OPERATIVE DENTISTRY

GUIDE BOOK

Academic year: 2022-23

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Table of Contents

VISION

To set local and global standards for quality patient outcomes- creating a culture of excellence to promote a transformative experience for the 21st century clinicians, educators and researchers to benefit all humanity.

MISSION

We are committed to develop well rounded academics, thinkers, clinicians and researchers by strengthening a global view, broadening intellectual foundation and teaching effective communication. It is our aspiration to cultivate creative and critical thinking skills for problem solving, sensitive to cultural and ethical values and responsibilities. Our graduates will be role models and leaders for society.

VALUES

- Equity
- Quality
- Compassionate behaviour
- Social accountability
- Social justice
- Humanistic approach
- Leadership
- Innovation
- Integrity
- Collaboration

PROGRAM LEARNING OUTCOMES – 7 STAR DOCTOR - (PMDC)

Our dental graduate shall be able to:

- Develop insight, imagination and curiosity, define one's unique self, one's values and one's place in the world, while incorporating the qualities of a good physician.
- Answer complex questions facing physicians, including the role they should play in society, politics, and promotion of social justice.
- Display enlightenment and moral values to prepare themselves for life and work in a problematic, changing and diverse world.
- Be responsible leaders for their own good of their family, community and country.
- Be humane and socially equipped individuals, in tune with rights of patients and vulnerable groups
- Develop moral reasoning for ethical dilemmas
- Be experts of critical situational analysis
- Believe in diversity in practice
- Display effective communication
- Be able to address population health system issues on the basis of demography, by statistics, epidemiology and cultural nuances.


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OPERATIVE DENTISTRY - COURSE CODE - 4.2

INTRODUCTION

Operative dentistry is one of the oldest branches of dental sciences forming the central part of dentistry as practiced in primary care. The clinical practice of operative dentistry is ever evolving as a result of improved understanding of etiology, prevention and management of common dental diseases. The advances and developments within last two decades have drastically changed the scope of this subject. Since effective practice of operative dentistry requires not only excellent manual skills but also both understanding of disease process and properties of dental materials available for use, the objective of this study guide to help students sail through.

According to Mosby's dental dictionary, "Operative dentistry deals with the functional and esthetic restoration of the hard tissues of individual teeth". According to Sturdevant, "Operative dentistry is defined as science and art of dentistry which deals with diagnosis, treatment and prognosis of defects of the teeth which do not require full coverage restorations for correction". Such corrections and restorations result in the restoration of proper tooth form, function and aesthetics while maintaining the physiological integrity of the teeth in harmonious relationship with the adjacent hard and soft tissues. Such restorations enhance the dental and general health of the patient. According to Gilmore, "Operative dentistry is a subject which includes diagnosis, prevention and treatment of problems and conditions of natural teeth vital or nonvital so as to preserve natural dentition and restore it to the best state of health, function and aesthetics.

The Academy of Operative Dentistry (AOD) defines Operative Dentistry as the field of general dentistry that deals with the management of teeth, by direct or indirect means that are defective through disease, trauma, wear, and/or abnormal development, or are

unesthetic, to a state of normal form, function, health, and appearance. The practice of dentistry in this area requires a wide range of knowledge, from diagnosis, disease processes and prevention, and minimally invasive clinical approaches; to biomaterials and other dental science disciplines as they apply to this distinct and unique interest area limited to the hard calcified tissues of the oral cavity.

At the undergraduate level Operative Dentistry is introduced in second year of teaching to familiarize them with the subject. In the following years of teaching, the students are taught Operative Dentistry with other related sub-specialties like Paedodontics and Endodontics. Students are expected to acquire theoretical knowledge with its application, decision making skills, clinical skills and procedural skills relevant to each of these subject areas as mentioned in detail in the following sections.

At the undergraduate level, the curriculum of Operative Dentistry also includes Paedodontics and Endodontics.

PAEDODONTICS

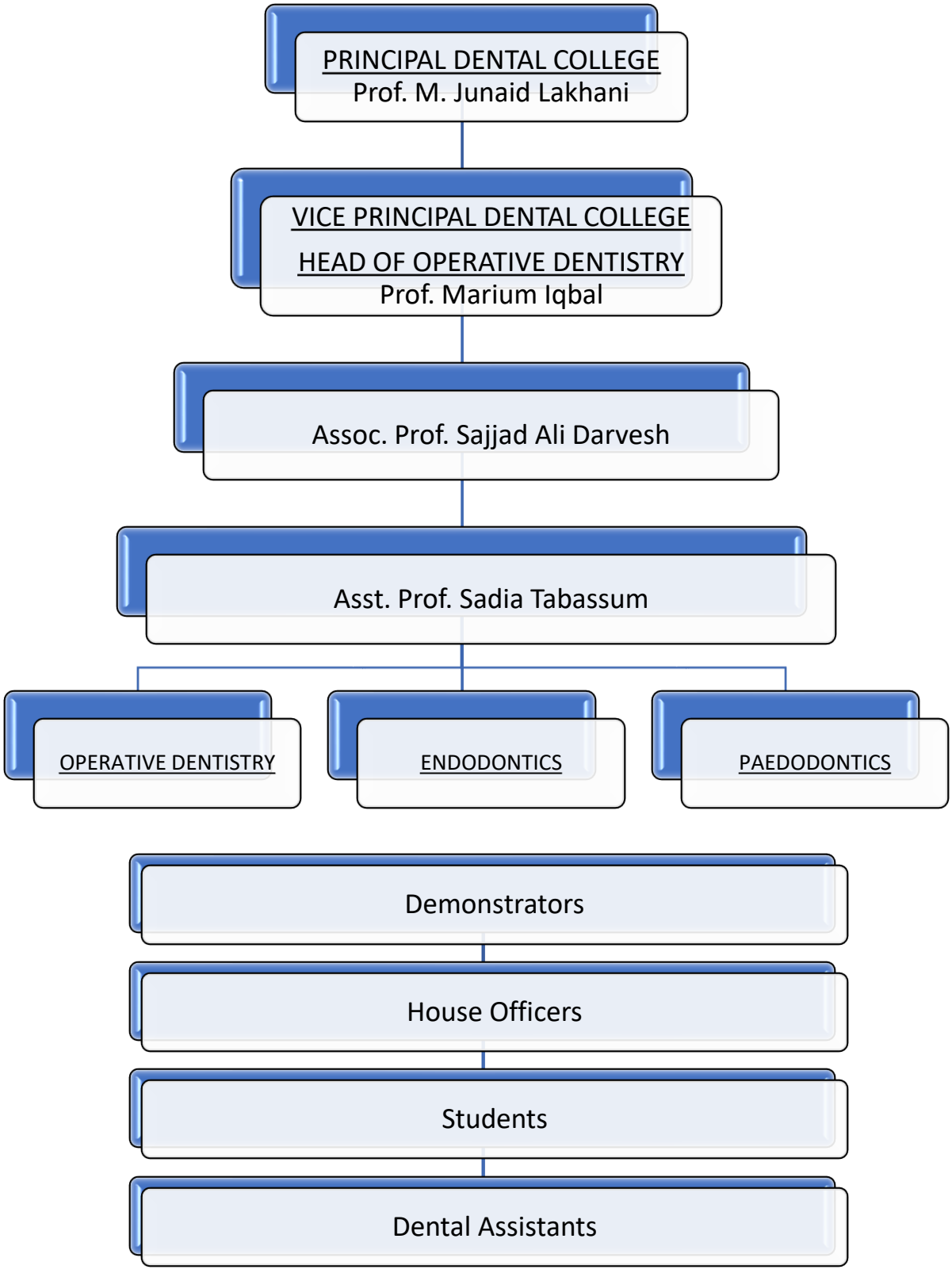
Paedodontics or Paediatric Dentistry is an age-defined specialty that provides both primary and comprehensive preventive and therapeutic oral health care for infants and children through adolescence, including those with special health care needs.

A pediatric dentist makes a recommendation of behavior guidance methods for the child based upon health history, special health care needs, dental needs, type of treatment required, the consequences of no treatment, emotional and intellectual development, and parental preferences.

ENDODODONTICS

Endodontics is the dental specialty which is concerned with the morphology, biology, physiology, pathology and regeneration of the human dental pulp and peri-radicular tissues. Its study and practice encompass the basic and clinical sciences including the biology of the normal pulp, the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated peri-radicular conditions.

HIERARCHY OF THE DEPARTMENT



LEARNING OUTCOMES FOR BDS OPERATIVE DENTISTRY

SECOND YEAR

By the end of teaching of Operative dentistry (second year BDS program), the student should be able to:

1. Describe the use of instruments, parts of a dental unit and chair positioning
2. Classify dental carious lesions using GV Black's classification
3. Identify line angles, point angles, walls and floors of cavity on a model
4. Describe principles of cavity design
5. Describe the various methods, techniques and chemicals used for sterilization and disinfection of various instruments.
6. Use tooth numbering systems to perform dental charting
7. Demonstrate the following on phantom head
    - Placement of rubber dam
    - Placement of matrix band
    - Cavity preparation (I-V), lining and restoration
8. Apply theory to practice, while preparing cavities and performing procedural skills
9. Display/ demonstrate the following:
    - Effective communication skills
    - Record keeping in log books
    - Team work
    - Respect for senior and junior colleagues, peers, dental assistants and other staff members.
    - Compliance with sterilization and cross infection control protocols
    - Compliance with rules and regulation of the department and institution

THIRD YEAR

By the end of teaching of Operative dentistry (third year BDS program), the student should be able to:

1. Justify the use of different liners, bases and restorative materials on the basis of their composition and properties in a patient presenting with a carious lesion.
2. Describe common dental, pulpal and peri-radicular diseases and conditions.
3. Apply the knowledge to diagnose and classify the carious lesions in a given patient.
    - Obtain relevant dental and medical history
    - Perform a detailed oral examination
    - Perform charting
    - Select appropriate radiographs (bitewing radiographs, periapical radiographs and OPG) for diagnosis of caries, pulpal and peri-radicular disease
    - Interpret bitewing radiographs, periapical radiographs, occlusal radiographs and orthopantomograph
    - Take an informed consent from the patient
4. Formulate a treatment plan to manage carious lesions, pulpal and peri-apical pathologies
5. Identify the need to refer
6. Explain the use of basic endodontic instruments
7. Demonstrate the endodontic treatment on blocks/ extracted teeth
8. Treat patients with carious lesions
9. Apply theory to practice, while treating patients (and other procedural skills)
10. Display/ demonstrate the following:
    - Effective communication skills including counselling

