CLINCAL MANUAL

College of Dentistry

2020-2021

PRINCESS NOURAH BINT ABUDULRAHMAN UNIVERSITY

Table of Contents:

Introduction

This clinical manual contains the current clinical practice and procedures for all clinical instructors (CI), students and interns of the collage of dentistry at PNU. It is the responsibility of the clinical instructors to guide and help the student to gain and improve their clinical skills. In case of any inquiries please do not hesitate to contact the following:

Head of the CDS Department:

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Head of the Divisions:

- Endodontics: Dr.Rahaf Almohareb: raalmohareb@pnu.edu.sa
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General Rules and Policies:

- The clinic facility is open 9:00 AM to 11:50 AM and 2:00 PM to 4:50 PM for student access.
- Faculty and staff are expected to be **on time** for the clinical sessions to give the approval for the students on the E-file (AxiUm), so the students start their work on time. Any instructor (faculty member or part-time instructor) is expected to notify the Course Director and the clinical coordinator if he/she cannot come to a clinical session and to arrange for substitute.
- All instructors are needed to be available from 11:30 to 11:50 AM and from 4:30 to 4:50 PM to complete student evaluations and approval progress notes on the e-files. All grading and signatures **must be completed before 12:00 PM or 5 PM.**
- CIs need to review the medical history and planned daily treatment for the patient before giving the student a start-check to begin treatment
- CIs will review treatment records and supervise changes in treatment planning needed.
- CIs will supervise and approve completion of treatment in AxiUm. (Procedure codes will be changed from 'P'-planned to either 'C'-completed or 'I' – in progress).
- CIs will review and approve procedure, attendance and SOAP notes completed in AxiUm every clinical session and ensure that student accurately recorded the progress notes.
- CIs will not leave the clinic until all patients have been dismissed.

Clinical Penalties

Competency Exam:

- Competency Dead line: Before March 12th, 2020. After the deadline, the student will be considered FAIL.
- If a student fails the competency exam, the INSTRUCTOR must return the form to the Course director. Course director must contact the head of division and the student. The student must contact the head division to arrange for remediation before taking the next competency exam
- If the students Failed 3 times, she will be considered as FAILURE in the course.

General :

- The students are not allowed to start the treatment procedure before getting approval for all specialty treatment plan except in emergency, otherwise the student will be **DISMISSED** from the clinic and she will get **ZERO** points at the specific clinic.
- Student will be **DISMISSED** from clinic if professionalism, infection control policy and procedures are not followed, she will receive a **CLINICAL WARNING** for the first violation and she will be **SUSPENDED** one clinic for the second violation.
- Student is **NOT allowed to change her clinic** unless she gets a permission from the course director, otherwise she will be **DISMISSED** from the clinic and **SUSPENDED** for one more clinic.
- Student will receive and return your instruments to CSSD by using her barcode; she has to return it 11.30 am for morning sessions and 4.30 pm for afternoon sessions. Any student **return it late, she will receive her instruments in the next session late** and she will get **CLINICAL WARNING** for the first time and then **SUSPENSION** from the clinic.

Infection Control Guideline

1. INTRODUCTION

Why is infection control important in dentistry?

Dental patients and DHCP can be exposed to pathogenic microorganisms including cytomegalovirus (CMV), HBV, HCV, herpes simplex virus types 1 and 2, HIV, Mycobacterium, tuberculosis, staphylococci, streptococci, and other viruses and bacteria that colonize or infect the oral cavity and respiratory tract. These organisms can be transmitted in dental settings.

The following recommended infection control procedures could prevent transmission of infectious organisms among patients and dental health care personnel.

Not all infectious patients can be identified from their medical history or clinical examination therefore, blood, all body fluids, non-intact skin, and mucous membranes of all patients should be treated as potentially infectious and the same infection control procedures used for all patients.

This policy is in accordance with Standard Precautions.

2. Objectives

- REDUCE the number of available pathogenic microbes to a level where the normal resistance mechanisms of the body can prevent infection.
- Break the chain of infection and eliminate cross contamination.
- Treat every patient or instrument as a possible source of infectious disease transmission.
- Protect patients and dental personnel from infection and its consequences.

3. Student Responsibilities

Each student will be responsible for:

- Reading this document, Protocol of Infection Control, and adhering to the guidelines of this document and any subsequent changes.
- Obtaining, documenting, and reviewing a thorough initial medical history of every

patient initially and each treatment visit thereafter.

- Wearing appropriate personal protective equipment (PPE) as outlined in this protocol.
- Properly setting up the treatment area, and for the cleanliness and disinfection of the dental cubicle, unit, chair, cabinets, lights, and other surfaces that may have become contaminated.
- Handling contaminated instruments safely.
- Proper disposal of contaminated disposable sharps and regulated waste.
- Minimizing contamination of the clinical and patient care areas including dispensing areas when wearing gloves and other PPE that have been contaminated with potentially infectious materials, by removing such barriers or by wearing over gloves.

4. Standard precautions

They are a set of infection control strategies to reduce the risk of transmission of infectious disease caused by pathogens through blood and body fluids including saliva, and extended to risk of tuberculosis transmission and other emerging diseases that potentially may be encountered in the dental office.

4.1. ELEMENTS OF STANDARD PRECAUTIONS

A. HAND washing
B. Use of gloves, masks, eye protection, head cover and gowns
C. Patient CARE ITEMS
D. Environmental surfaces
E. Injury

4. 1A- HAND WASHING

Reduces potential pathogens on the hands and is considered the single most critical measure for reducing the risk of transmitting organisms to patients and health care personal (HCP). The preferred method for hand hygiene depends on the type of procedure, the degree of contamination, and the desired persistence of antimicrobial action on the skin (Table 1).

Hand Washing (Step by Step):

- Remove all jewelry from hands and forearms (rings, watches, bracelets).

- Fingernails should be kept short and cleaned regularly.
- Nail polish and artificial fingernails harbor microorganisms and may not be worn.
- Wash hands with cleanser for 3 minutes using anatomic scrub technique.
- End with a cold-water rinse to close the pores.
- Pat hands and wrists dry with paper towels.
- Cuts and sores on hands must always be covered.

Anatomic Scrub Technique (figure 1):

To do the job thoroughly you need to clean these 6 surfaces:

- The palms
- The webs between the fingers
- The webs again with altered grip
- Palms to knuckles of opposing hands
- Thumbs clasped in opposing palm
- Tips of fingers against palm of opposing hand.

Alcohol-Based Hand Rub Technique:

- Hands must be dry and free of visible dirt.
- Do not use if there are cuts or open sores on hands.
- Dispense a sufficient quantity of antiseptic into the palm of one hand.
- Rub hands together for 1 minute to completely wet all surfaces of the hands and fingers.
- Reapply if hands are dry within 10-15 seconds.
- Antiseptic is flammable; avoid contact with open flame or high temperature.

Method	Routine hand wash	Antiseptic hand rub	Surgical antisepsis	Surgical antisepsis
Agent	Water and non-antimicrobial soap (e.g., plain soap)	Water and antimicrobial soap (e.g.,chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan)	Alcohol-based hand rub	Water and antimicrobial soap OR Water and non-antimicrobial soap followed by an alcohol-based surgical hand-scrub
Purpose	Remove soil and transient microorganisms	Remove or destroy transient microorganisms and reduce resident flora	Remove or destroy transient microorganisms and reduce resident flora	Remove or destroy transient microorganisms And reduce resident flora (Persistent effect)
Duration (minimum)	15 seconds	15 seconds	Rub hands until the agent is dry	2–6 minutes Follow manufacturer instructions for surgical hand-scrub product with persistent activity.
Indication	1-Before treating each patient (before glove placement) 2- After treating the patient and glove removal. 3- After barehanded touching of inanimate objects likely to be contaminated by blood or saliva. 4- Before leaving the dental operatory or the dental laboratory. 5- When visibly soiled. 6- Before re-gloving after removing gloves that are torn cut or punctured			Before donning sterile surgeon's gloves for surgical procedures

Table 1. Hand hygiene methods and indications

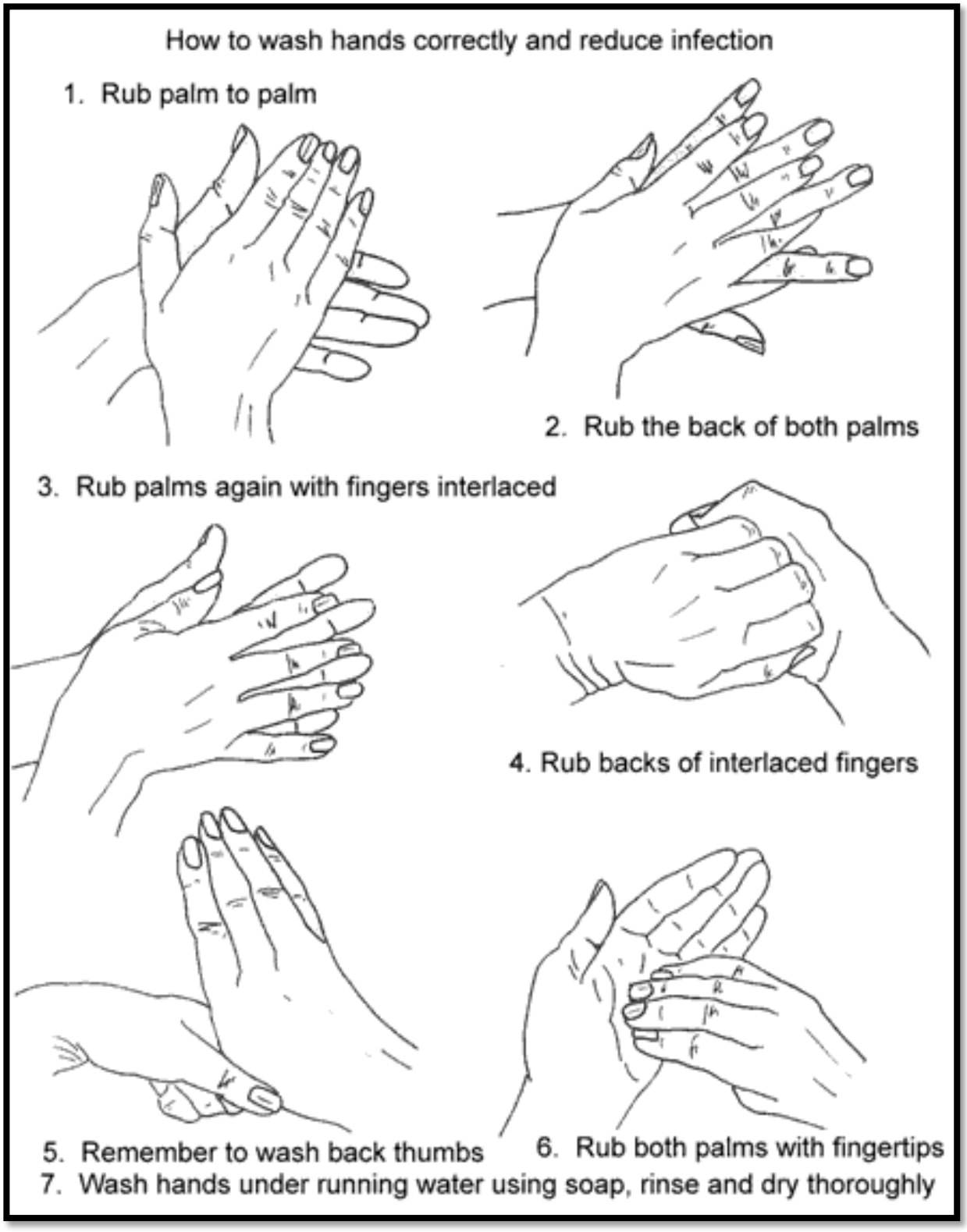

Figure 1. Anatomic scrub technique

4.1B USE OF GLOVES, MASKS, EYE PROTECTION AND GOWNS.

PERSONAL PROTECTION EQUIPMENT (PPE)

Gloves:

- Gloves are worn as a barrier to protect the wearer's hands from contamination or to prevent the transfer of organisms already on the hands.
- Gloves must be used in situations where the health care worker is potentially exposed to blood and/or body substances.
- During any procedure where direct contact is anticipated with a patient's blood/body substances, mucous membranes/non-intact skin.
- While suctioning a patient.
- While handling items or surfaces that have come into contact with blood or body substances.

General Dental Use

Non-sterile gloves are suitable for general dental procedures including exodontia and must be changed and discarded:

- Immediately any damage becomes apparent
- After treatment of the patient is complete
- When there is a risk of cross-contamination from separate procedures on the same patient.

Gloves should never be worn

- When entering data on a computer or write notes.
- In the waiting room/reception area.
- Outside the clinic.
- The common rooms.
- Answering the telephone.

Gloves must be worn for all intra-oral procedures including the taking of radiographs.

Sterile gloves

If the procedure involves contact with tissue that would be sterile under normal circumstances (oral surgery procedures), sterile gloves must be worn.

Masks

Masks are to be worn by clinical staff exposed to blood or saliva aerosols. Change masks regularly (after every patient) and more often if they become wet from talking, coughing, exhalation etc.

The mask should be fitted as per manufacturers' instructions:

- It should not be touched during patient treatment;
- It should be disposed of after use and not reused;
- It should not be worn loosely around the neck or carried in the pocket of gowns or uniforms.

Scrub, Lab Coat, head cover and gown

- Change daily or more often if visibly soiled.
- Remove gowns prior to leaving clinical area.
- Wash soiled scrubs, and lab coats in hot or cold water with detergent.
- Use normal washing and drying cycles.

Protective Eyewear ***(****safety glasses, face shield)*

- Protective eyewear must be worn during clinical procedures, prosthetic adjustments when handling chemicals or performing decontamination /cleaning duties.
- Eyewear must be appropriate side winged or wrap around eye.
- Prescription glasses must have this side protection or be used in conjunction with a face shield.
- After each use, eyewear must be washed with instrument cleaner and dried
- Footwear Closed-in, non-slip flat shoes must be worn at all times when in any clinical or laboratory areas.
- Nails short and clean, cuts and abrasions washed and covered with impermeable bandage, rings and watches are to be removed. Figure 2

The following figures (fig.2, 3, 4, 5, 6) shows how PPE should be worn step by step.

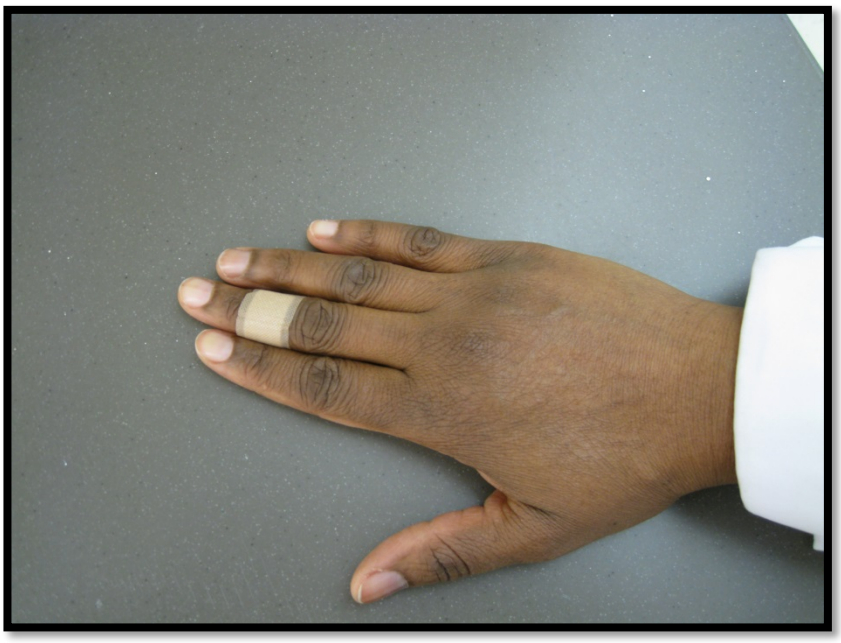

Figure 2. Injured fingers covered with plaster

Figure 3. Gown, head cover and mask adapted to face

Figure 4. Side view of head and face

Figure 5. eye wear (Goggle)

Figure 6. How to wear gloves

Figure 7. Personal protection equipment (PPE)

4.1C PATIENT CARE ITEMS

Instrument cleaning, disinfecting, and sterilization should occur in a designated central processing area (CSSD) to control both quality and personnel safety. Patient care items can be divided into three categories: Critical, semi critical and noncritical.

Table 2. Patient care items

Critical	Semi critical	Noncritical
Penetrates soft tissue, contacts bone, enters into or contacts the bloodstream or other normally sterile tissue.	Contacts mucous membranes or non-intact skin; will not penetrate soft tissue, contact bone, enter into or contact the bloodstream or other normally sterile tissue.	Contacts intact skin.
Examples: **Surgical instruments, periodontal scalers, scalpel blades, surgical dental burs**	Examples: Dental mouth mirror, amalgam condenser, reusable dental impression trays, dental hand pieces.	Examples: Radiograph head/cone, blood pressure cuff, facebow.
Should be sterilized using heat (autoclaved).	Should be sterilized using heat (autoclaved)	Should be Cleaned and disinfected using a low to intermediate level disinfectant.

