



**PAKISTAN MEDICAL COMMISSION**

(SUCCESSOR OF PAKISTAN MEDICAL & DENTAL COUNCIL)

G-10/4, MAUVE AREA,  
ISLAMABAD.

Dated: 29<sup>th</sup> November, 2021

**NOTIFICATION**

**Approval of the Standards and Structure of National Equivalence Board (NEB)  
Examination 2021 for foreign Dental Students**

The Council considered and approved the Standards and Structure of National Equivalence Board (NEB) Examination 2021 for foreign Dental Students recommended by the National Medical and Dental Academic Board.

**Secretary**

Pakistan Medical Commission





**Pakistan Medical Commission**  
**National Equivalence Board (NEB)**  
**Examinations 2021**  
*for*  
**Foreign Dental Students**

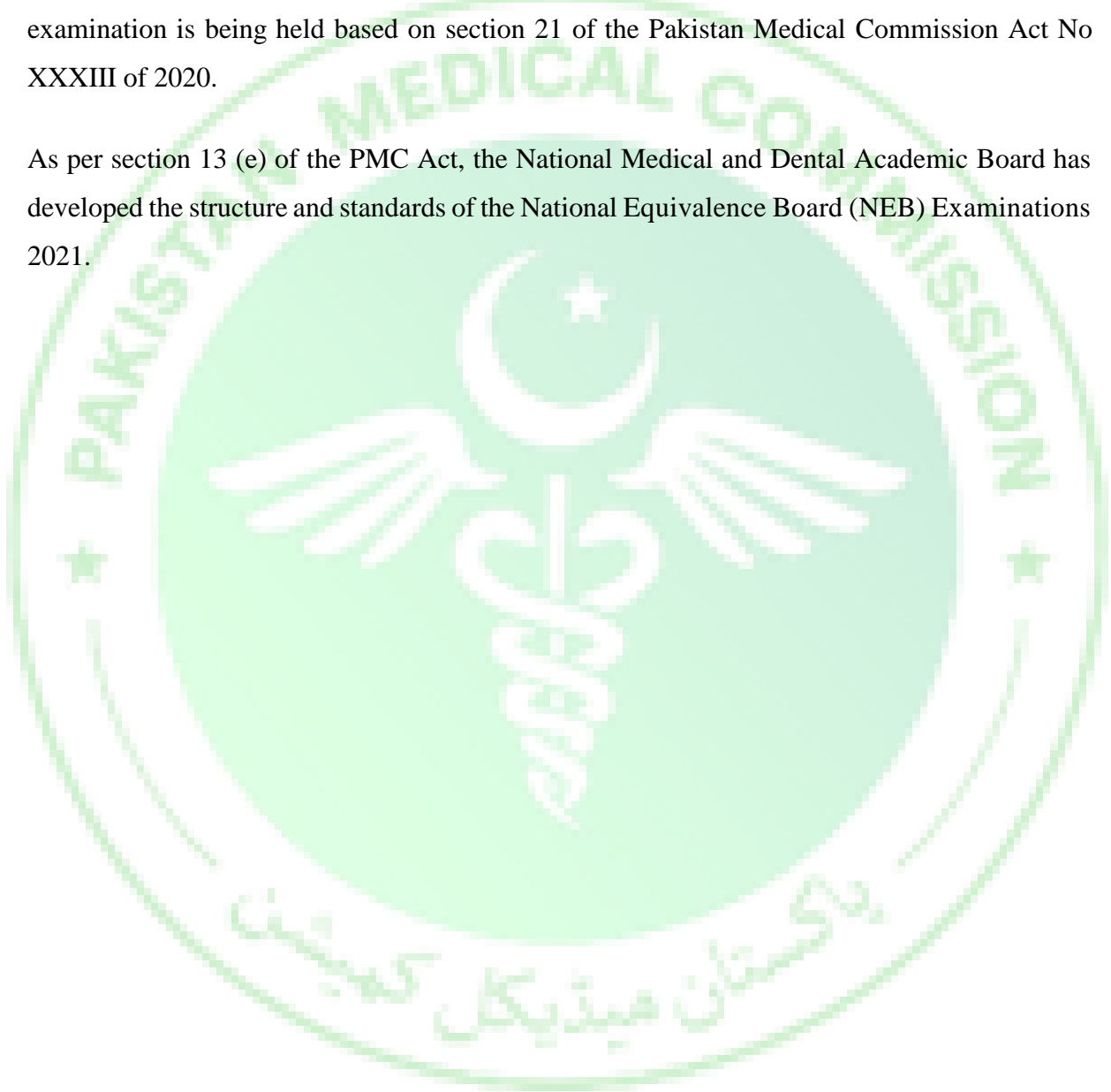
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## SECTION I: PREAMBLE

Pakistan Medical Commission (PMC) will be conducting the National Equivalence Board (NEB) for those Pakistani students who wish to migrate to a dental college in Pakistan. This examination is being held based on section 21 of the Pakistan Medical Commission Act No XXXIII of 2020.

As per section 13 (e) of the PMC Act, the National Medical and Dental Academic Board has developed the structure and standards of the National Equivalence Board (NEB) Examinations 2021.



## **SECTION II: FORMAT AND STRUCTURE OF NEB EXAMINATION 2021**

### **Eligibility:**

Any student who has completed more than two years of a dental programme in any dental institution or college outside Pakistan shall be eligible to register for and attempt the respective NEB Examination to seek a transfer/migration to a PMC recognized dental college in Pakistan in the relevant year having completed the period of a foreign programme up to the subsequent year in the institution seeking a transfer from. A student shall be required to take the NEB Examination within twelve months of having left the programme of study outside Pakistan to be eligible for admission to a dental college in Pakistan.

Please note that transfer/migration from the dental institution or college outside Pakistan will only be allowed if there is a vacant seat available in the Pakistani Dental College where transfer/migration is being sought. The student intending to transfer/migrate will not be accommodated over and above the seats approved/allocated for that particular Pakistani Dental College.

### **For the Year 2021 only**

**In 2021 only, the NEB Examination is also being offered to those foreign students who are currently studying in foreign dental colleges and wish to migrate to BDS Year 2 in a Pakistani Medical or Dental College recognised by PMC. This is subject to:**

- i. Having more than 65% marks in their FSc or HSSC.
- ii. Qualifying the requisite NEB Examination for the 2nd Year transfer from a foreign college.

### **Centres:**

NEB Examinations 2021 will be conducted at multiple centres across Pakistan to facilitate the candidates. It is envisaged that NEB Examination will be offered at certain international centres as well.

### **Frequency:**

The NEB Examination will be held at least twice a year.

