

SYLLABUS

COURSE: DENF 3671 Biomaterials III: Applications to Clinical Dentistry
SEMESTER: Fall
CREDIT HOUR: 0.5

REVISED: 2006
REPRINTED: 2009

COURSE DIRECTOR: Joe C. Ontiveros, D.D.S., M.S.

GOAL

This course will acquaint the student with the properties of bleaching agents, various types of dental adhesives, laboratory composites, dental cements, and color principles in dentistry. Additionally, the course will provide an opportunity for clinical problem-solving relating to the properties and materials introduced. Special emphasis will be placed on the biomaterials currently used in a dental practice. With rapid development in technology, the practicing dentist must have a working knowledge of the fundamental physical and mechanical properties of these materials to meet the challenges of modern dentistry. Also, the practitioner must understand the techniques required to control these properties in order to obtain optimal clinical results and to communicate more effectively with dental laboratory technicians. The information presented in this course will help provide the student with both a sound basis of knowledge and problem-solving skills that will aid in making appropriate selections of materials for each patient's unique needs.

OBJECTIVES

I. VITAL TOOTH BLEACHING

1. Describe the mechanism of staining in.
 - 1.1 tetracycline
 - 1.2 fluorosis
 - 1.3 trauma
 - 1.4 white spot lesions/amalgams
2. Describe the bleaching agents used and list the advantages of:
 - 2.1 in office vital bleaching
 - 2.2 home bleaching of vital teeth
3. Review the steps in tray fabrication for home bleaching.
4. Review the indications and limitations of home bleaching.
5. List side effects and list contraindications of home bleaching.
6. Describe the sequencing of bleaching in treatment planning.
7. List possible reasons why resorption occurs with nonvital bleaching.

II. DENTAL ADHESIVES

1. Become familiar with the dental adhesives used in the UTDB clinics.
2. Compare and contrast the composition of enamel and dentin and how that relates to adhesion.
3. Understand the nomenclature for adhesives by generation versus labeling by components or mechanism of action.
4. Identify methods for investigating the quality of adhesives invivo and invitro .along with the advantages and disadvantages of each.
5. Identify variables which can be controlled by the clinician that can have a deleterious effect on adhesive performance
6. List the advantages and disadvantages of self etching adhesives.
7. Understand the phenomena of Water Tree formation and how it relates to adhesive durability.
8. List examples of specific incompatibilities associated with certain dental adhesives.
9. Read article: "A Critical Review of the Durability of Adhesion to Tooth Tissue: Methods and Results", Demunk, .et.al (Blackboard posting)

III. OPTICAL PROPERTIES OF DENTAL MATERIALS

1. Define color.
2. List five types of light sources.
3. Describe characteristics of light sources.
4. Describe what happens when the light strikes an object surface.
5. Describe the mechanism of visual perception.
6. List two nerve endings of retina and describe their role in visual perception.
7. Identify color deficiency and types of color vision tests.
8. Identify primary and secondary colors.
9. Define color dimensions and ΔE^* .
10. Describe Munsell system.
11. Discuss optical properties of dental materials:
 - 11.1 dental ceramics
 - 11.2 resin composites
 - 11.3 denture base materials
 - 11.3 tooth bleaching materials
 - 11.4 glass ionomer and hybrid ionomer restorative materials
 - 11.5 maxillofacial prosthetic materials
 - 11.6 pediatric dentistry materials
 - 11.7 interim dental materials

IV. COLOR MATCHING

1. List inadequacies of commercial shade guides.
2. List possible dentist-related sources of error in shade matching.
3. Define standard light source for dentistry.
4. Describe characteristics of desirable light source.
5. Identify the recommended time for visual shade matching.
6. Describe dentist's position and distance during shade matching.
7. Describe the alternative shade tab arrangement method.
8. Describe shade tab position during shade matching.
9. Identify the length of single shade comparison.
10. Describe the ideal background for visual shade matching.

11. Identify the way of neutralizing the differences in surface texture between shade tab and natural tooth.
12. List principles of custom staining

V. INDIRECT COMPOSITE RESTORATIVE SYSTEMS

1. State the advantages and disadvantages of indirect composite restorations as compared to direct composite restorations.
2. State how an indirect composite material differs from a direct composite material.
3. List the critical properties of an indirect composite material.
4. Discuss the contraindications of an indirect composite restoration.
5. List some of the new fiber-reinforced indirect composite products available and describe their indications/contraindications.

