

ORAL PATHOLOGY AND MICROBIOLOGY

GOAL

To make postgraduate training programme effective so as to develop independent capabilities in a student, to learn and apply the knowledge of Oral Pathology in identifying the problems and diagnosis so as to conduct research with sound scientific knowledge and skills.

OBJECTIVES

a) KNOWLEDGE

1. To train a graduate dental surgeon so as to ensure higher competence in both pathology and microbiology dealing with the nature of oral diseases, their causes, processes and effects.
2. He/she is expected to perform routine histopathological evaluation of specimen relating to oral and peri-oral tissues, to carry out routine diagnostic procedures including hematological, cytological, microbiological, immunological and ultra structural investigations.
3. He/she is expected to have an understanding of current research methodology, collection and interpretation of data, ability to carry out research projects on clinical and or epidemiological aspects, a working knowledge on current database, automate data retrieval systems, referencing and skill in writing scientific papers.
4. He/she is expected to present scientific data pertaining to the field; in conferences both as poster and verbal presentations and to take part in group discussions.
5. He/she is expected to deal with the correct professional handling, examination, interpretation and presentation of dental and oral evidences, which may come before the legal authorities.
6. Since oral cancer continues to occupy a central stage of oral pathology, he/she should be capable of clinically correlating oral pre-cancer with emphasis on early diagnosis using research-based information.

b) SKILLS

1. To identify problems and answer the same through in-depth research so as to inculcate the concept of answering any question.
2. To develop confidence in a postgraduate student to handle and to manage academics and research responsibilities in future.
3. To help an individual to develop not only academically but also socially, spiritually and holistically.

COURSE CONTENT

FIRST YEAR

I. Bio-Statistics and Research Methodology

1. Introduction to Bio-Statistics - Scope and need for statistical application to biological data.
2. Definition of selected terms. Scale of measurements related to statistics. Methods of collecting data. Presentation as statistical diagrams and graphs.
3. Research methodology - Research protocol.

Approach: Didactic lectures on Bio-statistics and discussion on research methodology by eminent researchers.

II. Applied Gross Anatomy of Head and Neck including Histology

1. Temporomandibular joint.
2. Muscles of mastication.
3. Tongue.
4. Salivary glands.
5. Maxillary sinus.
6. Jaw muscles and facial muscles.
7. Nerve supply, blood supply, lymphatic and venous drainage.
8. Trigeminal, facial, glossopharyngeal and hypoglossal nerves.
9. Embryology: Development of craniofacial complex.

Approach: Topics to be covered as didactic lectures, demonstrations and seminars.

Cell Biology

- ❖ Detailed study of structure and function of the mammalian cell with special emphasis on ultrastructural features and molecular aspects.
- ❖ Detailed consideration of intercellular junctions.
- ❖ Cell cycle and cell division, cell cycle regulators, cell to cell and cell-extracellular matrix interactions.

Approach: Topics to be covered as seminars and didactic lectures.

General Histology - Light microscopic and electron microscopic considerations:

- ❖ Epithelial cells including glands.
- ❖ Connective tissue including bone.
- ❖ Hematopoietic system, lymphatic system.
- ❖ Digestive system with special reference to stomach, intestine, liver, pancreas.
- ❖ Urinary system.
- ❖ Endocrinal system.

Approach:

- ❖ Topics to be covered as didactic lectures and slide discussions.
- ❖ Maintenance of histology records.
- ❖ Posting in the department of Anatomy.

III. Applied Physiology

1. Saliva.
2. Pain.
3. Mastication.
4. Deglutition.
5. Taste.
6. Wound healing.
7. Vitamins.
8. Hormones.
9. Blood and its constituents.

Approach: Topics to be covered as didactic lectures and seminars.

IV. Applied Biochemistry

1. Chemistry and metabolism of carbohydrates, lipids and proteins.
2. Methods of identification and purification.
3. Various techniques applied including cell filtration, centrifugation, electrophoresis, spectrophotometer and radioactive techniques.

Approach:

- ❖ Topics to be covered as didactic lectures.
- ❖ Postings in Biochemistry laboratory to familiarize with the relevant laboratory techniques.

V. Applied General Pathology

VI. Pathogenic mechanism at molecular level

1. Cellular changes following injury- degeneration, necrosis and repair.
2. Inflammation and chemical mediators.
3. Oedema, thrombosis and embolism.
4. Hemorrhage and shock.
5. Blood dyscrasias.
6. Carcinogenesis and Neoplasia.

Approach:

- ❖ To be covered as seminars, lectures.
- ❖ Attending postings.

VII. Applied General Microbiology

1. Infections, routes of infection and spread.
2. Sterilization, disinfection and antiseptics.
3. Bacteriology of Cocci, Bacilli and Spirochetes.
4. Mycology:
 - a. General properties of fungi, classification and infections.
 - b. Fungal infections, rapid diagnosis, method of collection of sample and examination of fungi.

