

**Pravara Institute of Medical Sciences  
(Deemed University)**

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**Syllabus**  
**M.D.S. (Oral Pathology & Microbiology)**

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## **ORAL PATHOLOGY AND MICROBIOLOGY**

Oral Pathology deals with the nature of oral diseases, their causes, processes and effects. It relates the clinical manifestation of oral diseases to physiologic and anatomic changes associated with these diseases. It deals with commonly occurring pre malignancies and malignancies and serves commonly with the scientifically based information. It also deals with application of dental science to the administration of law and the furtherance of justice.

### **Objectives:**

- To train a graduate dental surgeon so as to ensure higher competence in both general and special pathology dealing with the nature of oral diseases, their causes, processes and effects.
- An oral pathologist 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.
- 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.
- 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 etc.
- He / she is expected to deal with the correct professional handling , examination, interpretation and presentation of dental an oral evidences which may came before the legal authorities.
- 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 scientifically based information.

### **Broad outline of theoretical, clinical and practical courses:**

1. Study of principles of routine and special techniques used for histopathology including principles of histochemistry, immunohistochemistry, applied and theoretical biochemical basis of histochemistry as related to oral pathology.
2. Advanced histological an histopathological study of dental and oral tissues including embryonic considerations, clinical considerations, biology, histology, pathology, prognosis and management of oral oncology. concepts of oral pre malignancies.
3. Study of special and applied pathology of oral tissues as well as relation of local pathological and clinical findings to systemic conditions.

4. Oral microbiology and their relationship to various branches of dentistry.
5. Oral microbiology affecting hard and soft tissues, Study of clinical changes and their significance to dental and oral diseases as related to oral pathology
6. Forensic odontology.
7. Inter institutional posting such as cancer hospital, dermatology clinics, regional HIV detection centres, sophisticated instrumentation centres for electron microscopy and other techniques.
8. Intra institutional posting in Oral Medicine and Radiology, Oralsurgery and Periodontology..
9. Maintenance of records of all post graduate activities.
10. Library dissertation.
11. University dissertation/Thesis.

#### GENERAL INFORMATION:

- The duration of the post graduate degree course in oral pathology and microbiology will be of three years.
- It will consist of three modules of one year each.
- The library dissertation should be completed by the end of tenth month and evaluation to be done at the end of first year.
- The university dissertation should start in second year and should be completed and submitted to the university six months before the final university examination.
- There shall be one institutional / university examination at the end of first year in the subject of Basic sciences subjects (Research Methodology and Biostatistics) .

## A. Course Content

### FIRST YEAR

#### 1. Biostatistics n Research methodology

- Basic Principles of Biostatistics and study as applied to dentistry and Research
- Collection /organization of data/ measurement scales presentation data and analysis.
- Measures of central tendency
- Measures of variability
- Sampling and planning of health survey
- Probability, normal distribution and indicative statistics.
- Estimating population values.
- Tests of significance (Parametric/nonparametric qualitative methods).
- Analysis of variance.
- Association, correlation and regression.

#### Approach:

- Didactic lectures on Biostatistics an discussion on Research methodology.
- Two day Post graduate orientation course including General approach PG course ,library , Main dissertation, journal club topics selection and presentation, seminars, clinicopathological meetings, teaching technology and use of audiovisual aids.

#### 2. Applied Gross Anatomy of Head and Neck including Histology:

- Temporomandibular Joint
- Trigeminal nerve and Facial nerve.
- Muscles of Mastication.
- Tongue
- Salivary glands
- Nerve supply, blood supply, lymphatic drainage and venous drainage of Oro dental tissues
- Embryology
  - Development of face, palate, mandible, maxilla, tongue and applied aspect of the same.
  - Development of teeth and dental tissues and developmental defects of oral and maxillofacial region and abnormalities of teeth.
- Maxillary sinus.
- Jaw muscles and facial muscles

**Genetics:**

Introduction , mode of inheritance, chromosomal anomalies of oral tissues and single gene disorder.

**Approach:**

- To be covered as didactic lectures.
- Posting in department of Anatomy for demonstration of dissection of Head, face and neck.

**3. Physiology (General and Oral)**

- Saliva
- Pain.
- Mastication
- Taste
- Deglutition
- Wound healing
- Vitamins (Influence on growth, Development and structure of Oral soft and hard tissues and para oral tissues.)
- Calcium metabolism.
- Theories of mineralization
- Tooth eruption and shedding
- Hormones((Influence on growth, Development and structure of Oral soft and hard tissues and para oral tissues.)
- Blood and its constituents.

**Approach:**

To be covered as didactic lectures.