- Record keeping
- Team work
- Respect for senior and junior colleagues, peers, dental assistants and other staff members.
- Respect for privacy and confidentiality etc.
- Compliance with sterilization and cross infection control protocols
- Compliance with rules and regulation of the department and institution
- Professionalism

FINAL YEAR

By the end of teaching of Operative dentistry (final year BDS program), the student should be able to:

1. Justify the use of different dental materials on the basis of their composition and properties in a patient presenting to department of Operative Dentistry
2. Describe common dental, pulpal and peri-radicular diseases and conditions; types of dental trauma and loss of tooth tissue; as observed in the department of Operative Dentistry.
3. Describe common conditions associated with discolouration of teeth.
4. Apply the knowledge to manage carious lesions in a given patient.
    a. Obtain relevant dental and medical history
    b. Perform a detailed oral examination
    c. Perform charting
    d. Perform clinical tests
    e. Interpret clinical tests
    f. Select appropriate radiographs (bitewing radiographs, periapical radiographs and OPG) for diagnosis of caries, pulpal and peri-radicular disease
    g. Interpret bitewing radiographs, periapical radiographs, occlusal radiographs and orthopantomograph
5. Take an informed consent from the patient
6. Formulate a treatment plan to manage carious lesions, pulpal and peri-apical pathologies and patient's aesthetic needs
7. Write prescriptions for simple dental infections
8. Identify the need to refer

9. Use basic endodontic instruments
10. Demonstrate the endodontic treatment on blocks/ extracted teeth
11. Treat patients with carious lesions
12. Treat patients requiring endodontic treatment for single rooted teeth
13. Apply fissure sealants in paediatric patients
14. Apply theory to practice, while treating patients (and other procedural skills)
15. Display/ demonstrate the following:
    a. Effective communication skills including counselling
    b. Record keeping
    c. Team work
    d. Respect for senior and junior colleagues, peers, dental assistants and other staff members.
    e. Respect for privacy and confidentiality etc.
    f. Compliance with sterilization and cross infection control protocols
    g. Compliance with rules and regulation of the department and institution
    h. Professionalism

TEACHING AND LEARNING STRATEGIES

Lectures (large group teaching)

Second year BDS students are taught basics of Operative Dentistry (pre-clinical) in the lectures and this is complemented with skills teaching in the phantom head lab for a better understanding and a smooth transition to clinical skills teaching.

For third year, it is a once-a-week lecture/ tutorial of 50 minutes duration, and 3 days per week of OPD.

In the final year BDS, interactive lectures for large groups predominates. Operative Dentistry lectures span over the whole week. There are a total of 5 lectures per week; each of 50 minutes duration.

For student engagement and active participation to its fullest, following are employed:

a. Quizzes
b. Active learning strategies.
c. Mini-student presentations

Skills Development Sessions

The skills teaching begins in Phantom head labs during the second year. This is continued in the third year for other skills. However, third year students practice what they learnt in second year on patients, under the supervision of the experienced and vigilant faculty. Most of the clinical learning in the final year BDS occurs in the out-patient department of operative dentistry during OPD hours. Final year students are engaged through:

a. Learning on phantom and extracted teeth
b. On-patient demonstration of clinical and procedural skills; and counselling.
c. Discussions for critical thinking, decision making and ethical issues

Learning guidance:

To complement the lectures, students are provided with videos, relevant book chapters and materials for better understanding.

Along with these individual and group tasks are assigned.

E-Learning

In the challenging times of pandemic COVID-19, distance learning has been incorporated in the strategies of learning and teaching.

An easy access has been provided to the students through the institution's E-portal. Each student has the access to the portal through their individual Ids, on which they can go through the recorded lectures and material, whenever they want.

During the pandemic, and now as a routine, students can access their recorded lectures of Operative Dentistry on Google classroom as well. The same is used to share videos of clinical procedures; and share and receive assignments with students.

Zoom is also utilized to deliver the lectures in real time during the lockdown.

ASSESSMENT TOOLS AND STRATEGIES:

In-Class Assessment:

a. Participation/ interaction

b. Quizzes.

c. Presentations.

d. Assignments.

Ward Assessment:

A test is conducted at the mid- and end of the clinical rotation to assess the learning of students. This is to ensure that the students develop the required skills under supervision in a controlled environment.

Mid Term examinations:

These are conducted in the mid of the academic year. It has the following components:

Component	**Marks**
BCQs	100
OSCE	50
VIVA	50
TOTAL	**200**

Pre-Professional examinations:

These are conducted at the end of the academic year before the final professional examination. The break-up is as follows:

Component	**Marks**
BCQs	100
OSCE	75
VIVA	75
TOTAL	**250**

INTERNAL EVALUATION/ CONTINUOUS ASSESSMENT POLICY:

Continuous Assessment

Continuous Assessment Policy		
1.	Assignment/ class test/ ward test etc.	25%
2.	Mid-term exam	35%
3.	Pre-prof. exam	35%
4.	Extra effort	5%

Details of Assignments/ Test/Mid-term/ Pre-professional examinations.		
	Present and fail	25%
	Pass	Actual percentage
	ABSENT	**ZERO**

Professional Annual Examinations:

Professional annual examinations are conducted by the University (JSMU) and comprise theory examinations and OSPE/OSCE.

Eligibility criteria for sitting in the Professional Annual Examinations is as follows:

1. Minimum of **40% aggregate** marks in all continuous assessment examinations (Mid-Term Examinations, Pre-Professional Examinations, Assignments and Tests)
2. Students less than **75% overall attendance** will not be allowed to sit in the Annual Professional Examinations.
3. Clinical attendance will be maintained separately. Attendance in any clinical rotation which falls below **75%** must be made up by students.
4. Students must obtain **passing marks in the clinical ward tests**. Failing to do so, students will have to sit for re-take ward test (Only one re-take is allowed).

To be considered successful in annual professional examination the students must pass individual components of the professional examination.

This is to say, that the students must pass theory and OSPE/ OSCE examinations independent of each other. Failing one component will result in failing that component of the subject only. The student will then have to appear for supplementary examination in that component of the subject.

CONTENT OF OPERATIVE DENTISTRY

OPERATIVE DENTISTRY

S. No.	Topic
01	Clinical significance of Dental Anatomy, Histology, Physiology
02	Dental Caries: Etiology, Clinical Characteristics, Risk Assessment, and Management
03	Patient assessment, examination, diagnosis and treatment planning
04	Preliminary Considerations in Operative Dentistry
05	Sterilization and Disinfection
06	Radiographic Assessment
07	Fundamental concepts of Enamel and Dentin Adhesion
08	Fundamentals of Tooth Preparation
09	Instruments and Equipment for Tooth Preparation
10	Occlusion concepts
11	Restorative Materials
12	Amalgam Restorations
13	Direct Anterior Composite Restorations
14	Direct Posterior Composite Restorations
15	Class V Restorations
16	Diagnosis and Treatment of Root Caries
17	Tooth Surface Loss
18	Discoloration of Teeth
19	Periodontology applied to Operative Dentistry

ENDODONTICS

S. No.	Lecture Topic
01	Biology of Dental Pulp and Peri-radicular Tissue
02	Preserving Pulp Vitality
03	Endodontic Microbiology
04	Pulp and Peri radicular Pathosis
05	Endodontic Diagnosis and Treatment Plan
06	Endodontic Radiology
07	Pulp Anatomy
08	Instruments in Endodontics
09	Local Anesthesia in Endodontics
10	Isolation, Endodontic Access, and Length Determination
11	Cleaning and Shaping

12	Intra Canal Medicaments and Temporary Filling Materials
13	Root Canal Obturation
14	Procedural Accidents
15	Endodontic Emergencies
16	Restoration of Endodontically Treated Tooth
17	Endodontic Considerations in Geriatric Patients
18	Nonsurgical Endodontic Retreatment
19	Endodontic Surgery
20	Longitudinal Tooth Fractures
21	Endodontic and Periodontal Inter Relationship

PAEDODONTICS

S. No.	Lecture Topic
01	Craniofacial growth and development
02	Management of Pain and Anxiety
03	History, examination, risk assessment, treatment planning and Prevention of Dental Disease
04	Local Anesthesia for Paediatric Patient
05	Operative treatment of dental caries in primary and young permanent dentition
06	Pulp Therapy for Primary and Young Permanent Teeth
07	Inherited Anomalies of Enamel and Dentin
08	Periodontal Diseases in children
09	Anomalies of Tooth Formation and Eruption
10	The Pedodontics-Orthodontic Interface
11	Oral Surgery and Pathology in Paediatric Patients
12	Dental Trauma basics
13	Injury to Tooth and Healing After Trauma
14	Traumatic injuries to Primary Dentition
15	Traumatic injuries to Permanent Dentition-Hard Tissue
16	Injury to Permanent Dentition-Luxation and Avulsion

INDIRECT RESTORATIONS

S. No.	Lecture Topic
01	Review of Restorative Materials
02	Partial Coverage Indirect Restorations
03	Porcelain Veneers
04	Full Coverage Indirect Restorations
05	Implant Supported Restorations

CURRICULUM OF OPERATIVE DENTISTRY

SECOND YEAR BDS

S. No.	TOPIC	LEARNING OBJECTIVES By the end of second year BDS, the student should be able to:	MODE OF TEACHING	ASSESSMENT TOOLS The students will be assessed during class tests, mid-rotation and end-of rotation tests; mid-term and final examination through:
1.	Introduction to Operative dentistry, Biologic Considerations in Operative Dentistry	1. Discuss chemical composition, structure and properties of enamel, dentin, pulp, cementum and gingiva. 2. Discuss morphologic and histologic structure of tooth tissues with their clinical impact on restorations. **3.** Discuss the importance of dento-gingival complex and biologic width when planning restorations.	Lecture	MCQs
2.	Dental Caries - Etiology, Clinical features & Prevention	1. Classify different types of caries based on various factors (location, spread, extent, rate and others) 2. Discuss the factors responsible for caries development. 3. Identify clinical features of different types of caries on pictures. 4. Discuss the various methods of caries control.	Lecture	MCQs

