

## **Second Year**

### 1. General Pathology & Microbiology

#### **AIM:**

At the end of the course the student should be competent to:

Apply the scientific study of disease processes, which result in morphological and functional alterations in cells, tissues and organs to the study of pathology and the practice of dentistry.

#### **OBJECTIVES :**

Enabling the student

1. To demonstrate and apply basic facts, concepts and theories in the field of Pathology.
2. To recognize and analyze pathological changes at macroscopically and microscopical levels and explain their observations in terms of disease processes.
3. To Integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of Pathology.
4. To demonstrate understanding of the capabilities and limitations of morphological Pathology in its contribution to medicine, dentistry and biological research.
5. To demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes.

#### **COURSE CONTENT**

##### **A. General Pathology –**

###### 1. Introduction to Pathology

Terminologies

The cell in health

The normal cell structure

The cellular functions

The vascular response

## 2. Etiology and Pathogenesis of Disease

Cell Injury

Types – Congenital

Acquired

Mainly Acquired causes of disease

(Hypoxic injury, chemical injury, physical injury, immunological injury)

## 3. Degenerations

Amyloidosis

Fatty change

Cloudy swelling

Hyaline change, mucoid degeneration

## 4. Cell death & Necrosis

Apoptosis

Def, causes, features and types of necrosis

Gangrene - Dry, wet, gas

Pathological Calcifications

(Dystrophic and metastatic)

## 5. Inflammation

Definition, causes types, and features

- a. Acute inflammation
- b. The cellular response
- c. Chemical mediators
- d. The inflammatory cells
- e. Fate

## 6. Healing

Regeneration

Repair

Chronic inflammation

Granulomatous inflammation

- a. Mechanisms
- b. Healing by primary intention
- c. Healing by secondary intention
- d. Fracture healing
- e. Factors influencing healing process
- f. Complications

## 7. Tuberculosis

Epidemiology

Pathological features of Primary and secondary

Pathogenesis ( Formation of tubercle)

TB

Complications and Fate

## 8. Epidemiology

Types and stages of syphilis

Pathological features

Diagnostic criteria

Oral lesions

## 9. Typhoid

Epidemiology

Pathogenesis (Formation of tubercle

Pathological features

Diagnostic criterias

## 10. Thrombosis

Definition, Pathophysiology

Formation, complications & Fate of a thrombus

## 11. Embolism

Definition

Types

Effects

## 12. Ischaemia and Infraction

Definition, etiology, types

Infraction of various organs

## 13. Derangements of body fluids

Oedema – pathogenesis

Different types

## 14. Disorders of circulation

Hyperaemia

Shock

## 15. Nutritional Disorders

## Common Vitamin Deficiencies

### 16. Immunological mechanisms in disease

Humoral & cellular immunity

Hypersensitivity & autoimmunity

### 17. AIDS

### 18. Hypertension

Definition, classification

Pathophysiology

Effects in various organs

### 19. Diabetes Mellitus

Def, Classification, Pathogenesis, Pathology in different organs

### 20. Adaptive disorders of growth

Atrophy & Hypertrophy, Hyperplasia, Metaplasia and Dysplasia

### 21. General Aspects of neoplasia

- a. Definition, terminology, classification
- b. Differences between benign and malignant neoplasms
- c. The neoplastic cell
- d. Metastasis
- e. Etiology and pathogenesis of neoplasia, Carcinogenesis
- f. Tumour biology
- g. Oncogenes and anti-oncogenes
- h. Diagnosis
- i. Precancerous lesions
- j. Common specific tumours, Sq papilloma & Ca, Basal cell Ca, Adenoma & Adenoca, Fibroma & Fibrosarcoma, Lipoma and liposarcoma

## B. Systemic Pathology

### 22. Anaemias

Iron Deficiency anaemia, Megaloblastic anaemia

### 23. Leukaemias

Acute and chronic leukaemias, Diagnosis and clinical features

### 24. Diseases of Lymph nodes

Hodgkin's disease, Non Hodgkins lymphoma, Metastatic carcinoma

### 25. Diseases of oral cavity

Lichen planus, Stomatitis, Leukoplakia, Sq cell Ca, Dental caries, Dentigerous cyst, Ameloblastoma

