Course Description:

This course is designed to teach basic non-surgical endodontic procedures (access, biomechanical preparation and obturation) on extracted human teeth.

I. General Information

Course Director:

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Course Credits: 2  
Semester: Spring

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Support Staff

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Administrator

II. Course Goals

This preclinical course in nonsurgical endodontic therapy is designed to teach basic endodontic procedures on extracted human teeth. The primary goal is to provide simulation, in
so far as possible, of the clinical conditions under which this endodontic therapy is accomplished. The simulation is provided by performing endodontic procedures on a dental simulator, utilizing natural teeth mounted in a manikin.

III. Course Overview

DEN6432C is a case-based course and will introduce the student-dentist to simulations of clinical cases routinely encountered in the endodontic clinic. The students will be expected to apply the knowledge obtained from previous (DEN6430) and current endodontic courses to assess the pulpal and periapical status, determine treatment plan, and perform endodontic therapy on natural teeth mounted in a manikin.

At the end of the course, the student should be able to:

1- Be familiar with the scope of endodontics,

2- Identify endodontic instruments, equipment, and materials used in root canal therapy,

3- Correctly utilize the endodontic armamentaria to perform root canal therapy,

4- Practice infection control methods in endodontics,

5- Explain the importance of the root canal anatomy and its influence in the outcome of endodontic therapy,

6- Describe how the endodontic biological principles can be applied during the different steps of the root canal therapy,

7- Perform endodontic therapy following the prescribed sequences,

8- Record essential treatment data,

9- Discuss the importance of the root canal obturation and coronal seal after completion of the endodontic therapy, and

10- Assess evaluate endodontic treatment outcome.

IV. Course Outline

Part I. Introduction
1. “Answering essential endodontic questions” (Turning Point Clickers required)
   - Review of topics covered in DEN6430. The students should be familiar with all major topics taught in previous endodontic courses. This will provide the foundation knowledge necessary to enable students to perform endodontic therapy

2. Endodontic Armamentaria
   - Instruments in the endodontic kit will be presented along with supplemental endodontic equipment
   - Operatory management orientation

Part II. Preparation for endodontic therapy

1. Knowledge of tooth morphology
   - Coronal and radicular internal canal morphology (including variations)
   - Influences of trauma, aging, caries, restorations on pulpal morphology
   - Carious removal and assessment of remaining tooth structure prior to endodontic therapy

2. Assessment of tooth restorability

3. Rubber dam isolation

Part III. Endodontic Treatment

1. Access Opening
   - Relationship between crown and pulp morphology
   - Adequate outline forms
   - Straight line access to the root canal system

2. Cleaning and shaping
   - Crown-down approach
   - Working length determination
   - Taper and apical preparation
   - Irrigation and lubricating materials

3. Obturation
   - Fitting the gutta-percha points
   - Root canal sealers
   - Thermoplasticized obturation technique
   - Cleaning the pulp chamber after obturation
   - Coronal seal
   - Radiographic and clinical records of endodontic procedures
Part IV. Restoration of endodontically treated teeth

1. Removal of gutta-percha
   - Chamber retained restorations and post space
   - Criteria for optimum preparation of post space
   - Technique, sequence, and instrumentation for post space preparation

2. Rationale for utilization of post and core

Other Activities

1. Case based Study - Issues in Endodontics
2. Introduction to the endodontic clinic
   a. Distribution and discussion of clinical competencies
   b. Methods of obtaining, registering, and discharging patients for endodontic therapy
   c. Endodontic records

V. Course Material

1. Required Text:


2. The following materials will be available on Canvas:
   - PDF of PowerPoint presentations
   - Supplemental reading when indicated
   - Mediasite Classroom video

3. Endodontic Laboratory Manual

4. Dentoform

   The dentoform should be mounted as instructed in DEN6430 and this syllabus (see Pretreatment Radiograph Mounting under Documents folder). You **MUST** have your dentoform and all preoperative radiographs approved by a faculty member at the first laboratory session. The list below provides the *minimum* number of natural teeth you should have in your dentoform in order to be able to perform the exercises scheduled for this course:
Natural teeth

- One maxillary central incisor (#9)
- One maxillary lateral incisor (#10 - can be substituted by another #9)
- One maxillary canine (#6 or #11)
- Two maxillary first premolars with two roots and two canals (#5 and #12)
- Two maxillary molars (#3 and #14)
- Two mandibular central or lateral incisors
- One mandibular premolar (#20 or 29)
- Two mandibular molars (#19 and #30)

This syllabus is offered as a clinical aid to the student-dentist. The techniques presented emphasize adherence to the basic principles of endodontics.