**4. Cell Biology:**

- Cell structure and function (Ultra structural and molecular aspects), intercellular junctions, cell cycle and division, cell cycle regulators, cell to cell extra cellular matrix interactions.
- Detailed molecular aspects of DNA, RNA and intracellular organelles, transcription and translation and molecular biology techniques.

**Approach:**

To be covered as seminars.

## **5. General Histology:**

Light and electron microscopy considerations of epithelial tissues and gland, bone, hemopoietic system, lymphatic system, muscle, neural tissue, endocrinal system (Thyroid, pituitary, parathyroid)

### **Approach:**

- Topics to be covered as didactic lectures.
- Postings in the dept of Anatomy and histology for slide discussion.
- Record book to be maintained.

## **6. Biochemistry:**

- Chemistry of carbohydrates, lipids and proteins.
- Methods of identification and purification.
- Metabolism of carbohydrates, lipids and proteins.
- Biological oxidation.
- Various techniques- cell fractionation and ultra filtration, centrifugation, electrophoresis, spectrophotometry and radioactive techniques.

### **Approach:**

- Topics to be covered as didactic lectures.
- Posting I the dept of Biochemistry to familiarize with various techniques.
- Record book to be maintained.

## **7. General Pathology:**

- Inflammations and chemical mediators, thrombosis, embolism, necrosis, repair, degeneration, shock, hemorrhage, pathogenic mechanisms at molecular level and blood dyscrasias, carcinogenesis and neoplasia.

### **Approach:**

To be covered as seminars and didactic lectures.

## **8. General Microbiology:**

- Definitions of various types of infections.
- Routes of infection and spread.
- Sterilization, disinfection and antiseptics.
- Bacterial genetics.
- Physiology and growth microorganisms.

**Approach:**

- To be cover as didactic lectures.
- Record book to maintained.

**9. Basic Immunology:**

- Basic principles of immunity, antigens, and antibody reactions.
- Cell mediated immunity and humoral immunity.
- Immunology of hypersensitivity.
- Immunological basis of autoimmune phenomenon.
- Immunodeficiency with relevance to opportunistic infections.
- Basic principles of transplantation and tumour immunity.

**Approach:**

To be covered as didactic lecture.

**10. Systemic microbiology /Applied microbiology:**

Morphology, classification, pathogenicity, mode of transmission, methods of prevention, collection and transport of specimen for laboratory diagnosis, staining methods, common culture media, interpretation of laboratory reports and antibiotic sensitivity tests.

- Staphylococci
- Streptococci
- *Corynebacterium diphtheria*
- Mycobacteria.
- Clostridia, bacteroids and fusobacteria.
- Actinomycetales.
- Spirochetes.

**Virology:**

**General properties:** structure, broad classification of viruses, pathogenesis, pathology of viral infections.

**Herpes virus:** List of viruses included, lesions produced, pathogenesis, latency principles and laboratory diagnosis.

**Hepatitis virus:** List of viruses, pathogenesis, mode of infection, list of diagnostic tests an their interpretations, methods of prevention and control.

**Human Immunodeficiency Virus:** Structure with relevance to laboratory diagnosis, types of infection, laboratory tests and their interpretation, universal precautions, specific precautions and recent trends in diagnosis and prophylaxis.

**Mycology:**

- General properties of fungi, classification bases of diseases, superficial subcutaneous and deep opportunistic infections.
- General principles of fungal infections, diagnosis, rapid diagnosis method collection of sample and examination for fungi.

**Approach:**

- To be covered as seminars and didactic lectures.
- Posting in the dept of microbiology to familiarize with relevant diagnostic methods.
- Record book to be maintained.

**11. Oral Biology (Oral and Dental Histology)**

- Structure and functions of oral, dental and paraoral tissues including their ultra structure, molecular and biochemical aspects.
- Study of morphology of permanent and deciduous teeth.(Lectures and practicals to be given by P students)

**Approach:**

- To be covered as seminars and didactic lectures
- Record book to be maintained.

**12. Basic molecular biology and techniques.**

Experimental aspects – DNA extraction , PCR, Western blotting.

**Approach:**

- To be covered as didactic lectures.
- Posting in the centres where facilities are available for demonstration of routine , molecular biology techniques.
- Record book to be maintained.

**13. Basic Histotechniques and microscopy:**

- Routine hematological tests and clinical significance of the same.
- Biopsy procedures for oral lesions.
- Processing of tissues for paraffin embedding.



- Microtomes and principles of microtomy.
- Routine stains, principles and theories of staining techniques.
- Microscope and principle of microscopy.
- Light microscopy and various other types including electron microscopy.
- Methods of tissue preparation for ground sections, decalcified sections.

**Approach:**

- Topics to be covered as seminars.
- Preparation of ground and decalcified sections, tissue processing , sectioning and staining.
- Record book to be maintained.