4. 1D- ENVIRONMENTAL SURFACES

Categories of Environmental Surfaces:

- Clinical contact surfaces: High potential for direct contamination from spray or spatter or by contact with DHCP's gloved hand some examples of clinical contact surfaces, including a light handle, countertop, bracket tray, dental chair, and door handle (Figure 8).

- Housekeeping surface: Areas do not come into contact with patients or devices with limited risk of disease transmission. Examples of housekeeping surfaces are walls, sinks, and floors (Figure 9).

Figure 8. Clinical contact areas

Figure 9. House keeping areas

4.1E INJURY (MANAGEMENT OF NEEDLE STICK AND MUCOUS MEMBRANE EXPOSURES TO BLOOD AND BODY FLUIDS)

It is the responsibility of the exposed individual to report at the earliest opportunity, all puncture wounds and mucosal exposures to blood and body fluids that occur within the Dental Clinic. This is necessary in order for rapid follow–up of the incident and so that decisions may be made for the protection of the exposed individual.

All phases of medical management and counseling should ensure that the confidentiality of the medical data from both the exposed individual and the source is protected.

An Exposure Has Occurred If You Receive a laceration or puncture wound from a needle or sharp instrument contaminated with blood/body fluid or if blood/body fluid splashes into your eyes, non-intact skin, or the mucous membrane of your nose and mouth.

Stop the procedure and apply first aid

- Wash contaminated skin with soap and water.
- Flood eyes with water from Eye Wash Station.
- Flush mucous membranes of nose and mouth with water.
- **See Clinic Director.**
- An assessment of the exposure will be done.

CHECKLIST A

To Assess Exposure for Risk of Infection

(To be completed by Clinic Director or Designate)

Source Material

- Bloody Fluid
- Blood
- Instrument contaminated with one of these substances

No	**Yes**
• No Follow-Up Required	• Complete Accident Report

Type of Exposure

Intact Skin	**Mucous Membrane or Non-Intact Skin volume**	**Percutaneous Exposure**
• No Follow-Up Required		• Severity

Small	**Large**	**Less Severe**	**More Severe**
• Few drops • Short duration	• Several drops • Major Splash • Long Duration > 2 minutes	• Solid Needle • Superficial Scratch	• Large Bore Hollow Needle • Deep Puncture • Needle used in Source Patients artery or vein

Follow-Up

- Assess Source Patient using Checklist B
- Obtain Consent from Source and Provide Counseling Prior to Blood Work
- Arrange for Student/Employee and Source Patient to be Seen at Emergency department.

CHECKLIST B

To assess source patient after exposure

To be completed by clinic director

1- Inform the source patient of the reason for enquiry and allow them time to read information for patient.
2- Evaluate the source patient's risk of blood –borne infection by reviewing their medical history for clinical symptoms and asking them for additional information.

Do you know if you are hepatitis B, hepatitis C, or HIV positive or have any risk factors for exposure to these viruses?

Hepatitis B -----Yes -----No ----------Date diagnosed

Hepatitis C -----Yes -----No ----------Date diagnosed

HIV -----Yes -----No ----------Date diagnosed

Stage of illness ----------

Antiretroviral medication ----------

Risk factor--------Yes ----------No

Risk factor may include:

A. IV drug used/shared needle.
B. Receiving blood products.
C. Partner with hepatitis C.

3- Request source patient's consent to obtain blood for testing of their hepatitis B, C and HIV status.
    - Physician to whom the results should be send
    - DR/----------Telephone number----------
    - Address----------
    - Test result will also be sent to clinic Director College of dentistry.

MEDICAL FOLLOW-UP

The attending physician will direct the following procedures:

1. Medical management of the injury.
2. Testing of the source patient for Hepatitis B surface antigen, Hepatitis C antibody, and HIV antibodies with appropriate pre and post counseling and informed consent.
3. Testing of the exposed individual for Hepatitis B surface antibodies (if vaccinated), Hepatitis C antibodies, and HIV antibodies.
4. Determine the need for Post Exposure Prophylaxis.
5. Documentation of the following information in the exposed individual's confidential medical file:

- Date and time of exposure
- Details of the procedure being performed by individual at time of exposure
- Details of exposure, including amount of fluid or material, type of fluid or material and severity of exposure
- Details of the exposure source.
- Details of counseling, post exposure management and follow up.

5- protocol for infection control procedures used for all patients

5. I- CUBIC PREPARATION (CLEANING AND DISINFECTION)

Step by step:

Every morning:

CLEANING AND DISINFECTION

- Hand wash.
- Protective attire must be worn (PPE).
- Self-contained water system bottle should be disinfected and filled with distilled water every morning (Figure 10).

Figure 10. Self contained water system

Disinfection of the bottle (According to manufacture's instructions):

Put 100ml disinfectant solution in the water bottle (90 ml tap water and 10 ml 5.25% sodium hypochlorite) shake vigorously and let it to settle for 10 minutes. Shake again then rinse twice with water. Fill it with distilled water.

- Flush the following water-lines for two minutes.
- Air-water syringes, Handpiece hoses and Scalers .
- Flush evacuation system (suction tube and high volume evacuator HVE).
- Dilute evacuation cleaner into plastic container according to manufacture instructions.
- Draw prepared solution through the evacuation system.
- Allow for contact time.
- Refill 1liter container with water.
- Draw water through the evacuation system.
- Discharge water into sink.

- Clinical contact surfaces and equipments e.g. *(arm rests, headrest, control switches, light switch and handles)* should be wiped with a disinfectant by the spray-wipe-spray technique.

Step by step (Figure 12, 13 , 14 ,15):

1. Use a paper towel to remove any gross debris from surfaces
2. Spray surface disinfectant directly to the surfaces and leave it according to its working time.
3. Wipe the surface in one direction toward the edge.
4. Spray surface again and leave it to dry.

Figure 11. Flushing of water lines

Figure 12. Spraying surfaces

Figure 13. Wiping surfaces

Figure 14. Moistened towel

Figure 15. Electric controls should be disinfected by moisten towels

- Dental light covers - **do not use disinfectant** - let cool and wipe with a towel moistened with detergent and water.
- When surfaces dry apply clean barriers to all Clinical Contact Surfaces.
    - (Figures 16,17,18,19).

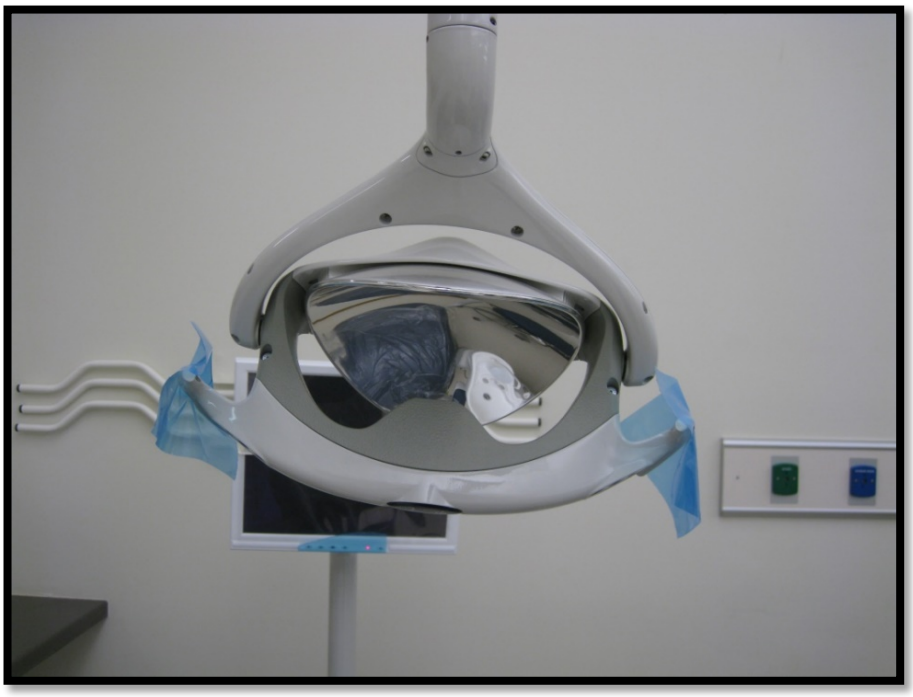

Figure 16

Figure 17

Figure 18

Figure 19

- Preparation of bracket table :

Bracket table is composed of (pull-handles, control switches, evacuation hoses and holders, hand piece hoses and holders, air/water syringes and holders).

- Use moisten towel to clean each item and leave it to dry for disinfectant working time.

Figure 20. Hand piece hoses disinfected by a towel saturated with disinfectant

- Re-apply and disinfect each item with another towel and allow to air dry.
- When dry, apply clean plastic evacuation tips and air/water syringe tips and apply clean barriers to all Clinical Contact Surfaces (Figure 21,22,23).
- Cover bracket table with sterile paper and liner under and both must be changed for each patient (Figure 24).

Figure 21. Clean barriers is applied to air/water syringe

Figure 22

Figure 23. Clean barriers applied to all clinical surfaces of bracket table

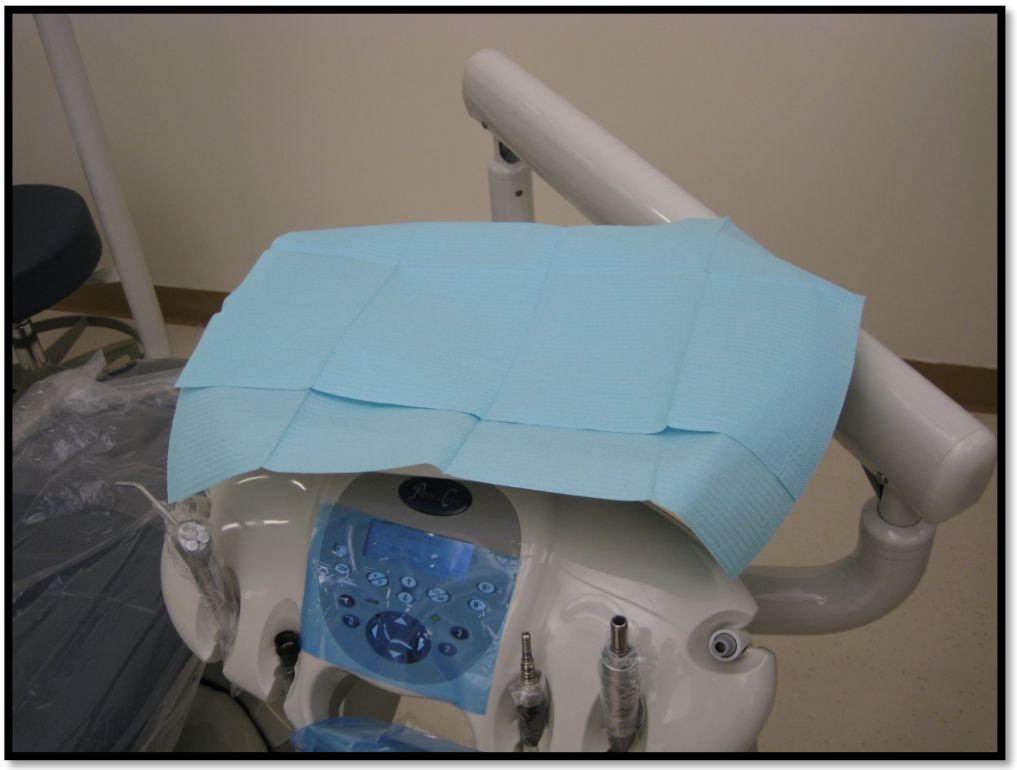

Figure 24. Two towels placed on bracket table

- In the clinic, unit dose concept will be used. This concept means :Materials and instruments are supplied only as needed to prevent contamination of the unused portion (Figure 25).

Figure 25

5. II- SET-UP

Hand pieces

- Assemble sterilized hand piece and attachments.
- Attach sterilized scaler and tip, If it will be used.

Sterile Instruments

- Open sterile trays and instrument packages immediately prior to use to decrease contamination of contents.

Consumable Supplies

- Bring only those items necessary for treatment into the operatory.

Dental Equipment

- Collect all necessary equipment and materials prior to beginning treatment.

5. III PRECAUTIONS DURING TREATMENT TO MINIMIZE CONTAMINATION

- Complete chart and computer entries before gloves are put on or after gloves are removed and hands cleaned.
- An antiseptic oral rinse may be used prior to treatment to reduce the number of microorganisms in dental aerosols.
- Rubber dam should be used as it Significantly reduces the aerosolization of oral bacteria.
- Aseptic technique must be applied i.e. Avoid touching unprotected switches, handles or other equipment with contaminated gloves (Figure 26).
- During treatment sterile tweezers should be available for -picking up items from containers such as: wooden wedges, gutta percha cones and crowns.

Figure 26

- Do not enter drawers or cabinets with contaminated gloves:
    A. Ask for assistance.
    B. Use another barrier (over glove).
    C. Remove and discard gloves, wash hands and reglove.
- Use only sterilizable or disposable items.
- HVE(High volume Evacuator) must be used whenever a drill is used inside the mouth to reduces the amount of spray and splatter
- Do not advise patients to close their lips tightly around the tip of the saliva ejector as Previously suctioned fluids might be retracted into the patient's mouth when a seal is created
- Instruments are no longer sterile if dropped on the floor, or if their outer wrap is wet or torn. Do not use contaminated instruments on patients. They are to be cleaned and sterilized.

6- Handling of sharp instruments and needles

Used needles, scalpel blades and other sharp instruments are considered potentially infective and are to be handled carefully to prevent unintentional injuries (CDC, 2003). To remove a sharp object, use a hemostat or instrument, not your hands.

Needles

- DO NOT recap used needles by hand.
- DO NOT remove used needles from the dental syringe by hand.
- DO NOT bend, break or otherwise manipulate used needles by hand.

Scalpel Blades

- Remove used blade from handle using blade remover or hemostat.
- **Disposal of used needles, scalpel blades, and other sharp items in puncture-resistant container, which is available in every cubicle.**

During Patient Anesthesia

Since a patient may require multiple injections from a single syringe the following technique can be used to minimize the likelihood of injury:

- Place the unsheathed needle and dental syringe on a “sterile field”, not on the dental tray. Each syringe is wrapped in a sterile napkin intended for this purpose OR Use the one–handed scoop method to recap syringe.
- Glide the needle into the plastic tip.
- Stand the syringe upright to secure the needle inside the tip.
- Use a hemostat to remove and discard the needle.

Exposure Prone Procedures

Avoid the simultaneous presence of the operator’s fingers and a needle or other sharp instrument in a poorly visualized or highly confined anatomic site

- Ask for assistance.
- Use an instrument for retraction.
- Position patient for greater visibility/access.

7. Between Patients (After Patient Treatment)

1. Remove contaminated attire (gloves, mask and eyewear), have clean hands, complete chart and computer entries, dismiss the patient.
2. Avoid leaving the work area with the protective wear to prevent contaminating clean areas.
3. Cleanup Procedure
4. During the cleanup procedure protective attire must be worn (Gown, gloves, mask and glasses).

- Discard disposables (suction tips, air–water syringe tips) take care to avoid touching clean surfaces with contaminated gloves (Figure 27).
- Use a hemostat to place used sutures, blades and needles into sharps container.
- Remove gross debris (i.e., dental materials, gauze, cotton rolls, sharps) from instruments trays.
- All heat tolerant items (instruments, syringes, diamond strips, Para posts, peso reamer, burs, endo files) are cleaned and sterilized after each use.

- No scrubbing or washing of instruments is to be carried out inside clinics
- Soak instruments in instrument cleaner.

Figure 27. Clean or unwrapped areas should not come in contact with contaminated gloves

8- Care of Hand Piece, Ultrasonics Scalers and Air-Water Syringes (CDC, 2003)

At Chair side:

- Wear protective attire (gloves, mask, and eyewear).
- Lubricate hand piece as indicated.
- Flush hand piece for 30 seconds, discharge water into closed container
- Remove bur.

At Scrub Sink (CSSD):

- Clean exterior surface with instrument cleaner and water.

- Do not immerse.
- Clean fiber optics with a soft bristle brush to remove debris
- Dry with paper towel and package for sterilization.

Air/Water Syringe:

AT Chair side:

- Flush unit by running for 30 seconds.
- Clean and disinfect syringe head by using 2 separate disinfectant saturated towels.
- Allow to air dry.

Evacuation Cleaning System:

Complete this procedure after each patient to prevent cross contamination from saliva ejector backflow and to keep the high-volume suction clear of debris.

- Remove disposable tips and discard it (Figure 28).
- Used instrument must be transferred to CSSD in a covered container completely soked in instrument cleaner.

