



CO2	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	M	S	S	M	S
CO4	S	S	M	S	S	S	S	S	S	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S	S	S
CO6	S	S	S	M	S	S	S	S	S	S	S	S
CO7	S	S	M	S	S	S	S	S	S	S	S	S

### **Course Content:**

The program outlined, addresses both the knowledge needed in Conservative Dentistry & Endodontics and allied medical specialties in its scope.

### **Part I: Paper – I:**

#### Applied Anatomy of Head & Neck

- Enamel – Development and Composition, Physical Characteristics, Chemical Properties, Structure. Age Changes – Clinical Structure.
- Dentin – Development, Physical and Chemical Properties, Structure Type of Dentin, Innervations, Age and Functional Changes.
- Pulp – Development, Histological Structures, Innervations, Functions, Regressive Changes, Clinical Considerations.
- Cementum – Composition, Cementogenesis, Structure, Function, Clinical
- Periodontal Ligament – Development, Structure, Function and Clinical Consideration.
- Salivary Glands – Structure, Function, Clinical Considerations
- Eruption Of Teeth

#### Applied Physiology:

- Mastication, Deglutition, Digestion and Assimilation,
- Fluid and Electrolyte Balance.
- Blood Composition, Volume, Function, Blood Groups, Hemostasis, Coagulation, Blood Transfusion, Circulation, Heart, Pulse, Blood Pressure, Shock.
- Respiration, Anoxia, Hypoxia, Asphyxia, Artificial Respiration,
- Endocrinology – General, Endocrine Activity, Disorders Relating to Pituitary, Thyroid, Parathyroid, Adrenals Including Pregnancy and Lactation.
- Physiology of Saliva – Composition, Function, Clinical Significance.
- Clinical Significance of Vitamins, Diet and Nutrition – Balanced Diet.
- Physiology of Pain, Sympathetic and Para Sympathetic Nervous System, Pain Pathways,

- Physiology of Pulpal Pain, Odontogenic and Non-Odontogenic Pain, Pain Disorders – Typical and Atypical,
- Biochemistry Such as Osmotic Pressure, Electrolytic Dissociation, Oxidation, Reduction Etc. Carbohydrates, Proteins, Lipids and Their Metabolism, Nucleoproteins, Nucleic Acid and Their Metabolism. Enzymes, Vitamins and Minerals, Metabolism of Inorganic Elements, Detoxification in The Body, Anti-Metabolites, Chemistry of Blood Lymph and Urine.

#### Pathology:

- Inflammation, Repair, Degeneration, Necrosis and Gangrene.
- Circulatory Disturbances – Ischemia, Hyperaemia, Edema, Thrombosis, Embolism, Infarction, Allergy and Hypersensitivity Reaction.
- Infections of Oral and Para Oral Regions (Bacterial, Viral and Fungal Infection)
- Neoplasms – Classifications of Tumours, Characteristics of Benign and Malignant Tumours Spread Tumours. Blood Dyscrisis.
- Developmental Disturbances of Oral and Para Oral Structures, Dental Caries, Regressive Changes of Teeth, Pulp, Periapical Pathology, Pulp Reaction to Dental Caries and Dental Procedures.
- Bacterial, Viral, Mycotic Infections of the Oral Cavity

#### Microbiology:

- Pathways of Pulpal Infection, Oral Flora and Micro Organisms associated with Endodontic Diseases, Pathogenesis, Host Défense, Bacterial Virulence Factors, Healing, Theory of Focal Infections, Microbes or Relevance to Dentistry – Streptococci, Staphylococci, Lactobacilli, Cornyebacterium, Actinomycetes, Clostridium, Neisseria, Vibrio, Bacteriodes, Fusobacteria, Spirochetes, Mycobacterium, Virus and Fungi.
- Cross Infection, Infection Control, Infection Control Procedure, Sterilization and Disinfection.
- Immunology – Antigen Antibody Reaction, Allergy, Hypersensitivity and Anaphylaxis, Auto Immunity, Grafts, Viral Hepatitis, HIV Infections and Aids.
- Identification and Isolation of Microorganisms from Infected Root Canals.
- Culture Medium and Culturing Technique (Aerobic and Anaerobic Interpretation and Antibiotic Sensitivity Test).

