

**DLT 118**  
**CAST PARTIAL DENTURES**

**COURSE DESCRIPTION:**

Prerequisites: DLT 114

Corequisites: None

This course covers techniques used in fabricating cast removable partial denture frameworks utilizing a chrome-cobalt alloy. Topics include surveying, designing, block-out procedures, pouring refractory casts, waxing, casting, finishing, polishing frameworks, tooth selection, setup, processing, finishing of acrylic, and repair procedures. Upon completion, students should be able to fabricate cast removable partial dentures following the dental prescription. Course Hours Per Week: Class, 3. Lab, 9. Semester Hours Credit, 6.

**LEARNING OUTCOMES:**

The student will:

- a. Practice proper infection control procedures.
- b. Identify and locate anatomical landmarks of the oral cavity.
- c. Interpret dental prescriptions for a Removable Cast Partial Denture.
- d. Define terms associated with cast partial denture frameworks.
- e. Identify materials used in fabricating cast frameworks.
- f. Demonstrate an understanding of cast partial denture design principles.
- g. Survey casts both before and after tripodding.
- h. Identify component parts of cast partial dentures.
- i. Transfer a framework design to the master cast.
- j. Prepare master casts for duplication.
- k. Duplicate master casts by utilizing hydrocolloid and pouring the refractory material.
- l. Prepare refractory casts for framework wax-up.
- m. Form framework patterns utilizing preshaped plastic forms, wax shapes, and free-hand wax forming.
- n. Invest wax patterns for burnout.
- o. Set-up burnout ovens and cast the metal frameworks.
- p. Recover the cast metal frameworks.
- q. Finish and polish the cast metal frameworks.
- r. Seat the cast metal frameworks on their master casts.
- s. Evaluate cast frameworks for proper seating on master cast.
- t. Demonstrate an understanding of occlusion.
- u. Define terms associated with selecting and arranging artificial teeth for removable partial dentures.
- v. Identify materials associated with arranging teeth and processing removable partial dentures.
- w. Fabricate and utilize jaw relationship records for mounting on both the Hanau H2 articulator and the plain line articulator.
- x. Select and skillfully arrange artificial teeth for partial dentures.
- y. Wax-up, flask, and process partial denture bases utilizing both the "holding" and "pulling" of framework techniques.
- z. Finish and polish processed partial dentures.
- aa. Fit the completed partial dentures on their respective master casts.
- bb. Evaluate the finished restoration seated on the master cast.
- cc. Outline the steps necessary for repairing cast partial dentures.
- dd. Fabricate a cast partial denture tooth, flange and clasp repair.

## OUTLINE OF INSTRUCTION:

- I. Diseases that may be contracted in the dental laboratory
  - A. Lecture - review of infection control
    - 1) Presentation
      - (a.) Types of diseases that may be contracted
      - (b.) Various methods that can be taken to reduce the risk of disease
    - 2) Application
  - B. References
    - 1) Infection Control in the Dental Laboratory - R.R. Runnels
    - 2) NADL – Infection Control Program
  
- II. Introduction to removable cast partial dentures
  - A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Anatomical landmarks associated with cast partial dentures
      - (b.) Dental prescription
      - (c.) Definition of a removable partial denture
      - (d.) Purpose of a removable partial denture
      - (e.) Classification of removable partial dentures
      - (f.) Components of the removable partial denture
      - (g.) Surveyor components and how they are used
    - 1) Application
  - B. Laboratory demonstration - one-half hour
    - 1) Use of the surveyor and accessories
    - 2) Surveying techniques
      - (a.) Relating the cast to the surveyor
      - (b.) Purpose for surveying
      - (c.) Parts of a surveyor and accessories
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 160-168
    - 2) Dental Laboratory Technology, AFM, Volume II, pages 138-161
  
- III. Fundamentals for surveying and preparing the master cast for duplication
  - A. Classroom lecture (demonstration) - two hours
    - 1) Presentation
      - (a.) Generating the RPD design
        - (1.) Analyzing the cast
        - (2.) Guides to tilting the cast
        - (3.) Path of insertion
        - (4.) Marking the survey lines
        - (5.) Gauging the desirable undercuts
        - (6.) Tripoding
        - (7.) Designing the framework
      - (b.) Blocking out undesirable undercuts
      - (c.) Ledging
      - (d.) Positioning the sprue cone
    - 2) Application
  - B. Laboratory demonstration included in classroom video demonstration
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 179-191
    - 2) Dental Laboratory Technology, AFM, Volume II, pages 161-201

- IV. Duplicating the master cast and preparing the refractory cast for wax-up of a partial denture framework
  - A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Duplicating the master cast
        - (1.) Soaking the cast
        - (2.) Pouring the hydrocolloid
        - (3.) Pouring the refractory
      - (b.) Preparing the refractory cast for wax-up
    - 2) Application
  - B. Laboratory demonstration - one hour
    - 1) Soaking the cast
    - 2) Pouring the hydrocolloid
    - 3) Pouring the refractory
    - 4) Preparing the refractory cast
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 192-196
    - 2) Ticonium Technique Manual, pages I-6, II and I2
    - 3) Dental Laboratory Technology, AFM, Volume II, pages 201-206
  