VI. ESTHETIC AND ADHESIVE RESIN CEMENTS

1. Describe the indications, composition, and properties of esthetic resin cements.
2. Explain the difference in composition, indication, and technique between light- and dual-cured resin cements.
3. Explain the advantages and disadvantages of dual-cured resin cements.
4. Compare the properties of light-cured versus dual-cured cements, such as color stability and bond to tooth structure and other dental materials.
5. Describe silane and its importance in bonding ceramic to resin.
6. Define resin cement try-in pastes and describe their indication and possible shortcomings.
7. Describe the cementation procedure for bonding all-ceramic or laboratory-processed composite restorations using resin cements.
8. Describe the differences between adhesive and esthetic resin cements.
9. Describe the indications for using adhesive resin cements.

VI. DENTAL CURING LIGHTS

1. Compare the advantages and disadvantages of QTH, PAC, Argon laser versus LED curing lights.
2. List variables which effect spectral output of curing lights.
3. Discuss the issues related to the maintenance of dental curing lights.
4. Identify materials which are incompatible with some curing lights and explain why.
5. Discuss the relationship that exists between adequate polymerization and type, shade, thickness and opacity of dental materials.

RESOURCES

I. Media Resources

A. Required textbook

Craig, R. G., ed.

Restorative Dental Materials, 12th ed.

Mosby, Elsevier Inc., 2006

Bleaching, Handout and Lecture material

Adhesives, Chapter 10, pp. 221-226

Composite Restorative Materials, Chapter 9,

Laboratory Composites p. 204

Light Curing pp. 205-207

Optical, Thermal, and Electrical Properties (Optical only) pp 28-33

Esthetic and Adhesive Resin Cements, Chapter 20, pp 491-497

B. Supplemental textbook (UTDB Library)

Paravina, R., Powers, J

Esthetic Color Training in Dentistry, 1st ed

Mosby, Elsevier Inc., 2005

Optical Properties. pp 69-109

Color Matching, pp. 139-172

C. Handouts with lectures and Blackboard.

II. Human Resources

Joe C. Ontiveros, D.D.S., M.S.

Phone: 713-500-4482; Room 480

Email: Joe.C.Ontiveros@uth.tmc.edu

Rade Paravina, D.D.S., M.S., Ph.D.

Phone: 713-500-4477, Room 479

Email: Rade.Paravina@uth.tmc.edu

Gary Frey, D.D.S.

Phone: 713-500-4475; Room 493

Gary.N.Frey@uth.tmc.edu

STUDY PLAN AND REQUIREMENTS

The following study plan for this course is recommended:

1. Read the assignments in the required textbook before attending each lecture. The reading assignments are listed in the schedule below.
2. Please review schedule carefully; the material contained in this course is updated yearly. Because of the rapidly changing nature of the materials and procedures covered in the course, it is strongly advised to attend all lectures to obtain the most updated information. Slides of new products and clinical techniques will aid in your understanding of these new materials and procedures.

DENF 3671 BIOMATERIALS III: APPLICATIONS TO CLINICAL DENTISTRY 2009 Fall Semester Schedule

Friday, 9-9:50 am; Room 132

DATE	LECTURE / READING ASSIGNMENTS	PRESENTERS
Aug 21	Vital Tooth Bleaching <i>Read Chapter 16, pp. 479-491; Handout</i>	Ontiveros
Aug 28	Dental Adhesives <i>Read Chapter 18, pp. 551-574, Chapter 19, pp. 576-592; Handout</i>	Ontiveros
Sep 4	Optical Properties of Dental Materials <i>Read Chapter 3, pp. 38-43; Handout</i>	Paravina
Sep 11	Dental Curing Lights <i>Read Chapter 9, pp. 246-247; Handouts</i>	Ontiveros
Sep 18	Esthetic and Adhesive Resin Cements <i>Handout; material presented in lecture</i>	Ontiveros
Sep 25	Color and Shade Matching Techniques <i>Handout; material presented in lecture</i>	Paravina
Oct 2	Indirect Composite Restorative Systems <i>Handout; Read Chapter 9, p. 247.</i> Course Evaluation	Frey
Oct 9	FINAL EXAMINATION Room 207	Ontiveros

EVALUATION METHODS

Course evaluation will consist of a final examination worth 100% of the course grade. The final examination will consist of approximately 50 multiple-choice/short-answer questions and will cover the objectives, handouts and material presented in lectures. Written material that you will be responsible for will be posted on Blackboard. Attendance is mandatory at all classes.