#### Pharmacology:

- Dosage and Route of Administration of Drugs, Actions and Fate of Drug in Body, Drug Addiction, Tolerance of Hypersensitivity Reactions.
- Local Anaesthesia – Agents and Chemistry, Pharmacological Actions, Fate and Metabolism of Anaesthetic, Ideal Properties, Techniques and Complications.

- General Anaesthesia – Pre-Medications, Neuro Muscular Blocking Agents, Induction Agents, Inhalation Anaesthesia and agents uses, Assessment of Anaesthetic Problems in Medically Compromised Patients. Anaesthetic Emergencies.
- Antihistamines, Corticosteroids, Chemotherapeutic and Antibiotics, Drug Resistance.
- Haemostasis, and Haemostatic Agents, Anticoagulants, Sympathomimetic Drugs, Vitamins and Minerals (A, B, C, D, E, K IRON), Anti-Sialogogue, Immunosuppressants,
- Drug Interactions, Antiseptics, Disinfectant Agents,
- Drugs Acting On CNS.

#### Biostatistics:

- Introduction, Basic Concepts, Sampling, Health Information Systems – Collection, Compilation, Presentation of Data. Elementary Statistical Methods – Presentation of Statistical Data, Statistical Averages – Measures of Central Tendency, Measures of Dispersion, Normal Distribution.
- Tests of Significance – Parametric and Non – Parametric Tests (Fisher Exact Test, Sign Test, Median Test, Mann Whitney Test, Kruskal Wallis One Way Analysis, Friedman Two-Way Analysis, Regression Analysis),
- Correlation and Regression, Use of Computers

#### Research methodology:

- Essential Features of a Protocol for Research in Humans. Experimental and Non-Experimental Study Designs.
- Ethical Considerations of Research.

#### Applied dental materials:

- Physical and Mechanical Properties of Dental Materials,
- Biocompatibility.
- Impression Materials, Detailed Study of Various Restorative Materials, Restorative Resin and Recent Advances in Composite Resins, Bonding – Recent Developments.
- Tarnish and Corrosion,
- Dental Amalgam,
- Direct Filling Gold,
- Casting Alloys,
- Inlay Wax,
- Die Materials, Investments, Casting Procedures, Defects,
- Dental Cements for Restoration and Pulp Protection (Luting, Liners, Bases) Cavity Varnishes.

## **Part – II Paper – I: Conservative Dentistry**

- Examination, Diagnosis and Treatment Plan.
- Occlusion As Related to Conservative Dentistry, Contact, Contour, its Significance.
- Separation of Teeth, Matrices, Used in Conservative Dentistry.
- Dental Caries – Epidemiology, Recent Concept of Etiological Factors, Pathophysiology, Histopathology, Diagnosis, Caries Activity Tests, Prevention of Dental Caries and Management – Recent Methods.
- Hand and Rotary Cutting Instruments, Development of Rotary Equipment, Speed Ranges, Hazards.
- Dental Burs and Other Modalities of Tooth preparation – Recent Developments (Air Abrasions, Lasers Etc)
- Infection Control Procedures in Conservative Dentistry, Isolation Equipment Etc.
- Direct Concepts in Tooth Preparation for Amalgam, Composite, GIC and Restorative Techniques, Failures and Management.
- Direct and Indirect Composite Restorations.
- Indirect Tooth Coloured Restorations – Ceramic, Inlays and Onlays, Veneers, Crowns, Recent Advances in Fabrication and Materials. Tissue Management. & Impression Procedures used for Indirect Restorations.
- Cast Metal Restorations, Indications, Contraindications, Tooth Preparation for Class 2 Inlay, Onlay Full Crown Restorations. Restorative Techniques, Direct and Indirect Methods of Fabrication Including Materials used for Fabrication like Inlay Wax, Investment Materials Direct Gold Restorations.
- Recent Advances in Restorative Materials and Procedures.
- Management of Non-Carious Lesion.
- Advance Knowledge of Minimal Intervention Dentistry.
- Recent advances in restoration of endodontically treated teeth and grossly mutilated teeth.
- Hypersensitivity, theories, causes and management.
- Lasers in conservative Dentistry.
- CAD-CAM & CAD-CIM in restorative dentistry.
- Dental imaging and its applications in restorative dentistry (clinical photography)
- Principles of aesthetics. Colour □ Facial analysis □ Smile design □ Principles of aesthetic integration □ Treatment planning in aesthetic dentistry.