3.	Isolation	1. Discuss the advantages, various methods and armamentarium of isolation. 2. Identify all the armamentarium required for rubber dam isolation. 3. Perform rubber dam isolation on phantom head for anterior and posterior teeth using different techniques accurately.	Lecture/ hands-on demonstration	MCQs OSPE Practical Exam
4.	Patient and Operator Positioning	1. Discuss the importance of correct patient and operator positioning during operative procedures. 2. Demonstrate the correct patient and operator position on phantom heads for working on different quadrants/teeth.	Lecture/Hands-on demonstration/ SBL	MCQs OSPE Practical Exam
5.	Instruments in Operative Dentistry	1. Define the terminologies pertinent to hand instruments. 2. Classify hand instruments. 3. Grasp the various hand instruments using the correct techniques. 4. Describe the different parts of dental bur. 5. Identify the different types of dental burs based on their shape. 6. Identify the parts of high speed and slow speed handpieces. 7. Demonstrate the accurate handling of high speed and slow speed handpieces on plastic teeth undertaking the necessary precautions	Lecture/ Hands on-demonstration/ SBL	MCQs OSCE Practical Exam
6.	Sterilization and disinfection	1. Differentiate among Sterilization, Disinfection and Asepsis. 2. Discuss the importance of sterilization and disinfection. 3. Discuss elements of a sterilization plan. 4. Describe various methods used for sterilization and methods to	Lecture	MCQs OSPE

		monitor effectiveness of sterilization. 5. List chemicals that are used for disinfection. 6. Discuss techniques for sterilization and disinfection of endodontic instruments. 7. Explain the exposure risks in dentistry. 8. Discuss cross infection and the different methods of cross infection control in the dental office.		
7.	Matrix band	1. Identify the different types of matrix bands, retainers and wedges. 2. Discuss the importance of using matrix bands and wedges during restoration placement. 3. Demonstrate the correct technique of contouring, placement and removal of commonly used matrix systems and wedges on phantom head for anterior and posterior teeth.	Lecture/ hands-on demonstration/ SBL	MCQs OSPE
9.	Cavity preparation	1. Discuss the objectives of tooth preparation. 2. Differentiate between tooth preparation features for amalgam and composite restorations. 3. Define various tooth preparation terminologies. 4. Classify various types of tooth preparations. 5. Discuss the stages of tooth preparation. 6. Prepare the anterior and posterior phantom teeth following principles of cavity design	Lecture/ hands-on demonstration/ SBL	MCQs Practical exam
10.	Lining and bases	1. Discuss the rationale for using cavity liners and bases 2. Demonstrate correct technique of placement of different liners	Lecture/ hands-on demonstration/ SBL	MCQs Practical exam OSPE

		and bases in cavities prepared on phantom teeth.		
10.	Amalgam-- placement, carving, polishing	1. Discuss the indications of amalgam restoration. 2. Restore phantom teeth using amalgam following all the recommended steps	Lecture/ hands-on demonstration/ SBL	MCQs Practical exam
11.	Composite--- placement, finishing, polishing	1. Discuss the indications of composite restoration. 2. Restore phantom teeth using composite following all the recommended steps	Lecture/ hands-on demonstration/ SBL	MCQs Practical exam
12.	Pits And Fissure Sealants	Discuss the indications, types and method of placement of pit and fissure sealants.	Lecture/ hands on demonstration	MCQs
13.	Glass Ionomer Cement (GIC)- placement, finishing	Restore phantom teeth using GIC following all the recommended steps	Lecture/ hands-on demonstration/ SBL	MCQs Practical exam

THIRD YEAR BDS

S. No.	TOPIC	LEARNING OBJECTIVES By the end of third year BDS, the student should be able to:	MODE OF TEACHING	ASSESSMENT TOOLS The students will be assessed during class tests, mid-rotation and end-of rotation tests; mid-term and final examination through:
1.	Basics of occlusion	1. Define basic terminologies of occlusion. 2. Identify the various incisor and molar relationships. 3. Discuss the tooth contacts during different phases of mandibular movement. 4. Discuss the importance of restoring occlusion in restorative dentistry.	Lecture	MCQs
2.	Pulpal and Periapical diseases	1. Discuss the various types of pulpal diseases and periradicular lesions of pulpal origin.	Lecture	MCQs
3.	Patient Evaluation & Problem Oriented Treatment Planning	1. Discuss merits and demerits of treatment- and problem-oriented treatment planning. 2. Discuss the importance of a thorough medical and dental history. 3. Discuss elements of a clinical examination. 4. Discuss esthetic parameters to be considered when restoring the dentition. 5. Discuss the importance of dental record keeping.	Lecture	MCQs

4.	History taking	1. Obtain history related to dental issues by asking all the pertinent questions. 2. Discuss the common medical diseases that may influence endodontic treatment planning.	Hands-on demonstration/ Role play/ WPBL	OSCE WPBA
5.	Clinical and Radiographic Examination	1. Discuss elements of a clinical examination. 2. Perform a thorough extraoral and intraoral examination on patients presenting to the dental OPD. 3. Describe various vitality tests, their advantages and limitations. 4. Perform vitality tests on patients. 5. Interpret findings of various vitality tests in clinical setting. 6. Prescribe appropriate radiographs for diagnosis of pulpal diseases. 7. Correlate radiographic findings to history and clinical examination.	Lecture/ Hands-on demonstration/ SBL/ WPBL	MCQs OSCE WPBA
6.	Assessment of radiographs	1. Describe x-ray equipment, films and processing of x-rays. 2. Describe importance of radiographs in operative dentistry. 3. Identify normal anatomic structures of maxilla and mandible on different radiographs (Periapical, Bitewing, Occlusal, Orthopantomogram [OPG]). 4. Discuss the indications and limitations of these radiographs for diagnostic purposes. 5. Interpret pathological findings seen on these radiographs.	Lecture/ Case based learning	MCQs OSCE

		6. Discuss the biological effects and risks associated with radiations. 7. Justify varying horizontal and vertical cone angulations to create image shift. 8. Describe the SLOB rule.		
7.	Endodontic Diagnosis and Treatment Planning	1. Diagnose pulpal and periapical pathosis in patients based on history, clinical and radiographic examination. 2. Develop a treatment plan. 3. Take an informed consent before any treatment.	Lecture/ Case based learning/ Role play	MCQs OSCE WPBA
8.	Sterilization and disinfection	1. Differentiate among Sterilization, Disinfection and Asepsis. 2. Discuss the importance of sterilization and disinfection. 3. Discuss elements of a sterilization plan. 4. Describe various methods used for sterilization and methods to monitor effectiveness of sterilization. 5. List chemicals that are used for disinfection. 6. Define cross infection. 7. Explain the exposure risks in dentistry. 8. Discuss the different methods of cross infection control in the dental office.	Lecture	MCQs OSCE
9.	Dental Unit	1. Identify all parts of a dental unit. 2. Describe the use of different parts of the dental unit. 3. Demonstrate correct operation of different parts of dental unit. 4. Perform accurate placement of different attachments (high speed, slow speed	Lecture/ hands-on demonstration	MCQs OSCE

		handpieces) to the dental unit.		
10.	Review of Restorative Materials	1. Discuss the composition, properties, merits and shortcomings of materials used for direct restorations: a. Amalgam, b. GIC, c. Composite.	Tutorial	MCQs
11.	Patient and operator positioning	2. Describe the importance of correct patient and operator positioning during operative procedures. 3. Demonstrate the correct patient and operator position when treating patients in the dental OPD.	Demonstration/ WPBL	MCQs, OSCE WPBA
12.	Instruments in Endodontics	1. List basic set of instruments appropriate for various endodontic procedures. 2. Describe the general physical properties of instruments. 3. Describe the design of common canal preparation instruments and their proper use of to prevent breakage within canal. 4. Explain the basis for sizing and taper of hand operated instruments. 5. Identify visible changes in instruments that will predispose them to breakage. 6. Describe nickel titanium rotary instruments.	Lecture/ Demonstration	MCQs OSCE
13.	Pulp Anatomy	1. Correlate the shape of pulp system to root anatomy. 2. List laws of canal orifice location. 3. Outline pathologic factors that may cause alterations in pulp anatomy. 4. Describe major components of the pulp space and	Lecture	MCQs OSCE

		variations in the pulp system in apical third. 5. Describe accessory canals. 6. Discuss relationship of anatomic, radiographic and actual location of apical foramen. 7. Describe variations in pulp anatomy resulting due to: a. Developmental defects b. Age. 8. Identify internal and external anatomy of teeth in sagittal and cross section.		
14.	Class I, II, III, IV, V, VI restorations	1. Perform Class I, II, III, IV, V, and VI restorations (amalgam, composite) on patients presenting to the dental OPD with dental caries.	Demonstration/ WPBL	WPBA
15.	Root canal treatment	2. Perform on extracted teeth the following steps of root canal treatment: 3. Access cavity preparation; 4. Working length determination; 5. Pulpectomy, cleaning, shaping and obturation of root canal space.	Demonstration/ Simulation based learning	WPBA

FINAL YEAR BDS

4.2.1. OPERATIVE DENTISTRY

S. NO.	TOPIC	LEARNING OBJECTIVES By the end of final year BDS, the student should be able to:	MODE OF TEACHING	ASSESSMENT TOOLS The students will be assessed during class tests, mid-rotation and end-of rotation tests; mid-term and final examination through:
1	Clinical significance of dental anatomy, histology, physiology	1. Describe teeth and supporting structures with respect to morphology, structure and properties of the following tissues: Enamel Pulp-Dentin complex Cementum Gingiva Oral mucosa 2. Describe the clinical impact of restorative dentistry on teeth and supporting structures of the teeth. 3. Relate the importance of dento-gingival complex and biologic width in restorative dentistry.	1. Lecture 2. Group presentations	1. Group presentations 2. BCQS 3. OSCE
2	Dental Caries: Etiology, Clinical Characteristics, Risk Assessment, and Management	1. Define dental caries. 2. Describe the etiology and pathogenesis of dental caries. 3. Describe factors influencing dental caries process. 4. Discuss the role of plaque bio-film in progression of dental caries. 5. Discuss the role of saliva in prevention of dental caries	1. Lecture 2. Small group discussion	1. BCQS 2. OSCE

		6. Name the microorganisms responsible for dental caries. 7. Draw the Stephan's curve. 8. Apply the knowledge of clinical characteristics and progression of carious lesions in: Pit and fissures, Smooth surfaces, Root surfaces. 9. Describe the progression of carious lesions in: Enamel, Dentin. 10. Discuss the different zones of enamel and dentin caries. 11. Discuss methods of detection and diagnosis of dental caries. 12. Apply International Caries Detection and Assessment System (ICDAS II) to clinical scenarios. 13. Assess dental caries risk for a patient (scenario and real patient) 14. Discuss Caries Management by Risk Assessment (CAMBRA). 15. Discuss protocols and strategies for prevention of dental caries. 16. Select appropriate non-invasive options for treatment of existing lesions. 17. Define caries control restorations. 18. Describe the clinical protocol for caries control restorations. 19. Recognize the need to develop a logical sequential treatment plan for restoration of patient's education 20. Formulate a logical and sequential treatment plan for restoration of dental carious lesions in a patient.		