**Academic Activities:**

- Submission of synopsis of dissertation in the 10 month of first year.
- Journal clubs and seminars to be presented by every post graduate student by turn.
- To attend the interdepartmental meetings.
- To attend dental camps based on survey to be done.
- Part 1 year ending examination to be conducted by college/university at the end of the academic year in optional subjects.

**SECOND YEAR**

**Oral Pathology**

- Developmental defects of oral and maxillofacial region and abnormalities of teeth.
- Dental caries(Introduction, Epidemiology, microbiology, cariogenic bacteria including properties, acid production in plaque, development of lesion, response to dentine-pulp unit, histopathology root caries, sequelae and immunology)
- Pulpal and perapical diseases.
- Infections of oral para oral regions (bacterial, viral and fungal infections)
- Non neoplastic disorders of salivary glands.
- Bone pathology
- Hematological disorders.
- Physical and chemical injuries, allergic and immunological diseases.
- Cysts of odontogenic origin
- Dermatologic diseases.
- Periodontal diseases.
- Oral manifestations of systemic diseases.
- Facial and neuromuscular disorder including TMJ disorders.
- Regressive alteration of teeth.

**Clinical Pathology:**

- Laboratory investigations-hematology, microbiology and urine analysis.
- Posting in clinical pathology to relevant training.

- Record book to be maintained.

**Specialized histotechniques and special stains:**

Specialized staining technique for different tissues.  
 Immunohistochemistry.  
 Preparation of frozen sections and cytological smears.

**Approach:**

Training to be imparted in the department or in the institutions having facility.  
 Record book to be maintained.

Recording of case history and clinicopathological discussions:

**Approach**

Posting to the department of Oral Medicine, Medicine and Radiology and Oral and Maxillofacial surgery for 15 days.  
 Record book to be maintained.

**Dermatology**

Study of selected mucocutaneous lesions-etiopathogenesis, pathology clinical presentation and diagnosis.

**Approach:**

- Posting to dept dermatology of medical college for 15 days.
- Topics to be covered as seminars.
- Record book to be maintained.

**Oral Oncology**

Detailed study including pathogenesis, molecular and biochemical changes of various tumours, tumour like lesions and premalignant lesions affecting the hard and soft tissues of oral and paraoral tissues tumour markers.

**Approach:**

- To be covered as seminars..
- Posting in cancer centres to familiarize with the pathological appearances, diagnosis radiodiagnosis and treatment modalities.

**Oral Microbiology and Immunology**

- Normal Oral microbial flora
- Defence mechanism in the oral cavity
- Microbiology and immunology of dental caries and periodontal diseases.
- Tumour immunology
- Infections of pulp and periapical and periodontal tissues.
- Oral sepsis and bacterimia

- Infections of oral and paraoral regions (Bacterial, viral and fungal infections)

**Approach:**

To be covered as seminars.

**Forensic Odontology:**

Legal procedures like inquest, medicolegal evidences, post mortam examination of violence around mouth and neck, identification of deceased individuals –dental importance bitemarks, rugae patterns and lip prints.

**Approach:**

To be covered as seminars.

Histopathology slide discussion  
Record book to be maintained.

**Other topics in Oral Pathology**

- Detailed description of diseases affecting oral mucosa, teeth supporting tissues and jaws.
- Cysts of oral and paraoral regions.
- Systemic diseases affecting oral cavity.

**Approach:**

Seminars and slide discussions. Record book to be maintained. Training in histopathology slide reporting.

Experimental aspects of oral diseases

Approach: Posting desirable in the centres where animal experimentation is carried out to familiarize with laboratory techniques , upkeep and care of experimental animals.

**Academic activities:**

- Library assignment to be submitted at the end of 6 months.
- Commencement of dissertation work.
- Journal club and seminars to be presented by every PG students turn by turn.
- Clinicopathological discussions once in a month by every PG student.
- To attend the interdepartmental meetings.
- Lectures and practical classes and slide discussion to be taken for ii BDS students in oral anatomy and histology, physiology.

### **THIRD YEAR**

- Non neoplastic disorders of salivary glands.
- Bone pathology
- Physical and chemical injuries, allergic and immunological diseases.
- Cysts of odontogenic origin.
- Oral manifestation of systemic diseases.

#### **Approach:**

- To be covered as seminars
- Slide discussion of the same.
- Record book to be maintained.

#### **Academic activities:**

- Visit to centre where animal experimentation is carried out to familiarize with laboratory techniques , upkeep and care of experimental animals.
- Completion of dissertation work and submission of the same six months before the final university examination.
- Study of journals, internet browsing and group discussion to update knowledge in recent advances in oral pathology.
- Lectures and practical demonstration for third BDS students in oral pathology.
- Reporting of histopathology slides.