5. Materials that you will have to furnish each session

1. Electrical Handpieces
2. Rubber dam punch and forceps

Additional Resource:
Dental Lib Guide: [http://guides.uflib.ufl.edu/dental](http://guides.uflib.ufl.edu/dental)

VI. Course Objectives

Course instruction will be accomplished through lectures, video self-instruction, case based study, and preclinical psychomotor skill development.

Part I - Introduction

1. Answering essential endodontic questions
   a. Review topics previously taught during DEN6430.

2. Endodontic armamentaria
   a. Identify and describe the functions of the instruments contained in the basic endodontic pack.
   b. Identify and describe the functions of the supplementary armamentaria (medicaments, filling materials, etc.).
   c. Describe and demonstrate the correct arrangement of the instruments, materials, and equipment employed in nonsurgical endodontic therapy to preserve each of three operating fields: sterile, surgically clean, clean.
d. Demonstrate the correct use of instruments, equipment, and materials used in nonsurgical endodontic therapy.

Part II - Preparation for endodontic therapy

a. Assess pulp and periapical status based on case simulations
b. Describe the coronal and radicular canal morphology
c. Assess tooth restorability after carious tissue removal
d. Describe different rubber dam isolation techniques prior to endodontic treatment

Part III - Endodontic treatment

Access Opening Preparations

Morphology of the teeth and pulp: Access to pulp cavities

1. Describe in detail the pulp cavity of any tooth and indicate how this influences the access preparation.
2. Describe the common and frequently encountered variations in pulp cavities and indicate what modifications in the access preparation are necessary to accommodate the variations.
3. Be able to identify, describe, and demonstrate the changes in the normal pulp cavity caused by trauma, aging, caries, restorations and systemic conditions, and indicate how these changes influence access and instrumentation.

Rubber dam isolation for endodontics

1. Demonstrate proper clamp selection, rubber dam isolation, and disinfection of the field on selected anterior and posterior teeth.
2. Describe the purposes of rubber dam isolation.
3. Describe the criteria for ideal access preparation in any tooth.
4. Describe the clinical consequences of improper access.
5. List the armamentaria needed for access preparations and explain the major function of the individual components.
6. Demonstrate achievement of acceptable access on selected anterior and posterior teeth.
7. Describe and demonstrate the procedure and instruments used for access preparation. Explain the importance of establishing an access form that is continuous and smooth from the cavosurface margin to the canal orifice.
8. Demonstrate the correction of access errors.

Cleaning and Shaping of the Root Canal(s) of a Selected Teeth in a Natural Tooth Dentoform Objectives:

1. Describe the anatomical determinants of "working length."
2. Describe the clinical cues for establishing the "working length."
3. Describe and demonstrate the correct placement of the silicone marker on the file.
4. List the criteria for identifying and locating appropriate reference point(s) for the selected teeth.

1. Establish the "working length" of the root canal(s) of selected teeth.
2. Describe and demonstrate the cleaning and shaping of the root canal(s), including: pulp extirpation, apical preparation, flared (backfilled) preparation, and utilization of irrigation and other instrumentation aids.
3. Describe and/or demonstrate how each of the following instruments are properly used when instrumenting a root canal: hand and rotary instruments (stainless steel and nickel titanium)
4. Describe the undesirable consequences of not establishing and maintaining the correct "working length."
5. Define and describe the importance of an "apical stop."
6. Describe the "flaring" procedure.
7. Describe and demonstrate the procedures for placing a curve in a stainless steel file which is used in instrumenting a curved canal.
8. Describe and demonstrate the criteria for an acceptable, completed root canal preparation.
9. Describe what is meant by using a root canal file with a filing action; with a reaming action, with a circumferential filing action, and with a continuous rotation action.
10. Describe the major function of and demonstrate the procedure for use of:
   a). sodium hypochlorite
   b). RC prep
11. Demonstrate and state Clark's Rule and describe how multiple radiographic horizontal angles are used to delineate specific canals.
12. Describe and demonstrate the proper method of placing a temporary restoration between appointments.

13. Maintain the proper radiographic and clinical records to document the endodontic treatment procedures.

14. Demonstrate correction of the instrumentation errors on a natural tooth dentoform.

**Obturation and Gutta-Percha Removal Objectives:**

**Filling the root canal(s) selected teeth**

1. List the ideal properties of the root canal filling material.
2. Describe why gutta-percha is the root canal filling material of choice.
3. List the criteria for adequate master cone adaptation.
4. Given a properly prepared root canal with correct "working length" and size of instrumentation, adapt a master gutta-percha cone.
5. Give probable cause and remedy for inadequate cone adaptations when supplied with the following:
   - Working length
   - Gutta-percha cone length
   - Size of cone and size of instrumentation
   - Description of radiographic appearance

6. Describe and demonstrate the methods of cone alteration to facilitate correct adaptation.
7. Briefly describe the purpose of using a sealer in filling a root canal.
8. Describe the standard consistency for a prepared mix of root canal sealer.
9. Demonstrate preparation of the root canal sealer to a standard consistency.
10. Describe the undesirable effects of moisture and temperature on the root canal sealer.
11. Describe and demonstrate the proper method of introducing sealer into the root canals and application on the gutta-percha cones.
12. Describe and demonstrate the proper methods of sterilizing gutta-percha cones.
13. Describe and demonstrate the optimum coronal termination of the root canal filling.
14. Fill the root canals of the selected teeth.
15. Provide proper radiographic documentation of the completed dentoform projects.