Figure 28. Removal of Disposable plastic tips

Dental Equipment's:

- Dental equipment (amalgamator, curing light) that becomes contaminated and cannot be sterilized is cleaned and disinfected between patients.

1. Apply instrument cleaner to a towel and clean exterior surfaces and controls of each item.
2. Use a separate towel for each item.
3. If visible blood is observed on an item, use a disinfectant to decontaminate.
4. Apply disinfectant to towel and clean each item.
5. Reapply and disinfect each item with another towel.
6. Allow to air dry.

Dental Materials:

- Dental materials (Primary adhesive, Vitramir) .use unit dose concept but if it became contaminated and cannot be sterilized, it must be cleaned and disinfected between patients.

Consumable Supplies:

- Items placed in an operatory during patient treatment become contaminated. If it is not possible to adequately clean, sterilize, or disinfect items they are to be discarded (cotton rolls, suction tips, evacuation tips, air/water tips, cotton applicators).
- Remove your gloves wash your hands ,Put on clean gloves, disinfect Clinic and Prepare it for next Patient.
- Covers should be placed immediately before start of patient treatment and not prepared before.

Figure 29. Gloves Removal

9- Biological Spill Kit and Procedure

A- BIOLOGICAL SPILL KIT SHOULD BE AVAILABLE IN EACH CLINIC AND IT SHOULD CONTAIN THE FOLLOWING

- Absorbent paper towel – 1 roll
- Utility gloves – 4 pairs
- Disposable apron – 2
- Autoclave bag – 1
- Bleach undiluted – 500ml
- Safety glasses – 2 pairs
- Container for dilution of bleach – 1
- Disposable sharps container – 1
- Plastic forceps – 2
- Permanent marker – 1
- University Accident/Incident form – 2

B- BIOLOGICAL SPILL PROCEDURE

1. Alert people in the immediate area of spill and evacuate area as necessary.
2. Put on protective equipment – gloves, apron and safety glasses.
3. Prepare 1 in 10 dilution of bleach using the empty 1 liter container.
4. Cover the spill with a layer of paper towel to absorb it.
5. Carefully pour the bleach solution onto the paper towel so as not to create a splatter or aerosol.
6. Allow approximately 20 minutes to effect disinfection.
7. After 20 minutes transfer the contaminated material into a biohazard bag.
8. Remove any sharp objects with forceps and discard into a labeled sharps container.
9. Use fresh paper toweling soaked in the bleach solution to wipe up any remaining spillage.
10. Transfer all contaminated material – paper toweling, gloves, and apron – into a biohazard bag.
11. Wash hands and any possible contaminated body parts with antibacterial Solution.

10- Water Lines Asepsis

In order to maintain a truly asepsis water system, daily and weekly cleaning procedure must be performed.

Daily maintenance (purging unit with air):

A. At the end of every day make your unit off, remove hand piece from tubing.
B. Empty water bottle then reinstall it.
C. Hold hand piece tubing and syringe over a pail.
D. Turn unit on ‘ wait for a few moments, then operate the flush toggle (figure 27) , syringe and foot control until the water is purged from the system.
E. Turn unit off.

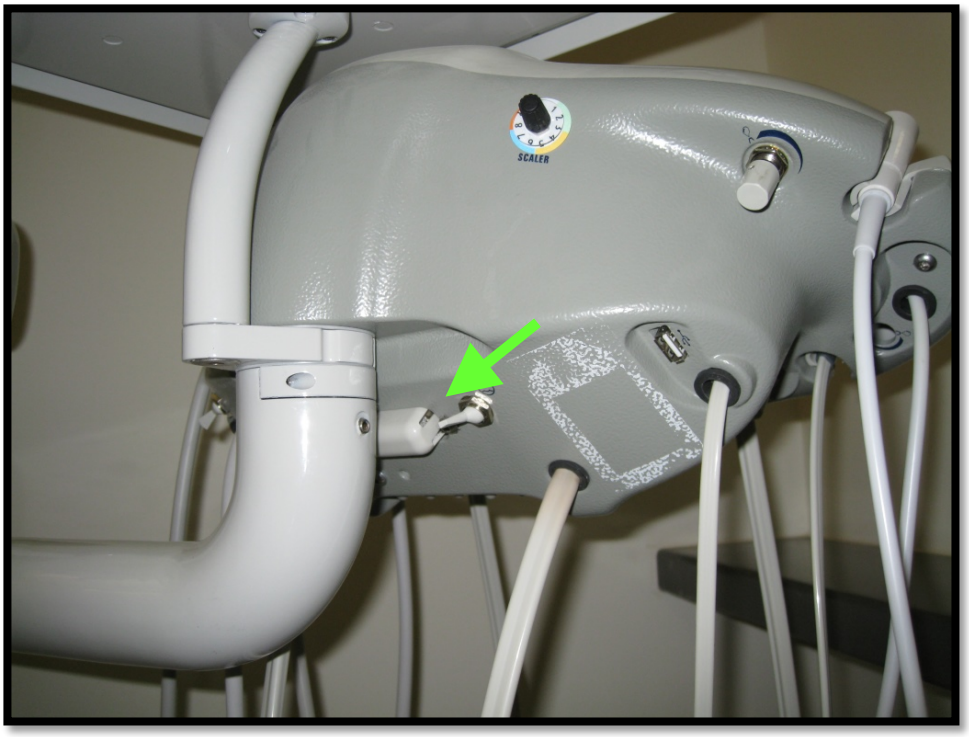

Figure 30. Arrow Indicates Flush Toggle Switch

Weekly maintenance:

1. It must be done at least once a week, preferably at the start before patient treatment
2. Purge unit with air.
3. Flush the system with disinfectant solution:

A. Turn unit off. Empty the water bottle, replacing the water with cleaning solution (1 part =10ml 5.25% sodium hypochlorite+9 parts =90 ml tap water)

B. Hold hand piece tubing and syringe over a pail. Turn unite on. Wait a few moments, and then operate the flush toggle. Syringe and foot control until a continuous stream of solution is running through the system.

4. Allow the disinfectant to remain in the unit for 10 to 20 minutes, and then flush the unit until solution is used up.
5. Purge the unit with air as in daily maintenance.
6. Fill with clean water:

A. With the unit off remove empty bottle and replace it with clean one and water.

B. Hold hand piece tubing's and syringe over a pail. Turn unit on, wait a few moments then operate the flush toggle, syringe and foot control until a continuous stream of water is flowing through system.

11- Supplemental Clinic Protocol and Guidelines

ENDODONTICS

1. All hand instruments, clamps, and rubber dam frames are contained in kits that will be sterilized by autoclave in accordance with approved protocols.
2. Electric pulp tester tips and lip clips will be autoclaved.
3. Electronic apex locator tip clips are sterilized in steam autoclaved when deemed necessary in the judgment of the supervising faculty.

ORAL AND MAXILLOFACIAL SURGERY CLINICS FOR DIFFERENT DEPARTMENT SPECIALITIES

1. PPE: Students, staff, and faculty attire for all surgeries includes:
2. Disposable, fluid-resistant, long sleeved surgical gown.
3. Protective soft facemask, with or without face shield.
4. OSHA-approved eyewear or full-face shield.
5. Surgical cap or bonnet that completely encases all hair when performing surgical procedures.

- Sterile or non-sterile gloves could be used according to the planned procedure by attending faculty.
- Maintenance of Glove Sterility. Whenever sterile gloves are worn, the hands and forearms should be kept upright and in front, not lowered below the waist or out of sight. Once surgical gloves are donned, nothing should be touched except the immediate area around the patient.
- Patient Preparation. All patients undergoing surgery should have their hair covered with, barrier areas, such as the light handle, or the instrument pack. If a sterile glove touches any non-sterile surface other than the patient's mouth, a second sterile glove should be put on over the contaminated glove, or the contaminated glove should be

removed, a hand washing and drying performed, and a new set of sterile gloves donned.

- Chair Bags. In lieu of disinfecting surgical chairs between patients, the backs of the chairs will be covered with a plastic barrier bag for each patient visit. After the patient departs, the bag will be removed inside out and discarded into the regular trash, unless bloodied or other- wise wetted with potentially infectious body fluid.
- Light Handle Covers. Surgical light handles will be covered with sterilized aluminum foil squares, which are discarded in the regular trash unless wetted with potentially infectious fluid.
- Students performing surgery are expected to leave their surgical cubicle clean and disinfected, as it was when they arrived. All barriers, trash, and debris should be cleaned up, including the floor around the area, all paperwork forms put away, and the chair, light handles, and countertop should be sprayed with the approved surface disinfectant before leaving the clinic, and allowed to air dry.
- Waste: All non-bloodied disposable items, including gowns, unused gauze, unbroken and blood-free anesthesia carpules, masks, caps, cotton applicators, and non-bloodied gloves, can be thrown in the regular waste containers. Items that are significantly soaked in blood or other potentially infectious materials, including gloves and human tissues, should be discarded in one of the red, closed-lid, regulated waste containers located in several locations around the clinics.
- HIV+ Protocols. HIV+ patients whose medical condition poses a hazard for surgery, such as patients with very low platelet or CD4 counts, may be referred to the Graduate Oral and Maxillofacial Surgery Clinic for care with faculty approval, due to the need for a more advanced level of risk management and surgical expertise in such patients.
- Sterile Packaging. All packs and individually wrapped instruments are packaged in cloth- wrapped stainless steel cassettes or nylon/paper, heat-sealed bags. As long as the outside integrity of these packs is intact, the contents are considered sterile.

MANAGMENT OF PROSTHETIC PROCEDURES

- Dental prostheses, appliances, and items used in their fabrication (e.g., impressions, occlusal rims, and bite registrations) are potential sources for cross-contamination and should be handled in a manner that prevents exposure of DHCP, patients, or the office environment to infectious agents.
- Dental prostheses, impressions, orthodontic appliances, and other prosthodontics materials (e.g., occlusal rims, temporary prostheses, bite registrations, or extracted teeth) should be thoroughly cleaned (i.e., blood and bio burden removed), disinfected with an EPA-registered hospital disinfectant with a tuberculocidal claim, and thoroughly rinsed before being handled in the in-office laboratory or sent to an off-site laboratory in a closed container or plastic sealable bag.

Disinfection of impressions:

1. Rinse under running water.
2. Squirt with detergent.
3. Rinse again under running water to ensure the removal of all detergent.
4. Shake off excess water.
5. Place in disinfectant solution (1:10 hypochlorite) for ten minutes.
6. Do not leave the impressions in the solution for longer than the recommended time, as impression material can absorb the excess moisture and distort the impression.
7. Rinse, shake off excess solution.
8. Package, label and mark disinfected before sending to laboratory.

- As imbibition distortion results from prolonged immersion for reversible and irreversible hydrocolloids impression material spray, rinse, repeat spray again and delay pouring for approximately 10 minutes.

Adjustments:

- Minor adjustments may be performed at the chair side.
- Burs used for adjustments must be cleaned and sterilized after use. If it is necessary to make major adjustments in the laboratory all procedures for disinfection in this policy for transfer between clinics – laboratory – clinic must be followed.

Issuing of Prosthesis/Appliances to patient:

1. Check that you have correct work.
2. Disinfect in 1:10 hypochlorite solution for 10 minutes.
3. Rinse in running water.
4. Insert, adjust and issue appliance.

DENTAL LABORATORY GUIDLEINES

A. General Guidelines

1. Use PPE when handling items received in the laboratory until they have been decontaminated.
2. Before they are handled in the laboratory, clean, disinfect and rinse all dental prostheses and prosthodontics materials (e.g. impressions, bite registrations, occlusal rims) by using an EPA–registered hospital disinfectant having at least an intermediate level of activity (tuberculocidal claim).
3. Consult with manufacturers regarding the stability of specific materials (e.g. impression materials) relative to disinfection procedures.
4. Clean and autoclave heat-tolerant items used in the mouth (e.g. metal impression trays and face bow forks).
5. Follow manufacturers' instructions for cleaning and sterilizing or disinfecting items that become contaminated but do not normally contact the patient (e.g. burs, polishing points, rag wheels, articulators, case pans and lathes). If manufacturer instructions are not available, clean and disinfect with an EPA–registered hospital disinfectant with low- level (i.e. HIV, HBV) effectiveness claim to intermediate-level (i.e. tuberculocidal claim) activity, depending on the degree of contamination.
6. Most of the work accomplished in preclinical laboratories is performed on models or phantom heads, where the transmission of blood borne pathogens is not a factor. Some training requires the use of human teeth, which may have a potential for disease transmission. In order for students to be better prepared for the clinical setting, certain procedures in the laboratory will be accomplished as if they are a biohazard.
7. Whenever laboratory procedures involve human tissues, such as extracted teeth or body

fluids, students should practice standard precautions.

8. Whenever impressions are made, whether of other students or patients, the impressions and casts should be processed in accordance with the standard guidelines.
9. Whenever potentially infectious materials or tissues have been used, un barrier surfaces must be disinfected with an EPA-registered disinfectant. Regulated waste should be collected and disposed of in accordance with college guidelines.
10. Work surfaces and equipment should be kept clean and free of debris.
11. Incoming prosthesis will follow disinfection protocol: rinse with water / spray with disinfectant (waiting the recommended time according to instructions) / rinse with water.
12. Vacuum should be used, if available, with the lathes.
13. Protective eye wear and mask should be used when using cutting and polishing instruments.
14. Pumice used in bulk should be changed.
15. Transportation of disinfected items to the dental laboratory, such as dental impressions, should be in a plastic wrap.

12- EXTRACTED TEETH PROTOCOL

1. Background. Extracted teeth are considered bio hazardous and must be handled using standard precautions. Extracted teeth are retained and used for various teaching purposes and for research. These teeth are normally stored in solutions of 10% formalin, to minimize the risk for transmission of blood borne pathogens and to fixate residual soft tissues. Since formalin and its parent chemical, formaldehyde, may be potentially carcinogenic, it is essential that these solutions be handled and disposed of carefully. There are specific guidelines from the OSHA, EPA that must be adhered to.
2. Disinfection of Extracted Teeth:
    - Although it is relatively easy to disinfect the outer surfaces of an extracted tooth, there is difficulty disinfecting pulpal tissues.
    - Teeth that are restoration-free can be steam autoclaved to achieve sterility (40 minutes at 121℃, 15 pounds pressure), but autoclaving is not recommended for

teeth containing amalgam restorations. There are no reliable data available on other restorative materials. Centers for Disease Control and Prevention has suggested storing extracted teeth in 1:10 to 1:100 dilutions of sodium hypochlorite (bleach)

- ALL extracted teeth must be considered bio hazardous until two weeks of formalin immersion has been attained. If formalin is not used, such teeth must be handled as bio hazardous material and used with appropriate aseptic techniques (PPE use and disinfection of equipment and surfaces that teeth contact).
- Students who wish to obtain extracted teeth for preclinical laboratory work from the Oral & Maxillofacial Surgery (OMS) clinics must bring a closeable container filled with 10% formalin, 0.05% or 1:10 household bleach solution sufficient to completely immerse all of the selected teeth. The OMS clinic will provide a biohazard label upon request, and long pickups for lifting the selected teeth from the collection jar.
- e. Students must wear a mask, gloves, and eye protection when selecting teeth from the jar. Selected teeth should be kept sealed in the sterilizing solution for a minimum of 2 weeks, because it will take that long for the pulpal tissues of any recently extracted teeth to be considered sterile. If bleach solution is used, it should be changed periodically over that period to maintain effectiveness.

Disposal of Extracted Teeth and Tooth Parts:

- Extracted teeth, which are not retained in formalin solution for educational, and research uses should be disposed of in red bio hazardous trash bags, not in the regular waste receptacles. Teeth should not be in any closed containers such as glass receptacles, plastic bottlers, or other similar items.
- If a patient requests his/her extracted teeth, the teeth will be returned to the patient after thoroughly washing them and placing them in a sealed Biohazard bag containing a bleach solution.
- Do not dispose of extracted teeth containing amalgam in regulated medical waste intended for incineration.
- Clean and place extracted teeth in a leak proof container, labeled with a biohazard

symbol, and maintain hydration, for transport to educational institutions or a dental laboratory.

- Heat sterilizes teeth that do not contain amalgam before they are used for educational purposes.

13- Food in Clinical Areas

- Eating, drinking, applying cosmetics, or handling contact lenses is prohibited in areas where exposures to blood borne pathogens may occur. This includes clinics, dispensaries, sterilization areas and other areas where potentially infectious materials are stored. Items requiring processing in the laboratory must be decontaminated chair side in the clinic before being brought into the student laboratories as food and beverages are allowed in these laboratories. The clinical items (casts, bite-blocks, impressions, castings, wax-ups or any other item) that are being worked on in the student laboratories must be again decontaminated before being re-introduced into the clinic.
- Food and drink are not to be kept in refrigerators, freezers, on countertops or in other storage areas where blood or other potentially infectious materials are present. This prohibition applies to all employees, students and patients.