### **Number of attempts:**

There shall be no restriction on the number of attempts by a student subject to:

- (1) taking the NEB examination for the first time within twelve months of having left their program of study in a foreign institution' This condition may be held in abeyance for 2121-22 examination as the first-year exemption to sit the exam in relative to the COVID-19 outbreak, which has been raging since end of 2019.
- (2) re-attempting the exam at any future scheduled NEB Examination window notified by PMC within 24 months of the previous NEB Examination attempt.

### **Validity**

A student's NEB Examination result shall be valid for two years from the date of the examination. If a student retakes the NEB Examination during this period, the person may use the highest attained result to apply for transfer to a medical or dental college in Pakistan.

### **Result**

The results of the NEB Examination as communicated and issued shall be final and shall be neither available for rechecking or any other objection from the student who has taken the examination.

## **Structure**

The theory component of the NEB Examination shall be substantially based on computer-based multiple-choice questions (MCQs). The MCQs will target higher cognition and will check a candidate's ability to apply knowledge. The theory component will have 200 MCQs in which there will be an emphasis on the application of knowledge. The duration of the theory component of the NEB Examination will be three hours.

The first year BDS examination is only being offered for 2021, but actually the examination will be held in early 2022.

For transfer to BDS Year 2: candidates will be required to appear in the theory component of the NEB Examination only.

For transfer to BDS Year 3: candidates will be required to appear in the theory component of the NEB Examination only.

For transfer to BDS Year 4: candidates will be required to appear in the theory and the relevant clinical skills component of NEB Examination.

There will be no negative marking in any component of the NEB Examination.

### **NEB Examination – Basic (for Year 2021 only)**

Eligibility: Student must have passed BDS Year 1 from a foreign dental college and intends to migrate to BDS Year 2 of a dental college in Pakistan recognised by PMC. Please also refer to eligibility criteria above. **This NEB Examination – Basic will be offered in 2021 only.**

Disciplines: General Anatomy, General Physiology, Biochemistry, Oral Biology and Tooth Morphology (see syllabus below)

MCQ's Weightage: General Anatomy 30%, General Physiology 30%, Biochemistry 10% Oral Biology and Tooth Morphology 30%

**NEB Examination (Dental) Standard 3 (for transfer to BDS Year 3)**

Eligibility: Student must have passed BDS Year 2 from a PMC recognised foreign Dental College and intends to migrate to BDS Year 3 in a PMC recognised Dental College in Pakistan.

Disciplines: General Pathology, Pharmacology including Dental Therapeutics, Science of Dental Materials, Oral Pathology (see syllabus below)

MCQ's Weightage: General Pathology 20%, Pharmacology including Dental Therapeutics 25%, Science of Dental Materials 30%, Oral Pathology 25%

**NEB Examination (Dental) Standard 4 (for transfer to BDS Year 4)**

Eligibility: Student must have passed BDS Year 3 from a PMC recognised foreign Dental College and intends to migrate to BDS Year 4 in a PMC recognised Dental College in Pakistan.

Disciplines: Oral Medicine Oral Diagnosis and Oral Radiology, General Medicine, General Surgery, Community & Preventive Dentistry, Periodontology (see syllabus below)

MCQ's Weightage: Oral Medicine Oral Diagnosis and Oral Radiology 25%, General Medicine 15%, General Surgery 15%, Community & Preventive Dentistry 20%, Periodontology 25%



## **Passing criteria**

For transfer in BDS Year 2: 70% or above in theory component of NEB Examination.

For transfer in BDS Year 3: 70% or above in theory component of NEB Examination.

For transfer in BDS Year 4: 70% or above separately in both the theory and clinical skills component of NEB Examination. Candidates will have to pass both the theory and the clinical skills component separately to be declared successful in NEB Examination.

Candidates who pass the theory (MCQs) component but fail the clinical Skills component will have to re-appear in the clinical skills component only. Such candidates will re-register for the clinical skills component only.

If a candidate fails in three consecutive attempts of the clinical skills component, they will have to appear in both the theory (MCQs) and clinical skills component on the fourth attempt. That is, after every three failed attempts at the clinical skills component, candidates will have to sit the entire NEB Examination.

## **Limitations**

Please note that a foreign student will not be allowed to migrate in a particular BDS year of a Dental College in Pakistan if more than two months have passed since the start of the academic year. In cases where over two months have passed since the start of the academic year, the foreign student will be allowed migration in the preceding year.

Successfully clearing NEB Examination does not guarantee admission to a Pakistani Dental College as it will depend on the availability of seats in the admitting medical college and its admissions policy.

## **ANNEXURE I**

### **Syllabus for NEB Examination – Basic (for the Year 2021 only)**

#### **(For transfer to BDS Year 2)**

#### **GENERAL ANATOMY**

##### **Introduction to:**

- Radiological, clinical and applied anatomy
- Terms and planes of Gross anatomy
- Developmental anatomy/embryology
- Anatomical positions

##### **Overview of the Skeletal system:**

- Axial and appendicular skeleton
- Definition and Classification of bones
- Functions of bones
- Parts of a young and adult bone
- Ossification of bones
- Blood supply of bones
- Applied Anatomy of Bones
- Characteristics and classification of joints (Structural, Regional and Functional)
- Characteristics features of a synovial joint
- Classification of synovial joints
- Movements at different joints
- Anatomy of joints with reference to dislocation, sprain and inflammation)

##### **Introduction to the Muscular system:**

- Classification of muscles
- Structure of skeletal muscles
- Parts of muscle
- Neuromuscular Junction
- Blood supply and nerve supply of muscles
- Applied anatomy of muscle with reference to spasm, paralysis, atrophy and regeneration

##### **Introduction to the Nervous system**

- Introduction to the central nervous system
- Different parts of CNS with their brief functions
- Peripheral Nervous system
- Autonomic Nervous system (Sympathetic and Parasympathetic Nervous System)

### **Introduction to the Circulatory system**

- Types of circulation
- Anastomoses

### **Introduction to the Lymphatic system**

- Lymph node
- Lymph capillary
- Functions

### **Skin and Fascia**

- Introduction to skin
- Superficial and deep fascia

### **GENERAL HISTOLOGY**

- Cell
- Microscopy
- Epithelial tissue
- Connective tissue
- Cartilage
- Bone
- Muscular tissue
- Nervous tissue & Nervous system
- Lymphoid organ
- Circulatory system
- Integument

### **GENERAL EMBRYOLOGY AND ASPECTS OF GENETICS**

- Male and Female Reproductive System
- Cell division and structure of DNA
- Terms used in embryology
- Gametogenesis
- Fertilization, cleavage and implantation of an embryo
- Development in 2nd and 3rd week of intrauterine life
- Fetal Period

- Fetal Membrane
- Embryonic period
- Derivatives of germinal layers
- Introduction to Genetics and Teratogenesis

## **GROSS ANATOMY**

### **Head and Neck (in detail)**

Brain, limbs, thorax, abdomen, & pelvis (General Considerations)