- V. Forming the wax pattern for a partial denture framework
  - A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Choosing the right materials
      - (b.) Important considerations
      - (c.) Procedures for forming the wax pattern
    - 2) Application
  - B. Laboratory demonstration - one-half hour
    - 1) Using tacky liquid
    - 2) Accurate placement of plastic patterns
    - 3) Controlling the flow of wax
    - 4) The neat wax-up
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 197-202
    - 2) Ticonium Technique Manual, page I2
    - 3) Dental Laboratory Technology, AFM, Volume II, pages 206-221
  
- VI. Spruing and investing the wax pattern for partial denture frameworks
  - A. Classroom lectures - two hours
    - 1) Presentation
      - (a.) Spruing
        - (1.) Definitions
        - (2.) Purpose for spruing
        - (3.) Rules for spruing
        - (4.) Overjet principle
        - (5.) Advantages of overjet spruing
        - (6.) Determining amount of metal needed for casting
      - (b.) Investing
        - (1.) Debubblizing
        - (2.) The paint-on
        - (3.) Full-flasking
        - (4.) Advantages of double investing
    - 2) Application

- B. Laboratory demonstrations - one hour
  - 1) Proper spruing procedure
  - 2) Investing the pattern
    - (a.) Debubblizing
    - (b.) The paint-on
    - (c.) Full-flasking
    - (d.) Orienting the wax pattern in the flask
    - (e.) Trimming the mold
- C. References
  - 1) Ticonium Technique Manual, pages 13-22
  - 2) Dental Laboratory Technology, AFM, Volume II, pages 221-227

## VII. Burn-out and casting

- A. Classroom lecture - one hour
  - 1) Presentation
    - (a.) Burn-out
      - (1.) Purpose for burn-out
      - (2.) Phases
        - (a) Run-up
        - (b) Heat soak
      - (3.) Time and temperature
      - (4.) Loading the oven
      - (5.) The dater time clock
    - (b.) Casting
      - (1.) The Ticomatic casting machine
      - (2.) Induction casting
      - (3.) Function of parts
      - (4.) Casting procedures
  - 2) Application
- B. Laboratory demonstration - one hour
  - 1) Loading the burn-out oven
  - 2) Setting the Ti-Controller for burn-out
  - 3) Casting procedures
    - (a.) Introducing the Ticomatic casting machine
    - (b.) Loading the ingot
    - (c.) Mounting the flask
    - (d.) Casting procedures
    - (e.) Shut down procedures
  - 4) Casting freed of investment
    - (a.) Shell blaster
    - (b.) Sand blaster
- C. References
  - 1) Ticonium Technique Manual, pages 25-27, 39, 41 and 42
  - 2) Dental Laboratory Technology, AFM, Volume II, pages 227-229

## VIII. Finishing and polishing the cast framework

- A. Classroom lecture - one hour
  - 1) Presentation
    - (a.) Rules for finishing
    - (b.) Finishing procedure
      - (1.) Rough finish
      - (2.) Ti-Lectro polisher

- (c.) Final polish
    - 2) Application
  - B. Laboratory demonstration - one and one-half hours
    - 1) Finishing procedure
      - (a.) Sprue removal
      - (b.) Rough finish
      - (c.) Sand blast
    - 2) Ti-Lectro polisher
    - 3) Final finish
    - 4) Polish
  - C. Reference:
    - 1) Ticonium Technique Manual, pages 51-54
    - 2) Dental Laboratory Technology, AFM, Volume II, pages 229-233
- IX. Seating the cast metal framework
- A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Preserving model accuracy
      - (b.) Adjusting the framework
      - (c.) Verifying proper retention
      - (d.) Identifying prematurities
    - 2) Application
  - B. Laboratory demonstration - one hour
    - 1) Seating the casting to observe the following
      - (a.) Prematurities
      - (b.) Retention
      - (c.) Fit
  - C. Final polishing.
- X. The parts and function of a clasp
- A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Definitions
      - (b.) Clasp classifications
      - (c.) Parts and function
    - 2) Application
  - B. No laboratory demonstration due to nature of lesson
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 166-174
    - 2) Dental Laboratory Technology, AFM, Volume II, pages 140-149
- XI. Fundamentals for designing removable partial dentures
- A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Factors in planning the design
        - (1.) Clinical phase
        - (2.) Laboratory phase
        - (3.) Primary objective
        - (4.) How dislodging forces can be counteracted
        - (5.) Indirect retention
      - (b.) How much undercut for retention
      - (c.) Requirements of a clasp