14- Waste Disposal and Management

- Waste can fall under two categories, regulated waste and non-regulated waste (regular waste).
- Examples of regulated waste are disposable sharps (anesthetic needles, suturing needles, knife/blade, used orthodontic wire, etc.) and saturated gauze that can express at least a drop liquid (blood/saliva) when squeezed.
- Waste that does not need special handling as above is considered regular waste.
- Non-regulated waste must be placed in regular containers (white or non-color coded containers).

Sharps:

A. Contaminated disposable sharps, such as anesthesia and suturing needles, scalpel blades, broken anesthetic carpules, burs, and wires, will be disposed of in red, puncture-resistant, leak-proof, closable, biohazard-labeled sharps containers, which are placed in multiple locations throughout all clinics.
B. Sharps containers should not be loaded over the safety limit.
C. The contents of these containers should never be removed because of the high risk of accidental skin puncture.
D. All broken or bloody anesthetic cartridges should be placed in the disposable sharps container.
E. Designated clinic personnel should notify Environment Services for pick-up and disposal of full sharps containers. Clinic personnel should not remove full containers from the clinic.

Soft Materials:

A. All contaminated, heavily saturated disposable soft materials, including cotton rolls and pellets, gauze, tissue packs or dressings, or heavily contaminated gloves, will be placed in the red regulated waste bag in each cubicle. The small cubicle red bags are then placed into a larger red, closed, regulated waste container.
B. Items can be placed in the regular trash if not heavily saturated with blood or saliva.

Tissue:

A. Tissues, including extracted teeth, removed from patients in the clinics are considered bio hazardous, regulated waste, and must be handled with caution.
B. Extracted teeth will be immersed in 10% formalin or 1:10 household bleach in a closed jar in the central instrument processing and sterilization department (area of decontamination).
C. A biohazard and chemical content label must be affixed to the outside of the jar.
D. Details are provided in protocol for retrieving teeth for use in research or preclinical laboratories.
E. Other removed human tissues will be placed in a closed bottle containing 10% formalin for submission to the Department of Diagnostic Sciences for pathologic examination.
F. Other removed human tissue will be placed in a red regulated waste container. Specimens sent outside the College must be in a sealed container, which bears a red/red- orange biohazard label.

15- Immunizations Strongly Recommended for Health care Personnel (HCP)

Table 3. Recommended immunization for health care personnel

Vaccine	Dose schedule	Indications	Major precautions And contraindications	Special considerations
Hepatitis B Recombinant Vaccine	Three-dose schedule Administered intramuscularly (IM) in the deltoid; 0,1,6 second dose administered 1 month after first dose; third dose administered 4 months after second. Booster doses are not necessary for persons who have developed adequate antibodies to hepatitis B surface antigen (Anti-HBs). Annual single-dose vaccination	Health-care personnel (HCP) at risk for exposure to blood and body fluids.	History of anaphylactic reaction to Common baker's yeast. Pregnancy is not a contraindication.	Health-care personnel who have ongoing contact with patients or blood should be tested 1–2 months after completing the vaccination series to determine serologic response. If vaccination does not induce adequate anti-HBs (>10 mIU/mL), a second vaccine series should be administered.
Influenza Vaccine	Annual single-dose vaccination IM with current vaccine.	HCP who have contact with patients at high risk	History of anaphylactic hypersensitivity to	History of anaphylactic hypersensitivity

		or who work in chronic-care facilities; HCP aged >50 years or who have high-risk medical conditions	eggs or to other components of the vaccine.	to eggs or to other components of the vaccine.
Measles live virus vaccine	One dose administered subcutaneously (SC); second dose >4 weeks later	All HCP who have no proof of immunity	Pregnancy; immune-compromised state (including human immunodeficiency virus [HIV]-infected persons with severe immunosuppression); history of anaphylactic reactions after gelatin ingestion or receipt of neomycin; or recent receipt of antibody-containing blood products.	Measles, mumps, rubella (MMR) is the recommended vaccine
Mumps live virus vaccine	One dose SC; no booster	HCP believed susceptible can be vaccinated; adults born before 1957 can be	Pregnancy; immune-compromised state; history of anaphylactic reaction after	MMR is the recommended vaccine.

		considered immune.	gelatin ingestion or receipt of neomycin.	
Rubella live virus vaccine	One dose SC; no booster	HCP, both male and female, who lack of laboratory evidence of immunity can be vaccinated.	Pregnancy; immune-compromised state; history of anaphylactic reaction after receipt of neomycin.	MMR is the recommended vaccine
Varicella-zoster live-virus vaccine	Two 0.5 mL doses SC 4–8 weeks apart if aged >13 years	HCP without reliable history of varicella or laboratory evidence of varicella immunity.	Pregnancy; immune-compromised state; history of anaphylactic reaction after receipt of neomycin or gelatin; recent receipt of antibody-containing blood products; salicylate use should be avoided for 6 weeks after vaccination.	Serologic testing before vaccination might be effective.

REFRENCES

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8. Occupational Safety And Health Administration (OSHA):"CDC. Guidelines for Infection Control in Dental Health-Care." MMWR, December 19, 2003 / 52(RR17); 1-61.
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Restorative Clinical Manual

Goals

To provide a clinical and didactic learning environment that assures our graduating dental students of competence in all phases of Operative Dentistry. The clinical and didactic portions of the Operative Dentistry course are integrated to produce graduates competent to treat patients, and to integrate the principles of Biomaterials Science as they pertain to the art and science of Operative Dentistry.

Objectives

- Provide operative dentistry treatment on adult patients in a competent manner using amalgam, direct composite restorations and Glass ionomer cement restoration.
- Successfully identify and remove dental caries.
- Successfully complete the clinical requirement and prepare students to pass the International Board examinations.
- Achieve at least a 60% grade for each essential patient experience and each patient competency examination.
- Pass all conducted examinations with a score of 60% or higher.

Essential Patient Experiences

To assist students in development of competence, the college require that each student provide evidence that they are capable of preparing and restoring direct restorations in patients.

Restorative Clinical rules

- Student must complete the minimum number of finished cases and educational needs as stipulated at the beginning of the course.
- Student must follow clinical and PPE procedures and adhered strictly in the clinic.
- Student responsible to wear her name ID and to use a stamp (that include name and ID number) on the patient file and any other clinical forms.
- A finished case form must be filled once a case is finished and submitted to course director.
- All Students Should FINISH their Competency Assessments ONE MONTH before the Last day of Clinic of the Academic Year.
- All Educational Needs and Competencies should be finished before graduation.
- Competency assessment will be graded as PASS/FAIL and doesn't count as points or educational needs.
- Student will be dismissed from clinic if professionalism, infection control policy and procedures are not followed.
- No treatment should be started after 10 am in morning sessions and after 2:45 in afternoon session.
- Students must write their name and proposed procedure on clinical supervisor's card at start of session.
- No operative credit is given for temporary restorations, but points are earned for the procedure.
- All materials should be prepared before start of procedure and shown to clinical supervisor.
- 10% grade of clinical procedure is dedicated to knowledge.
- Evaluation and progress notes must be signed during the same session.
- Prophylaxis should be done before operative treatment plan.
- Postoperative bitewing radiograph is needed for evaluation of Cl. II.

- Students will not be allowed to work more than one tooth at a time unless specifically indicated and approved by the instructor.
- **Zero grade** is given **in the following:**
    - Starting treatment without approval of operative clinical supervisor.
    - Starting treatment without signed treatment plan by course director.
    - Treatment without bitewing x-rays present or X-rays older than 6 months.
    - Cavity preparation modification without approval of clinical supervisor. e.g. Cl. I to Cl. II.
    - Damage to adjacent tissues.
- Rubber dam will be used in all operative procedures. When working, the dam should be applied (when possible) to 2 teeth distal to the operated tooth, until the bicuspid or cuspid on the contralateral quadrant.
- Students should work with the same instructor for any one given procedure. Avoid other advice from another instructor.
- The student should begin only one clinical procedure at a time. When cavity preparation and restoration have been completed and if enough time remains to complete another procedure, the instructor may give permission to begin the second procedure.
- Treatment plans are required for patient treatment. If there is no treatment plan, for the scheduled patient signed by the course director, the student will not be allowed to start the procedure until the treatment plan has been approved.
- The best teaching and learning experience will occur when you work with the same instructor while completing a given procedure.
- Work habits and time utilization:
    - Be punctual.
    - Keep patient appointment: Patient can be rescheduled only with the approval of the course director.
    - Rescheduling or cancelling patient without prior approval can result in an unsatisfactory grade.

- The instructor assigned to each clinical period will be posted. Students should take note of the instructor assigned to their group. Failure to work with your assigned instructor could lead to an unsatisfactory grade.

Treatment Plan Sequence

- Emergency Case – *Pain and Acute Infection Control*
- Initial Therapy
  - **Phase I**
    - Removal of hopeless teeth
    - Endodontic therapy
    - Caries control (Large Lesions)
    - Minor tooth movement
    - Occlusal Adjustment
    - Periodontal Therapy
  - **Phase II**
    - Operative Dentistry
  - **Phase III**
    - Fixed and Removable Prosthodontics
  - **Phase IV**
    - Establish after-care treatment
    - Re-evaluate and perform any needed adjustment.
    - Final prophylaxis and update radiographs if needed.
    - Complete case with course director

Detection of Caries

Occlusal caries

- Diagnosed visually for opacity, cavitation or breakdown, Grey/brown appearance of underlying stained dentin.
- Catching of explorer is not a reliable method in diagnosis of pit and fissure caries because forceful probing could convert non cavitated lesion to cavitated one. In addition, catching could be felt due to the normal anatomy of intact pit and fissures.
- Explorer could be used for cleaning the plaque and debris, gently for exploring any softness at pits and fissures.
- Could also be detected by using Diagnodent "Laser detector if available"

Interproximal caries

- Diagnosed visually, gentle exploring, transillumination and radiographically.
- Bite-wing radiograph should be done for the patient before caries examination. Minimum four bitewing.

Note: All findings should be written in the dental chart in patient e-file

Caries Risk Assessment (CRA)

(done with the help of an instructor)

- The CRA consists of five main sections including:
  - Diet
  - Caries activity
  - Fluoride exposure
  - Salivary flow, and
  - Plaque retention
- It is the process of identifying the risk of the development of future carious lesions for each individual patient. The assessment will indicate that the patient falls into one of three categories:
- Low caries risk;
- Moderate caries risk;
- High caries risk.

- This assessment is based on a subjective evaluation of the above-mentioned factors believed to be good indicators of the patient's future risk for the development of carious lesions.
- The patient dietary habit is:
  - Important
  - Essential
  - Refer to CRA form

Operative Treatment Plan

- Clinical and radiographically findings **should be reviewed by the instructor** and any corrections should be made as necessary and signed by the instructor.
- Operative Treatment Plan form should include the tooth number the class, the surface of the tooth to be treated and the material to be utilized.
- The treatment plan should be written in sequenced manner (proposed sequence) according to priority of treatment (e.g. advanced lesions or defective restorations that have the potential of developing into emergency situations; caries control).
- **The Operative Treatment Plan should be checked and approved by the instructor before the treatment is started.**
- The complete treatment of assigned patients in a professional manner is the primary requirement of the program.
- Students are required to complete the treatment. The treatment procedure will include esthetic restorations, amalgam, inlay, onlay, buildup.
- During diagnosis and treatment planning, the staff will conduct transfer of each case according to the level of complexity (Simple, Moderate, Difficult).

Preventive Dentistry Program

Preventive measures are instituted at all levels of caries management. The student should apply the preventive practices and procedures during operative treatment. These preventive practices include:

- Dental health education
- Topical fluoride application
- Nutrition and dietary control
- Detailed home care instruction
- Motivation of the patients for preventive programs
- Use of pit-and-fissure sealants.

Local Anesthesia

- Local anesthesia should be given under direct supervision of the instructor.
- Topical anesthesia is recommended before any injection.
- Student under the instructor's supervision should detect the effectiveness of the anesthesia before R.D. application.
- If after a reasonable period the patient does not exhibit expected effects of anesthesia, the student should call the instructor. The student should expect a discussion why profound anesthesia was not obtained with the first injection. The instructor has the option of administering the second injection if he/she feels such assistance is warranted.

Rubber Dam Isolation

- All restorations including fissure sealants **must be done under RD isolation** unless the instructor permits the work without it because its placement is contraindicated. In such instances, cotton rolls and a saliva ejector must be used throughout the procedure.
- When working on Anterior Teeth, 1st Premolar to 1st premolar isolation is recommended.
- When working on Posterior teeth one quadrant isolation is recommended and it is advised to include the first pre-molar on the other quadrant.

- Anchored tooth should be distally 1 to 2 teeth to the operating tooth.
- Rubber dam clamp must be ligated and stable on the anchor tooth with no damage or strangulation of gingival tissue.

Caries Control Restorations

Indications

- When the patient presents multiple active and advanced carious lesion.
- Teeth with questionable pulpal prognosis

Clinical Technique

- Anesthesia
- Isolation of the operating site with a rubber dam when excavating a deep lesion. Visuality and cautious are important factors when handling deep carious lesion.
- Excavation of soft carious dentin from all the lesions (retaining of unsupported enamel is permissible at this stage since final preparation will be done at later visits)
- Placement of pulp medication and restoration with IRM or GIC or GIC derivative (Ketac Fill)
- This is accompanied with plaque control, dietary control and OHI.
- After the improvement in the oral health, these temporary restorations are replaced with the definitive restorations (Cavities are finalized to receive the definitive restorations at this stage)

Preventive Resin Restoration (PRR) or Conservative Composite Restorations (CCR)

Indication

Small carious lesion that involve part of the pit and fissure system while the adjacent pits and fissures are sound but at high risk for caries.

Technique

- The carious part is removed using a small round bur (Intact pits and fissures should be left untouched).
- The cavity is filled using composite resin, the remaining non- carious pits and fissures are sealed.

Pulp Capping Procedures

The tooth must be vital, symptom-less and have no history of previous irreversible pulpitis.

Indirect Pulp Capping

- During treatment of a deep carious lesion, carious soft dentin overlying the pulp should be completely removed with excavators (Single Excavation Technique).
- The hard stained dentine should be left in situe or site and should be covered with a firm setting Calcium Hydroxide cement. A stronger lining material (i.e. RMGIC) should then be placed and the tooth restored as originally planned.
- Advice of supervision is of essential importance. N.B. DEJ must be stain free

Direct Pulp Capping

- During the preparation of a cavity, when the dental pulp has been exposed by a sterile instrument/bur either accidentally or when removing softened dentin overlying the pulp, a direct pulp cap may be considered. Assuming the site is moisture free (i.e. R.D.)
- After obtaining hemostasis – after saline washing and drying using sterile cotton pellet (avoid the 3-way syringe) the exposed pulp should then be covered with a hard setting Calcium Hydroxide (Dycal) and restored with IRM.
- The tooth should be observed over a period of 8 - 12 weeks for vitality and dentin bridge formation.
- Root canal treatment is carried out if indicated or the definitive restoration is placed if the tooth is in healthy state.
    - Mechanical exposures should be considered in the evaluation of the procedure (-ve grade) while carious exposure is not supposed to affect evaluation because it is unavoidable. Our policy is complete caries removal.
    - Seeking advice of supervision is of essential importance.

Choice of a Lining Material

- The lining and basing material of choice is:
    - Resin-modified glass ionomer (e.g. RMG1) lining material (e.g. Vitrebond).
- Hard setting Ca (OH)2 (e.g. Dycal) should be placed under any restorative material when the Remaining Dentin Thickness is judged to be 0.5 mm or less.
- The lining material is applied to the axial and pulpal walls only and a sealing material is applied for sealing restoration-cavity wall interface.
- When the lining material is applied, the student must call the instructor for checking before proceeding to lacing the restoration.

Amalgam Restorations

- Amalgam restorations have no initial seal. All amalgams should be sealed at the interface between the cavity walls and amalgam restorations. This could be achieved by:
    - Two coats of cavity varnish (e.g. Copal Varnish or Gama bond); or
    - Resin bonding agent.
    - Amalgam bonding agent.
- These sealing materials are applied to the walls of the cavity and avoid the margins. Afterwards apply the lining material.
- For shallow cavities: Sealing of cavity walls by varnish or resin bonding agent or Amalgam bonding agent.
- For moderate cavities: RMGI liner and the cavity walls are sealed.
- For deep cavities: Ca (OH)2 liner –on the deep portion only- then RMGI base and sealing of the cavity walls.

N.B. for using resin bonding agent for sealing the cavity, acid etching using 37% phosphoric acid should be applied for 15 seconds over RMGI liner or cavity walls or both. The acid will not affect the cured RMGI liner.

Finishing and Polishing

- Indicated for improperly contoured and rough restorations.

- Should be done after 24 hours.

Technique

- Finishing burs (latch type) are used in light touch to remove slight defects and scratches, and to create the proper contour leaving a smooth surface and margins.
- Polishing of the restorations is done by using browny and greeny rubber points or a thick mixture of pumice and glycerin with rubber points followed by rubber cup with mixture of Tin Oxide powder and alcohol.