## **Part – II PAPER – II: Endodontics**

- Rationale of Endodontics.
- Knowledge of Internal Anatomy of Permanent Teeth, Anatomy of Root Apex and its Implications in Endodontic Treatment.
- Dentin and Pulp Complex.
- Pulp and Periapical Pathology.
- Pathobiology of Periapex.
- Diagnostic Procedure – Recent Advances and Various Aids used for Diagnosis.
- Orofacial Dental Pain Emergencies: Endodontic Diagnosis and Management Case Selection and Treatment Planning.

- Infection Control Procedures used in Endodontics (Aseptic Techniques such as Rubber Dam, Sterilization of Instruments etc.)
- Access Cavity Preparation – Objectives and Principles.
- Endodontic Instruments and Instrumentation – Recent Developments, Detailed Description of Hand, Rotary, Sonic, Ultra-Sonic etc.
- Working Length Determination / Cleaning and Shaping of Root Canal System and Recent Development in Techniques of Canal Preparation.
- Root Canal Irrigants and Intra Canal Medicaments used to include Non-Surgical Endodontics by Calcium Hydroxide.
- Endodontic Microbiology.
- Obturating Materials, Various Obturation Techniques and Recent Advances in Obturation of Root Canal.
- Traumatic Injuries and Management.: Endodontic Treatment for Young Permanent Teeth. Paediatric Endodontics – Treatment of Immature Apex.
- Endodontic Surgeries, Recent Development Technique and Devices, Endo- Osseous Endodontic Implants- Treatment of Immature Apex.
- Endodontic Interrelationship, Endo-Perio Lesion and Management.
- Drugs and Chemicals used in Endodontics
- Endo Emergencies and Management.
- Restoration of Endodontically Treated Teeth, Recent Advances.
- Geriatric Endodontics
- Endo Emergencies and Management.
- Biologic Response of Pulp to Various Restorative Materials and Operative Procedures.
- Lasers In Endodontics.
- Multidisciplinary Approach to Endodontics Situations.
- Endodontics Radiology – Digital Technology in Endodontics Practice.
- Local Anaesthesia in Endodontics.
- Procedural Errors in Endodontics and Their Management.
- Endodontics Failures and Retreatment.
- Resorptions and its Management.
- Microscopes in Endodontics.
- Single Visit Endodontics, Current Concepts and Controversies.
- ADDITIONAL TOPICS: Effect of Age and Systemic Health Endodontics with Emphasis on Treatment of Medically Complex Endodontic Patient. Rhinosinusitis and Endodontic Disease □ Vital Pulp Therapy □ Records and Legal Responsibilities □ Inflammation and Immunology in Endodontics □ Non-Microbial Endodontic Disease □ Pulpal Reaction to Caries and Endodontic Procedures □ Bleaching Principles □ Ethics in Endodontics □ Regeneration in Endodontics □ Outcome of Endodontic Treatment □ Cracks and Fracture □ Osseointegrated Dental Implants □ Effects of Dental Implants on Treatment Planning of Prosthodontics, Periodontics and Endodontics.

### **Part – II Paper – III:**

- Descriptive and analysing type question.

### **Pre-Clinical Exercises on Plaster Models**

#### **Pre-Clinical Work – Operative and Endodontics Preclinical Work on Typhodont Teeth**

- Class 2 amalgam cavities a. Conservative preparation. - 03 b. Conventional preparation - 03 2. Inlay cavity preparation on premolars and molars – MO, DO, MOD – 10. a. Wax pattern - 06 b. Casting - 04
- Onlay preparation on molars - 02 a. Casting - 01
- Full Crown a. Anterior - 05 b. Posterior - 05 (2 each to be processed)
- 7/8 crown - 02 (1 to be processed)
- 3 / 4 crown premolar - 02 (1 to be processed)

### **Pre-Clinical Work on Natural Teeth:**

- Inlay on molars and premolars MO, Do, and MOD - 08 a. Casting - 02 b. Wax pattern - 02 2. Amalgam cavity preparation a. Conventional - 02 b. Conservative - 02
- Pin retained amalgam on molar teeth - 02
- Post and core build up a. Anterior teeth - 10 b. Posterior teeth - 05
- Casting a. Anterior - 04 b. Posterior - 02
- Onlay on molars - 03 (1 to be processed)
- Full crown premolars and molars - 04
- Full crown anterior (2 and 3 to be processed) - 06
- Veneers anterior teeth (indirect method) - 02
- Composite inlay (class 2) - 03 (1 to be processed)
- Full tooth wax caring – all permanent teeth