Coagulation disorders

Platelet function

Ischaemic heart Disease

### 26. Diseases of salivary glands

Normal structure, Sialadenitis, Tumours

### 27. Osteomyelitis, Metabolic bone diseases, Bone Tumours, Osteosarcoma, Osteocalstoma, Giant cell Tumour, Ewing's sarcoma, Fibrous dysplasia, Aneurysmal bone cyst

### 28. Diseases of Cardiovascular system

Cardiac failuare

Congenital heart disease

ASD, VSD, PDA Fallot's Tetrolgy

Infective Endocarditis

Atherosclerosis

29. Haemorrhagic Disorders

Coagulation cascade

Platelet disorders

## **PRACTICALS**

### **1. Urine**

Abnormal constituents

Sugar, albumin, ketone bodies

### **2. Urine – Abnormal constituents**

Blood, bile salts, bile pigments

### **3. Haemoglobin (Hb) estimation**

### **4. Total WBC count**

### **5. Differential WBC Count**

### **6. Packed cell volume(PCV,) rythrocyte sedimentation Rate (ESR)**

### **7. Bleeding Time & clotting Time**

### **8. Histopathology**

Tissue Processing

Staining

### **9. Histopathology slides**

Acute appendicitis, Granulation tissue, fatty liver

### **10. Histopathology slides**

CVC lung, CVC liver, Kidney amyloidosis

### **11. Histopathology slides**

Tuberculosis, Actionomycosis, Rhinosporidiosis

### **12. Histopathology slides**

Papilloma, Basal cell Ca, Sq cell Ca

### 13. Histopathology slides

Osteosarcoma, osteoclastoma, fibrosarcoma

### 14. Histopathology slides

Malignant melanoma, Ameloblastoma, Adenoma

### 15. Histopathology slides

Mixed parotid tumour, metastatic carcinoma in lymph node

### LIST OF TEXTBOOKS

1. Robbins – Pathologic Basis of Disease Cotran, Kumar, Robbins
2. Anderson's Pathology Vol 1 & 2 Editors – Ivan Damjanov & James Linder
3. Wintrobe's clinical Haematology Lee, Bithell, Foerster, Athens, Lukens

## MICROBIOLOGY

### AIM:

To introduce the students to the exciting world of microbes. To make the students aware of various branches of microbiology, importance, significance and contribution of each branch to mankind and other fields of medicine. The objectives of teaching microbiology can be achieved by various teaching techniques such as :

- a) Lectures
- b) Lecture Demonstrations
- c) Practical exercises
- d) Audio visual aids
- e) Small group discussions with regular feed back from the students.

### OBJECTIVES

#### A. Knowledge and Understanding

At the end of the Microbiology course the student is expected to :

1. Understand the basics of various branches of microbiology and able to apply the knowledge relevantly.
2. Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like Oral Pathology, Community Dentistry, Periodontics, Oral Surgery,



Pedodontics, Conservative Dentistry and Oral medicine in higher classes.

3. Understand and practice various methods of Sterilisation and disinfection in dental clinics.
4. Have a sound understanding of various infectious diseases and lesions in the oral cavity.

## **B. SKILLS**

1. Student should have acquired the skill to diagnose, differentiate various oral lesions.
2. Should be able to select, collect and transport clinical specimens to the laboratory.
3. Should be able to carry out proper aseptic procedures in the dental clinic.

A brief syllabus of Microbiology is given as follows:

### **A. GENERAL MICROBIOLOGY:**

1. History, Introduction, Scope, Aims and Objectives.
2. Morphology and Physiology of bacteria.
3. Detail account of Sterilisation and Disinfection.
4. Brief account of Culture media and Culture techniques
5. Basic knowledge of selection, collection, transport, processing of clinical Specimens and identification of bacteria.
6. Bacterial Genetics and Drug Resistance in bacteria.