Direct Composite Restorations

Indications

- Class III, IV and V restorations.
- For posterior teeth: Small to moderate restorations i.e. the anticipated cavity width is about one-third the intercuspal distance.

Contraindications

- Where maximum moisture control is impossible.
- Direct composite resin restorations **should normally not be placed in Large Class II cavities** (the procedure is technique sensitive and difficult to perform well).
- Patients with abnormal occlusal function e.g. bruxism.
    - In shallow to moderate cavities, no pulp protecting material is placed. Sealing will be achieved using the bonding agent.
    - In deep cavities dentin overlying the pulp should be protected with calcium hydroxide (Dycal) only on the deep portion of the axial or pulpal walls.

Technique

1. Modified cavity design is recommended, 45 degree bevel should be placed except in the occlusal preparations in posterior teeth.

2. Layering of enamel shades (transparent) and dentin shades (opaque) should be considered in class IV, through and through class III and fractured incisal edges restorations.
3. Finishing and Polishing.
4. The selection of the restorative material for class I cavities in posterior teeth is dependent primarily on the Instructor's judgment
5. Material (including etching and bonding) will be manipulated according to manufacturer instruction.

Glass Ionomer Restorations

Indication

- Class V cavities where aesthetics is not important.
- For root part of class V cavities (Sandwich Technique).
- Restoration of root caries.
- Caries control restoration.

Technique

- Follow manufacture instruction.

Resin Modified GI Restoration:

Indications

- Class V cavities.
- Root caries.
- Restorations of cervical lesions due to abrasion, erosion and abfraction.

Technique

- The cavity should be conditioned with polyacrylic acid for 10 seconds.
- The acid is washed and dried for 2 seconds.
- The restoration is placed, cured and finished immediately without sealing.
- Follow manufacture instruction.

- Restorations placed using convention GIC or RMGI's do not require a lining. However, if the cavity floor is within 0.5mm of the pulp a setting calcium hydroxide lining material should be used.

Restoration of Endodontically Treated Teeth

- Providing the tooth is checked for restorability before starting Root Canal Treatment (RCT), the student should seek consultation about the type of restoration to be placed which is either:
- Amalgam or composite restoration or casting restoration as definite restoration
- Amalgam or composite restoration as a core material
- In posterior teeth, the pulp chamber can be opened, and extensions made about 2 millimeters into each treated canal to improve the retention.

Treatment Progress Form should include the followings:

- Date
- Tooth Number
- Anesthesia description (type and technique)
- No. of carpule used
- Class of Preparation and surfaces included.
- Pulp Protection (liners, bases, sealers)
- Type of restoration.(Brand of bonding + Brand of composite + shade
- Instructor Approval

Example:

Date: 17 / 9 /2017 Time: o AM o PM Tooth #: 16

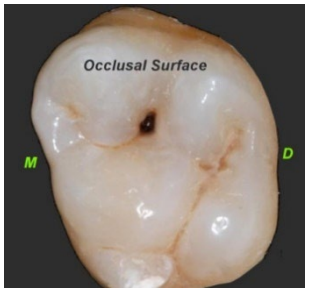
- Xylocaine with adrenalin Local Anesthesia (L.A.) was given using infiltration technique; 1 carpule (1:80,000)
- One quadrant R.D isolation was done;
- Cl II OM Comp. Prep. was done;

- Dycal liner and RMGIC was placed as a base and Etching ,Bonding: Optibond solo plus is applied to cavity walls .
- Tofflemire matrix and wedge were placed, composite restoration Z 350 XT Shade A2 is placed.
- The patient is given an appointment after 1 week .

Scope of work for all clinical levels

D3	• **Simple to moderate Class I and II Composite or amalgam restorations** • **Simple to moderate Class I, III, IV and V composite restorations and GIC**
D4	• All classes of amalgam and composite restorations and GIC • Complex amalgam restorations • Caries control restorations
D5	• Above mentioned classes • Build-up (2) • Direct aesthetic procedures such as diastema closure, direct composite veneers and bleaching • Indirect tooth colored restorations i.e. inlays, Onlays and veneers

- The student should differentiate a CL I pit from a CL I occlusal which should include all the pit and fissure in the occlusal surface:



CL I pit: Includes only a pit in the occlusal surface or Buccal, lingual pit. It is not considered as an Educational need Or can be restored as a PRR.

Evaluation

- The student will be evaluated for each procedure in the following areas:

- Patient management.
- Knowledge of the procedure.
- Organization of the work area.
- Diagnostic skills and treatment planning.
- Operative skills.
- Completion of all necessary treatment documents.
- Procedure time management.

- When the student completes work on the patient, the following must be done before calling the instructor for final evaluation:
    - Have a clean mirror, explorer, floss and articulating paper available.
    - Have all records available and completely filled.
    - Have instruments readily available should the instructor need them.

Competency

Overview

- A number of required basic skills and essential patient experiences are part of student instruction in the placement of direct restorations using amalgam and resin composite, which also include the removal of caries. Students will be judged competent in the Operative Dentistry section of the Restorative Department when the following examinations and requirements are completed with a grade of 60% or better.
- Standard infection control guidelines and universal precautions must be followed. The examination may be done at times when student book an appointment with her patient. It is the student's responsibility to schedule the examinations at the appropriate times. Grade sheets are available in each team.

Patient Competency Procedures

- The operative competency procedures must be performed on a patient. The competency must be started within 30 minutes of the clinic session (with exceptions made for patient cancellations).
- At the time, you sign in with your operative instructor declare that you are doing this patient competency procedure. It must be declared before beginning the procedure.
- One competency per clinic session. The student must complete the procedure without instructor help or guidance.
- One day's notice should be given to the instructor if a student finds it necessary case, provided the tooth meets all other requirements.
- Failure to complete all competencies in a timely manner will be reflected in the student's clinic semester grade submitted by the Operative Faculty team.
- D3 students must complete a minimum of 4 Cl I operative procedures with the operative instructor before competency. For deadlines see clinic manual. Operative procedures must be simple Class I composite resin or Amalgam restoration. Caries procedure must involve significant caries removal.
- The completion of these procedures will help your operative instructor to determine your quality clinical grade.
- Rubber dam must be used throughout the preparation and restoration portions of the procedure. Remove the rubber dam prior to checking occlusion and the final evaluation of the restoration.
- Proper clinical procedures must be used throughout the examination period (PPE, protective eyewear, gloves and appropriate instrument set up).
- All procedures must be "**Self-Evaluated**" prior to instructor evaluation.
- Students should raise any complain to facilitate active learning with their instructor person.

- Prepare the ideal prep first before any caries removal. After request for extension has been approved then caries can be removed.
- The students will automatically fail if:
    - Unable to diagnose Caries.
    - Unable to place a Rubber Dam
    - Incomplete removal of caries
    - Failure to produce a conservative cavity
    - Inappropriate finish of restoration
    - Inappropriate infection Control
    - Poor timing.

Endodontic Clinical Manual

Root Canal Treatment

Definition

Endodontic therapy involves the *removal* of the dental pulp, the subsequent shaping, cleaning, and decontamination of the canals with files and irrigating solutions, and the *obturation* of the decontaminated canals.

Rules

- Students should start and finish the treatment on time.
- Student is not allowed to plan for Endodontic treatment until she has completed the preventive, periodontal and restorative treatment planning.
- Student is not allowed to proceed with endodontic treatment until she has an approved complete Endodontic diagnosis and treatment planning of the patient.
- Student is not allowed to start the treatment until she takes the permission from the clinical instructor (Approval in axiUm).
- Each student should be supervised with the assigned instructor in the clinical card (student is not allowed to change into another instructor).
- Students are not allowed to move from one phase of RCT to another until they take the permission from their clinical instructor.
- Students are not allowed to treat two teeth at the same visit.
- Treatment must be within the scope of the undergraduate student's ability, so students are not allowed to treat Difficult cases, and such cases that should be referred to the resident program. e.g.: difficult canal anatomy, pulp stones, tooth resorption, severe root curvature.
- Students are not allowed to do Single visit root canal treatment.

- Mishaps: Complications if happened, the student should inform the clinical instructor IMMEDIATELY, after that she should inform the patient and document the mishaps in axiUm.
- Management of Deep Caries in CDS Clinics: Pulpal and periapical diagnosis must be carried out on all teeth with deep caries and deep restoration in the general dental clinic of CDS 301, CDS 401 and CDS 501 with endodontic faculty before treatment is commenced. Teeth diagnosed as reversible pulpitis are treated under supervision of the restorative faculty.
- For vital pulp therapy (VPT) cases: reversible pulpitis cases should be treated under supervision of restorative faculty, while irreversible pulpitis cases should be treated under supervision of endodontic faculty, and in that case the endodontic VPT form should be filled.
- Rotary instrumentation:
    - D5 students are encouraged to use manual techniques in at least half of their cases and to use rotary for suitable cases identified by their clinical instructors.
    - D4 students need to finish the minimum number of educational needs required to pass CDS 401 before they can use rotary instrumentation.

Competencies

- All competencies should be finished one month before the end of the academic year.
- D4 students are allowed to schedule for a Single Canal competency after she has satisfactorily completed at least 2 single canals without any complications (Quality of RCT should not be less than 8 out of 10 in the rubric)
- D5 students are allowed to schedule for a bicuspid competency (upper first premolar) or a simple molar after completing the difficulty assessment form and in suitable cases identified and approved by their clinical instructor.

- If the student needs major assistance or creates a mishap during competency assessment, the case will not be counted as a competency case and required to repeat the competency exam.

- If the student who failed twice in the competency, the student case will be raised for examination and discussion in the endodontic division. Accordingly, the student may need further preclinical training in the simulation lab on a natural or artificial tooth under the supervision of PNU Endodontic Faculty before she repeats the competency exam.

- **Competencies are to be performed using manual instrumentation except for molars.**

  Notice 1: Students are expected to follow the policies set forth for the clinical competency assessment in the general dental clinics courses, As follows:

  a. Course Director must be notified BEFORE commencing any competency assessment
  b. Presence of Two evaluators from the same specialty chosen by the course director for evaluation
  c. First evaluator must be a PNU academic faculty, and the second can be a collaborating consultant.

  Notice 2:

  1- All instruments should be well organised during clinical setting.

  2- All used unwanted sharps should be discarded immediately.

  3-Students should act professionally and select only needed instruments and mate

1. Endodontics Educational Needs:

Level Procedure	D4	D5
Weight	1 anterior = 20% 1 Premolar bicuspid= 30%	1 Single canal = 10% 1 Premolar= 15% 1 Molar=25%
RCT (Canals)	2 Anteriors 2 Premolars	Any cases to collect the 100% as the calculation above but (One molar case is mandatory.)
Retreatment (Canals)	not educational need.	At least (1 case) from the above-mentioned cases to collect at least 60%
Minimum	2 Anteriors 1 Premolar	But (One molar case is mandatory.)

2. Type of Cases Allowed for Each Level:

Type of Treatment	Type of Tooth	D4	D5
Primary RCT	Anterior	✓	✓
	Premolar	✓	✓
	1st Molar	✓	✓
	2nd Molar	☒	✓
Re-Treatment	Anterior	✓	✓
	Premolar	✓	✓
	1st Molar	☒	✓
	2nd Molar	☒	☐

* For D4 student is not allowed to schedule a molar until she has satisfactorily completed 1 single canal without any complications (Quality of RCT should not be less than 8 out 10 in the rubric).

Documentation

College of Dentistry at PNU maintains an electronic patient record "**axiUm**", so all patient data associated with the visits must be entered in the **axiUm,** and the necessary approvals from Clinical supervisors should be obtained.

1. The patient history is taken by students upon initial exam and entered within **axiUm**.
2. A comprehensive extra and intra oral examination is also to be completed at the initial examination. Any time a positive finding is noted, students are required to update them in the electronic system.
3. A Periapical film of the involved teeth is mandatory. It should demonstrate the length of the entire tooth and demonstrate at least two millimeters of bone beyond the root apex.
4. Endodontic Examination of the involved teeth should be completed by the student.
    - Always remember that pulp testing is a comparative test, so you must apply it on neighboring tooth, as well as a contralateral tooth "Control Teeth" to assess the normal response of the patient.
    - For cold testing, a cotton pellet is held with a pair of pliers and is sprayed to saturation with the test spray (Endo-Ice). The cotton pellet is placed in firm contact with the buccal or lingual surface of the tooth to be tested. Don't use the cotton swab.
5. The clinical findings should be entered into **axiUm** and approved by the clinical instructor.
6. Endodontic diagnosis and treatment planning of the involved teeth should be entered into **axiUm** and approved by clinical instructor.
    - If a pulpal and a periapical diagnosis are normal, another reason for endodontic treatment must be entered, e.g. prosthodontic indication.
    - The patient is informed of the approved treatment plan and expected prognosis is explained. The treatment plan shall be signed by the patient in **axiUm** prior to initiating the treatment.
7. Endodontic Informed Consent should be signed by the patient in **axiUm** prior to initiating the treatment.

8. Treatment Notes of each procedure shall be entered in template format within **axiUm** and approved by clinical instructor.

Procedure

Pre-Endodontic Tooth Preparation and Access Cavity

All root canal treatment should be proceeded by these steps:

1. Local anesthesia is used as in cases of: vital pulp extirpation, remnant pulp tissues, anxious patient or in acute cases.
2. Application of topical anesthesia before injection is recommended. Infiltration anesthesia could be applied if the patient could not tolerate rubber dam clamps- clamps discomfort.
3. Access cavity is prepared, caries and defective restorations should be completely removed (caries must be removed completely before pulp chamber is entered).
    - A #2 diamond round bur is appropriately sized for bicuspid and anterior teeth, whereas the #4 diamond round bur is generally the right size for molar teeth
4. Assess the need for build- up and if needed establish sound tooth margins above the gingival tissues for rubber dam placement, to prevent bacterial contamination as well as for ultimate tooth restoration. Use ***Composite/GIC*** as a buildup material
5. Apply rubber dam
6. Now expose the pulp chamber, perform complete deroofing and locate the canals.
    - The #2 and #4 surgical length carbide round burs provide extended reach and improved vision during the entry into the pulp chamber. The Endo Z bur's lateral cutting edges are used to flare, flatten, and refine the internal axial walls. A surgical length tapered diamond bur may be utilized at high speeds to flare, flatten, and finish the axial walls of the pulp chamber.

Notices

- If time is limited, you can postpone the build up to the next visit and continue to the working length steps with minimum canals instrumentation, then temporize the access cavity with cotton pellet and IRM.

Concerning Rubber Dam Application

- Rubber dam application during root canal therapy is a **Must**
- Single tooth isolation is required.
- In case of applying a clamp to a tooth before rubber dam sheet, the clamp must be flossed before use to avoid accidental aspiration or ingestion.
- If rubber dam isolation is inadequate use ready-made temporary filling to improve the peripheral seal.
  - There are rare situations in which rubber dam may not be placed during access cavity preparation, such as in cases of severely titled or rotated teeth, however rubber dam should be applied after access preparation and before inserting any file in the canal.
- Never use hand files before rubber dam placement to avoid accidental ingestion or aspiration.

Working Length Determination

Working length should be approved by your clinical instructor

1. Estimate the initial working length (WL) from the pre-operative radiograph.
2. Use K-file size 10 or 15 to determine the working length using the apex locator.
   - When the indicator of the apex locator indicates overextension beyond the apex, withdraw the file around 0.5 – 1mm.
3. Expose radiographic X-ray with a file (at least size 15) inserted in the canal according to the apex locator reading. If you have buccal and lingual canals, use a SLOB technique.
4. Establish the final working length according to this radiograph.
   - ***Notice**: each student should learn how to use the apex locator.*

Apex Locator:

- A file is inserted into the root canal and an electrical contact is made with the shank of the instrument. The device has a second electrode, which is placed in contact with the patient's oral mucosa.
- Blue indicators illuminate when the file inserted in the canal
- Green indicators illuminate when the file is approaching the apical constriction
- Red indicators illuminate when the file tip reaches the major foramen

Root Canal Instrumentation

1. Manual Step-back technique is the technique used in the school.
2. When rotary instrumentation is used, regardless of Niti rotary system, the minimal apical enlargement size accepted is size 30/taper.04. (Exception would be cases of severe canal curvature or complex anatomies)

Notice

- NEVER use a file in a dry canal
- NEVER skip sizes of files
- Check the file for signs of deformation before inserting inside the canal and after its removal.

Irrigation & Lubrication

1. After access cavity preparation, flush the cavity with copious irrigation of NaOCl.
2. Canals must always be filled with irrigant to increase its working time and enhance the cutting efficiency of instruments due to lubrication effect.
3. Between instruments use 2-5 ml of irrigant.
4. When using NaOCl irrigation use a luer-lock syringe to avoid accidental flushing of the irrigant.
5. Bend the needle against a sterile surface to accommodate irrigation in the pulp chamber.