**Part IV – Restoration of endodontically treated teeth**

**Gutta-percha removal for restoration of endodontically-treated teeth**

1. List the common errors made during gutta-percha removal and describe their potentially undesirable consequences.
2. Describe and demonstrate the use of heated pluggers to properly remove gutta-percha from endodontically treated teeth.

3. Describe the restoration(s) of choice for endodontically treated teeth with minimal, moderate, and severe coronal breakdown.

4. Describe and demonstrate gutta-percha removal for a chamber-retained composite restoration for an anterior tooth.

5. Describe and demonstrate gutta-percha removal for a chamber-retained amalgam restoration for a posterior tooth.

6. State the rationale for using a post and core plus a crown for the restoration of certain endodontically treated teeth.

7. State the criteria for optimum post space.

8. Describe and demonstrate the technique for post space preparation in an endodontically treated maxillary anterior tooth.

WRITTEN EXAM: Demonstrate your familiarity with the didactic material presented in this course by successfully completing the final EXAM at a passing level.

CLINICAL PSYCHOMOTORS

Demonstrate your clinical skill and judgement by successfully completing nonsurgical endodontic therapy at a passing level on selected plastic teeth (#8 and #14).

VII. Course Competencies

This course teaches the following competencies in the "Competencies for the New Dental Graduate".

Domain I: Critical Thinking
Apply biomedical science knowledge in the delivery of patient care.

Domain II: Professionalism
Legal Standards: Apply legal and regulatory concepts related to the provision and/or support of oral health care services.

Domain VI: Patient Care
1. Assessment, Diagnosis, and Treatment
Patient Assessment, Diagnosis, Treatment Planning and Informed Consent: Provide oral health care within the scope of general dentistry to include patient assessment, diagnosis, comprehensive treatment planning, prognosis, and informed consent.

2. Establishment and Maintenance of Oral Health
   ● Assessment of Treatment Outcomes: Provide oral health care within the scope of general dentistry to evaluate the outcomes of treatment, recall strategies and prognosis.
• Patient Management: Provide oral health care within the scope of general dentistry to patients in all stages of life.
• Emergency Treatment: Provide oral health care within the scope of general dentistry to include dental emergencies.
• Provide oral health care within the scope of general dentistry to include local anesthesia and pain and anxiety control, including consideration of the impact of prescribing practices and substance use disorder.
• Provide oral health care within the scope of general dentistry to include pulpal therapies.

VIII. Evaluation

Didactic Component:

Evaluation of this component consists of five written quizzes (20% of the grade) and a final exam (30% of the grade). The quizzes and final exam will be taken with CANVAS.

A grade of C (72%) on the written exam is the minimum satisfactory performance. A student will be permitted only ONE retake of the written exam and no retakes will be offered on the quizzes. If a student fails the written exam, after successfully achieving the minimum passing score (retake exam), the original grade will be used in computing the final course grade. If a student is unsuccessful on the retake examination, an E grade will be recorded on the transcript. Automatically, the student will be re-enrolled when the course is next offered.

Psychomotor Component:

Two psychomotor exercises (averaged) represent 50% of this course’s grade. The student must demonstrate a thorough understanding of the principles involved and be able to perform the procedures with little or no help from the faculty to pass the psychomotor exercises. A grade of C (2.0 or 72%) must be achieved ultimately in the final evaluation for each of the steps of the psychomotor exercises. A grade of E (< 2.0) will make it necessary for the student to perform the procedure again. After successfully performing the prescribed exercise again (achieving a grade of 2.0 or above) the grade will be recorded as a 2.0, and this will be used in the final grade tabulations. If any step is not successfully completed, the student will be required to re-enroll in the course. Since these procedures are repetitions of previous, non-graded exercises, failure to achieve the minimum passing grade will affect the student’s overall evaluation.

It is expected that there will be individual student differences in levels of accomplishment; therefore, a grading scale is employed. The final evaluation of the psychomotor exercises must average C (2.0) to constitute a passing performance. Four or more cumulative repetitions will warrant a final grade of E (< 2.0) and necessitate the student's retaking the entire course. A retaken written exam will count towards the cumulative repetitions.
Psychomotor skills appropriately incorporate some opportunity for repetition of the procedures without penalty. The initial practical exercises in this course are non-graded experiences, but definitive verbal and written critiques will be an integral part of the process. Individualized exercise repetitions will be prescribed as needed. Assessment of psychomotor skills will be determined by student performances on the psychomotor graded exercises.