		21. Justify maintenance care and recall visit intervals for high-risk individuals 22. Summarize the various possible reactions of the pulp-dentin complex to a deep carious lesion. 23. Define: Stepwise excavation, Indirect pulp cap, Direct pulp cap (carious and iatrogenic). 24. Apply the rationale of stepwise excavation to clinical situations. 25. Enumerate materials that can be used for direct and indirect pulp cap. 26. Apply the knowledge of the clinical protocol for direct and indirect pulp cap procedures.		
3	Patient assessment, examination, diagnosis and treatment planning	1. Recognize the importance of a thorough medical and dental history. 2. Demonstrate history taking for dental carious lesions, pulpal, periapical and periodontal diseases 3. Analyze the symptoms of presenting complaint. 4. Define treatment-oriented treatment planning and its merits. 5. Define problem-oriented treatment planning and its merits. 6. Interpret information gained from the elements of a clinical examination: Dentition Occlusion Periodontium, Evaluation of radiographs, Evaluation of diagnostic casts and photographs.	1. Lecture 2. Tutorial/ Small Group Discussion, 3. Case presentations 4. Clinical teaching	1. BCQS 2. OSCE

		7. Discuss esthetic parameters to be considered when restoring the dentition. 8. Rank the importance of dental record keeping as very high. 9. Explain dental disease; interpretation and use of diagnostic findings		
4	Preliminary Considerations in Operative Dentistry	1. Explain the need of correct patient and operator positions while performing restorative procedures. 2. Demonstrate the ideal operating positions when carrying out various procedures. 3. Apply the knowledge of importance of isolation in operative dentistry and endodontics. 4. Describe different methods used for isolation. 5. List the armamentarium required for rubber dam isolation. 6. Demonstrate application and removal of rubber dam for operative dentistry and endodontics.	1. Tutorial/ Small Group Discussion 2. Clinical Teaching	1. Assignment 2. OSCE
5	Sterilization and Disinfection	1. Differentiate between the following terms: Sterilization, Disinfection, Asepsis. 2. Discuss the importance of sterilization and disinfection. 3. Enlist elements of a sterilization plan. 4. Compare various methods used for sterilization. 5. Discuss methods to monitor effectiveness of sterilization. 6. List the chemicals that are used for disinfection.	1. Lecture 2. Tutorial	1. Group presentations 2. Quiz

		7. Discuss general considerations for infection control in the dental office.		
6	Radiographic Assessment	1. Describe the importance of radiographs in operative dentistry. 2. Differentiate normal anatomic structures of maxilla from and mandible from pathologies on a: Periapical x-ray, Bitewing x-ray, Occlusal x-ray, Orthopantomogram (OPG). 3. Formulate a treatment for common dental pathologies plan, based on the interpretation from radiographs mentioned above 4. Discuss the indications and limitations of the following x-ray views for diagnostic purposes: Periapical x-ray, Bitewing x-ray, Occlusal x-ray, Orthopantomogram (OPG).	1. Lecture 2. Tutorial/ Small Group Discussion 3. Clinical Teaching	1. OSCE
7	Fundamental concepts of Enamel and Dentin Adhesion	1. List advantages of adhesive techniques over conventional, non-adhesive methods. 2. Explain why the structure of enamel is a favorable substrate for bonding. 3. Explain how the structure of dentine is different from enamel. 4. Discuss the effect of smear layer on dentin bonding. 5. Explain the effect of Configuration Factor (C-factor) on bonding. 6. Classify modern adhesives. 7. Describe smear layer modifying adhesives. 8. Discuss etch and rinse adhesives.	1. Lecture 2. Small group discussion 3. Students group presentation	1. BCQS

		9. Explain the effect of acid conditioning on enamel. 10. Discuss difficulties in dentine conditioning. 11. Discuss chemistry of primers and adhesive resin (bonding agent). 12. Explain the importance of hybridization for effective dentine bonding. 13. Discuss self-etch adhesives. 14. Compare 4th, 5th 6th and 7th generation adhesives. 15. Explain the steps involved in enamel bonding. 16. Describe steps in dentin bonding 17. Explain the difference between moist vs. dry dentin surfaces while bonding with etch and rinse adhesives 18. Differentiate between microleakage and nanoleakge 19. Explain the role of water and proteins in dentin bonding		
8	Fundamentals of Tooth Preparation	1. Classify carious lesions and tooth preparation. 2. Describe the nomenclature of tooth surfaces in a prepared cavity 3. Describe the objectives of tooth preparation. 4. Apply the knowledge of factors that need to be considered before tooth preparation to clinical scenarios. 5. Outline the steps in the initial and final stages of tooth preparation. 6. Plan restorations in different clinical situations.	1. Lecture 2. Tutorial 3. Clinical teaching/ chair side teaching	1. BCQS 2. OSCE
9	Instruments and Equipment	1. Differentiate between hand and rotary instruments used for tooth preparation. 2. List various cutting and noncutting hand instruments.	1. Lecture 2. Tutorial/ Small Group	1. BCQS 2. OSCE

	for Tooth Preparation	3. Discuss the design features and nomenclature of hand cutting instruments. 4. Demonstrate the various instrument grasp techniques 5. Identify rotary cutting equipment, instruments based on their design characteristics. 6. Discuss the latest developments for tooth preparation and caries removal including: Lasers, Ozone, Air abrasion. 7. Discuss hazards of cutting instruments and their prevention.	Discussio n 3. Chair side teaching/ clinical teaching	
10	Occlusion concepts	1. Define the terms: Occlusion, Static occlusion, Dynamic occlusion, Centric relation, Maximum intercuspation, Supporting cusps, Non-supporting cusps. 2. Explain the types and directions of mandibular movements. 3. Review the importance of restoring occlusion in restorative dentistry.	1. Lecture	1. BCQS
11	Restorative Materials	1. Apply the clinical knowledge of the composition, properties, merits and shortcomings of materials used for direct restorations: Amalgam, GIC, Composite to clinical scenarios.	1. Lecture 2. Tutorial/ Small Group Discussio n	1. Group presentat ions 2. BCQS
12	Amalgam Restorations	1. Discuss chemistry of dental amalgam. 2. Discuss mercury hazards and how to manage mercury disposal	1. Lecture 2. Tutorial/ Small Group Discussio n	1. BCQS 2. OSCE

		3. List advantages and disadvantages of amalgam restorations. 4. Demonstrate class I and II cavity preparation. 5. Apply methods of improving resistance and retention form of a simple class I and II restoration. 6. Define complex restorations. 7. Discuss ways of improving resistance and retention form of complex restorations. 8. Highlight the need for cuspal coverage with special reference to rule of thirds. 9. Describe types of dentin pins. 10. Describe the method of placement of dentin pins. 11. Discuss importance of matrices and wedges. 12. Enlist various types of matrix band systems. 13. List various parts of tofflemire. 14. Apply a toefflemire matrix system with an appropriate wedge. 15. List different types of wedges. 16. Explain bonded amalgam restorations. 17. Describe placement of amalgam in simple and complex cavities. 18. Apply the knowledge of other cavity preparation designs e.g. box only preparation, tunnel preparation. 19. Discuss cavity preparation and restoration of a class VI lesion.	3. Clinical teaching	
13	Direct Anterior Composite Restorations	1. Discuss the chemistry of anterior composites. 2. Describe pre-operative evaluation for an anterior composite restoration. 3. Analyze factors influencing shade selection.	1. Lecture 2. Individual presentations	1. BCQS 2. OSCE

		4. Discuss guidelines for shade matching. 5. Discuss various methods of shade selection. 6. Demonstrate cavity preparation for class III restorations. 7. Demonstrate cavity preparation for class IV restorations. 8. Discuss importance of matrices and wedges. 9. Demonstrate composite placement technique for class III and IV restorations. 10. List indications, contraindications, advantages and disadvantages of direct composite veneers. 11. Describe clinical steps for placing direct resin composites veneer. 12. Explain the technique for diastema closure with direct composite. 13. Discuss different instruments used for finishing and polishing of composite restorations and their use.		
14	Direct Posterior Composite Restorations	1. List indications, contraindications, advantages and disadvantages for composite resin as a posterior restorative material. 2. Describe preoperative evaluation for a posterior composite restoration. 3. Describe placement technique for preventive resin restoration. 4. Explain the importance of pre-wedging in class II composites. 5. Prepare a class II cavity. 6. Explain bonded base technique.	1. Lecture 2. Individual presentation 3. Clinical teaching	1. OSCE 2. BCQS