Irrigation Protocol

	Protocol 1	***Protocol 2***

	Vital pulp extirpation	*Infected canal, Retreatment*
After Access cavity	NaOCl (1-3%)	NaOCl (1-3%)
Canal shaping	NaOCl (1-3%) EDTA (17%) or Citric acid (30%)	CHX (2%) – NaOCl (1-3%) EDTA (17%) or Citric acid (30%)
Before obturation	CHX (2%) Distilled water	CHX (2%) Distilled water
Distilled water is used between each irrigating solution		

Intracanal Medication

- The purposes of their use: (1) to reduce inter-appointment pain, (2) to decrease the bacterial count and prevent regrowth, and (3) to render the canal contents inert.
- It is recommended in cases with necrotic pulps and apical periodontitis, weeping canals and root resorption. It is also used in vital pulp extirpation between visits to prevent bacterial contamination.
- The recommended medicament is $Ca(OH)_2$ paste.
- It is recommended to be applied using lentulo spiral filler.
- After $Ca(OH)_2$ placement, walls of the pulp chamber must be cleaned thoroughly before placement of temporary restoration to avoid the subsequent micro leakage.

Temporization

- Between RCT visits, seal the tooth using small cotton pellet and temporary restoration (at least 4mm in thickness).
- Check that the filling is not too high in occlusion.

Obturation

Tooth must be Symptoms-free, and the canal should dry before obturation (no exudate)

- Master apical cone is selected according to the master apical file and verified radiographically
- Criteria of Master cone selection:

  1- The master cone selected should have the same size of the M.A.F. & it should have the same length of the full working length.

  2- The master cone should need some force to be seated inside the canal to the WL & some force is required to dislodge the master cone from the canal. This is called Tug back. This resistance of removal of the master cone enhances the sealing ability at the apical area of the root canal

  3- If the master cone goes to the full working length but it's loose inside the canal, we take a larger gutta percha cone or we cut 1 mm from the apical end of the master cone to increase the width of the master cone.

  4- Verify the master cone position with a radiograph to ensure the optimum fitness and length.

The selected master cone should be approved by your clinical instructor

- The used technique in the school is the lateral condensation.
- The used sealer is AH26™ or AH plus™
- The used spreader is finger spreaders
- Dry canals well using paper points (canals must be completely dry before obturation)
- Place the sealer in the canal using master apical cone (MAC)
- Selection of the size of the spreader and accessory gutta-percha (GP) cones as following:
  - The spreader should fit within 1 to 2 mm of the prepared length, and when introduced into the canal with the master cone in place, it should be within 2 mm of the working length. Appropriate accessory points are also selected to closely match the size of the spreader.
  - System-B or heated hand plugger are used to cut the GP excess, and then cold (not heated) plugger is used to condense the GP at the level of canal orifice.

Instructions concerning System-B:

1. use large tips (size 10 or 12)
2. the recommended heat is 200°C
3. wipe the tips with alcohol swab after using

Notice

- During obturation of a multi-rooted tooth, it is recommended to obturate the canals individually while placing the MAC in the other canals; for example: in the mandibular molar, obturate the MB canal then cut the excess up to the canal orifice then start obturation of the next canal.
- Start obturation with the difficult canal.

Finishing Procedures

Orifice Seal (Coronal plug)

1. Remove 1-2mm of filling material from each canal orifice,
2. Clean/scrub the pulp cavity with alcohol and cotton pellets (or swab).
3. Cavit or IRM or GIC (according to the final treatment plan) is placed in the canal orifices, compact it with a plugger to avoid voids between your plug and the gutta-percha.

***Notice*: Orifice seal material not placed in canals where Post needed and the post should be place as soon as possible to avoid microbial leakage.**

Coronal restoration

1. If time allows a permanent restoration may be placed (according to the treatment plan). Ensure that all dentin surfaces are cleaned well with alcohol cotton pellet or swab. A composite restoration is placed- ask your clinical instructor!
2. Remove the rubber dam/clamp, and expose a postoperative (Final) radiograph

Notice: *at least 6 radiographs are required during endodontic therapy, are distributed as following:*

1. Pre-operative radiograph (at least 2 angulations specially for premolars and molars)
2. Initial working length (WL)
3. Master apical file (MAF)
4. Master apical cone (MAC)

5. Intermediate radiograph
6. Final obturation (without clamps)

Retreatment

Definition

Endodontic retreatment is a procedure performed on a tooth that has received inadequate endodontic treatment resulting in a condition requiring further endodontic treatment to achieve a successful result.

Procedure

1. Give local anesthesia if needed,
2. Place rubber dam,
3. Prepare access cavity and locate canal orifices,
4. Remove the coronal portion of gutta-percha by hot plugger or by Gates Glidden burs to provide reservoir for the solvent "chloroform" that is used to dissolve the remaining gutta-percha,
5. Estimate the working length of the treated tooth from the preoperative radiograph and confirm it radiographically during instrumentation of the canal,
6. Dispense one or two drops of chloroform into the coronal part of the canal, leave it for seconds, then with large files (e.g. #30 H-File) remove the gutta-percha high in the canal and decrease the size of the file as you removed toward the apex,
7. Irrigate canal using (Protocol 2), and repeat step 6 until all the gutta-percha removed.
8. After the bulk of the old filling removed, circumferential filling is done to remove all gutta-percha and sealer from the walls.
9. Expose a radiograph to ensure a complete removal of gutta-percha (without files inside the canal).
10. Prepare canals one size larger than the initial file to remove the infected dentin of the canal walls, not like the primary RCT where the initial file should be increased 3-4 sizes larger. Unless the canal wasn't enlarged during the previous RCT.

Management of Acute Endodontic Conditions

Management of Symptomatic (Acute) Apical Periodontitis

1. Profound anesthesia (supplement),
2. Apply rubber dam,
3. Access cavity preparation,
4. Complete removal of infected pulp tissues,
5. Copious irrigation (Protocol 2),
6. Carefully dry the canals with paper points,
7. Intracanal medicament $(CaOH)_2$,
8. A dry cotton pellet is placed ,
9. Close the cavity with temporary filling
10. Reduce the occlusion,
11. Analgesics are indicated

Management of Acute periapical abscess

1. Apply rubber dam.
2. Access cavity preparation- Stabilize the tooth with a finger pressure to reduce pain
3. Debride root canals thoroughly,
4. Drain pus*,
5. Copious irrigation (Protocol 2),
6. Canal dryness (paper points),
7. Intracanal medicament $(CaOH)_2$,
8. Cotton pellet in pulp chamber,
9. Temporary coronal seal,
10. Antibiotic (in case of systemic involvements- see the indication of antibiotic),
    - NEVER prescribe antibiotic without approval from your clinical instructor
11. Analgesics

Management of Phoenix abscess

1. Apply rubber dam,
2. Access cavity preparation- Stabilize the tooth with a finger pressure to reduce pain,
3. Debride root canals thoroughly,
4. Drain pus*,
5. Copious irrigation (Protocol 2),
6. Canal dryness (paper points),
7. Intracanal medicament $(CaOH)_2$,
8. Cotton pellet in pulp chamber,
9. Temporary coronal seal,
10. Antibiotic (in case of systemic involvements- see the indication of antibiotic),
    - Never prescribe antibiotic without approval from your clinical instructor

1. Analgesics

Drainage is done for two reasons:

- Relief of pressure and pain and
- Removal of a very potent irritant- purulence

***Pus drainage**

1. ***Through the canal***

a. Draining of pus after opening the pulp chamber

b. Violation of apical foramen is done if pus does not drain through the access cavity (penetration of the apical foramen with small files (up to 25) may initiate drainage and release of pressure) Ask the advice and approval of your clinical instructor.

2. ***Surgical drainage***

Incision in case of localized fluctuant swelling resulted from the accumulation of exudate within soft tissues (this should be managed by oral surgeon or endodontist).

Management of Cellulitis

1. Canal debridement or extraction.
2. The apical foramen may be gently penetrated with a file although drainage often does not occur.

(Some cases especially immunocompromised patients, they need to be referred for hospitalized emergency room for intravenous antibiotics, incision, corticosteroids and placement of several drains. Therefore, ask your clinical instructor to guide you)

Management of Acute Endodontic Conditions

Management of incomplete removal of pulp tissues during the initial appointment

1. Anesthesia is needed,
2. Apply rubber dam,
3. Remove temporary filling.
4. Reestablish the working length (by apex locator then confirm it by a radiograph),
5. Remove the remaining vital pulp tissue completely,
6. Copious irrigation (Protocol 1),
7. Carefully dry the canals with paper points,
8. Intracanal medicament $(CaOH)_2$,
9. A dry cotton pellet is placed,
10. Close the cavity with temporary filling,
11. Analgesic is prescribed (if needed)

Antibiotics and Analgesics in Endodontics

Indications of Antibiotics

1. Fever > 37.7 °C
2. Malaise
3. Lymphadenopathy
4. Trismus
5. Increased Swelling
6. Cellulitis
7. Osteomyelitis
8. Persistent Infection
9. Immunocompromised patient

Standard antibiotic treatment regimen

Penicillin VK (phenoxymethyl penicillin) 500 mg every 4-6 h for 3-7 days. Or amoxicillin 500 mg every 8 h for 3-7 days. If after the initial treatment, symptoms do not improve over a two- to three-day period then metronidazole (500 mg every 8 h for 5-7 days) may be added to the original prescription of penicillin or clindamycin.

If allergic to penicillin: Clindamycin 300 mg every 6 h for 3-7 days.

Indication of prophylactic antibiotic

1. For patients at risk of developing infective endocarditis
2. Following trauma to prevent inflammatory root resorption and replacement resorption
3. Prior to some surgical situations

Patients at risk of endocarditis

1. Prosthetic cardiac valves, including transcatheter implanted prostheses and homografts.
2. Prosthetic material used for cardiac valve repair, such as annuloplasty rings and chords.
3. Previous IE.
4. Unrepaired cyanotic congenital heart disease or repaired congenital heart disease, with residual shunts or valvular regurgitation at the site of or adjacent to the site of a prosthetic patch or prosthetic device.
5. Cardiac transplant with valve regurgitation due to a structurally abnormal valve.

Standard antibiotic prophylactic regimen

Amoxicillin 2 g, 1 hour prior to procedure

In case of allergy to penicillin: clindamycin 600 mg 1 hour prior to procedure

Conditions Not Requiring Antibiotics

1. Pain without signs and symptoms of infection
    a. Symptomatic irreversible pulpitis
    b. symptomatic periradicular periodontitis
2. Teeth with necrotic pulps and a radiolucency
3. Teeth with a sinus tract (chronic periradicular abscess)
4. Localized fluctuant swellings

Analgesic/anti-inflammatory drugs

1. ibuprofen, 400-600 mg every 8 hours for anti-inflammatory effect.
2. paracetamol, 500-1000 mg every 6 hours as needed
3. paracetamol (300 mg) and codeine (30 mg) (Tylenol with codeine #3), 1-2 tablets every 4-6 h
4. paracetamol 500 mg, with 30 mg caffeine and 8 mg codeine phosphate (Solpadeine): 2 capsules every 4 hours as needed

for moderate to severe pain: combination of paracetamol and Ibuprofen, Dose: 500-1000 mg of paracetamol + 400-600 mg of ibuprofen every 6 hours for maximum of 3 days.

Prosthodontics Clinical Manual

Clinical Rules

This manual identifies the protocol of patient treatment and student conduct at Prosthodontics clinic:

- No treatment can be initiated until the instructor is present in the clinic. Students should always get permission to start, no matter what the procedure (including exams, x-rays).
- Students who are late or who have late patient appointments will not be allowed to start clinic procedures unless prior approval has been obtained from the course director and depending on patient arrival times, students with guidance from faculty may be instructed to select alternative treatment for the patient for that day.
- The student is expected to have the basic knowledge of the procedure to be done. Failure to demonstrate adequate knowledge about the procedure will result in **dismissal of the patient and student from the clinic immediately.**

The student is expected to be familiar with each clinical procedure to be completed. This knowledge should be based upon an overall view of the relationship of these procedures in the fabrication of the prosthesis. Each procedure should follow a step by step sequence as detailed

- in preclinical courses, or as currently detailed by an instructor. **The student is not allowed to proceed to another step until the preceding step is evaluated and approved by the instructor.** This step by step procedure in the clinical development of the prosthesis in intended to give the student a better understanding of the value and importance of the sequence of steps in the practice of prosthodontics.
- Before commencing treatment on the Fixed Prosthodontics and Removable Partial Prosthodontics case, the student must have periodontal clearance, diagnostic radiographs and study casts. Diagnostic wax up should be provided when requested by the clinical instructor.
- The student must present the patient's case or potential treatment to the attending faculty for evaluation and acceptability as a treatment case in the clinic.

- Final impressions for fixed prosthodontics will not be allowed until a provisional restoration has been completed and approved by the clinical instructor.
- Final impression must be completed by 11:00 a.m. for the morning session and 4:00 for the afternoon session.
- Students must complete any treatment they started. **Students are not allowed to leave incomplete treatment under any circumstances.**
- It is recommended to work with the same instructor throughout a case whenever possible.
- The instructor who approves the final impression will assume responsibility for supervising the case through the laboratory phases (i.e. dies, articulation, work authorization, etc.).

Clinical Protocol

Patient Management & Treatment Sequence

- Students should keep patients informed, give adequate advanced notice for scheduling appointments, counsel when treatment problems arise, and consult with instructors when necessary.
- Patients with any required periodontal therapy must be completed before initiating fixed prosthodontic treatment (periodontal clearance). **Generally**, **all direct procedures should be completed prior to beginning indirect procedures.** Following completion of direct procedures, an operative faculty should certify that all required operative treatment has been acceptably completed (i.e. Operative Case Complete). Permission of fixed prosthodontic treatment will not be given until *Tx Note is added to clarify that all periodontal and operative treatments are completed.*
- Typically, fixed prosthodontic patients should have a clear bitewings x-rays for all posterior teeth. Recent clear periapical x-rays of teeth to be restored should be available.
- All indirect procedures must be planned and sequenced. This may be done initially on a Fixed Prosthodontics Treatment Plan, and it should be approved by a clinical instructor.

- If possible, students should start their fixed clinical experience with a simple crown and gradually work into more complicated procedures. The following guidelines apply for progressing through the clinical requirements. This will facilitate patient treatment and optimize the learning experience for the student.
- All steps should be completed by the same student **(No exception will be given to competencies or any other reasons).**
- The clinical instructors must evaluate the procedures performed and give permission to dismiss the patient. At no time, will a patient be dismissed from the clinic without expressed permission from the clinical instructor.
- A Treatment Planning and Diagnostic wax-up appointment in the Prosthodontics clinic must be completed prior to appointing a patient for actual definitive treatment (tooth preparation).

Records and Charts

- No student will be permitted to bring a patient to the Prosthodontics clinic without the patient's e-records readily available and updated.
- A treatment plan must be established for all fixed prosthodontic procedures to initiating fixed prosthodontic treatment and approved by the instructor and the patient.
- The proper codes for the procedure must be entered correctly in the Treatment Plan. If the code needs to be changed (e.g. All ceramic to PFM), this must be done when the clinical procedure is still in the "Planned" status. The status should not be changed to "In Progress" without an instructor approval.
- The student must request that the instructor approve all procedures completed.
- The student will not be allowed to progress to the next step if the previous one has not been evaluated and approved.
- The treatment records must be completed at the end of each clinical period.
- When a restoration is completed (i.e. final cementation), the restoration must be identified as "Completed" in **Axium.**

Fixed Prosthodontics Manual

Treatment Plan

Armamentarium

1. Case presentation-detailed and extensive treatment planning;

2. Prerequisites for this step are the Operative Periodontal Clearance.

3. Diagnostic casts, as indicated; instrument cassette

Procedure

1. Obtain permission to start appointment.

2. Obtain current x-rays (periapical, bitewings), if indicated.

3. Complete Fixed Pros Tx Plan, enter the planned treatment listing all indicated fixed prosthodontics procedures, including phase, sequence, Axium code, restoration type & design, articulation, miscellaneous steps, etc.

4. With an instructor, review and confirm proposed fixed prosthodontics treatment plan, sequence, and other information.

5. In Axium, enter all planned treatment at *Tx Plan* tab (*Problems, Diagnosis, Detailed Plan, etc.)* with proper codes & sequence. Add *Tx Note.* The note will list all the planned indirect restorations to include tooth #, restoration type & design (porcelain coverage & margin design), and any other pertinent information.

6. Have Instructor change this step to either I or C (as indicated) and approve the *Tx Note*.

Comments and Tips

1. The purpose of this appointment is to review and update the treatment plan.

2. The review and confirmation of the fixed prosthodontic treatment plan should consider the current periodontal and endodontic status of the teeth. Teeth should be evaluated for acceptability of foundation restorations, need for post and core, crown lengthening, or molar up-righting, etc.

3. New casts are required following any significant change (i.e., extensive indirect restorations, extractions, occlusal adjustment, etc.).