## **SPECIAL HISTOLOGY**

- The digestive system
- The oral cavity
- Tongue, Teeth, Gums, Pharynx, Hard and Soft palate and Lips
- Esophagus
- Salivary glands

### **The respiratory system**

- Nasal Cavity, paranasal sinuses, larynx and trachea
- Bronchi and lungs

### **The endocrine system**

- Pituitary
- Thyroid and parathyroid
- Adrenal
- Pineal body

## **SPECIAL EMBRYOLOGY**

### **Development of Head & Neck**

- Tongue
- Thyroid
- Pituitary
- Upper respiratory system
- Development of face and palate
- The digestive system
- The respiratory system
- The cardiovascular system

- The musculoskeletal system
- Special senses and development of Nervous system

## **GENERAL PHYSIOLOGY**

### **Cell and General Physiology**

- Functional organization of the human body
- Homeostasis
- Control systems in the body
- Cell membrane and its functions
- Cell organelles
- Transport through the cell membrane
- Membrane transport including active transport, passive transport, simple and facilitated diffusion
- Genetics

### **Blood**

- Composition and functions
- Plasma proteins: albumin, globulin fibrinogen, and their functions
- Red blood cells (Erythropoiesis)
- Haemoglobin and blood indices, iron metabolism, fate of haemoglobin.
- White blood cells, Leucopoiesis, functions
- Platelets
- Haemostasis, clotting factors, anticoagulants
- Blood groups, Blood transfusion and complications
- Reticuloendothelial system – Spleen

### **Clinical/Applied Concepts**

- Anaemia and its types
- Blood indices in various disorders Thalassemia
- Leucopaenia Leucocytosis
- Thrombocytopenia
- Clotting disorders (haemophilia etc.)
- Blood grouping/cross matching and significance

### **Nerve and muscle**

- The neuron-structure and functions

- Properties of nerve fibres
- Physiology of action potential including compound action potentials
- Conduction of nerve impulse, nerve degeneration and regeneration
- Synapses
- Types of muscle, functions
- Skeletal muscle contraction
- Isometric and isotonic contraction
- Smooth muscle contraction
- Neuromuscular junction
- Excitation-contraction coupling
- Motor unit
- Neuromuscular junction blockers

### **Clinical/Applied Concepts**

- Nerve injury
- Rigor mortis and contractures
- Myasthenia gravis

### **Cardiovascular system**

- Introduction to heart and circulation
- Physiology of cardiac muscle
- Action potential in atrial and ventricular
- Muscle and pace-maker potential
- Regulation of cardiac functions
- Cardiac Cycle and various events
- ECG-recording and interpretation
- Arrhythmias- mechanism of development
- Functional types of blood vessels
- Haemodynamics of blood flow
- Local control of blood flow
- Systemic circulation - basic principles/characteristics and control
- peripheral resistance and its regulation
- Arterial pulse
- Arterial Blood pressure(short/long term regulation)
- Cardiac Output (regulations/measurements)
- Heart sounds
- Venous return and its regulation
- Coronary circulation
- Cardiovascular changes during exercise

### **Clinical/Applied Concepts**

- Correlation of cardiac cycle with Electrocardiogram (ECG) and heart sounds  
Echocardiogram
- Radial/other pulses
- Hypertension, types and effects
- Jugular venous pulse
- Cardiovascular changes during exercise
- Types of shock

### **Respiratory system**

- Organization/functions of respiratory tract
- Functions of lungs (respiratory and non-respiratory)
- Mechanics of breathing, pulmonary pressure changes
- Dead spaces
- Diffusion of gases (gas laws, composition)
- Transport of CO<sub>2</sub> in blood
- Regulation of respiration (nervous/chemical)
- Abnormal breathing
- Hypoxia-types and effects
- Physiology of cyanosis
- Physiology of high altitude, space, deep sea diving
- Oxygen debt
- Respiratory changes during exercise

### **Clinical/Applied Concepts**

- Types of respiration (intrapleural pressure, pneumothorax, effusio
- Lung function tests (Spirometry)
- Obstructive / Restrictive lung disease (FEV<sub>1</sub>/FVC)
- Abnormal Ventilation / Perfusion
- Respiratory failure: Types I & II
- Asphyxia
- Hypoxia, cyanosis, dyspnoea, hypo- and hypercapnoea

## **BIOCHEMISTRY**

- Introduction of Biochemistry:

### **Biochemistry of the Cell**

- Introduction to cell (Biochemical point of view)
  - Scientific methods to study the cell Biochemistry
  - Biochemical composition of the cell

### **Biochemistry of the Cell and Body Fluids**

- Ionization of water & weak acids, Bases
- Concept of Ph, and pH scale
- Dissociation constant & titration curve of weak acids, the concept of pK values
- Buffers, their mechanism of action
- Henderson-Hasselbalch Equation (No derivation)
- Importance of selectively permeable membranes,
- Osmosis, Osmotic pressure, surface tension, viscosity & their importance related to body fluids

### **Carbohydrates**

- Definition, biochemical function and classification
- Structure and functions of Monosaccharides and their derivatives
- Disaccharides, their important examples
- Oligosaccharides, their important combination with other macromolecules
- Polysaccharides, their important examples and biochemical role
- The biochemical importance of carbohydrates

### **Proteins**

- Definitions, Biomedical importance and classification of proteins based on
  - Physiochemical properties
  - Functional
  - Nutritional
  - Structural
- Amino acids, their structure, properties and functions
- Classification and nutritional significance of amino acids
- Structure of proteins and their significance



- Separation of proteins e.g. salting out, Electroresis, Chromatography, Centrifugation
- Immunoglobulins and its biomedical significance
- Plasma proteins & their clinical significance
- **Nucleotide and Nucleic Acid:**
- Chemistry and structure of nucleotides and their biochemical role
- Nucleotides, structure, their derivatives and their biochemical role
- Nucleic acids, their types, structure and functions

### **Lipids:**

- Definition, biomedical function
- Classification of lipids
- Phospholipids, Glycolipids, Sphingolipids and their Biochemical signation
- Fatty acids, chemistry, classification and biochemical function
- Essential fatty acids
- Eicosanoids, their classification and functions in health and disease
- Steroids, Sterol e.g Cholesterol, their chemistry, functions and clinical significance
- Lipid peroxidation and its significance

### **Biological Membrane**

- Biochemical composition
- Biochemistry of cell membrane, chemical composition, mportance ofLipid and proteins in membranes, chemistry of signals and receptors
- Biochemistry of membrane transport mechanism, active transport
- Passive transport, simple and facilitated diffusion

### **Enzymes**

- Introduction, definition, mechanism of catalysis
- Coenzyme s, co-factors
- Isoenzymes, their clinical importance
- Factors affecting enzymes activity, ichaelis-Menten Equation (no derivation of equations)
- Enzyme inhibitors and their classification and biomedical importance
- Application of enzyme in clinical diagnosis and therapeutic