### **Pre – Clinical Endodontic Exercises**

- 1 Access cavity preparation 21 to 27 31 to 37
- 2 Access under magnification 16,31,41,46
- 3 Hand Instrumentation using conventional method Obturation with lateral condensation.
- 4 Hand Instrumentation using Step Back Technique obturation with warm vertical condensation 24
- 5 Hand Instrumentation using Crown Down technology and obturation with Warm Vertical Condensation 26
- 6 Access cavity & Rotary instrumentation for cleaning and shaping, obturation using various techniques 34,36, 37,41
- Create a Blunderbuss canal on central incisor. MTA plug and back fill with thermoplastic GP, 11/21

- Instrument retrieval 16
- Cast post and core 11/21
- Tooth sections of all the teeth a. longitudinal section b. cross section through crown  
Coronal third Middle third Apical third.

### **Clinical Work Quota For Post – Graduate Course**

- Amalgam Restorations: 100 (I, II, III MDS) A. Class I: B. Class II: C. Mod: D. Pin-Retained.
- Inlays: 20 (II & III MDS) A. Class I B. Class II C. Mod
- Onlays: 10 (III MDS)
- Glass Ionomer Cement Restorations: 25
- Composite Resin Restorations: 100 (I, II & III MDS)
- Anterior Root Canal Treatment: 100 (I, II MDS)
- Posterior Root Canal Treatment: 200 (II, III MDS)
- Post & Core: A. Custom (Cast): 25 B. Prefabricated: 25
- Crowns: Anterior – 25 Posterior 25
- Bridges: 05 (III MDS)
- Bleaching: A. Vital: 05 B. Non – Vital: 05
- Endodontic Surgeries: (II, III MDS) A. Peri-Apical Surgeries: 05 B. Root Resections: 05 C. Hemi sections: 05
- Miscellaneous – Splinting, Re-Attachment, Assenter-Disciplinary Cases etc.

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**Programme: MDS**

**Course: Orthodontics and Dentofacial Orthopedics**

**Course Code: ODO 101**

**Course Outcome-**

The dental specialty of dentistry that focuses on the alignment of the teeth and dental arches: the maxilla and the mandible. The practice of the specialty includes diagnosis, prevention, interception and correction of malocclusion and other abnormalities of the developing and mature orofacial structures.

**At the end of the program, post-graduates will be able to-**

- Apply the Knowledge of basic medical sciences relevant to the practice of Orthodontics.
- Diagnose the abnormal growth and development patterns of Dento-facial skeletal and soft tissue structures along with their etiology and pathophysiology.
- Diagnose anomalies of dentition;
- Detect changes in dentition development;
- Formulate a treatment plan and predict its course;
- Evaluate the need for orthodontic treatment and study treatments using fixed, functional and removable appliances.
- At the end of the course, you will have a thorough understanding of the multidisciplinary approach to treating adult, orthognathic, surgical cases and cleft-palate patients, while developing a scientific attitude and enquiring mind. Along with training in scientific methodology, you will carry out research activity.

<b>CO/PO Mapping</b>												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	S	S	S	S	S	S	M	S
CO2	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	M	S	S	M	S
CO4	S	S	M	S	S	S	S	S	S	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S	S	S
CO6	S	S	S	M	S	S	S	S	S	S	S	S
CO7	S	S	M	S	S	S	S	S	S	S	S	S

**Course Content:**

The program outlined, addresses both the knowledge needed in Orthodontics and allied medical specialties in its scope.

**Spread of the Curriculum:**

**Part-I:**

**A. Applied Basic Sciences:**

**Applied Anatomy:**

- Prenatal growth of head: Stages of embryonic development, origin of head, origin of face, origin of teeth.
- Postnatal growth of head: Bones of skull, the oral cavity, development of chin, the hyoid bone, general growth of head, growth of the face.

- Bone growth: Origin of bone, composition of bone, units of bone structure, schedule of Ossification, mechanical properties of bone, roentgen graphic appearance of bone.
- Assessment of growth and development:
- Growth prediction, growth spurts, the concept of normality and growth increments of growth, differential growth, gradient of growth, methods of gathering growth data. Theories of growth and recent advances, factors affecting physical growth.
- Muscles of mastication: Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion
- Development of dentition and occlusion: Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of occlusal development, pattern of occlusion.
- Assessment of skeletal age.