**Factors considered when grading psychomotor exercises**

* A detailed description will be provided in your clinical manual. (Hard copy provided and contained in Documents.)*

**Access Openings** - the incorrect access form (outline) and position, under- or overextensions, changes in treatment plan due to overextensions, failure to identify canals and/or unroof the pulp chamber (pulp horns), presence of gouges, achievement of straight-line access, finishing errors (rough walls), and perforations. The point deductions associated with these errors depend on their severity. For instance, while a moderately overextended or underextended access opening may result in a deduction of 0.50 to 0.75 point in your grade, a grossly overextended or severely gouged access may require immediate remediation. Your instructor has been calibrated to grade you according to the severity of the error. However, remediation will be immediately required if one or more of the following errors are observed:

1. Change in restorative treatment plan due to overextension or gouges
2. Failure to remove the pulp horn
3. Failure to completely unroof the pulp chamber
4. Failure to identify canal(s)
5. Perforate the tooth while performing access opening

**Cleaning and shaping** – the adequacy of the preparation flare (taper), presence of an apical stop, size of the apical preparation (overprepared x underprepared canal), length of preparation (based on radiographic assessment), and cleaning and shaping procedure errors, such as: presence of blockages, canal transportation, ledges, and perforation will be taken into consideration. The deductions will vary according to the error(s) severity. Remediation is required if one or more of the following errors are observed:

1. Failure to identify canal
2. MAF extends past the working length with light apical pressure
3. Severe over- or under instrumentation
4. Loss of more than 2.0mm in root canal working length due to canal blockage or transportation
5. Perforation of the root surface
**Obturation** – the length of obturation (underfilled, flush, overfilled or overextended obturations), the presence of sealer overextensions, density (presence of voids in the obturation mass), GP burned out, pulp chamber cleanliness after obturation, level of GP at the level of CEJ, the presence of temporary restoration (whenever required). As above, remediation is required if one or more of the following errors are observed:

1. The obturation is 2.0mm (or more) past (overfilled) of the apex.
2. The obturation is 2.0mm (or more) short (underfilled) of the apex.
3. Presence of apical void or large voids throughout the obturation
4. Obturation is overextended (material goes beyond the apex and there is no apical seal)
5. Density is inadequate throughout the length of the obturation mass.

**Final psychomotor grades**

The grades for the SimLab exercises vary from 1 (one) to 4 (four). After the completion of the psychomotor exercises, your scores will be averaged and converted using the scale below to obtain the **practical (psychomotor) grade**, which combined represents 50% of your final grade.

The following grading scale will be used:

4 Excellent: Superior quality
3 Acceptable: Satisfactory quality
2 Substandard: Below acceptable quality, but is correctable to at least satisfactory standard.
1 Unacceptable: Inadequate quality, but is not correctable and may require a change of treatment

**Final Evaluation**: The final evaluation will be based on the following:

- Written Quizzes 20%
- Final Written Exam 30%
- Psychomotor 1 & 2 (averaged) 50%

The student must have 72% or higher on each of the written and psychomotor assessments.

Honorlock will proctor your exams this semester. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You DO NOT need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, and a stable Internet connection.
To get started, you will need Google Chrome and to download the Honorlock Chrome Extension. You can download the extension at www.honorlock.com/extension/install.

When you are ready to test, log into the LMS, go to your course, and click on your exam. Clicking Launch Proctoring will begin the Honorlock authentication process, where you will take a picture of yourself, show your ID, and complete a scan of your room. Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it's on a secondary device. Good luck! Honorlock support is available 24/7/365. If you encounter any issues, you may contact us by live chat, phone (844-243-2500), and/or email (support@honorlock.com. If you encounter issues within the LMS, you may contact Your School's Online Support Services team at their number.

Remediation:

**IMPORTANT NOTE:** Since there will be allowed retake of the written exam and repetitions of the simulated exercises, this course **does not offer remediation.** Students who fail to achieve the minimum passing grade (2.0 or above) in the written exams or psychomotor exercises will receive a grade of E, will be required to re-enroll the course, and will be sent to the SPEC.

IX. Administrative Practices

Administrative practices for all UFCD courses are universally applied. Exceptions to or deviations from these practices are stated in the individual syllabi by the course director. When not individually stated in the syllabus, course administrative practices default to those identified under "Course Policies" on the DMD Student Website:

https://dental.ufl.edu/education/dmd-program/course-policies/

X. Grade Scale

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