from your preceptor and from working with your patient. This is an opportunity for you to think critically

about selecting the best possible treatment for your patient and providing the most appropriate patient care.

Format for Presentation of Cases

- 1) Patient description with chief complaint.
Example: A 22 year-old male presented to the clinic with a chief complaint of:
A 22 year-old female was referred to the clinic for examination and treatment of:
- 2) General Medical History
- 3) Examination
 - Clinical; extraoral and intraoral
 - Diagnostic Tests
 - Radiographic Findings
- 4) Preliminary Diagnosis
 - Pulpal
 - Periradicular
- 5) Treatment Plan
- 6) Treatment Performed
 - General Procedures
 - Special Procedures and Techniques
- 7) Patient's Tolerance of Procedures
- 8) Definitive Diagnosis
- 9) Recommendation for Restoration
- 10) Prognosis
- 11) Recall Examination
 - Time Frame
 - Patient's History Since Treatment
 - Clinical Exam
 - Radiographic Exam
- 12) Recommendation for Disposition of Patient

EN 910, 911, 912 Clinical Endodontics

Course Instructor:	Dr. Ralph Hawkins
Office Hours:	Sunday – Thursday 9:00 am to 4:00 pm
Credit Hours:	12 credits, 1st, 2nd, 3rd, 4th semester 16 credits, 5th and 6th semester.
Prerequisites:	DMD or equivalent
Co-requisites:	None

Course Description: Clinical management of non-surgical and surgical endodontic cases. Special attention to development of diagnostic skills and clinical endodontic proficiency and to the application of a therapeutic approach formed in conjunction with other dental specialties.

This course is the foundation of clinical practice where the students apply their knowledge and skills to treating patients.

Intended Learning Outcomes: The graduating student will be proficient in:

- Discussing and identifying the pathophysiology of endodontic disease
- Diagnosing endodontic pathology using proper diagnostic tools
- Performing non-surgical and surgical endodontic therapy
- Managing endodontic emergencies including facial space infections and traumatic injuries to teeth
- Evaluation of endodontic success
- Identifying the relationship between oral and systemic disease.
- Coordinating endodontic therapy with other dental specialties

Course Topics and Content: This is the clinical portion of the endodontic program. Students are assigned patients for endodontic consultation, diagnosis and treatment. The Program Coordinator is responsible for patient assignment.

Assignments: Students are required to follow proper clinical protocols during the practice of Endodontics. The student is expected to be prepared and on time for treating the Dental Health Center patients. Patients are assigned to each student on a daily basis. Patient coordinators perform the booking and manage patients' payments. The student is expected to review the medical history, the dental history, the chief complaint and perform the extra-oral and intra-oral testing. A diagnosis, treatment and prognosis sequence is then formulated and reviewed with faculty to obtain a start for the procedure. Informed consent is explained and signed, treatment plan and financial implications are reviewed with the patient before starting the procedure. The student starts the procedure and seeks the faculty's assistance and advice at different steps. At the

end of each procedure the student records the treatment notes and logs the patient's name, record number and the procedure performed on his or her Clinical Cases Log Book.

Methods of Student Evaluation:

The student receives faculty feedback in 3 different manners:

- immediately; either during the procedure or at the end of it
- monthly, when the faculty reviews the Clinical Cases Log Book with the student and discusses the cases and the student progress over the past month
- quarterly; using the online student evaluation and performance system, where the program coordinator meets with the student and review their overall performance and progress during the past 3 months.

A final grade for each year will be submitted.

This course uses the competency based evaluation method.

Teaching and Learning Methodologies: Mentored clinical patient care

Course Text, Recommended Reading, Material, and Resources: Students will be provided adequate assigned clinic time and assistance to treat their assigned patients.

EN 991, 992, 993 Research: Endodontics

Course Instructor: Dr. Ralph Hawkins / Faculty

Office Hours: Sunday – Thursday 9:00 am to 4:00 pm

Credit Hours: 6 Credits, 1st, 2nd, 3rd, 4th semester;
8 Credits 5th and 6th semester.

Prerequisites: DMD or equivalent

Co-requisites: Courses as assigned by the research advisor

Course Description: Research in endodontics and related fields designed as a partial requirement for the MSD. Selected preceptor.

Intended Learning Outcomes:

1. Students will learn the background literature needed to understand their research project.
2. Students will learn the techniques needed to carry out the project.
3. Data from the project will be discussed and evaluated in relationship to controls and related results published from other laboratories on an ongoing basis.
4. Data from the project will be organized and interpreted with the student so that an overall thesis is generated, written and defended.

A thesis will be written by the student that provides the background information, results, data and discussion of the data before graduating.

Course Topics and Content: This course involves carrying out a research project or field project under the supervision of a research advisor. Research is generally related to the student's field of specialty education and may involve clinical research or public health research.

Assignments and Due Dates: There are no specific assignments. However it is generally expected that the student will have developed a research topic and done a literature review by the end of the first year, made substantial progress on the research by the end of the second year and have written and defended a thesis by April of the third year.

Methods and Dates of Student Evaluations: The student will meet with the research advisor on a regular basis to seek guidance and to review progress. The advisor will submit a grade annually based on student progress and comprehension of the material.

Teaching and Learning Methodologies: The accomplishment of a research project is highly individualized and methods will vary. Research seminars and periodic meetings with the research advisor will be a part of the learning process.