### **Porhyrins & Hemoglobin**

- Chemistry and biosynthesis of porphyrins and its disorders (porphyrias)

- Structure, functions and types of hemoglobin
- Oxygen binding capacity of hemoglobin, factors affecting and regulating the oxygen binding capacity of hemoglobin
- Degradation of heme, formation of Bile pigments, its types, transport and excretion
- Hyperbilirubinemia, their biochemical causes and differentiation,
- Jaundice and its types
- Hemoglobinopathies (HP-S, Thalassemia etc) and their biochemical causes

#### **Vitamins:**

- Introduction, classification
- Chemistry, biochemical functions, deficiency manifestations, daily allowances and source of water soluble and fat-soluble vitamins
- Hypervitaminosis

#### **Biochemistry of digestive tract:**

- Introduction of digestion and absorption  
Introduction, composition, function, daily secretion, stimulants and depressants of:
  - Saliva
  - Gastric Juice & HCL
  - Pancreatic Juice
  - Bile Juice
  - Succus Entericus
- Digestion and absorption of carbohydrates, proteins, nucleic acid and lipids.
- Lactose intolerance, cholelithiasis and related disorders. (introductions)

#### **Mineral & Trace Elements:**

Classification and Biochemical role of:

- Macro minerals (Na, K, Ca, Cl, PO<sub>4</sub>)
- Micro minerals (Fe, Zn, Mg, Se, I, Cu, Cr, Cd, Mn)

### **D: SCIENCE OF DENTAL MATERIALS**

#### **Properties for characterization of biomaterials**

- Mechanical properties
- Physical and Chemical properties
- Thermal properties
- Rheological properties
- Biocompatibility and Biomechanics

### **Impression materials**

- Hydrocolloids
- Agar
- Alginate
- Elastomers
- Silicone Rubbers
- Polysulphide
- Polyether
- Non-elastic impression materials
- Impression Plaster
- Impression Compound
- Zinc-oxide eugenol impression paste
  
- **Gypsum products for Dental Casts**
- **Dental Waxes**
- **Casting**
  - Investment and Refractory Dies
  - Steps of casting
  - Faults in castings

### **Polymers**

- Classification of denture base materials
- Properties of Acrylic Resin as a denture base material
- Acrylic Resin composition, manipulation and processing
- Alternative denture base materials
- Artificial teeth
- Tissue Conditioners
- Separating media
- Denture Lining materials (Hard and Soft liners)
- Denture Repair and Rebasing

### **Adhesion**

- Principles of Adhesion
- Acid-etch systems for bonding to enamel
- Applications of acid-etch technique
- Dentin conditioning, priming and bonding
- Smear Layer and Hybrid Layer
- Dentin bonding systems

### **Dental Composites**

- Classification
- Composition and manipulation
- Setting characteristics
- Properties including polymerization shrinkage

### **Dental Cements**

- Lining, Base and Luting materials
- Cavity varnish
- Properties, setting characteristics and uses of
- Zinc Phosphate Cement
- Zinc Oxide/Eugenol Cement
- Ortho-ethoxy Benzoyic Acid Cement
- Polycarboxylate Cement
- Glass Ionomer Cement (GIC)
- Resin Modified Glass Ionomer Cement (RMGIC)
- Calcium Hydroxide Cement

### **Dental Amalgam**

- Amalgamation process
- Properties and uses of amalgam
- Manipulation and handling

### **Metal and Alloys in Dentistry**

- Base metal casting alloys
- Wrought alloys (Steel and Stainless Steel)
- Gold and alloys of Noble metals
- Titanium

### **Ceramics**

- Classification of dental porcelain
- Porcelain veneers and Porcelain fused to metal(PFM) crowns
- CAD-CAM restorations
- Zirconia

### **Endodontic materials**

Irrigants and Intra-canal medicaments  
Obturation materials e.g., Gutta Purga

### **Abrasion and polishing material**

## ANNEXURE II

### Syllabus for NEB Examination (Dental)

(For transfer to BDS Year 3)

#### GENERAL PATHOLOGY

##### Cell Injury

- Terms necrosis, ischemia, hypoxia, infarction and gangrene.
- Sequence of the ultrastructural and biochemical changes which occur in the cell in response to the following:
  - Ischemia
  - Immunological injury – eg. Asthma / SLE / Anaphylactic reaction
  - Physical agents – eg. Radiation
  - Genetic defects – eg. Thalassemia / hemophilia
  - Nutritional deficiency
  - Infectious agents
    - Viruses – eg. Hepatitis / Aids / HIV infections
    - Fungi – eg. Candida Albicans / Candidiasis
    - Parasites – eg. Malaria
  - Irreversible and reversible injury.
  - Apoptosis and its significance.
  - Necrosis and its types.
  - Exogenous and endogenous pigment deposition
  - Dystrophic and metastatic calcification along with clinical significance.
- Metabolic disorders of Lipids, Proteins, Carbohydrate

#### INFLAMMATION AND MEDIATORS OF INFLAMMATION

- Role of inflammation in the defense mechanisms of the body.
- Vascular changes of acute inflammation and relate these to the morphological and tissue effects.
- Process of chemotaxis opsonization and phagocytosis.
- Role of cellular component in inflammatory exudate.
- Differences between exudate and transudate.
- List of important chemical mediators of inflammation.
- Pathway of Arachidonic Acid metabolism.
- Role of products of Arachidonic Acid metabolism in inflammation.
- Mechanism for development of fever, with reference to exogenous and endogenous pyrogens.
- Chronic inflammation including granulomas.

- Granuloma, its type and causes.
- Systemic effects of acute and chronic inflammation and their possible outcomes.
- Signification of ESR.
- Examples of induced hypothermia in medicine.
- Pathogenesis, clinical features and lab Diagnosis of Gout.
- Management of acute and chronic Gout.

## **WOUND HEALING**

- Differences between repair and regeneration.
- Wound healing by first and second intention.
- Factors that influence the inflammatory reparative response.
- Comparison of wound contraction with cicatrization.
- Formation of granulation tissue.
- Complications of wound healing.

## **DISORDERS OF CIRCULATION**

### **THROMBO-EMBOLIC DISORDERS AND THEIR MODALITIES:**

- Pathogenesis of thrombosis.
- Consequences of thrombosis.

### **DISORDERS OF THE CIRCULATION AND SHOCK**

- Definition of Edema, ascites, hydrothorax and anasarca.
- Pathophysiology of edema with special emphasis on CHF.
- Pathogenesis of four major types of shock (Hypovolemic, cardiogenic, vasovagal and septic) and list their causes.
- Compensatory mechanisms involved in shock.