		7. Classify matrix systems available for composite restorations. 8. Compare circumferential and sectional matrix systems. 9. Discuss methods to minimize polymerization shrinkage when placing composite. 10. List different methods to create a tight contact for class II composite restorations. 11. List various resin polymerization equipment. 12. Discuss other cavity preparation designs e.g. box only preparation, tunnel preparation. 13. Discuss cavity preparation and restoration of a class VI lesion.		
15	Class V Restorations	1. Demonstrate cavity preparation for class V restorations. 2. Describe non-surgical and surgical techniques for isolating class V restorations. 3. Justify the choice of restorative materials from those available for restoring class V lesions. 4. List ways of improving retention of class V composite restorations.	1. Lecture 2. Clinical teaching	1. BCQS 2. OSCE
16	Diagnosis and Treatment of Root Caries	1. Define root caries. 2. Apply the knowledge of appearance and location of root caries to clinical situations. 3. Apply the knowledge of etiology and risk factors associated with root caries to clinical situations. 4. Discuss preventive and chemotherapeutic strategies to treat root caries.	1. Lecture 2. Clinical teaching	1. BCQS 2. OSCE

		5. Discuss available restorative materials for treating root caries.		
17	Tooth Surface Loss	1. Explain the following types of tooth surface loss: Abrasion, Attrition, Erosion, Abfraction. 2. Discuss the etiology of each. 3. Discuss the prevention and management of tooth surface loss. 4. Discuss etiology, pathogenesis and management of dentine hypersensitivity.	1. Lecture 2. Small group discussion	1. BCQS 2. OSCE
18	Discoloration of Teeth	1. Describe the intrinsic and extrinsic causes of tooth discoloration. 2. Describe the mode of action of bleaching agent on stains. 3. List the advantages and disadvantages of commonly used bleaching agents and their strengths. 4. List the indications and contraindications of various types of bleaching techniques. 5. Explain technique for: In-office/power vital bleaching At-home vital bleaching Non-vital bleaching. 6. Describe the procedure for micro-abrasion and macro-abrasion.	1. Lecture 2. Small group discussion	1. OSCE 2. BCQS
19	Periodontology applied to Operative Dentistry	1. Discuss the basic concept of the periodontium relevant for restorative dentistry 2. Relate the concept of the biological width to clinical scenarios 3. Describe the challenges in periodontal health affecting restorative dentistry 4. Describe different gingival biotypes	1. Lecture	1. BCQS 2. OSCE

		5. Discuss crown lengthening procedures 6. Discuss the sequelae of biological width violation 7. Describe retraction cords and impressions		

4.2.2. ENDODONTICS

S. NO.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Biology of Dental Pulp and Peri-radicular Tissue	1. Describe the stages of development of tooth. 2. Describe the development of dentin and its types. 3. Explain the properties of root dentin. 4. Label the morphological zones of the pulp. 5. Explain the importance of different type of cells in the pulp. 6. Describe the blood vessels and lymphatic of pulp. 7. Explain the neural components of pulp and its distribution. 8. Describe the pathways of efferent nerves from the pulp to central nervous system. 9. Discuss the theories of dentin sensitivity. 10. Discuss changes in pulp morphology with age. 11. Describe the structure and function of peri-radicular tissues.	1. Lecture 2. SGD	1. BCQS
2	Preserving Pulp Vitality	1. Explain the physiologic and structural characteristics of pulp. 2. Discuss pulp response to injury. 3. Discuss pulp reaction to local anesthesia. 4. Discuss pulp reaction to restorative procedures. 5. Discuss pulp reaction to restorative materials. 6. Discuss pulp reaction to Laser procedures. 7. Discuss pulp reaction to Bleaching. 8. Discuss pulp reaction to Periodontal procedures. 9. Discuss pulp reaction to	1. Lecture 2. Clinical teaching	1. BCQS 2. OSCE

		Orthodontic procedures. 10. Explain the formation and role of tertiary dentin in pulp protection. 11. Describe preventive measures during dental restorative procedures to preserve pulp vitality.		
3	Endodontic Microbiology	1. Describe the association of microbes with pulpal and peri-radicular diseases. 2. Describe the routes of entry of microorganisms to the pulp and peri-radicular tissues. 3. Apply the knowledge of different types of endodontic infections. 4. Discuss the detection and identification of putative pathogens 5. Describe the management of abscess and cellulitis 6. Discuss the types of anti-biotic in endodontic infection 7. Discuss the role of prophylactic antibiotics for medically compromised patients 8. Explain the association of oral and systemic diseases.	1. Lecture 2. Clinical teaching	1. BCQS 2. OSCE
4	Pulp and Peri radicular Pathosis	1. Classify pulpal diseases 2. Classify peri-radicular lesions of pulpal origin along with their clinical and histological features. 3. Describe etiological factors of pulp inflammation. 4. Explain mechanism of spread of inflammation in the pulp. 5. Explain why the pulp has difficulty in recovering from severe injury. 6. List specific and non-specific indicators of pulpal inflammation. 7. Classify pulpal diseases along with their clinical and histological features.	1. Lecture	1. BCQS 2. OSCE

		8. Explain the consequences of spread of pulpal inflammation into peri-radicular tissues. 9. Describe steps involved in repair of periapical pathosis after successful root canal treatment. 8. Describe non-endodontic lesions that may simulate endodontic peri-radicular pathosis.		
5	Endodontic Diagnosis and Treatment Plan	1. Justify questions regarding history and symptoms of presenting complaint. 2. Describe the importance of medical and dental history. 3. Perform complete extra- and intraoral examination to ascertain pulpal and periapical health. 4. Correlate findings from different investigations 5. Select the correct method of investigation keeping in mind their limitations. 6. Correlate radiographic findings with history and clinical examination. 7. Discuss the common medical diseases that may influence endodontic treatment planning. 8. Discuss special considerations when planning treatment for geriatric patients. 9. Synthesize all the data to formulate a diagnosis and treatment plan. 10. Discuss the importance of an informed consent in endodontics. 11. Justify referral to an endodontist in certain cases.	1. Lecture 2. Tutorial/ Small Group Discussion 3. Clinical teaching	1. Case presentations 2. BCQS 3. OSCE
6	Endodontic Radiology	1. Identify normal anatomic structures of maxilla and mandible on radiograph.	1. Lecture 2. Tutorial/ Small Group	1. BCQS 2. OSCE

		2. Describe importance of radiographs in endodontics. 3. Discuss the principles of endodontic radiography. 4. Interpret the radiographs in relation to endodontics. 5. Discuss the limitations of radiograph in endodontics. 6. Describe radiographic characteristics of periapical lesion of endodontic origin. 7. Apply the knowledge of reasons for varying horizontal and vertical cone angulations to create image shift to clinical scenarios. 8. Apply the knowledge of SLOB rule. 9. Describe new technologies for radiographic imaging and how they will affect the prognosis of your treatment.	Discussion 3. Clinical Teaching	3. Case-based viva
7	Pulp Anatomy	1. Explain the components of root canal system. 2. Discuss objectives and guidelines for access cavity preparation. 3. Explain the relationship of shape of pulp system to root anatomy. 4. State laws of canal orifice location. 5. Explain the significance of iatrogenic or pathologic factors that may cause alterations in pulp anatomy. 6. Describe pulp space and its major components. 7. Describe variations in the pulp system in apical third. 8. Describe how to determine clinically the distance from occlusal/incisal surface to the roof of chamber. 9. Define accessory canals. 10. Differentiate between anatomic, radiographic and	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. Individual Assignment 3. Final Examination

		actual location of apical foramen. 11. Describe common variations in pulp anatomy resulting from developmental abnormalities. 12. Describe changes in pulp anatomy that occur with age. 13. Draw a representative example of the most common internal and external anatomy of each tooth in sagittal section and in cross section.		
8	Instruments in Endodontics	1. Describe diagnostic materials and devices. 2. Perform a tray set-up for basic set of instruments appropriate for various endodontic procedures. 3. Explain materials for endodontic field isolation. 4. Explain the general physical properties of instruments. 5. Identify the endodontic instruments based on the design and use. 6. Explain the basis for sizing and taper of hand operated instruments. 7. Apply the knowledge of proper use of instruments to prevent breakage within canal. 8. Describe visible changes in instruments that will predispose to breakage. 9. Describe techniques for sterilization and disinfection. 10. Describe nickel titanium rotary instruments.	1. Lecture 2. Clinical teaching	1. BCQS 2. OSCE
9	Local anesthesia in endodontics	1. Discuss the mechanism of action for anesthetics. 2. Define pain threshold and the factors affecting it. 3. Explain the selection of local anesthetic and their possible side effects. 4. Enlist important clinical factors in local anesthesia.	1. Lecture 2. Clinical Training	1. BCQS 2. OSCE

		5. List techniques that are helpful in giving "painless" injections. 6. Describe the "routine" approach to conventional local anesthesia. 7. Identify circumstances that create difficulties in obtaining profound anesthesia. 8. Describe when to use supplemental methods of obtaining pulpal anesthesia. 9. Review techniques of intraosseous, periodontal ligament, and intrapulpal injections.		
10	Isolation, Endodontic Access, and Length Determination	1. Describe methods of isolation in endodontics with emphasis on rubber dam isolation. 2. Explain the importance of pre-operative assessment as pre-requisite for treatment success. 3. Explain the importance of pre-endodontic buildup. 4. Describe the objectives of access cavity preparation. 5. Apply the general principles of endodontic access cavity. 6. Identify the challenging access preparation. 7. Explain the mechanical phases of access cavity preparation. 8. Draw outline of access cavity of each tooth. 9. Describe average length and canal configuration of various teeth. 10. Describe technique for locating canal orifices. 11. Identify errors during access cavity preparations 12. List the methods to correct errors during access cavity preparation. 13. Describe various methods of working length determination.	1. Lecture 2. Clinical Teaching	1. BCQS 2. OSCE

11	Cleaning and Shaping	1. List the steps of root canal treatment. 2. Differentiate infection of pulp space from other tissues of body. 3. Explain the purpose of cleaning the pulp space. 4. Enumerate the biological and mechanical objectives of root canal cleaning and shaping. 5. Explain the concept of apical patency. 6. Describe basic and combined instruments movements. 7. Describe different techniques of canal preparation. 8. Differentiate between step-back and crown-down technique. 9. Explain how to minimize preparation errors in curved canal. 10. Discuss management of calcified canals. 11. Differentiate between NiTi rotary files and SS files 12. Explain the importance of irrigants. 13. Name various irrigants that are used in endodontics 14. List properties of an ideal irrigant. 15. Choose irrigation techniques that provide maximum effect. 16. Explain disinfection of canal. 17. Discuss smear layer management.	1. Lecture 2. SGD 3. Clinical Teaching	1. BCQS 2. OSCE
12	Intra Canal Medicaments and Temporary Filling Materials	1. Enumerate different microorganisms involved in endodontic pathosis. 2. Explain the importance of intracanal medicament. 3. Select the most appropriate intracanal medicament based on the properties and role of intra-canal, inter-appointment medicaments.	1. Lecture 2. SGD 3. Clinical teaching	1. BCQS 2. OSCE