### **B. IMMUNOLOGY:**

1. Infection - Definition, Classification, Source, Mode of transmission and types of Infectious disease.
2. Immunity
3. Structure and functions of Immune system
4. The Complement System
5. Antigen
6. Immunoglobulins - Antibodies - General structure and the role played in defense mechanism of the body.
7. Immune response
8. Antigen - Antibody reactions - with reference to clinical utility.
9. Immuno deficiency disorders - a brief knowledge of various types of immuno deficiency disorders - A sound knowledge of immuno deficiency disorders relevant to dentistry.
10. Hypersensitivity reactions
11. ic knowledge of various types - sound knowledge of autoimmune disorders of oral cavity and related structures.
12. Immunology of Transplantation and Malignancy

### 13. Immunohaematology

#### **C. SYSTEMATIC BACTERIOLOGY:**

1. Pyogenic cocci - Staphylococcus, Streptococcus, Pneumococcus, Gonococcus, Meningococcus – brief account of each coccus - detailed account of mode of spread, laboratory diagnosis, Chemo therapy and prevention - Detailed account of Cariogenic Streptococci.
2. Corynebacterium diphtheriae - mode of spread, important clinical feature, Laboratory diagnosis, Chemotherapy and Active immunisation.
3. Mycobacteria - Tuberculosis and Leprosy
4. Clostridium - Gas gangrene, food poisoning and tetanus.
5. Non-sporing Anaerobes - in brief about classification and morphology, in detail about dental pathogens - mechanism of disease production and prevention.
6. Spirochaetes - Treponema pallidum - detailed account of Oral Lesions of syphilis, Borrelia vincentii.
7. Actinomycetes.

#### **D. VIROLOGY:**

1. Introduction
2. General properties, cultivation, host - virus interaction with special reference to Interferon.
3. Brief account of Laboratory diagnosis, Chemotherapy and immuno prophylaxis in general.
4. A few viruses of relevance to dentistry.

Herpes Virus

Hepatitis B Virus - brief about other types

Human Immunodeficiency Virus (HIV)

Mumps Virus

Brief - Measles and Rubella Virus

5. Bacteriophage - structure and Significance.

#### **E. MYCOLOGY**

1. Brief Introduction
2. Candidosis - in detail
3. Briefly on oral lesions of systemic mycoses.

## **F. PARASITOLOGY:**

1. Brief introduction - protozoans and helminthes
2. Brief knowledge about the mode of transmission and prevention of commonly seen parasitic infection in the region.

### **RECOMMENDED BOOKS FOR REGULAR READING:**

1. Text book of Microbiology – R.Ananthanarayan & C.K.Jayaram Paniker.
2. Medical Microbiology – David Greenwood et al.

### **BOOKS FOR FURTHER READING/REFERENCE.**

1. Microbiology – Prescott, etal.
2. Microbiology – Bernard D. Davis , et al.
3. Clinical & Pathogenic Microbiology – Barbara J Howard, etal.
4. Mechanisms of Microbial diseases – Moselio Schaechter, etal.
5. Immunology an Introduction – Tizard
6. Immunology 3rd edition – Evan Roitt , etal.

## **1. General and Dental Pharmacology and Therapeutics**

### **GOAL:**

The broad goal of teaching under graduate students in pharmacology is to inculcate rational and scientific basis of therapeutics keeping in view of dental curriculum and Profession.

### **OBJECTIVES :**

At the end of the course the student shall be able to:

1. Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular.
2. List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason.
3. Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs.
4. Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immuno compromised patients.
5. Integrate the rational drug therapy in clinical pharmacology.
6. Indicate the principles underlying the concepts of “Essential drugs”.

### **SKILLS :**

At the end of the course the student shall be able to:

1. Prescribe drugs for common dental and medical ailments.
2. To appreciate adverse reactions and drug interactions of commonly used drugs.
3. Observe experiments designed for study of effects of drugs.
4. Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.
5. INTEGRATION: Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments.