## **MICROBIOLOGY**

- Defense mechanisms of the body.
- Microbial mechanisms of invasion and virulence.
- Differences between sterilization and disinfection.
- Methods of disinfection and sterilization.
- Principles of aseptic techniques.
- Universal precautions for infection control.
- General principles of the following serological tests:
  - ELISA - Hepatitis (A, B, C, D, E, G), Rubella, CMV and HIV
  - Haemagglutination - TPHA
  - Western blot - HIV

- ICT – Malaria
- Interpretation of Culture reports, Serological reports and Microscopic reports of gram stain and AFB stain
- Principles of proper collection and submission of specimens for laboratory investigations with due precautions.
- General characteristics and taxonomy of Bacteria, Viruses and Fungi.
- Definition of communicable endemic, epidemic and pandemic diseases, carriers, pathogens, opportunists, commensals and colonizers.
- List of microorganisms responsible for infection of the body with especial reference to oral cavity.
- Pathogenesis, treatment, epidemiology, prevention and control of the following organisms.
  - Bacteria
  - Viruses
  - Fungus
  - Protozoa
  - Helminths
- Principles of anti-microbial action.

## GENETICS

- Agenesis, Dysgenesis, Aplasia, Hypoplasia, Hyperplasia, Metaplasia, Dysplasia, Neoplasia, Anaplasia, Atrophy and Hypertrophy.
- Cell cycle and list cell types (stable, labile, permanent).
- Mechanisms controlling cell growth.
- Classification systems of tumors.
- Characteristics of benign and malignant tumors.
- Grading and staging system of tumors.
- Biology of tumor growth.
- Process of carcinogenesis.
- Host defense against tumors.
- Mechanism of local and distant spread.
- Local and systemic effects of tumors.
- Tumor markers used in the diagnosis and management of cancer.
- Chemical, Physical agents and Viruses related to human cancers.
- Epidemiology of common cancers in Pakistan.

## IMMUNOLOGY

- Antigen, antibody, epitope, hapten and adhesion molecules
- Innate and acquired immunity. .
- Type-I, type-II, type-III and type-IV hypersensitivity reactions.
- Classification of the immunodeficiency disorders.

- Autoimmunity

## **THE ORAL CAVITY**

- Leukoplakia.
- Predisposing factors (pipe smoking, ill-fitting denture, alcohol abuse, irritant foods) of leukoplakia.
- Risk factors of oral cancer.
- Clinical and morphological features of oral cancer.
- Benign and malignant tumors of salivary glands.
- Clinical and morphological features of pleomorphic adenoma.

## **PHARMACOLOGY**

### **General Pharmacology:**

- Definition of drug and drug nomenclature.
- Branches / Divisions of Pharmacology
- Sources of drugs
- Active principles of drug and Pharmacology
- Active principles of drug and Pharmacology Dosage forms and doses of drugs.
- Drug administration. . .
- Absorption of drugs and processes involved in drug absorption
- Factors modifying absorption of drugs.
- Transport of drugs across cell-membrane.
- Bioavailability, its clinical significance and factors affecting bioavailability
- Drugs reservoirs, distribution and redistribution of drugs, plasma protein binding.
- Pro-drug, Biotransformation of drugs, enzyme induction, enzyme inhibition and entero-hepatic circulation
- Plasma half-life of drugs, steady state concentration, its clinical importance and factors affecting it.
- Excretion of drugs.
- Mechanism of drug action.
- Dose response curves, structure-activity relationship.
- Factors modifying action and doses of drugs.
- Pharmacokinetics, pharmacodynamics and Receptors

### **Locally Acting Drugs**

- Demulcents, Emollients, Irritants, Counter irritants, Astringents, antiseborrheics, locally acting enzymes.
- Antiseptics and Disinfectants
- Ectoparasiticides



## **Drugs Acting on Gastrointestinal Tract**

- Anti Emetics

## **Cardiovascular Drugs**

- Antiarrhythmic Drugs
- Inotropic Drugs
- Antianginal Drugs
- Thrombolytics
- Antihyperlipidemic Drugs

## **Diuretics**

## **Autocoids**

## **Drugs Acting on Autonomic Nervous system**

### **Cholinergic Drugs**

- Choline Esters
- Anticholine-esterases
- Cholinomimetic Alkaloids

### **Anti- Cholinergic Drugs**

- Anti Muscarinic
- Non catecholamine

### **Sympatholytics / Antiadrenergics**

- Alpha Adrenergic Blockers
- Beta Adrenergic receptor Blockers

### **Adrenergic Neuron Blockers**

### **Autonomic Ganglionic Blockers**

## **Skeletal Muscle Relaxants**

- Neuromuscular Blocking Agents - D-tubocurarine, Suxamethanin
- Central Muscle Relaxants, Meprobromate, Mephenesim, Diazepam etc.

## Central Nervous System

- Sedative-Hypnotics
- Antiepileptics
- General Anaesthetics
- Local Anesthetics
- Drugs for movement Disorder/Muscle Relaxant
- Alcohol
- Drugs for Migraine
  - Stimulants of the Central Nervous System:
    - Caffeine, Theophylline, Theobromine
    - Brain stem stimulants: PicROTOXIN, Nikethamide, Ethamivan, Doxapram

## Psychopharmacology

- Anti-psychotics
- Anxiolytics
- Anti-Depressant / Anti mania

## Drugs acting on Endocrine System

- Drugs-Hypothalamic Drugs
- Adrenocorticoids
- Sex Hormones
- Thyroid / Parathyroid Drugs
- Pancreatic Hormones and Oral hypoglycemic Agents

## ANTIBIOTICS

### Parameters:

- Provisional Diagnosis, Investigation, Empirical Therapy, prescribing after culture and sensitivity.

## VITAMINS

### Parameters:

- Drugs-Hypothalamic Drugs
- Groups of vitamins prescribed
- Vitamins prescribed on basis of therapeutic indication or empirical
- Single I multiple vitamins prescribing
- Rational with use of vitamins.

## **ANALGESICS**

Parameters:

- Various groups of analgesics prescribed
- Single / multiple adverse drug prescription.
- Non specific indications of analgesic prescribed

## **ADVERSE DRUG REACTIONS**

- Anti-microbials, cytotoxic drugs, steroids etc.