		4. Categorize various agents used as intra-canal medicament. 5. Describe the method of application and instruments used for intra-canal medication. 6. Describe techniques used for placement and removal of temporary filling materials.		
13	Root Canal Obturation	1. Discuss the importance of coronal seal. 2. Explain the purpose of obturation 3. Apply the knowledge of reasons of the reasons why inadequate obturation may result in treatment failure. 4. Explain the timing of obturation. 5. Explain the length of obturation and its significance. 6. Explain the clinical criteria that determines the time of obturation. 7. List the properties of ideal obturation material. 8. Name the core obturation materials. 9. Describe the composition and properties of gutta percha. 10. Describe advantages and disadvantages of each core material. 11. Enlist properties of ideal sealer 12. Explain the need for using a sealer. 13. Name various types of sealers. 14. Describe lateral condensation technique. 15. Describe briefly other techniques used for obturation. 16. Apply the knowledge of the clinical and radiographic criteria for evaluating the quality of obturation.	1. Lecture 2. Clinical teaching	1. BCQS 2. OSCE

14	Procedural Accidents	1. Identify procedural endodontic mishaps 2. Describe their causes, prevention and treatment during: Access cavity preparation, Cleaning and shaping Obturation. 3. Discuss the management of following errors: Transportation, Ledging, Elbow, Zipping, Root perforations- apical, middle and coronal, Separated instruments, Aspiration and ingestion, Hypochlorite accident, Air Emphysema. 4. Discuss how procedural errors can affect the prognosis of treatment.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. Individual Assignment 3. OSCE
15	Endodontic Emergencies	1. Explain the causes of emergencies before treatment, inter-appointment and after obturation. 2. Explain how the emotional status of emergency patient can complicate diagnosis and treatment. 3. Discuss the importance of sequential approach to endodontic emergencies which includes:. Determine source of pain, Establish a pulpal and periapical diagnosis, Design an emergency (short term) treatment plan, Design a long-term treatment plan. 4. Describe the management of various endodontic emergencies including: Painful irreversible pulpitis,	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE

		Necrotic pulp with acute apical periodontitis, Acute apical abscess, Acute apical periodontitis. 5. Identify inter-appointment flare-up 6. Describe the management of inter-appointment flare-up. 7. Recognize post-obturation flare-up 8. Describe the management of post-obturation flare-up. 9. Discuss pharmacological therapy used in emergency and its role in controlling pain and infection. 10. Enlist the indications and contraindications for prescribing analgesics, antibiotics, anti-inflammatory agents and anxiolytics. 11. Discuss the development of a treatment plan consisting of appropriate endodontic and pharmacologic strategies for managing pain, anxiety, and infection.		
16	Restoration of Endodontically Treated Tooth	1. Apply the knowledge of pre-treatment evaluation to clinical scenarios. 2. Explain why endodontically treated teeth are different from vital teeth. 3. Describe the importance of coronal seal. 4. Explain the restorative treatment planning for endodontically treated teeth. 5. Explain ferrule effect and its importance. 6. Enlist indications of post placement in anterior and posterior teeth. 7. Describe ideal dimensions of a post.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE

		8. Describe common post systems, their advantages and disadvantages. 9. Describe method of placement of prefabricated and cast post. 10. Describe core materials and their placement. 11. Discuss complications that can occur during placement of post.		
17	Endodontic considerations in geriatric patients	1. Describe changes in pulp morphology with age. 2. Discuss special considerations when planning treatment for geriatric patients. 3. Identify management of the difficulties that can be encountered during root canal treatment of older patients.	1. Lecture 2. SGD	1. BCQS 2. OSCE
18	Nonsurgical Endodontic Retreatment	1. Discuss etiology of persistent apical periodontitis. 2. Describe the diagnosis of post treatment disease. 3. Enlist the indications of endodontic retreatment. 4. Describe the alternatives to endodontic retreatment. 5. Describe technique of accessing through extra coronal restorations. 6. Describe technique of removing crowns and posts. 7. Identify various types of canal obstructions 8. Describe the management of various types of canal obstructions. 9. Describe the techniques for gutta percha removal. 10. Explain the role of intra-canal medicament in retreatment. 11. Discuss prognosis of retreatment.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. Class Participation 3. OSCE
19	Endodontic Surgery	1. Discuss general principles of wound healing.	1. Lecture	1. BCQS

		2. Discuss preoperative evaluation of medically compromised patients. 3. Discuss indications for peri-radicular surgeries. 4. Identify situations when endodontic surgery is contraindicated. 5. Discuss the role of endodontic surgery alone or in combination with nonsurgical root canal therapy. 6. Define the terms: Incision for drainage, Apical curettage, Root-end resection, Root-end preparation Root-end filling, Root amputation, Hemisection, Bicuspidization. 7. Discuss patient preparation for surgery. 8. Describe, step by step procedures involved in peri-radicular surgery. 9. Enumerate local hemostatic agents. 10. Discuss guided tissue regeneration and endodontic surgery. 11. Discuss prognosis of endodontic surgical cases.		
20	Longitudinal Tooth Fractures	1. Differentiate between Craze line, Cracks and Fractures. 2. Describe the causes of these fractures of tooth structure. 3. Identify symptoms and clinical features of crack tooth. 4. Apply the knowledge of the diagnosis, treatment, prognosis and prevention of a crack at various levels to clinical scenarios..	1. Lecture 2. SGD 3. Clinical teaching	1. BCQS 2. OSCE 3. Case presentation
21	Endodontic and Periodontal Inter Relationship	1. Discuss intercommunication between pulpal and periodontal tissue.	1. Lecture	1. BCQS 2. OSCE

		2. Describe the influence of pulpal pathologic condition on the periodontium. 3. Describe the influence of periodontal inflammation on the pulp. 4. Discuss theoretic pathways of osseous lesion formation. 5. Justify the differential diagnosis for lesions of endodontic and periodontal origin based on clinical, radiographic and histopathological features. 6. Discuss treatment options.		

4.2.3. PEDONONTICS

S. NO.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Craniofacial growth and development	1. Discuss growth and development of jaws and dentition. 2. Differentiate between permanent and primary teeth. 3. Discuss the chronology of development of primary and permanent dentition. 4. Apply the knowledge of eruption timing and sequence of primary and permanent teeth to different situations.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE
2	Management of Pain and Anxiety	1. Enlist various pharmacological and non-pharmacological methods of pain and anxiety control. 2. Apply the knowledge of different behavioral management strategies for pediatric patients to clinical scenarios. 3. Describe different sedation techniques for pediatric patients. 4. Discuss the dental management of children with special needs.	1. Lecture 2. SGD	1. BCQS 2. OSCE
3	History, examination, risk assessment, treatment planning and Prevention of Dental Disease	1. Discuss the importance of a detailed medical and dental history for management of the paediatric patient. 2. Apply the knowledge of various medical conditions that may affect the management of paediatric patient. 3. Discuss effects of diet on dental tissues. 4. Describe various sources of sugars. 5. Discuss the effect of fluoride on dental caries process. 6. Explain the rationale for fluoride supplementation.	1. Lecture 2. Tutorial/ Small Group Discussion	1. Case presentation 2. BCQS

		7. Describe different vehicles of fluoride delivery. 8. Describe correct tooth brushing technique. 9. Recognize the importance of parental counseling. 10. Describe the importance of dietary management and home care in caries prevention. 11. Discuss the importance of regular dental follow-ups. 12. Recognize the importance of fissure sealing and acid etch technique as a preventive measure. 13. Describe the placement of pit and fissure sealants and preventive resin restorations in primary teeth.		
4	Local Anesthesia for Paediatric Patient	1. Describe available topical anesthesia solutions. 2. Describe new techniques for achieving topical anesthesia. 3. List various techniques of local anesthesia administration. 4. Describe pain free anesthesia technique. 5. Discuss possible complications of local anesthesia.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE
5	Operative Dentistry for Paediatric Dentition	1. Apply the knowledge of different methods to detect and diagnose dental caries in primary teeth to clinical scenarios. 2. Describe the pattern of early childhood caries and its management. 3. Justify the selection of the radiographic views that are of value in diagnosing dental caries. 4. Explain the importance of isolation when restoring teeth. 5. Discuss restorative materials used to restore a carious lesion.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE

		6. Describe restoration of occlusal and proximal caries. 7. List the indications and contra-indications for stainless steel crowns 8. Describe the technique for stainless steel crown and acrylic crown placement.		
6	Pulp Therapy for Primary and Young Permanent Teeth	1. Explain the development of a tooth from its eruption to root maturation. 2. Explain the need to save a primary tooth. 3. Describe the importance of case assessment. 4. Apply the knowledge of the indications and contraindications of pulp therapy in deciduous teeth to clinical situations. 5. Describe the stabilization of mouth in case of rampant caries. 6. Apply the knowledge of the indications, contraindications and procedures in primary dentition for: Pulp cap, Pulpotomy, Pulpectomy to clinical scenarios. 7. Apply the knowledge of indications, contraindications and procedure in young permanent dentition for: Indirect pulp cap, Direct pulp cap, Cvek pulpotomy, Apexogenesis, Apexification. 8. Discuss the role of regenerative endodontics in the management of non-vital immature teeth.	1. Lecture 2. Small Group Discussion	1. BCQS 2. OSCE
7	Inherited Anomalies of	1. Enlist various inherited enamel and dentin defects.	1. Lecture	1. BCQS