#### LECTURES:

##### I. GENERAL PHARMACOLOGY:

1. General principles of pharmacology; sources and nature of drugs dosage forms; prescription writing; pharmacokinetics (absorption, distribution, metabolism and excretion of drugs), mode of action of drugs, combined effects of drugs, receptor mechanism of drug action , factors modifying drug response, adverse drug reactions; drug interactions.
2. CNS drugs; General anaesthetics, hypnotics, analgesics psychotropic drugs, anti – epileptics, muscle relaxants, local anaesthetics.
3. Autonomic drugs; sympathomimetics, antiadrenergic drugs parasympothomimetics and parasympatholytics.
4. Cardiovascular drugs; Cardiac stimulants ; antihypertensive drugs, vasopressor agents , treatment of shock, Antianginal agents and diuretics.
5. Autocoids: Histamine, antihistamines, prostaglandins, leukotriens and bronchodilators.
6. Drugs acting on blood : coagulants and anticoagulants, hematinics.
7. G.I.T. Drugs, Purgatives, anti-diarrhoeal, antacids, anti-emetics.
8. Endocrines; Emphasis on treatment of diabetes and glucocorticoids, thyroid and antithyroid agents, drugs affecting calcium balance and anabolic steroids.
9. Chemotherapy: Antimicrobial agents ( against bacteria, anaerobic infections, fungi, virus and broad spectrum). Infection management in dentistry. Phamacotherapy of Tuberculosis, leprosy and chemotherapy of malignancy in general.
10. Vitamins: Water soluble vitamins, Vit. D, Vit.K. and Vit. E.

11. Pharmacotherapy of emergencies in dental office and emergency drugs tray.
12. Chelating agents – BAL, EDTA and desferrioxamine.

## II. DENTAL PHARMACOLOGY :

1. Anti - septic, astringents, obtundents, mummifying agents, bleaching agents, styptics, disclosing agents, dentifrices, mouth washes, caries and fluorides.
2. Pharmacotherapy of common oral conditions in dentistry.

### LIST OF BOOKS RECOMMENDED FOR READING AND REFERENCE :

1. R.S.Satoskar, Kale Bhandarkar's Pharmacology and Pharmacotherapeutics, 10th Edition, Bombay Popular Prakashan 1991.
2. Bertam G Katzung, Basic and Clinical pharmacology 6th ed. Appleton & Lange 1997
3. Lauerence D.R. Clinical Pharmacology 8th ed. Churchill Livingstone 1997
4. Satoskar R.S. & Bhandarkar S.D., Pharmacology and Pharmacotherapeutics part I & part ii, 13th Popular Prakashan Bombay 1993
5. Tripathi K.D., Essentials of Medical Pharmacology 4th ed Jaypee Brothers 1999.

1. Dental Materials

## **DENTAL MATERIALS**

The science of Dental Material has undergone tremendous changes over the years. Continued research has led to new material systems and changing concepts in the dental field. Interlinked with various specialised branches of chemistry, practically all engineering applied sciences and biological characteristics, the science of dental material emerged as a basic sciences in itself with its own values and principles.

### 1) **INTRODUCTION**

#### **AIMS:**

Aim of the course is to present basic chemical and physical properties of Dental materials as they are related to its

manipulation to give a sound educational background so that the practice of the dentistry emerged from art to empirical status of science as more information through further research becomes available. It is also the aim of the course of Dental materials to provide with certain criteria of selection and which will enable to discriminate between facts and propaganda with regards to claims of manufactures.

### **OBJECTIVES:**

To understand the evolution and development of science of dental material.

To explain purpose of course in dental materials to personnels concerned with the profession of the dentistry. Knowledge of physical and chemical properties. Knowledge of biomechanical requirements of particular restorative procedure. An intelligent compromise of the conflicting as well as co-ordinating factors into the desired Ernest. Laying down standards or specifications of various materials to guide to manufacturers as well as to help professionals.

Search for newer and better materials which may answer our requirements with greater satisfaction. To understand and evaluate the claims made by manufactures of dental materials

### **NEEDS FOR THE COURSE:**

The profession has to rise from an art to a science, , the need for the dentist to possess adequate knowledge of materials to exercises his best through knowledge of properties of different types of materials. The growing concern of health hazards due to mercury toxicity, inhalation of certain vapour or dust materials, irritations and allergic reaction to skin due to contact of materials. Materials causing irritation of oral tissues, pH of restorative materials causing inflammation and necrosis of pulp which is a cause for the dentist to posses wider knowledge of physical, chemical and biological properties of materials being used. For the protection for the patient and his own protection certain criteria of selection are provided that will enable the dentist to discriminate between facts and propaganda, which will make a material biologically accept.