## **ORAL BIOLOGY & TOOTH MORPHOLOGY**

### **EMBRYOLOGY**

- General human development
- The brachial apparatus
- Development of face/tongue/thyroid gland
- Development of nasomaxillary complex
- Development of palate
- Development of mandible and temporo mandibular joint
- Development of para-nasal sinuses
- Development of salivary glands
- Tooth development and its associated structures
- Development of cartilages and bones of facial skeleton
- Introduction of clinical anomalies related with all the above topics
- Introduction to Post natal facial growth.
- Development of base of skull

### **Developmental Histology (structure) and Function of:**

- Bone/cartilage (specially jaws)
- Alveolar bone
- Periodontal ligament
- Cementum
- Tooth eruption and shedding
- Oral mucous membrane
- Dentine
- Pulp
- Enamel
- Temporo-mandibular joint clinical consideration
- Endogenous implants/changes during tooth movement/wound healing

## **ORAL PHYSIOLOGY:**

- Immunology
- Calcium metabolism and bone
- The healing of bone fractures
- Repair and regeneration of dental tissues
- Histology and function of
- Saliva and salivary glands
- Taste and taste organs
- Pain and pain pathway

## **TOOTH MORPHOLOGY AND OCCLUSION**

- Introduction and nomenclature
- Anatomic and physiologic consideration of form and function of orodento-facial structures
- Brief study of comparative Oral Biology and Tooth Morphology

### **The Deciduous Dentition:**

- Detail description of each primary tooth
- The pulp cavities
- The difference between deciduous and permanent teeth

### **Occlusion:**

- Temporo-mandibular joint
- Muscles of mastication and facial expression
- Mastication and Swallowing
- Occlusion at primary/mixed/adult dentition stages
- Innervation and arterial supply of orofacial structures

## **COMMUNITY AND PREVENTIVE DENTISTRY**

### **Introduction to Community Dentistry and Dental Public Health:**

Concepts of health; disease and illness and factors affecting these states; activities carried out in the field of community dentistry.

### **Oral Epidemiology:**

- Definition
- Uses and principles of epidemiology
- Research designs
- Dental surveys
- Clinical trials
- Screening
- Oral health assessment indices
- Concepts of aetiology, epidemiology of oral diseases and conditions having public health implications;
- Assessment of disease risk and predictive tests

### **Prevention of oral and dental diseases:**

- Levels of prevention
- Health promotion
- Specific protection
- Dental plaque and its role in the etiology of dental diseases
- Diet; nutrition and dental health
- Water fluoridation
- Fluoride supplements
- Professionally and self-applied topical fluorides
- Fissure sealing
- Atraumatic Restorations
- Methods of plaque control
- Principles and strategies of dental health education and promotion
- Cross infection control
- Protection from radiation and mercury hazards in dental practice.

**Dental health care delivery system:**

- The structure of dental care
- Role of dentists, dental auxiliaries and general health workers in oral health care
- Dental care of people with special needs including the elderly, the handicapped, patients with infectious and communicable diseases
- Principles and elements of primary health care
- Ethical issues in dental care

**Behavioral sciences:**

- Health behaviour and its determinates
- Attitudes, beliefs and values about health and illness
- Theories of health behaviour
- Dentist – patient communication
- Informed Consent, Breaking Bad News
- Management of stress, fear and anxiety in dentistry, child psychology and behavior management and modification techniques
- Counselling, motivation and compliance.

**Introduction to bio - statistics:**

- Types of variables
- frequency distribution
- Measures of central tendency and variability in data
- Methods of sampling
- Sampling error
- Probability
- Normal interval
- Tests of statistical significance

**Chairside preventive dental procedures**

- High fluoride gel application
- Fissure sealing
- Dietary counseling
- Plaque disclosing

### **Instructions about Oral Hygiene measures**

- Tooth brushing demonstration
- Inter-dental cleaning
- Chemical control of dental plaque



## ANNEXURE III

### Syllabus for NEB Examination (Dental)

(For transfer to BDS Year 4)

#### GENERAL MEDICINE

- History taking in general,
- General Physical Examination Pallor, Cyanosis, Jaundice, Clubbing and Koilonychia.
- Thyroid, Lymph nodes, Dehydration, Nutrition, Decubitus, Edema.
- Pulse.
- Examination of Blood Pressure and JVP.
- History taking in GIT - Vomiting, Diarrhea, Pain Ab, Constipation.
- Hematemesis, Melena, Dyspepsia, Distension.
- Examination of GIT- Inspection, Palpation.
- Percussion, Auscultation.
- Any deficient program.
- Chest pain, wheezing.
- Inspection, Palpation, Percussion Auscultation front of chest.
- Inspection, Palpation, Percussion, Auscultation back of chest.
- Any deficient program.
- History taking in CVS. .
- General Physical Examination in CVS - Clubbing, Koilonychia, Osier's nodes, Splinter Hemorrhages, Cyanosis.
- Pulse, JVP, Blood pressure
- Inspection, Palpation of pericardium
- Percussion, Auscultation of pericardium - Mitral, Tricuspid, Aortic.
- Pulmonary areas.
- Any deficient program.
- History taking in CNS
- Higher Mental Functions of consciousness, Behavior, Speech Memory
- Examination of cranial nerves I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII
- Examination of Motor system
- Examination of sensory system crude touch, pain, temperature. Fine touch, pressure, vibration Joint position
- Cortical sensation
- TWO point localization and discrimination
- Reflexes.
- Examination of Cerebellar system.



## **Knowledge of Systems and the Diseases**

- Genetic factors in disease.
- Immunological factors in disease.
- Climate and environmental factors in disease
- Diseases due to infection.
- Diseases of the cardiovascular system.
- Diseases of the respiratory system.
- Diseases of the alimentary tract and pancreas.
- Diseases of the liver and biliary system.
- Nutritional factors in disease.
- Disturbances in water, electrolyte and acid base balances.
- Diseases of the kidney and genito-urinary system.
- Endocrine and metabolic Diseases.
- Diseases of the blood.
- Oncology.
- Diseases of connective tissues joint and bones.
- Diseases of the skin.
- Psychiatry
- Diseases of the nervous system.
- Principles of geriatric medicine.
- Acute poisoning.

## **GENERAL SURGERY**

- Physiological response to Surgical Trauma and homeostasis
- Wound and its Repair.
- Pathophysiology and Management of Shock including fluid and electrolyte imbalance. c
- Investigation and treatment of Infections and parasitic infestations of surgical importance
- Hemorrhage Blood Transfusion and their implications
- Management of acutely injured & critically ill patients including aspiration pneumonia and embolic phenomena
- Principles in the Management of common Skin and Soft tissue problems: Ulcers, Abscesses, Sinus & Fistulae swellings, embedded foreign bodies and minor injuries.
- Principles of Anaesthesia.
- Nutrition of surgical patients.
- Cardiac Arrest
- Polytrauma with airway difficulty and circulatory instability
- Uncontrolled External Hemorrhage.
- Sudden upper Respiratory Tract Obstruction
- Hypovolumic or Septicemic Shock
- Tension Pneumothorax.

- Cardiac Tamponade.
- Unconscious due to Head Injury
- Gas Gangrene and Tetanus.
- Burns

**Knowledge of Systems and the Diseases:**

**Head, Face and Neck:**

- Development abnormalities of face, palate, lip.
- Principles of management of Head Injuries and its complications
- Oral region including tongue.
- Diseases of Salivary glands (Inflammation, Calculus, Tumors)
- Neck lumps including Lymphatics Thyroid, Parathyroid.