- (d.) Rules for clasp construction
  - 2) Application
  - B. No laboratory demonstration due to nature of lesson
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 179-181
    - 2) Dental Laboratory Technology, AFM, Volume II, pages 138-194
- XII. Fundamentals of circlet clasps design
- A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Advantages of circlet clasps
      - (b.) Disadvantages of circlet clasps
      - (c.) Types, indications, and structural details
    - 2) Application
  - B. No laboratory demonstrations due to nature of lesson
  - C. Reference: Removable Prosthodontic Techniques, pages 168-172
- XIII. Fundamentals of bar clasp design
- A. One hour classroom lecture
    - 1) Presentation
      - (a.) Advantages of bar clasps
      - (b.) Disadvantages of bar clasps
      - (c.) Types, indications, and structural details
    - 2) Application
  - B. No laboratory demonstration due to nature of lesson
  - C. Reference: Removable Prosthodontic Techniques, pages 172-174
- XIV. Fundamentals for designing major connectors
- A. Classroom lecture - one hour
    - 1) Presentation
      - (a.) Definitions
      - (b.) Requirements for major connectors
      - (c.) Types, indications and structural details
    - 2) Application
  - B. No laboratory demonstration due to nature of lesson
  - C. References
    - 1) Removable Prosthodontic Techniques, pages 175-178
    - 2) Dental Laboratory Technology, AFM, Volume II, pages 140-142, 166, 167
- XV. Partial denture record bases and articulation
- A. One hour lecture
    - 1) Presentation
      - (a.) Jaw relationship records
      - (b.) Record base materials
      - (c.) Articulating partial denture casts.
    - 2) Application
  - B. One hour demonstration
    - (a.) Fabricating jaw relationship records
    - (b.) Articulating partial denture casts
  - C. References
    - 1) Removable Prosthodontic Techniques, page 214-222

- XVI. Tooth selection, tooth arrangement, and denture base wax-up
- A. One hour lecture
    - 1) Presentation
      - (a.) Tooth selection
        - (1.) Anterior
        - (2.) Posterior
        - (3.) Mechanical factors governing selection
        - (4.) Indications
      - (b.) Tooth arrangement
        - (1.) Seating the framework
        - (2.) Fitting the teeth
      - (c.) Denture base wax-up
    - 2) Application
  - B. One hour demonstration
    - 1) Selecting the teeth
    - 2) Fitting the teeth
    - 3) Denture base wax-up
  - C. References
    - 1) Dental Laboratory Technology, AFM, Volume II, pages 234-237
    - 2) Removable Prosthodontic Techniques, pages 223-226
- XVII. Flasking, packing, and processing removable partial dentures
- A. One hour lecture
    - 1) Presentation
      - (a.) "Holding" the framework during flasking
      - (b.) "Pulling" the framework during flasking
      - (c.) Packing the mold
      - (d.) Processing the denture base
      - (e.) Deflasking the denture
    - 2) Application
  - B. One hour demonstration
    - 1) Flasking the denture base wax-up
    - 2) Packing the mold
    - 3) Processing the denture base
    - 4) Deflasking the denture
  - C. References
    - 1) Dental Laboratory Technology, AFM, Volume II, pages 237-238
    - 2) Removable Prosthodontic Techniques, pages 227-231
- XVIII. Deflasking, remounting, and selective grinding the RPD
- A. One-half hour lecture
    - 1) Presentation
      - (a.) Deflasking the RPD
      - (b.) Remounting on the articulator
      - (c.) Selective grinding
    - 2) Application
  - B. One hour demonstration
    - 1) Deflasking
    - 2) Remounting
    - 3) Selective grinding
  - C. References
    - 1) Dental Laboratory Technology, AFM, Volume II, pages 237-238

2) Removable Prosthodontic Techniques, pages 231-232

XIX. Recovering, finishing, polishing, and fitting the RPD to the master cast

A. One hour lecture/demonstration

1) Presentation

(a.) Recovering the RPD

(b.) Finishing and polishing the RPD

(c.) Fitting the denture to the master cast

2) Application

B. References

1) Dental Laboratory Technology, AFM, Volume II, pages 238-239

2) Removable Prosthodontic Techniques, pages 232-233

XX. Repairing cast partial dentures

A. Lecture – one hour

1) Presentation

(a.) Procedures for cast partial denture tooth repairs

(b.) Procedures for cast partial denture flange repairs

(c.) Procedures for cast partial denture clasp replacement

(d.) General considerations for types of cast partial denture repairs.

B. Application

1) Demonstration-one hour

2) Cast partial denture tooth repair

3) Cast partial denture flange repair

4) Cast partial denture clasp repair

C. References

1) Dental Laboratory Technology, AFM, Volume II, pages 247-253

2) Removable Prosthodontic Techniques, Chapter 30, pages 240-243.

### **REQUIRED TEXTBOOKS:**

Sowter. Removable Prosthodontic Techniques. University of North Carolina.

Ticonium Technique Manual. Ticonium Company, Albany, New York.

Dental Laboratory Technology. AFM, Volume I, II, & III, 1991, Department of Air Force, Washington, D.C.

### **SUGGESTED REFERENCES:**

Weinberg. Atlas of Removable Partial Denture Prosthodontics, C.V. Mosby, 1969.

Henderson. McCracken's Removable Partial Prosthodontics, sixth edition, C. V. Mosby, 1981. Rudd.

Removable Partial Dentures. C.V. Mosby, 1981.

Mosby. The Journal of Prosthetic Dentistry

NADL. Journal of Dental Technology

### **STATEMENT FOR STUDENTS WITH DISABILITIES:**

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class.

Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 919-536-7207, ext. 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1209.