## **SCOPE:**

The dental materials is employed in mechanical procedures including restorative dentistry such as Prosthodontics, endodontics, periodontal, orthodontics and restorative materials. There is scarcely a dental procedure that does not make use of dental materials in one form or another and therefore the application of dental material is not limited to any one branch of dentistry. Branches such as minor surgery and periodontics require less use of materials but the physical and chemical characters of materials are important in these fields.

The toxic and tissue reaction of dental materials and their durability in the oral cavity where the temperature is between 32 & 37 degree centigrade, and the ingestion of hot or cold food ranges from 0-70 degree centigrade. The acid an alkalinity of fluids shown pH varies from 4 to 8.5. The load on 1 sq. mm of tooth or restorative materials can reach to a level as high as many kilograms. Thus the biological properties of dental materials cannot be separated from their physical and chemical properties.

### **1. STRUCTURE OF MATTER AND PRINCIPLES OF ADHESION.**

Change of state, inter atomic primary bonds, inter atomic secondary bonds, inter atomic bond distance and bonding energy, thermal energy, crystalline structure, non crystalline structures, diffusion, adhesion and bonding and adhesion to tooth structures.

### **2. IMPORTANT PHYSICAL PROPERTIES APPLICABLE TO DENTAL MATERIALS**

Physical properties are based on laws of mechanics, acoustics, optics, thermodynamics, electricity, magnetism, radiation, atomic structure or nuclear phenomena. Hue, value, chroma and translucency physical properties based on laws of optics, dealing with phenomena of light, vision and sight. Thermal conductivity & coefficient of thermal expansion are physical properties based on laws of thermodynamics. Stress, strain, proportional limit, elastic limit yield strength, modulus of elasticity, flexibility, resilience, impact, impact strength, permanent deformation, strength, flexure strength fatigue, static fatigue, toughness, brittleness, ductility & malleability, hardness, abrasion

resistance, relaxation, rheology, Thixotropic, creep, static creep, dynamic creep, flow, colour, three dimensional colour – hue, values, chroma, Munsell system, metamersim, fluorescence, physical properties of tooth, stress during mastication

### **3. BIOLOGICAL CONSIDERATIONS IN USE OF DENTAL MATERIALS.**

Materials used are with the knowledge of appreciation of certain biological considerations for use in oral cavity. Requirement of materials with biological compatibility. Classification of materials from perspective of biological compatibility. eg. contact with soft tissues, affecting vitality of pulp, used for root canal fillings, affecting hard tissues of teeth, laboratory materials that could be accidentally be inhaled or ingested during handling. Hazards associated with materials: pH-affecting pulp, polymers causing chemical irritation, mercury toxicity, etc. Microleakage, Thermal changes, Galvanism, toxic effect of materials. Biological evaluation for systemic toxicity, skin irritation, mutagenicity and carcinogenicity. Disinfection of dental materials for infection control.

### **4. GYPSUM & GYPSUM PRODUCTS.**

Gypsum – its origin, chemical formula, Products manufactured from gypsum.

Dental plaster, Dental stone, Die stone, high strength, high expansion stone.

Application and manufacturing procedure of each, macroscopic and microscopic structure of each . Supplied as and Commercial names.

Chemistry of setting, setting reaction, theories of setting, gauging water, Microscopic structure of set material.

Setting time: working time and setting time, Measurement of setting time and factors controlling setting time .

Setting expansion , Hygroscopic setting expansion – factors affecting each

Strength :wet strength, dry strength, factors affecting strength, tensile strength

Slurry – need and use.



Care of cast.

ADA classification of gypsum products

Description of impression plaster and dental investment

Manipulation including recent methods or advanced methods.