	Enamel and Dentin	2. List the clinical problems associated and treatment objectives with inherited enamel and dentin defects. 3. Discuss the etiology, prevention, clinical features and management of: Amelogenesis Imperfecta Dentinogenesis Imperfecta Molar Incisor Hypomineralization		
8	Periodontal Diseases in children	1. Classify periodontal diseases 2. Discuss the etiology, clinical features and management of acute gingival conditions: Primary herpetic gingivostomatitis Necrotizing ulcerative gingivitis. 3. Discuss the etiology, clinical features and management of chronic gingivitis and periodontitis. 4. Discuss etiology, clinical features and management of drug induced gingival enlargement. 5. Discuss periodontal disease as a manifestation of various syndromes and systemic diseases in children.	1. Lecture	1. BCQS
9	Anomalies of Tooth Formation and Eruption	1. Discuss the prevalence, etiology and management of variation in number of teeth. 2. Discuss various anomalies in tooth size and their management. 3. Discuss various anomalies of tooth form and their management. 4. Describe disturbances in eruption and exfoliation; and its clinical significance.	1. Lecture	1. BCQS 2. OSCE
10	The Pedodontics-Orthodontic Interface	1. Explain the importance of screening patients for orthodontic referral at the correct time.	1. Lecture	1. BCQS 2. OSCE

		2. Define interceptive orthodontics. 3. Discuss the rationale and sequence of serial extractions. 4. Select the most appropriate space maintainers used in mixed dentition based on different clinical situations. 5. Describe various habit breaking appliances in paediatric patients.		
11	Oral Surgery and Pathology in Paediatric Patients	1. Discuss lesions affecting the oral soft tissues in children: Infections, Ulcers, Vesiculobullous, White lesions, Cysts, Tumors. 2. Discuss lesions affecting the jaws in children: Cysts, Developmental, Osteodystrophies, Tumors.	1. Lecture	1. BCQS
12	Dental Trauma basics	1. Classify dento-alveolar injuries. 2. Explain the importance of a detailed history of trauma including past medical and dental history. 3. Justify questions to be inquired from a patient presenting with history of dental trauma. 4. Perform a thorough extraoral and intraoral examination. 5. Justify the appropriate radiographs needed for an accurate diagnosis.	1. Lecture 2. Tutorial/ Small Group Discussion 3. Clinical Teaching	1. BCQS 2. OSCE
13	Injury to Tooth and Healing After Trauma	1. Describe different types of healings. 2. Describe the healing of pulp and factors affecting its healing. 3. Describe the healing of periodontium and factors affecting its healing	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE

		4. Differentiate between various types of root resorptions: External resorption, Cervical resorption, Internal resorption, Replacement resorption.		
14	Traumatic injuries to Primary Dentition	1. Formulate the management plan of hard tissue injury: Uncomplicated crown fracture, Complicated crown fracture, Crown-root fracture, Root fracture. 2. Formulate the management plan of soft tissue injury: Concussion, Subluxation, Extrusive luxation, Lateral luxation, Intrusion, Avulsion. 3. Describe the sequelae of injuries to the primary dentition.	Lecture Tutorial/ Small Group Discussion	OSCE BCQS
15	Traumatic injuries to Permanent Dentition-Hard Tissue	1. Formulate the management plan of hard tissue injury in the following categories: Enamel infarction, Enamel fracture, Enamel-dentin fracture, Complicated crown fracture, Uncomplicated crown-root fracture, Complicated crown-root fracture, Root fracture. 2. Discuss the types and uses of splints. 3. Describe the duration of splint therapy in each injury. 4. Describe the procedure for placement of composite and wire splint.	1. Lecture 2. Tutorial/ Small Group Discussion	1. BCQS 2. OSCE
16	Injury to Permanent Dentition-	1. Formulate the management plan of soft tissue injury in following categories: Concussion,	1. Lecture 2. Tutorial/ Small Group	1. BCQS 2. OSCE

	Luxation and Avulsion	Subluxation, Extrusive luxation, Lateral luxation, Intrusion, Avulsion. 2. Describe duration of splint therapy in each injury. 3. Describe the rationale of delayed reimplantation of an avulsed tooth.	Discussion	

4.2.4. INDIRECT RESTORATIONS

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Review of Restorative Materials	1. Explain indications and contraindications of cast restoration. 2. Discuss the composition, properties, merits and shortcomings of materials used for indirect restorations: Metals, Ceramics.	1. Lecture 2. Tutorial/ Small Group Discussion 3. Group presentations	1. BCQS 2. OSCE
2	Partial Coverage Indirect Restorations	1. List various partial and full coverage indirect restorations. 2. Discuss the principles of tooth preparation for indirect restorations. 3. Describe the indications and contraindications for provision of: Inlay, Onlay. 4. Describe the clinical evaluation required and the steps of preparation for: Inlay, Onlay. 5. Enlist materials available for these restorations. 6. Discuss soft tissue management and impression making for inlays and onlays. 7. Discuss laboratory steps for these restorations. 8. Enlist the materials used for cementation. 9. Describe the clinical procedure for cementation. 10. Discuss the latest innovations including CAD-CAM technology.	1. Lecture	1. BCQS 2. OSCE
3	Porcelain Veneers	1. Discuss types of veneers and their advantages and dis advantages.	1. Lecture	1. BCQS 2. OSCE

		2. Discuss indications and contraindications for veneers. 3. Describe the procedures involved in treatment planning. 4. Apply the knowledge of importance of quality and quantity of enamel for predictable bonding to clinical scenarios. 5. Describe tooth preparation, soft tissue management and impression making for veneers. 6. Describe methods of temporization. 7. Describe step by step procedure of veneer placement. 8. Describe the importance of silane coupling agent and hydro fluoric acid. 9. Explain techniques for intra-oral repair of indirect restorations.		
4	Full Coverage Indirect Restorations	1. Discuss the treatment planning for extra-coronal restoration 2. Describe the principles of occlusion and periodontal consideration for extra-coronal restoration 3. Discuss the general principles of tooth preparation and their biological and mechanical consideration. 4. Describe the indications and contraindications for: Porcelain fused to metal crown, All metal crown, All ceramic crown. 5. Discuss factors influencing shade selection. 6. Describe guidelines for accurate shade matching.	1. Lecture	1. BCQS 2. OSCE

		7. Discuss various methods of shade selection. 8. Describe the clinical assessment required and the steps of preparation for: Porcelain fused to metal crown, All metal crown, All ceramic crown. 9. List different materials available for these restorations. 10. Discuss soft tissue management and impression making for full coverage restorations. 11. Discuss the indications, contra indications and technique for the use of electrosurgery. 12. Discuss laboratory steps for these restorations. 13. Enlist the materials used for cementation. 14. Describe the clinical procedure for cementation. 15. Discuss the latest innovations including CAD-CAM technology.		
5	Implant Supported Restorations	1. Discuss indications and contraindications of implant supported restorations. 2. Discuss advantages and disadvantages of implant supported restorations 3. Explain the treatment planning for implant recipient. 4. Discuss the assessment of implant placement in esthetic zone 5. Describe various implant supported restorations that can be used for replacement of missing teeth.	1. Lecture	1. BCQS

PRE-CLINICAL AND CLINICAL ROTATIONS

OPERATIVE DENTISTRY ROTATION SECOND YEAR BDS

S. NO.	PROCEDURAL SKILLS By the end of the phantom head lab rotation the second year BDS student should be able to demonstrate the following:	TEACHING METHODOLOGY	ASSESSMENT TOOLS The students will be assessed mid-rotation and end-of rotation tests
1.	Instruments and chair position- demonstration	1. Teaching on phantom teeth 2. Teaching on extracted teeth	1. OSPEs 2. Viva 3. Direct observation of procedural skills Will be assessed during: 1. Daily supervision 2. Mid-rotation test 3. End-of- rotation test
2.	Tooth numbering system and charting		
3.	Hand wash technique and Sterilization		
4.	Isolation		
5.	Matrix band application		
6.	Cavity preparation class I-V		
7.	Lining and bases		
8.	Amalgam restoration class I, II and V		
9.	Composite restoration		
10.	GIC restoration		
11.	Pit and fissure sealant		

OPERATIVE DENTISTRY ROTATION THIRD YEAR BDS

S. NO.	PROCEDURAL SKILLS By the end of the clinical rotation the third year BDS student should be able to demonstrate the following:	TEACHING METHODOLOGY	ASSESSMENT TOOLS The students will be assessed mid-rotation and end-of rotation tests
1.	History taking	1. Teaching on phantom teeth 2. Teaching on extracted teeth 3. Teaching on patients (under supervision)	1. OSPEs / OSCEs 2. Viva 3. Direct observation of procedural skills Will be assessed during: 1. Daily supervision 2. Mid-rotation test 3. End-of- rotation test
2.	Clinical examination including Vitality/ sensibility test		
3.	Radiographic examination and interpretation • Periapical radiographs • Bitewing radiographs • Orthopantomograph • Occlusal radiographs		
4.	Diagnosis and treatment planning		
5.	Parts of a dental unit		
6.	Patient and operator positioning		
7.	Class I-V cavity preparation and restorations on patients		
8.	Endodontic instruments		
9.	Endodontic treatment on extracted teeth		

OPERATIVE DENTISTRY ROTATION FINAL YEAR BDS

S. NO.	CLINICAL AND PROCEDURAL SKILLS By the end of the clinical rotation the final year BDS student should be able to demonstrate the following:	TEACHING METHODOLOGY	ASSESSMENT TOOLS The students will be assessed mid-rotation and end-of rotation tests; mid-term and final examination through:
1.	Instruments and chair position- demonstration	1. Chair- side teaching 2. Teaching on phantom teeth 3. Teaching in radiology department 4. Teaching on extracted teeth 5. Supervised work on patients	1. OSCEs 2. Chair-side viva 3. Direct observation of clinical skills 4. Direct observation of procedural skills Will be assessed during: 5. Daily supervision 6. Mid-rotation test 7. End-of- rotation test (Ward test)
2.	Tooth numbering system and charting		
3.	History taking and clinical examination including clinical tests (e.g. pulp testing)		
4.	Peri-apical radiograph (exposure and processing)		
5.	Interpretation of radiographs (peri-apical, bitewing, OPG and occlusal)		
6.	Cavity preparation, lining and restoration- Class I-VI (Phantom teeth)		
7.	Hands-on matrix band and rubber dam application		
8.	Cavity preparation, lining and restoration (patients)		
9.	Endodontics - single rooted tooth (extracted tooth)		
10.	Endodontics - single rooted tooth (patient)		