**Chest Wall & Thora**

- Blunt & Penetrating Injuries and their Complications.
- Lung abscess and Emphysema thoracics
- Growth of cysts in the lungs.

**Gastro Intestinal Tract:**

- Diseases causing Oesophageal Obstruction
- Peptic ulcer and its complications
- Tumors of Stomach.
- Conditions causing Acute Abdomen
- Conditions causing Chronic Abdomen including malignant lesions of small and large bowel

**Abdominal Pelvic and Genital Traumas and Hernias**

- Principles in management of abdominal trauma
- Epigastric Hernia
- Incisional Hernia

**Liver**

- Obstructive Jaundice
- Trauma
- Liver Abscess
- Hydrated Cyst
- Malignancy (Hepatoma & Secondaries)

### **Gall Bladder**

- Acute and duoruc Cholecystitis
- Cholelithiasis and its Complications
- Malignancies

### **Pancreas**

- Acute, Relapsing and Chronic pancreatitis
- Panaeatic masses induding (benign, malignant) neoplasia

### **Skin & Soft Tissues**

- Common benign and malignant skin lesions
- Wounds / Ulcers I abscesses /Sinuses / Fistulae
- Soft Tissue Lumps

### **Orthopedics and Trauma**

- Common Congenital Malformatios of Locomotive System.
- Bone Fracture & their Complications.
- Sports injuries and afflictions of Tendons and Bursae.
- Bone and joint Infections.
- Arthritis.
- Bone and Cartilage Tumours

### **Vascular and Nerve Disorders**

- Vascular afflictions.
- Varicosities.
- Deep venous thrombosis.
- Peripheral nerve Injuries.

## **ORAL PATHOLOGY**

- Developmental disturbances of Teeth
- Pre malignant, Benign and Malignant lesions
- Salivary gland tumors and diseases
- Odontogenic & non -Odontogenic tumours
- Tooth wear
- Caries
- Diseases of pulp and periapical tissues
- Spread of Infections
- Wound Healing
- Diseases of bones and joints
- Cysts of Jaws and Oral Cavity
- Immunology

## **PERIODONTOLOGY**

### **Normal Periodontium**

- Periodontium and its structures
- Gingiva
- Periodontal Ligaments
- Alveolar bone
- Cementum
- Periodontal anatomy in relation to periodontal and implant surgical procedures

### **Classification of Gingival and Periodontal Diseases**

- Gingivitis: Dental biofilm induced
- Gingivitis: Non - Dental biofilm induced
- Periodontitis (chronic and aggressive periodontitis according to 1999 classification)
- Periodontitis as a manifestation of systemic diseases
- Necrotizing periodontal diseases
- Other conditions affecting periodontium
- Systemic diseases/condition affecting periodontal supporting tissues
- Periodontal abscesses and Perio-Endo lesions
- Mucogingival deformities and conditions
- Occlusal trauma
- Prosthesis and tooth related factors
- Peri-Implant diseases and conditions

### **Etiology of Gingival and Periodontal Diseases**

- Plaque Microbiology
- Plaque retentive factors
- Calculus
- Improper restorations
- Improper crown margins
- Orthodontic appliances
- Risk factors of periodontal disease

### **Gingival and Periodontal Diseases**

- Pathogenesis
- Host response
- Clinical features
- Histological features
- Radiographic features

### **Periodontal examination, investigations and documentation**

- Extra oral and intraoral examination
- Basic Periodontal Examination
- General dental charting
- Detailed periodontal charting
- Indices and classification of gingival/ periodontal parameters
  - Gingival inflammation
  - Periodontal disease
  - Gingival recession
  - Furcation
  - Mobility
- Sensibility tests
- Referral to physician and/or dental specialists

### **Diagnosis & Treatment plan of periodontal disease**

- Periodontal diagnosis according to 2017 classification
- Radiographic interpretations
- Prognosis of individual teeth
- Phases of treatment plan
- Patient education and motivation regarding proposed treatment plan
- Evidence based sequence of treatment planning

## **Plaque control**

- Plaque indices
- Plaque disclosing agents
- Oral hygiene tools
- Oral hygiene instructions
- Chemical plaque control methods
- Dentifrices
- Dietary counseling

## **Non-surgical Periodontal therapy**

- Goal of non-surgical therapy
- Instruments
- Scaling and prophylaxis
- Scaling and root surface debridement
- Healing response end outcomes expected from periodontal non-surgical therapy

## **Surgical Principles and Procedures**

- Goal of surgical therapy
- Principles of periodontal surgical therapy
- Basic principles of wound healing
- Periodontal surgical procedures for pocket depth reduction
- Gingivectomy
- Principles of Osseointegration
- Basic surgical principles of implant surgery
- Surgical assessment of implant cases
- Basic surgical procedure of implant surgery
- Instruments for perio and implant surgical procedures

## **Interdisciplinary Periodontics**

- Perio-Restorative interrelationship
- Endo-Perio Continuum
- Perio-Ortho interrelationship
- Perio-Medicine
  - Perio- Diabetes
  - Perio – CVD
  - Perio – pregnancy
  - Bleeding/clotting disorders and blood thinners

## **Periodontal and Implant maintenance**

- Importance
- Compliance of Perio and Implant patients
- Choice of instruments for implant maintenance
- Periodontal risk assessment

## **Clinical skills**

- Educate patients concerning the aetiology of periodontal disease and encourage them to assume responsibility for their oral health.
- Perform periodontal charting and instrumentation techniques for plaque, calculus and stains removal using manual and powered instruments.
- Instruct the patients on when and how to use chemical plaque control agents in periodontal disease management.
- Provide symptomatic relief to patients presenting with painful conditions such as necrotizing ulcerative conditions, periodontal abscess, food impactions, dentine hypersensitivity
- Use plaque disclosing agents
- Perform instrument sharpening techniques and identify worn down periodontal instruments

## **ORAL MEDICINE**

### **The Oral Mucosa**

#### **Normal Oral Mucosa**

- Structure
- Function
- Age changes

#### **Abnormal oral mucosa**

- Oral mucosa in generalized disease
- Periodontium in generalized disease

## **Principles of oral medicine: assessment and investigation of patients**

- Patient assessment
- History taking
- Examination
- Investigations
  - Blood examination
  - Blood chemistry
  - Endocrine function
  - Urinalysis
  - Biopsy
- Microbiological investigations
- Imaging techniques

## **Infections of gingivae and oral mucosa**

### **Bacterial infections**

- Acute Necrotizing Ulcerative Disease
- Non-specific

### **Fungal infections**

#### Primary Candidiasis

- Acute (Pseudomembranous and Erythematous)
- Chronic (Pseudomembranous, Erythematous and CHC)
- Candida associated lesions
- Denture Induced Stomatitis
- Angular Cheilitis
- Median Rhomboid Glossitis
- Secondary Candidiasis
- Secondary Chronic Mucocutaneous Candidiasis syndrome