4. Teeth should be evaluated for restorability **after caries excavation and prior to endodontics**.

5. Patients should receive a thorough periodontal evaluation to include mucogingival problems, crown lengthening, pocketing, mobility, bone support, and treatability prognosis. All periodontal treatment should be accomplished prior to fixed prosthodontic treatment. If indicated, these teeth should be re-evaluated for fixed prosthodontic treatment after periodontal therapy. However, there are some instances where an initial crown preparation and provisional are needed prior to periodontal therapy.

6. No decay should be present when referring the patient for periodontal or endodontic therapy.

7. Any extensive restoration that was not placed recently in the dental school should be evaluated for replacement. The student should check with an instructor about these restorations.

Tooth Preparation

Armamentarium

1. Must have an approved Treatment Plan.

2. Current PA radiograph.

3. Mounted diagnostic casts on the articulator (if indicated).

4. Unmounted duplicate casts of diagnostic wax-up (if indicated).

5. putty index (if applicable).

6. Instrument cassette, handpieces, burs.

7. Provisional kit (disks, stones, acrylic bur, rubber wheels, etc.) from dispensary

Procedure

1. Obtain starting check after reviewing proposed treatment and confirm correct AxiUm code with the clinical instructor

2. Administer local anesthetic & prepare tooth; obtain evaluation from instructor.

3. Fabricate provisional restoration; and obtain evaluation from the instructor. If the time is enough, precede to final impression step, if not then go to step 4.

4. Cement provisional with temporary cement and give patient instructions in maintenance of provisional.

5. Add *Tx Note* to step. Include all detailed steps. Add procedures planned for next visit (NV).

6. Have the instructor change status of preparation and provisional steps to I or C, as indicated and approve step(s) and added *Tx Note*.

Comments and Tips

1. Determining the need for crown lengthening or RCT when preparing a tooth for a crown should be done **AFTER** all decay has been removed. When possible, establishing a finish line prior to crown lengthening gives the surgeon a definite guide as to the desired position of the bone-gingival complex.

2. Supra gingival or equal gingival finish line should be prepared whenever possible. If subgingival finish line is needed, it should be placed within the gingival sulcus and at least 3 mms should be left between the finish line and the alveolar bone so as not to violate the biological width.

3. Inspect preparations carefully for smooth, continuous margins without shoulders, ledges, lips, or unsupported enamel.

4. It is recommended to complete a prosthesis with the same instructor who supervised the preparation.

5. If the pulp is exposed during crown preparation, endodontic therapy must be completed before the crown fabrication; **a student will receive no credit for the preparation step if she creates an avoidable mechanical exposure.**

6. If a tooth is wrongfully prepared, **a student will receive no credit for the preparation, and she must fabricate the crown for no credit, and the patient will not be charged**.

7. The preparations must be approved prior to the final impression.

Sequence of preparation:

Posterior metal ceramic prosthesis	Occlusal reduction	- The reduction should maintain the basic anatomy of occlusal inclines. - Functional cusp should be beveled.
	Axial reduction	- Ensure that over tapering and undercuts are avoided. - Heavy chamfer finish line is provided. - Initial proximal preparation should commence using fine needle bur to protect the adjacent tooth.
	Finishing	- Care must be taken to ensure rounding of the labio-proximal and linguo-proximal line angles. - Preparation should be smooth of all irregularities before considering it for impression.
Anterior metal ceramic prosthesis	Labial reduction	- A uniform reduction of approximately 1.2 mm is needed over the entire facial surface. - The facial surface must be prepared in two planes that correspond roughly to the two geometric planes present on the facial surface of an uncut tooth.
	Incisal reduction	- Reduce the incisal edge by 1.5 to 2 mm. - The plane of the reduced surface parallel to the former incisal edge.
	Proximal and lingual reduction	- Reduction is carried proximally and lingually using the same bur (round-end tapered bur) - Lingual surface is reduced with a small wheel diamond to obtain a minimum of 1 mm of clearance with the opposing teeth. - The junction between the cingulum and the lingual wall must not be over-reduced.
	Finishing	- Preparation should be smooth of all irregularities before considering it for impression.

Anterior All-ceramic prosthesis	Incisal reduction	- Reduce the incisal edge by 1.5 to 2 mm. - The plane of the reduced surface parallel to the former incisal edge.
	Labial reduction	- Shoulder finish line is prepared. - The facial surface must be prepared in two planes that correspond roughly to the two geometric planes present on the facial surface of an uncut tooth.
	Proximal and lingual reduction	- Adequate amount of reduction should be provided which ensures uniform thickness of ceramic 1 to 1.5 mm. - Lingual surface is reduced with a small wheel diamond to obtain a minimum of 1 mm of clearance with the opposing teeth.
	Finishing	- Care must be taken to round all angles and to have smooth prepared surfaces before making the final impression.

9. All teeth must have a provisional restoration before the patient can leave the clinic.

10. Provisional crowns should be adjusted before proceeding with the final impression.

11. Regardless of the type or technique used for provisional crown fabrication, crowns should be highly polished with adequate margins, proper occlusion and fit.

12. All provisional restorations must be checked prior to and after cementation.

Final Impression

Armamentarium

1. Custom tray or stock tray (as indicated).
2. Instrument cassette, handpieces, burs and diamond stones.

Procedure

1. Obtain starting check and approval to begin impression procedure.

2. Remove provisional restoration, administer local anesthetic and try the tray.

3. **Have instructor check preparation for any additional design modifications.**

4. Achieve adequate and atraumatic isolation, retraction and moisture control.

5. Produce an accurate elastomeric impression of the prepared tooth.

6. Rinse and disinfect impression.

7. Make interocclusal record for mounting of working cast and an alginate impression for a current opposing cast (if needed). Select porcelain shade for PFM crown.

8. Re-cement provisional restoration.

9. Add *Tx Note* to step and add procedures planned for next visit (NV).

10. Have the instructor change impression step to either "In Progress" or "Complete". Preparation, provisional, IOR, and shade selection steps, should be indicated as "Complete". Instructor approve the steps and added *Tx Note*.

Comments and Tips

1. An impression cannot be made unless **the preparations and provisional have been approved** and the provisional is ready for cementation.

2. Patients should be maintained in a supine position during retraction cord application using cotton rolls and a saliva ejector to maintain a dry field.

3. Proper size of retraction cord should be used. Cord placement should be done firmly but gently, and impression should be made immediately after removal of the retraction cord.

4. If the soft tissue at the crown margin is inflamed and/or bleeds easily, it is often impossible to achieve an acceptable impression. In these cases, it is better to make sure the provisional fits well, that there is no residual cement in the sulcus and that the patient knows how to maintain proper plaque control. The impression should be delayed after 1-2 weeks until adequate healing has taken place.

5. All fixed partial dentures and surveyed crowns require **a full arch impression**

6. The tray should be held in position for at least the first 5 minutes and **a patient must not be left alone with an impression in his/her mouth**. Before the tray is inserted, the patient should be in upright position while the impression is setting.

7. Crowns and FPDs are fabricated in MI (maximum intercuspation). In most cases for single units, the working cast may be hand-articulated to the opposing cast. However, if posterior teeth are missing, it may be necessary to fabricate record bases and wax rims on the working casts to properly articulate these casts. This should be done before sectioning the working dies. This will require a separate appointment to make the IOR. Occasionally, a PVS putty IOR may be adequate, depending on the degree of accuracy required for the restoration.

8. An alginate impression must be made to obtain a current opposing cast if any new restorations have been placed since the cast was made, or the opposing cast is damaged or otherwise inadequate.

Metal Try-In Appointment

Armamentarium

1. Instrument cassette, handpieces, etc.
2. Fit Checker.
3. Thickness gauge.

Procedure

1. Evaluate and adjust, if needed, in the following order (proximal contacts, internal adaptation, external adaptation, pontic to ridge relationship, adequate clearance for porcelain, occlusion, location of porcelain-metal junction, connector size and clearance for gingival papilla, metal collar.

2. Make a bite-wing x-ray to confirm the mesial and distal integrity of the metal core.

3. Remount the cast prior to returning to lab if the occlusion required substantial adjustment. This may require the use of an IOR made between the framework and the opposing teeth. For FPDs with a porcelain occlusal design, verify the mounting with a PVS IOR and remount if necessary to minimize occlusal adjustment at delivery. If opposing cast or teeth were adjusted, make a new alginate impression.

4. Select or confirm the porcelain shade.

5. Receive approval of coping (framework) and shade selection.

6. Obtain e-signature and evaluation for the step

Cementation Appointment

Armamentarium

1. Handpieces, instrument cassette.

2. Crown adjustment kit.

3.Fit checker.

4. Cotton rolls, articulating paper, ribbon, or film.

5. Thickness gauge.

Procedure

1. Evaluate and adjust, if necessary, in the following order: (proximal contacts, internal fit, external adaptation, occlusion, contour).

2. Receive evaluation of adjustments.

3. Polish restoration (This should be done in the lab, if extensive) and obtain pre-cementation evaluation from instructor.

4. Clean tooth preparation and internal surface of casting

5. Isolate and dry tooth, if indicated.

6. Cement the restoration and remove excess cement.

7. Post-cementation evaluation of occlusion and cement removal by student and then by instructor.

8. Make a bite-wing x-ray to confirm the integrity of the prosthesis and the complete removing of residual cement at the mesial and distal sulcus.

9. Add *Tx Note* to step and add procedures planned for next visit (NV).

10. Have the instructor change status of cementation step to “Complete” and approve step and added *Tx Not*e.

Comments and Tips

1. Student should receive the restoration before booking an appointment for the patient and she should check the fit of the casting to the die prior to the cementation appointment. I**f the casting does not fit the die, it will not fit the tooth**.

2. The casting should be evaluated for optimum seating with the use of Fit-Checker. 3. Adjustments on the walls or near the margins are usually made inside the casting.

4. Measure crown thickness when necessary to prevent perforation, especially for PFM units where the metal thickness under the porcelain is quite thin. Internal adjustments of any restoration should be very minor. **Do not grind on the inside of all-ceramic crowns, as this may result in a fracture.**

5. The casting should be evaluated by an instructor after the proximal contacts and internal adjustments have been made. This will insure that the margins are acceptable before time is devoted to adjusting the occlusion. **The occlusion must not be adjusted until instructor has verified seating**.

4. FPDs may be cemented provisionally for several days to one week. This will allow alterations if needed for occlusion, esthetics, pontic design, or soft tissue condition.

5. Appropriate cement should be used according to the case.

6. Cement material should be mixed according to the manufacture's recommended proportion in order to get the proper consistency.

7. Crown or retainers are loaded with a thin layer of cement material and then fitted over the preparation.

8. Final cementation: For posterior units, the patient must use heavy biting force to seat the casting, while for anterior prosthesis, finger pressure must be used to produce a force in the long axis of the preparation.

Post & Core Fabrication (Cast or Pre-fabricated)

Armamentarium

1. Diagnostic casts, matrix.

2. Instrument cassette, handpieces, burs and diamond stones.

3. Provisional armamentarium.

4. Radiograph of completed root canal filling.

Procedure

1. Obtain starting check and review proposed treatment and confirm AxiUm code is correct.

2. Prepare coronal aspect of tooth for the indicated crown. Make decision about the type of post/core required based on the amount of remaining tooth structure.

3. Gain access to pulp chamber; remove filling material. Remove gutta percha from desired canal (Remove 2/3 of the gutta-percha or leave an apical seal of 3-5 mm of gutta percha) with rotary instruments (Gates Glidden or Peeso Reamer) or heated endodontic plugger as directed by instructor. **Never use a high-speed bur in the canal and do not use the parapost drills to remove gutta perch.**

4. If using a rotary instrument, choose it to be slightly narrower than the canal, make sure that the instrument follows the path of least resistance through the gutta-percha, without cutting dentin.

5. Make PA x-ray to confirm depth of GP removal and integrity of apical seal. (The working length for the post space is to be radiographically determined.

6. After the gutta-percha has been removed to the appropriate depth, shape the canal as required by the type of post to be used and complete coronal preparation.

7. Obtain evaluation from instructor.

a. Prefabricated Post & Core

- Obtain prefabricated post (Titanium, stainless steel or fiber post) corresponding to drill used.
- Cut off post to provide 2 mm of occlusal clearance.
- Cement (Titanium or Stainless steel) post into canal using Lentulo spiral to spin the cement into the canal. Use resin cement for fiber post cementation.
- Place core material (with either an amalgam or composite).
- Prepare for crown; make and cement provisional restoration.

b. Cast Post & Core

- Make impression of post space and preparation (indirect technique) or make a direct-resin pattern.

- Fabricate and cement provisional restoration.
- Have the instructor change status of step to “In Progress” and approve step and added *Tx Note*.

Delivery of Cast Post & Core

1. Fit post and core to canal.

Finish preparation (all possible corrections to core should be made prior to cementation).

3. Make a PA x-ray to confirm the adequate length and integrity of the cast post.

4. Obtain evaluations and approval to cement from instructor.

5. Cement the post and core using lentulo spiral to spin the cement into the canal.

6. Make and cement the provisional restoration.

From this point the goals for the preparation appointment will apply. The post and core status will be changed to “Complete” in AxiUm. The crown step can be changed to “In Progress”, if desired.

Comments and tips

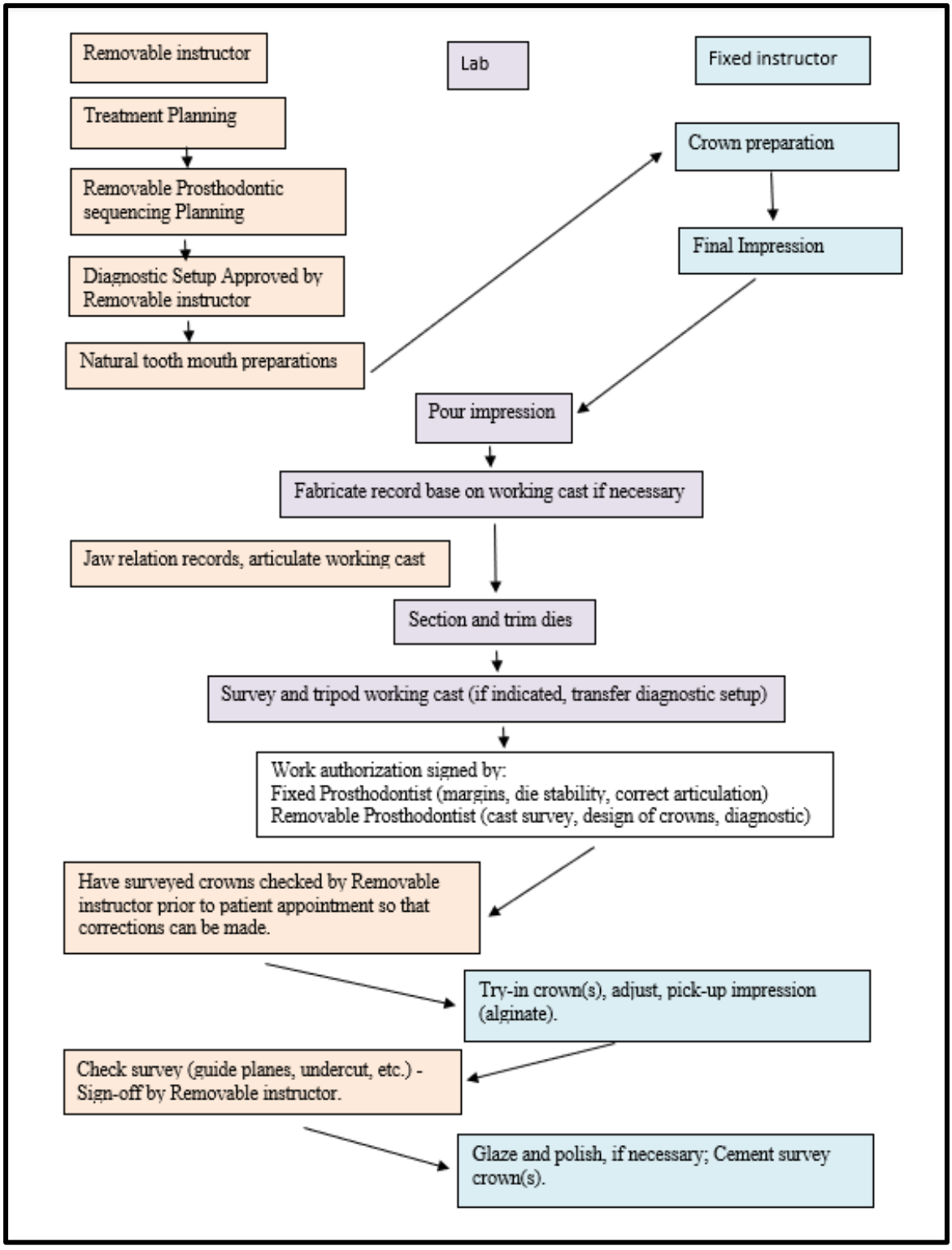
1. The amount of remaining tooth structure, the height of the crown, the occlusal scheme, and significance of the tooth in that occlusion will be factors in the decision of type of post system to be used.