Disinfection : infection control, liquids, sprays, radiation

Method of use of disinfectants

Storage of material – shelf life

1. Pre clinical Conservative Dentistry

**LABORATORY EXERCISES :**

1. Identification and study of handcutting instruments chisels, gingival margin trimmers, excavators and hatchet.
2. Identification and use of rotary cutting instruments in contra angle hand pieces burs (Micromotor)
3. Preparation class I and extended class I and class II and MOD's and class V amounting to 10 exercises in plaster models.
4. 10 exercises in mounted extracted teeth of following class I , 4 in number class I extended cavities 2, class II 4 in number and Class V 2 in number. Cavity preparation base application matrix and wedge placement restoration with amalgam.
5. Exercises on phantom head models which includes cavity preparation base and varnish application matrix and wedge placement followed by amalgam restoration

Class I 5

Class I with extension 2

Class II 10

Class II Mods 2

Class V and III for glass ionomers 4

6. Polishing of above restorations.
7. Demonstration of Class III and Class V cavity preparation. For composites on extracted tooth completing the restoration.
8. Polishing and finishing of the restoration of composites.
9. Identification and manipulation of varnish bases like Zinc Phosphate, Poly carboxylate, Glass Ionomers, Zinc Oxide, Eugenol cements.
10. Identification and manipulation of various matrices, tooth separators and materials like composites and modified glassionomer cements.
11. Cast Restoration
  1. Preparation of Class II inlay cavity
  2. Fabrication of wax pattern
  3. Sprue for inner attachment investing
  4. Investing of wax pattern
  5. Finishing and cementing of class II inlay in extracted tooth.
12. Endodontics
  1. Identification of basic endodontic instruments
  2. Coronal access cavity preparation on extracted. Upper central incisors
  3. Determination of working length.
  4. Biomechanical preparation of root canal space of central incisor
  5. Obfuration of root canal spaces. Absens of coronal access cavity.
  6. Closure of acess cavity

## 2. Pre clinical Prosthodontics and Crown & Bridge

### COMPLETE DENTURES

- A. Applied Anatomy and Physiology.
  1. Introduction
  2. Biomechanics of the edentulous state.
  3. Residual ridge resorption.
- B. Communicating with the patient
  1. Understanding the patients.

Mental attitude.

2. Instructing the patient.

C. Diagnosis and treatment planning for patients-

1. With some teeth remaining.

2. With no teeth remaining.

a) Systemic status.

b) Local factor.

c) The geriatric patient.

d) Diagnostic procedures.

D. Articulators- discussion

E. Principles of Retention, Support and Stability

F. Impressions - detail.

a. Muscles of facial expression.

b. Biologic considerations for maxillary and mandibular impression including anatomy landmark and their interpretation.

c. Impression objectives.

d. Impression materials.

e. Impression techniques.

f. Maxillary and mandibular impression procedures.

i. Preliminary impressions.

ii. Final impressions.

g. Laboratory procedures involved with impression making (Beading & Boxing, and cast preparation).

G. Record bases and occlusion rims- in detail.

a. Materials & techniques.

b. Useful guidelines and ideal parameters.

c. Recording and transferring bases and occlusal rims.

H. Biological consideration in jaw relation & jaw movements -  
craniomandibular relations.

- a. Mandibular movements.
- b. Maxillo -mandibular relation including vertical and horizontal jaw relations.
- c. Concept of occlusion- discuss in brief.

I. Relating the patient to the articulator.

- a. Face bow types & uses– discuss in brief.
- b. Face bow transfer procedure - discuss in brief.

J. Recording maxillo mandibular relation.

- a. Vertical relations.
- b. Centric relation records.
- c. Eccentric relation records.
- d. Lateral relation records.

K. Tooth selection and arrangement.

- a. Anterior teeth.
- b. Posterior teeth.
- c. Esthetic and functional harmony.

L. Relating inclination of teeth to concept of occlusion- in brief.

- a. Neurocentric concept.
- b. Balanced occlusal concept.

M. Trial dentures.

N. Laboratory procedures.

- a. Wax contouring.
- b. Investing of dentures.
- c. Preparing of mold..
- d. Preparing & packing acrylic resin.
- e. Processing of dentures.
- f. Recovery of dentures.
- g. Lab remount procedures.
- h. Lab remount procedures.
- i. Recovering the complete denture from the cast.

- j. Finishing and polishing the complete denture.
- k. Plaster cast for clinical denture remount procedure.

## **REMOVABLE PARTIAL DENTURES**

### 1. Introduction

Terminologies and scope

### 2. Classification.