### **Viral infections**

- Herpes simplex virus infections
- Varicella zoster virus infections
- Epstein-Barr virus infections
- Human papillomavirus infections
- Human immunodeficiency virus and AIDS



## **Oral Ulceration**

- Traumatic ulceration
  - Aetiology
  - Clinical features
  - Management
- Recurrent aphthous stomatitis (RAS)
  - Clinical features
  - Aetiology
  - Histopathology and immunopathogenesis
  - Systemic conditions and RAS like lesions

## **Diseases of the lips and tongue and disturbances of taste and halitosis**

### **Diseases of the lips**

- Swelling of the lips
- Angular cheilitis (angular stomatitis, chelosis, perleche)
- Lip fissures
- Allergic cheilitis
- Actinic cheilitis (solar keratosis)
- Exfoliative cheilitis
- Perioral dermatitis
- Lip Lickers eczema
- Cheilocandidosis

### **Diseases of tongue**

- Developmental abnormalities and Morphological variations
- Tongue fissures
- Coated tongue
- Hairy tongue
- Atrophy of the lingual epithelium
- Traumatic irritation of the tongue
- Enlargement of the foliate papillae
- Geographic tongue (Erythema Migrans, Benign Migratory Glossitis),
- Median Rhomboid Glossitis
- Disturbances of taste and halitosis

## **Swellings of the face and neck**

### **Facial swellings**

- Differential diagnosis swellings in the neck
- Cervical lymphadenopathy
  - Differential diagnosis
  - Examination of the lymph nodes
  - Inflammatory causes of lymph node enlargement
  - Neoplastic causes of lymph node enlargement

### **Salivary glands and saliva**

- Saliva and salivary glands
- Saliva
- Salivary glands

### **Assessment of the salivary glands**

- Measurement of the salivary flow

### **Salivary gland diseases**

- Sialadenitis
- Sialosis
- Necrotizing sialometaplasia
- HIV-associated salivary gland disease
- Salivary gland tumours

### **Inflammatory overgrowths, developmental and benign lesions, and pigmentation of the oral mucosa**

#### **Inflammatory overgrowths**

- Epulides
- Fibroepithelial polyp
- Denture granuloma
- Focal epithelial hyperplasia (Heck's disease)
- Developmental white lesions
- Benign neoplasms
- Squamous cell papilloma
- Miscellaneous benign conditions
- Traumatic keratosis
- Nicotinic Stomatitis (pipe smokers' palate)

- Leukoedema
- Amalgam tattoos
- Melanotic pigmentation Oral melanoma

### **Precancerous Lesions and Conditions**

- Precancerous lesions
  - Leukoplakia
  - Erythroleukoplakia
  - Speckled leukoplakia
  - Candidal leukoplakia (chronic hyperplastic candidosis)
- Malignant transformation of precancerous lesions
- Management of precancerous lesions
- Precancerous conditions
  - Oral Submucous Fibrosis (OSF)
  - Lichen Planus
- Oral carcinoma and carcinogenesis
- Aetiological factors for oral Squamous Cell Carcinoma
- Clinical features and diagnosis of oral carcinoma
- Staging systems for oral carcinoma
- The management of oral carcinoma
- Prevention of oral carcinoma
- Oral carcinoma as a genetic disease

### **Gastrointestinal disease**

- Coeliac disease (gluten sensitive enteropathy)
- Oral manifestation of Celiac disease
- Inflammatory bowel disease (IBD)
- Ulcerative colitis
- Stomatosis and Inflammatory bowel disease
- Gastro Esophageal reflux disorder (GERD)

## **Blood and nutrition, endocrine disturbances, and renal disease**

### **Disorders of the blood**

- Anaemias
- Oral signs and symptoms in anaemia
- Management of patients with anaemias and haematinic deficiencies
- Leukaemia
- Leukopenia
- Platelet abnormalities
- The selection of patients for haematological examination

### **Disorders of nutrition**

- Nutritional deficiencies
- Scurvy
- Endocrine disturbances
  - Normal endocrine changes
  - Adrenocortical diseases
  - Thyroid disease
  - Diabetic mellitus

### **Renal disease**

- Chronic renal failure
- Renal patients undergoing dialysis Renal transplant patients

### **Immunodeficiency, hypersensitivity, autoimmunity and oral reactions to drug therapy**

- Immunodeficiency
- Hypersensitivity
- Angioedema
- Autoimmunity
- Oral reactions to drug therapy
- Spectrum of adverse reactions
  - Oral reactions of antibiotics
  - Oral reactions to steroids
  - Drug therapy and periodontal tissues
  - Fixed drug eruptions

## **Facial Pain and neurological disturbances**

- Facial pain: an overview
- The nerve supply of the face
- The evaluation of facial pain
- Neuropathic pain
  - Trigeminal neuralgia
  - Glossopharyngeal neuralgia
  - Postherpetic neuralgia
  - Neuropathic pain secondary to other conditions
    - Migraine
    - Cluster headaches (periodic migrainous neuralgia/ migrainous neuralgia)
    - Tension type headache
- Giant cell arteritis (temporal arteritis/cranial arteritis)
- Neurological disturbances
- Facial nerve deficits
- Anaesthesia and paraesthesia
- Bell's palsy
- Multiple sclerosis

## **Temporomandibular disorders**

- Investigation of the stomatognathic system
- History
- Examination
- Imaging
- Temporomandibular pain and dysfunction syndrome (TMPDS)
- Management
- Internal derangement
- Disc displacement with reduction
- Disc displacement without reduction
- Rheumatoid arthritis
- Osteoarthritis (osteoarthritis)
- Masseteric Hypertrophy
- Tumours

## **Chronic and Psychogenic orofacial problems**

- Chronic orofacial pain
- Atypical facial pain
- Atypical odontalgia
- Oral dysaesthesia (Burning mouth syndrome)
- Management of chronic orofacial pain

## **Medical emergencies in dentistry**

- The prevention of medical emergencies
- Administration of drugs
- Routes of administration of drugs
- Emergency drugs and equipment

## **Management of emergencies**

- Fainting
- Hypoglycaemia / Hyperglycaemias
- Epileptic seizures
- Asthma
- Chest pain
- Hyperventilation
- Respiratory obstruction/foreign body aspiration
- Anaphylaxis
- Cerebrovascular accidents
- Local anaesthesia toxicity/ overdose
- Adrenal shock/ Addison's crisis
- Respiratory arrest
- Cardiac arrest

## **Radiology**

- Radiation biology, hazards of radiation and radiation protection
- General patient consideration including control of infection
- Intraoral Periapical Radiographs
- Intraoral Bitewing Radiographs
- Intraoral Occlusal Radiographs
- Lateral Cephalometric Radiographs

- Panoramic Radiographs
- Posterior view Skull
- Imaging of Paranasal Sinuses





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