DETAILS OF CLINICAL ROTATION -FINAL YEAR BDS

ORIENTATION SESSION:

Introduction to sub-departments

- Operative Dentistry
- Endodontics
- Paedodontics

Introduction to demonstrators/lecturers

Communication skills

Code of conduct -

- Patients' record maintenance
- Log book record maintenance

Use of rubber dam for every patient

OPERATIVE DENTISTRY POSTING FOR FINAL YEAR BDS

Nine weeks of posting

DEPARTMENT	DURATION (weeks)	ACTIVITY/ SKILLS TO BE LEARNT
OPERATIVE	04	Orientation Tests Cavity preparation on patients (Class I – V) Veneers preparation, demonstration on phantom teeth and practice. Inlay preparation, demonstration on phantom teeth and practice. **Mid rotation assessment**.
ENDODONTICS	02	Demonstration of Root canal treatment (RCT) on extracted tooth Practice on 2 anterior and 2 posterior and 1 RCT on patient Demonstration of use of manual protaper on extracted tooth Practice of use of manual protaper
PAEDODONTICS	01	Alternating with Diagnosis- half students in Paedodontics and half in Diagnosis
DIAGNOSIS AND END-OF-ROTATION TEST	02	Change over- half students in Paedodontics and half in Diagnosis

THREE MONTHS ROTATION OF HOUSE OFFICERS

Department of Operative dentistry

DEPARTMENT	DURATION
Operative: **Week I** Informed consent, counselling Communication skills and professionalism Class I & II Amalgam restorations. **Week II & III** Class III, IV, V and complex amalgam/ composite restorations. **Week IV** Management of patients presenting to the OPD for indirect fixed restorations	04 Weeks
Endodontics: **Week I & II** Use of apex locator Root canal treatment on anterior teeth. **Week III & IV** Root canal treatment on posterior teeth. **Week V** Restoration of endodontically treated teeth with post and core. Demonstration of manual protaper on extracted teeth. Practice of manual protaper on extracted teeth; one anterior one posterior **Week VI** Performance of root canal treatment by manual protaper Demonstration of rotary endodontics	06 Weeks
Paedodontics: Performance of fissure sealant placement, pulpotomy, pulpectomy and stainless-steel crown on paediatric patients.	01 Week

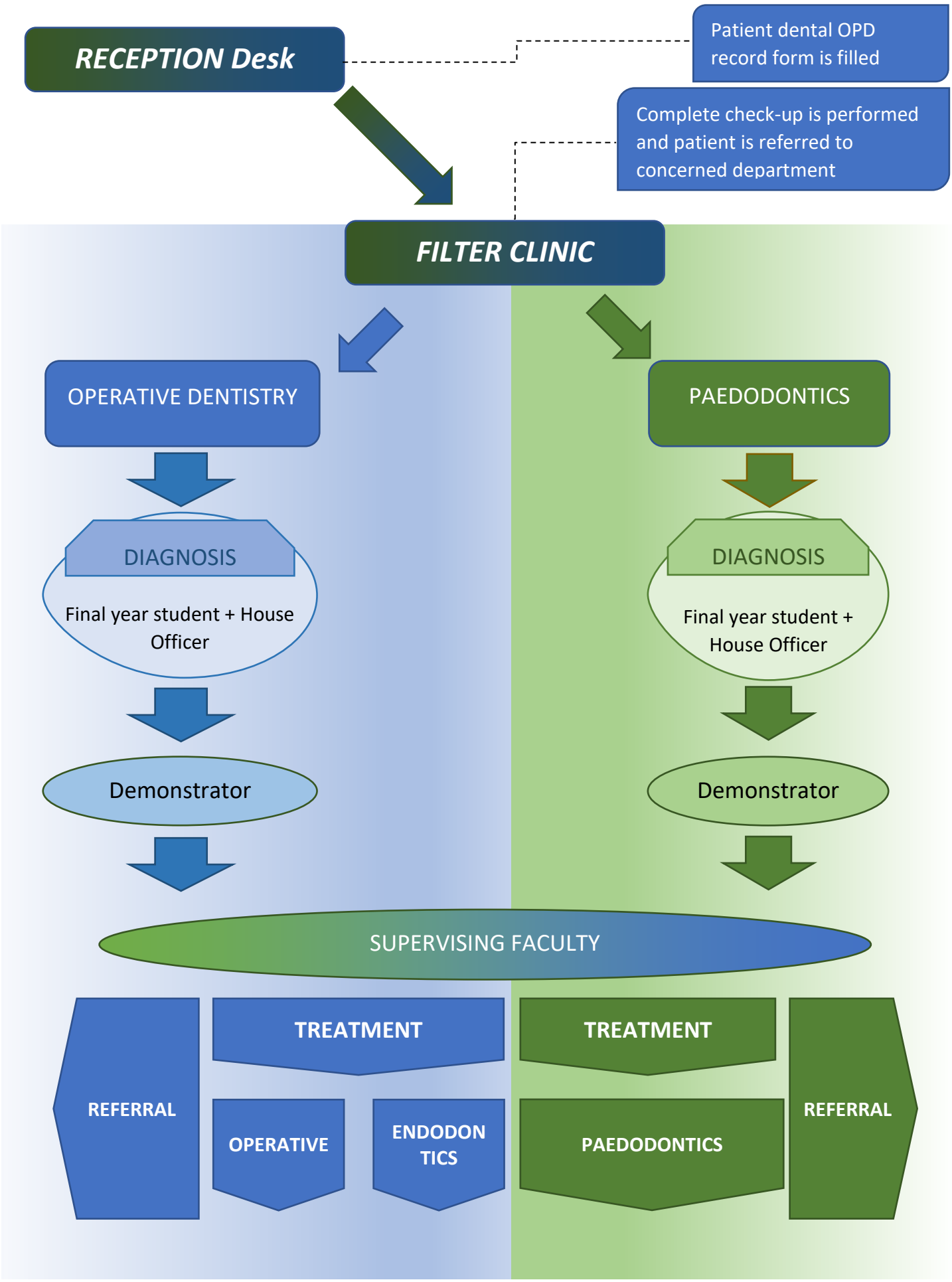
End of rotation test Completion of patients Submission of log book	01 Week

Each house officer posted in Operative Dentistry has days designated for the following:

- Diagnosis
- Operative dentistry department
- Paedodontics
- Endodontics
- Each house officer will present 2 cases during their rotation in their operative department

APPENDIX

PATIENT FLOWCHART



SAMPLE WEEK # 1 SCHEDULE- FINAL YEAR BDS CLINICAL ROTATION

DAY 1:

10:30 AM to 11:30 AM (Orientation)

11:30 AM to 12:30 PM (Diagnosis and treatment Planning Demonstration)

12:30 PM to 01:30 PM (Radiograph Demonstration)

DAY 2:

10:30 AM to 11:30 AM (TEST 1 Instruments used in operative and endodontics)

11:30 AM to 12:30 PM (TEST 2 Diagnosis and treatment planning)

12:30 PM to 01:30 PM (Matrix band placement on phantom teeth revision class)

DAY 3:

10:30 AM to 11:30 AM (TEST 3 Matrix band placement on phantom teeth)

11:30 AM to 12:30 PM (Diagnosis)

12:30 PM to 01:30 PM (Rubber Dam Demonstration + Practice)

DAY 4:

10:30 AM to 11:30 AM (TEST 4 Rubber dam placement)

11:30 AM to 12:30 PM (Diagnosis)

12:30 PM to 01:30 PM (TEST 5 Radiographs)

DAY 5:

Cavity preparation on patients (Class I – V)

RECOMMENDED BOOKS (Latest editions):

OPERATIVE DENTISTRY:

Summit Fundamentals of Operative Dentistry
Sturdevant's Art and Science of Operative Dentistry

ENDODONTICS:

Endodontics: Principles and Practice (Torabinejad, Fouad & Walton)
Harty's Endodontics in Clinical Practice
Cohen's Pathways of the Pulp

PEDIATRIC DENTISTRY/ PAEDODONTICS:

Pediatric Dentistry (Richard Welbury)

CROWNS AND BRIDGES:

Planning and Making Crowns and Bridges (Bernard G N Smith)
Contemporary Fixed Prosthodontics (Stephen F. Rosenstiel)
Fundamentals of Fixed Prosthodontics (Shillingburg)

IMPLANTS:

Contemporary Fixed Prosthodontics (Stephen F. Rosenstiel)

DRESS CODE POLICY FOR STUDENTS WORKING IN THE OPD

The dress code policy has been developed to maintain and promote high standards of personal appearance, hygiene, professionalism, and safety in the work place. The professional image of JMDC will be upheld by all the students through their dress and attire, which should be consonant with the national cultural sensitivities. It is important to ensure that the institute's image is projected favorably. Dress and appearance should not be offensive to fellow students, faculty members, visitors, patients, attendants or co-workers. It is the responsibility of all students to adhere to the institution policy (as well as clinical department's policy) and comply with the following defined rules of conduct.

- All students are required to be clean, well-groomed and dressed appropriately for the job at all times. Female students are required to dress in well-tailored and subtly coloured clothing which portrays an image of modesty, respectability, decorum and efficiency.
- Male students are required to portray a professional image in shalwar kameez or dress shirt and trousers
- All students must wear (MANDATORY) clean, white, neat lab-coats while in the OPD.
- Long hair must be tied at the back, neatly into a bun or braid.
- All students must be neat and clean whenever they report to work. As an example, male students should keep shirts buttoned and tucked neatly into pants.
- Students should avoid extremes in hairstyles, cosmetics and jewelry. Reasonable jewelry is permitted; excessive visible piercings and loud make-up are not permitted.
- Casual sportswear such as blue jeans, shorts, sweat suits, warm-up suits, t-shirts (with or without writing on them), and sundress - should NOT be worn in the OPD.
- Foot wear should be clean, safe and appropriate for the OPD.
- No artificial nails, overlays, long nails or chipped nail polish in clinical areas