5. Virology:

- ❖ General properties, Structure, classification, pathogenesis and pathology. {Herpes, Hepatitis, Human Immunodeficiency (HIV) viruses}

6. Parasitology

Approach: Topics to be covered as didactic lectures and seminars.

Posting in Microbiology Lab: To familiarize with the relevant laboratory techniques (collection and transport and preservation of specimens, culture and sensitivity techniques).

VIII. Basic Immunology

1. Cell mediated and humoral immunity.
2. Antigen- antibody reactions.
3. Graft versus host reaction, auto immunity.

Approach: Topics to be covered as didactic lectures and seminars.

Posting in Microbiology Lab: To familiarize with routine immunological diagnostic methods.

Selection of topic for Library Dissertation.

IX. Oral Biology (Oral and Dental Histology including Embryology and Oral Physiology)

1. Detailed structural and functional study of the oral, dental and para-oral tissues with emphasis on ultrastructural, molecular and biochemical aspects.
2. Development of oral and Para-oral tissues including detailed aspects of tooth, dental hard tissues formation.
3. Study of morphology of deciduous and permanent teeth.
4. Applied aspects – influence of hormones and nutrients on growth, development and structure of oral soft and hard tissues and para- oral tissues.

Approach: Topics to be covered as seminars and slide discussions. Records to be maintained.

X. Basic Molecular Biology and Genetics

1. Detailed molecular aspects of DNA, RNA, golgi apparatus, endoplasmic reticulum and other intracellular organelles, transcription and transplanted, plasmids.
2. Molecular biology techniques: DNA extraction, PCR and Western blotting.

Approach: Topics to be covered as didactic lectures. Posting in centres where facilities are available for demonstration of routine molecular biology techniques.

XI. Nutrition and Dietetics

1. General principles, balanced diet, effect of dietary deficiency, protein energy malnutrition and recommended dietary allowances.
2. Fluid and electrolyte balance in maintaining homeostasis.

XII. Basic Histology techniques and Microscopy

1. Theoretical aspects of microscopy – light and various other types including electron microscopy.
2. Methods of tissue preparation for ground and decalcified sections, light microscopy and electron microscopy.
3. Routine staining procedures and theory of staining.

Approach: Topics to be covered as seminars. Preparation of ground and decalcified sections, biopsy processing, sectioning and staining.

This is basic minimum requirement, however a student needs to know all the related aspects of the above mentioned topics.

SECOND YEAR

I. Library Dissertation

Evaluation and satisfactory completion of library dissertation by the end of six months.

II. Oral Pathology

1. Basic Oral Pathology

- a. Development disturbances of oral and para oral structures.
- b. Dental caries.
- c. Pulp and periapical pathology.
- d. Osteomyelitis.
- e. Periodontal diseases.
- f. Salivary gland diseases.
- g. Cysts of the oral and para oral region.
- h. Traumatic, reactive and regressive lesions of oral cavity.
- i. Pigmentation of oral and para oral region and discoloration of teeth.
- j. Microbial infections of oral soft tissues.
- k. Diseases of the bone and TMJ.
- l. Systemic diseases involving oral cavity.
- m. Mucocutaneous disorders.
- n. Diseases of the nerves.
- o. Diseases of maxillary sinus.

2. Oral Oncology:

- a. Precancerous lesions and conditions.
- b. Benign and malignant tumors of the oral cavity.

3. Biopsy: Types of Biopsy: Incisional, Excisional, Punch biopsy, Exfoliative Cytology and FNAC.

Approach: Attending classes with undergraduates, group discussions, didactic lectures and slide review.

Posting to Dermatology Department.

Maintenance of Histopathology Log book.

III. Principles of Basic Forensic Odontology (Pre-clinical Forensic Odontology)

1. Introduction, definition and scope.
2. Age, Sex and Ethnic identification through tooth morphology and histology.
3. Determination of sex and blood groups from buccal mucosa and saliva.
4. Dental DNA methods.
5. Legal procedures like inquest, medico-legal evidences, and post-mortem examinations of violence around the mouth and neck.
6. Identification of deceased individual- Mass disaster.
7. Bite marks, rugae pattern and lip prints.
8. Overview of forensic medicine and toxicology and dental importance of poisons and corrosives.

Approach: Didactic lectures from experts in the Department of Forensic Medicine. Training in Forensic laboratory for basic procedures in identification of deceased individuals.

Practical Approach to Record:

1. Sex determination by the use of skull and mandible.
2. Identification of person by rugae patterning, bite mark analysis (Bite marks recording, swabbing techniques and various types of overlays production and comparison).
3. Lip prints recording and analysis.
4. Age estimation: Schour and Maisler's method, Demerjian's method, Gustafson's method, dentin translucency, cemental incremental lines, Kvaal and associated radiographic method.