2. Drill is set to the designated depth **with rubber stopper** and canal space is prepared.

3. Make sure that the drill is not tilted while entering the canal to avoid ledge formation and perforation.

4. Canal should not be over prepared to thin the remaining wall; Post space should be 1/3 of the root thickness with at least 1 mm of sound root structure surrounding it).

Surveyed Crown and combined fixed RPD cases:



Evaluation Criteria for Fixed Prosthodontic Procedures:

The clinical instructors will supervise and provide continuous assessment and feedback to the student regarding student performance.

Procedure	Criteria	Ideal	Unacceptable
Preparation	Occlusal/Incisal Reduction	1.5 – 2.0 mm.	Excessive reduction or inadequate clearance.
	Facial/Lingual Reduction	1.0 -1.5 mm.	Insufficient reduction for replacement or over-reduction.
	Proximal Reduction	Proper reduction for replacement.	Excessive proximal reduction. Proximal contact not broken.
	Retention & Resistance Form	12-16° taper of opposing walls. Minimum 3 mm axial wall height.	Over-tapered or undercut.
	Finish Lines and Surface Finish	Visible, smooth, continuous finish lines, placement on sound tooth structure. Proper location to achieve the desired esthetic result.	Feather edge or lipped margin. Surface finish is rough, irregular, sharp.
	Caries, Pulp Exposure, Damage to Adjacent Tissues	Finish line extended 1 mm to intact tooth structure. Adjacent teeth are not affected.	Caries remaining or mechanical pulp exposure. Damage to adjacent tooth or restoration during preparation. Damage to prepared tooth by cutting dry.

Provisional Restorations	Occlusion	Proper occlusal contact, at least one contact per tooth.	High or under occlusion.
	Marginal Adaptation	All margins are sealed without overhang or negative ledge.	Open, short margins. Overhanging margins. Negative ledge margins.
	Proximal Contact	Adequate and harmonious with adjacent teeth. Visible contact.	Open or tight contact.
	Esthetics, Contour, Occlusal Form, Pontic Form	Proper esthetics, contour, embrasures, occlusal form, pontic form, and surface finish.	Presents of roughness, or voids. Over or under contour. Soft tissue impingement.
Impression	Isolation and retraction	Proper application of isolation and management of retraction.	Inadequate retraction. Excessive force in placement of retraction cord. Excessive use of chemical hemostatic agents. Moisture or hemorrhage which prevents making an adequate impression.
	Tray	Tray has adequate coverage of all teeth and soft tissue areas with 3 mm space for impression material.	Insufficient impression material coverage of tray.
	Margins	Margins detected with clear cuff.	Finish lines not visible.

	Voids	Void-free or small voids in the periphery.	Voids in impression near the preparations, pontic areas, or occlusal surfaces.
Delivery	Occlusion	Proper occlusion	Supra-occlusion, Infra-occlusion. Eccentric interferences.
	Marginal Adaptation	Proper margin integrity without overhang or negative ledge.	Open margin. Overhanging or bulky margin. Negative ledge margins.
	Proximal Contract	Adequate and harmonious with adjacent teeth.	Open contact. Excessively tight contact. Improper location of contact.
	Surface Finish	A smooth, highly polished surface.	
	Esthetics, Contour, Occlusal Form, Pontic Form	The student will be evaluated on the chair-side adjustments including occlusal, proximal contouring adjustments.	
Cementation		Adequate isolation. Proper mixing technique. Excess cement is well removed. The casting is well seated.	Inadequate isolation. Poorly mixed cement. Failure of casting to be fully seated. Failure to remove cement from tooth and margin.

Instructors will use the AxiUm Evaluations module to grade students' patient treatment performance.

Fixed Prosthodontics Manual

Complete Denture Prosthodontics

Definition

The body of knowledge and skills pertaining to the restoration of the edentulous arch with a removable dental prosthesis.

Procedures

First Visit

1. Examination, diagnosis and treatment planning.

2. Preliminary impression using edentulous stock trays. Alginate impression material is preferable material of choice used to obtain diagnostic casts.

3. Stock tray should be adjusted with utility wax if needed.

Second Visit

1. Check and adjustment of custom trays in patient mouth (The borders should be 2 mm short than proper depth of vestibules, except posterior palatal seal area).

2. Border molding should be done using green stick compound to record the shape and form of the vestibule.

3. Final impression taken with suitable material:

- Regular silicone impression material can be used with custom tray with spacer.

- Zinc oxide impression material can be used with close fit custom tray.

Third Visit

1. Jaw relationships recording visit.

2. Check record blocks outside the patient mouth (on the casts).

3. Adjust maxillary record block for the following criteria (retention, extension, stability, occlusal plane).

- Wax rim occlusal plane to be parallel to the interpapillary line anteriorly and parallel to Camper's plane posteriorly.

- With the lips at rest; the wax rim should project 1-2 mm below the lip line.

4. Adjust mandibular record block for the following criteria (retention, extension, stability, occlusal plane).

- Wax rim occlusal plane to be at level of inner surface of vermillion border of lip anteriorly and at level of to ⅔ retromolar pad area posterior.

5. Determine the midline.

6. Construct the index in the wax rim in premolar and molar areas.

7. Recording the vertical dimension of occlusion:

- Establish VDR, place the maxillary occlusion block in patient mouth.

- Place the patient in an upright position.

- Place marks on the tip of nose and the tip of the chin, on the greatest height of curvature. Make sure the chin is unstrained "VDR" then subtract the freeway space to get "VDO".

8. Register centric relation records using Iowa impression wax.

9. Face bow transfer in case that is indicated for balance occlusion.

10. Select shade and mold by means of shade and mold guides.

Fourth Visit

1. Try in of waxed up denture (Maxillary and mandibular).

2. Check retention stability and extension.

3. Esthetics and phonetics evaluation.

4. Verification of VDO and centric relation.

5. Obtain protrusive records.

6. Record posterior palatal seal.

Fifth Visit

1. Examine the processed denture outside the patient mouth.

2. Examine the denture inside the patient mouth and adjust accordingly.

3. In case of maxillary and mandibular dentures are constructed, denture placement should be carried out for each denture independently.

4. Examine both dentures intraorally Using PIP (pressure indicating paste).

5. Check centric occlusion of denture teeth and do clinical remount if necessary.

6. Educate your patient for proper placement and removal of the denture following the selected path of insertion.

7. Patient education for denture hygiene and reemphasize of oral hygiene instructions.

8. Inform the patient about the importance of removing the denture outside the oral cavity at least 8 hours /day.

Sixth Visit

1. Post-insertion visit.

2. Examination of the intraoral tissues to check the mucosal reaction to the denture.

3. Readjust according to intraoral examination and patient complains.

4. Reemphasize oral and denture hygiene instructions.

5. Reset another visit if required.

Single Complete Dentures

Definition

A complete denture that occlude against some or all of the natural teeth, a fixed restoration, or a previously constructed removable partial denture or a complete denture.

Procedures

- Evaluate the natural teeth in the opposite arch to plan the proper way of occlusal adjustment.
- Consider prevention and management of combination syndrome, if only mandibular anterior teeth are remaining.
- Mandibular single denture should be constructed with cobalt chrome alloy.

First Visit

1. Examination, diagnosis and treatment planning.
2. Preliminary impression using edentulous stock trays to obtain diagnostic casts for the edentulous maxillary arch.
3. Preliminary impression using dentulous stock tray to obtain diagnostic casts for the mandibular arch.

Special visits for occlusal adjustment must be done if needed before final impression.

Each case differs in the amount and technique of occlusal adjustment. Mounted diagnostic casts are mandatory.

Second Visit

1. Check and adjustment of custom trays in patient mouth.
2. Border molding to record the shape and form of the vestibule.
3. Final impression in suitable material for the maxilla.
4. Final impression in suitable material for the mandible.

Third Visit

1. Jaw relationships recording visit.
2. Check record blocks outside the patient mouth.
3. Adjust the maxillary record block (completely edentulous).
4. Adjust mandibular record blocks (if partially edentulous).
5. Register centric relation records.

6. Face bow transfer.

7. Select shade and mold by means of shade and mold guides. (Use shade of mandibular teeth as Your start point).

Fourth Visit

1. Try in of waxed up denture (Maxillary and mandibular).
2. Check retention stability and extension.
3. Esthetics and phonetics evaluation.
4. Verification of centric relation.
5. Obtain protrusive records.
6. Record posterior palatal seal.

Fifth Visit

1. Examine the processed denture outside the patient mouth.
2. Examine the denture inside the patient mouth and adjust accordingly.
3. In case of maxillary and mandibular dentures are constructed, denture placement should be carried out for each denture independently.
4. Examine both dentures intra-orally Using PIP (pressure indicating paste).
5. Check centric occlusion of denture teeth and do clinical remount if necessary.
6. Educate your patient for proper placement and removal of the denture following the selected path of insertion.
7. Patient education for denture hygiene and reemphasize of oral hygiene instructions.
8. Inform the patient about the importance of removing the denture outside the oral cavity at least 8 hours /day preferable at night during sleeping.

Sixth Visit

1. Patient complaints.
2. Examination of the intraoral tissues to check the mucosal reaction to the denture.
3. Readjust according to intraoral examination and patient complains.
4. Reemphasize oral and denture hygiene instructions.
5. Reset another visit if required.

Immediate Complete Dentures

Definition

An immediate denture is a dental prosthesis constructed to replace the lost dentition and associated structures of the maxillae and/or mandible and inserted immediately following removal of the remaining natural teeth.

Procedures

First Visit:

1. Examination, diagnosis and treatment planning.
2. Preliminary impression.

Second Visit

1. Check and adjustment of custom trays in patient mouth.
2. Border molding to record the shape and form of the vestibule.
3. Final impression in suitable material for both upper and lower arch

Third visit:

Jaw relationships recording visit.

1. Check record blocks outside the patient mouth.
2. Adjust the maxillary record block.
3. Adjust mandibular record blocks.
4. Register centric relation records.
5. Face bow transfer.
6. Select shade and mold by means of shade and mold guides.

Fourth Visit:

Evaluation of Trial Denture.

Fifth Visit:

1. Extraction.
2. Insertion.

Sixth Visit:

Post insertion appointment.

Overdentures

Definition

Is a removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants.

Procedures

1. Preliminary impressions for maxillary and mandibular arches.
2. Evaluate Overdenture abutment for the following:

   a. **Periodontal status:**
      - Surrounded by healthy periodontal tissues.
      - Circumferential band of attached gingiva.
      - Avoid abutments with vertical bone loss.
      - Avoid abutments with grade II or III mobility.
   b. **Caries susceptibility.**
   c. **Potential for endodontic treatment.**
   d. **Positional considerations:**
      - Mandible: canines or premolars.
      - Maxilla: canines or premolars, and incisors.
      - Recommendation of at least one tooth per quadrant.
      - Ideal situation: when four or more abutment teeth are spread out over as wide a rectangular area as possible (provides for maximum denture stability).
      - One or two teeth, though less than ideal, can be used satisfactorily.
      - If adjacent abutments, there should be several millimeters of space between the reduced tooth forms to minimize compromises in soft tissue health.
      - Position of tooth in the arch and its position between the buccal and lingual cortical plates

3. Attachments.
4. Final impressions (follow complete denture steps).
5. Interocclusal records (follow complete denture steps).
6. Trial insertion (follow complete denture steps).
7. Insertion (follow complete denture steps).

8. Post insertion appointments (follow complete denture steps).

Types of tooth supported Overdenture abutment preparation:

a. Non-coping preparation

- Tooth is reduced to a coronal height of 2-3 mm.
- Crown is contoured to a convex or dome shape,
- Tooth filled with amalgam or composite restoration (1-2 mm).

b. Coping preparation

- Short: 2-3mm long/ RCT done/ Copings are with a post/ Canals filled with GP.
- Long: 5-8 mm long/ RCT is not a must/ Copings are long.

Removable Partial Denture Prosthodontics

Definition

The branch of prosthodontics concerned with the replacement of teeth and contiguous structures for edentulous or partially edentulous patients by artificial substitutes those are readily removable from the mouth.

Procedures

First Visit

1. Diagnosis, treatment planning, patient education and oral hygiene instructions to obtain diagnostic casts.
2. Preliminary impression using dentulous or partially edentulous stock trays.

Second Visit

1. Surveying of diagnostic cast using surveyor.
2. Draw the RPD design on the diagnostic cast and the design sheet.
3. List abutment modifications on the RPD diagnosis sheet.
4. Take your instructor approval.
5. Mouth preparation phase 1 (treatment of carious teeth, retreatment of defective restorations, extraction of none restorable teeth and provide periodontal treatment if needed). More visits might be needed.

Third Visit

1. Abutments modification and preparations according to approved design (Guide planes preparation, Buccal and lingual surfaces recontouring and rest seat preparations) -with surveyor available on bracket table.
2. Check impression stage: Another Preliminary impression in alginate using same stock tray used in primary impressions making and immediate pouring of casts.
3. After approval of poured casts, resurveying of the new cast and modifications on abutment teeth should be carried out if required.
4. Polishing and Fluoride gel application on prepared teeth and patient instructions.

Fourth Visit

1. Final impression using alginate impression material.
2. In case of distal extension RPD, border molding is required in the distal extension parts of the custom tray before making the final impression.
3. Laboratory work -Check the master casts after pouring the impressions for accuracy. Draw the survey line indicate the selected undercut areas with red pencil. Submit the approved design sheets to the production lab.

Before Fifth Visit go the production lab and inspect the RPD metal framework wax pattern for accuracy and precision following up of the approved RPD design.

Fifth Visit

1. Framework examination, evaluation and adjustment (extra oral, intra oral and with opposing occlusion).
2. Finishing and polishing of the adjusted framework.
3. Construction of the attached trays for altered cast impression (in Kennedy Class I and II classification for RPD).
4. Make the impression after border molding and send it to the lab.
5. If the case has no distal extensions proceed with jaw relationship recording or centric occlusion recording according to the situation of posterior tooth contact and number of remaining teeth.
6. Select the shade and the mold of the artificial teeth using shade guide and mold

Sixth Visit

1. Try-in of waxed denture for esthetics

2. Try-in of waxed up denture for proper occlusal contact (whether in centric occlusion or centric relation according to the case).

3. Take patient approval for denture esthetics in cases of replacing anterior teeth.

Seventh Visit

1. Examine the processed denture outside the patient mouth.

2. Examine the denture inside the patient mouth and adjust accordingly.

3. In case of maxillary and mandibular dentures are constructed, denture placement should be carried out for each denture independently.

4. Examine both dentures intraorally and in occlusion.

5. Educate your patient for proper placement and removal of the denture following the selected path of insertion

6. Patient education for denture hygiene and reemphasize of oral hygiene instructions.

7. Inform the patient about the importance of removing the denture outside the oral cavity at least 8 hours /day**.**

Eighth Visit

1. Patient complaints.

2. Examination of the intraoral tissues to check the mucosal reaction to the denture.

3. Readjust according to intraoral examination and patient complains.

4. Reemphasize oral and denture hygiene instructions.

5. Reset another visit if required.

Surveyed Crown

Treatment plan for surveyed crown with removable partial denture:

1. Choose path of insertion.

2. Select abutments.

3. Draw design on the diagnostic cast:

a) Rests.

b) Guide planes.

c) Clasp positions.

4. Construct fixed prosthesis.

5. Construct Removable partial prosthesis.

Steps of fabrication:

1. Mount study casts with a facebow record in Centric Relation) at the proper vertical dimension (With Record bases and wax rims).

2. RPD design.

3. Survey and determine the proper path of insertion for RPD.

4. Set the denture teeth and establish the desired occlusal plane.

5. Scheme of occlusion selected based on the situation existing in the weakest arch.

6. Fabricate preparation guides: Vacuum formed matrix (Suck down) to serve as a tooth preparation guide.

7. Prepare abutment following Tooth preparation guidelines, with extra reduction in the following areas: Rest seats and Guide planes.

8. Final impression for prepared tooth.

9. Place crowns on a solid master cast to check for: Parallel guiding surfaces, Positive rests, Retention in the cervical one third of the tooth.

10. Place on surveyor to establish contours based on the RPD's path of insertion.

11. Prior to cementation recheck the following: Axial contours on the surveyor, Size, position, depth, morphology of rests, Sufficient retention.

12. Cementation procedures for survey crowns are identical to those for conventional restorations.

13. After cementation, allow the cement to set at least 10 minutes prior to the RPD final impression.

14. Prepare other RPD abutments (Guide planes, rest seats, heights of contour for retainers).

15. Final RPD framework impression.

16. Continue with RPD steps (As mentioned in RPD Section).

17. Delivery of RPD.

Evaluation Criteria for Removable Prosthodontic Procedures:

Instructors will use the AxiUm evaluations module to assess (grade) students' patient treatment performance.