IV. Oral Microbiology and Immunology

1. Detailed structure of oral bacteria with molecular and biochemical considerations, microbial genetics and immunologic mechanisms.
2. Detailed study of infections of oral and para-oral regions with emphasis on tropical diseases.

Approach: Seminars and demonstrations, maintenance of log book.

V. Clinical Pathology

Laboratory investigations – Hematology, Microbiology and Urine analysis.

Approach:

Postings in Clinical Pathology lab for relevant training.

Record books to be maintained.

VI. Commencement of dissertation.

VII. Specialized histotechniques and special stains.

1. Special staining techniques for different tissues.
2. Histo-chemistry.
3. Immunostaining.
4. Frozen sections staining.
5. Cytological techniques.

Approach: Training to be imparted in the department or in other institutions having facility. Record books to be maintained.

VIII. Recording of case histories and clinico-pathological discussions.

Posting in Oral and Maxillofacial Surgery Clinics, Oral Medicine and Radiology for Clinico- Pathologic discussions.

Record of case histories to be maintained.

IX. Dissertation Work Continuation.

X. Histopathology slide discussions.

Approach: Records to be maintained.

XI. Laboratory Techniques

1. Routine hematological tests and their clinical significance.
2. Biopsy procedures for oral lesions.
3. Processing of tissues for paraffin sections.

4. Microtome and principles of microtomy.
5. Routine stains, principles and theories of staining techniques.
6. Principles and theories of microscopy.
7. Light microscopy and various other types including electron microscopy.
8. Methods of tissue preparation for ground sections and decalcified sections.
9. Special stains and staining techniques for different tissues.
10. Immunohistochemistry.
11. Preparation of frozen sections and cytological smears.

Approach: Demonstrations, hands-on training, practical procedures, records and postings.

This is basic minimum requirement, however a student needs to know all the related aspects of the above mentioned topics.

THRID YEAR

I. Recent Advances in Oral Pathology

Approach: Update of knowledge in Oral Pathology through study of recent Journals and Internet browsing. Journal clubs and group discussions.

II. Experimental aspects of Oral Diseases

Approach: Posting is desirable in centers where animal experimentation is carried out to familiarize with Laboratory techniques, upkeep and care of experimental animals. Records to be maintained.

This is basic minimum requirement, however a student needs to know all the related aspects of the above mentioned topics.

III. Academic activities

- a. Journal clubs and seminars to be presented by every postgraduate student.
- b. Clinico-pathological discussions once in month by every postgraduate student.
- c. To attend interdepartmental scientific discussions.
- d. Lecture and practical classes and slide discussions to be taken for II B.D.S students in Oral and Dental Anatomy, Dental Histology and for III B.D.S. students in Oral Pathology.

IV. Dissertation completion and submission.

Preliminary examination (theory and practical) to be conducted at institutional level.

V. Monitoring and learning process.

- It is essential to monitor the learning process of each candidate through continuous appraisal and regular assessment. The monitoring to be done by the staff of the department based on the participation of students in various teaching-learning activities. It may be structured and assessment is done using checklists.

V. Preparation for the final university examination.

DISSERTATIONS

1. Synopsis for main dissertation
 - a. Identifying and selection of topic
 - b. Synopsis writing
 - c. Presentation of synopsis to the department, institute review board and ethical committee.
 - d. Submission to university (end of first 6 months).
2. Library dissertation: Completion and submission by 18 months of commencement of post graduation programme.
3. Main dissertation: Submission 6 months before university examinations.

QUOTA

S. No.	Activities	Yearly Quota
1.	Ground sections	5
2.	Decalcification sections	5
3.	Tooth carving	1 set
4.	Hematology	50
5.	Case presentation	5
6.	Routine staining	25
7.	Seminars	5
8.	Journal club	15
9.	Slide discussion	200
10.	Special stain	10
11.	CPC	3

ASSESSMENT AND MONITORING

1. Log books.
2. Scheme of examination (Institutional level).
 - a. First internal assessment examination on Basic sciences at the end of first year. (Theory)
 - b. Second internal assessment examination at the end of second year. (Theory and practicals).
 - c. Preliminary examination in the last 6 months. (Theory, practicals and viva voce).

C. VIVA VOCE EXAMINATION : 100 MARKS.

a) Viva voce 80 Marks.

b) Dissertation 20 Marks.

- All examiners will conduct viva voce conjointly to assess a candidate for comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents, presentations and discussion of dissertation.

A. Theory	300 Marks
B. Practical and Clinical Examination	200 Marks
C. Viva voce	<u>100 Marks</u>
Total (A+B+C)	600 Marks