### **Physiology:**

- Endocrinology and its disorders: Growth hormone, thyroid hormone, parathyroid hormone, ACTH.
- Calcium and its metabolism:
- Nutrition-metabolism and their disorders: Proteins, carbohydrates, fats, vitamins and minerals
- Muscle physiology:
- Craniofacial Biology: Adhesion molecules and mechanism of adhesion
- Bleeding disorders in orthodontics: Hemophilia.

### **Dental Materials:**

- Gypsum products: Dental plaster, dental stone and their properties, setting reaction etc.
- Impression materials: Impression materials in general and particularly of alginate impression material.
- Acrylics: Chemistry, composition physical properties.
- Composites: Composition types, properties, setting reaction
- Banding and bonding cements:
- Wrought metal alloys: Deformation, strain hardening, annealing, recovery, recrystallization, grain growth, properties of metal alloys
- Orthodontic arch wires
- Elastics: Latex and non-latex elastics

**Genetics:**

- Cell structure, DNA, RNA, protein synthesis, cell division
- Chromosomal abnormalities.
- Principles of orofacial genetics
- Genetics in malocclusion
- Molecular basis of genetics
- Studies related to malocclusion
- Recent advances in genetics related to malocclusion
- Genetic counseling
- Bioethics and relationship to Orthodontic management of patients.

**Physical Anthropology:**

- Evolutionary development of dentition
- Evolutionary development of jaws.

**Pathology:**

- Inflammation
- Necrosis

**Biostatistics:**

- Statistical principles • Data Collection
- Method of presentation
- Method of Summarizing
- Methods of analysis – different tests/errors
- Sampling and Sampling technique
- Experimental models, design and interpretation
- Development of skills for preparing clear concise and cogent scientific abstracts and publication

**Applied Research Methodology In Orthodontics:**

- Experimental design
- Animal experimental protocol

- Principles in the development, execution and interpretation of methodologies in Orthodontics
- Critical Scientific appraisal of literature.

### **Applied Pharmacology Definitions & terminologies used –**

- Dosage and mode of administration of drugs. Action and fate of drugs in the body, Drug addiction, tolerance and hypersensitive reactions, Drugs acting on the central nervous system, general anesthetics hypnotics, analeptics and tranquilizers. Local anesthetics, Chemotherapeutics and antibiotics. Vitamins: A, D, B – complex group, C & K etc.

## **Part-II:**

### **Paper-I: Basic Orthodontics**

#### **Orthodontic History:**

- Historical perspective,
- Evolution of orthodontic appliances,
- Pencil sketch history of Orthodontic peers
- History of Orthodontics in India

#### **Concepts of Occlusion and Esthetics:**

- Structure and function of all anatomic components of occlusion,
- Mechanics of articulation,
- Recording of masticatory function,
- Diagnosis of Occlusal dysfunction,
- Relationship of TMJ anatomy and pathology and related neuromuscular physiology.

#### **Etiology and Classification of Malocclusion:**

- A comprehensive review of the local and systemic factors in the causation of malocclusion.  
Various classifications of malocclusion

#### **Dentofacial Anomalies:**

- Anatomical, physiological and pathological characteristics of major groups of developmental defects of the orofacial structures.

### **Diagnostic Procedures and Treatment Planning in Orthodontics:**

- Emphasis on the process of data gathering, synthesis and translating it into a treatment plan
- Problem cases – analysis of cases and its management
- Adult cases, handicapped and mentally retarded cases and their special problems
- Critique of treated cases.

### **Cephalometrics**

- Instrumentation
- Image processing
- Tracing and analysis of errors and applications
- Radiation hazards
- Advanced Cephalometric techniques including digital cephalometric
- Comprehensive review of literature
- Video imaging principles and application.

### **Practice Management in Orthodontics:**

- Economics and dynamics of solo and group practices
- Personal management
- Materials management
- Public relations
- Professional relationship
- Dental ethics and jurisprudence
- Office sterilization procedures
- Community based Orthodontics.

### **Paper-II: Clinical Orthodontics Myofunctional Orthodontics:**

- Basic principles
- Contemporary appliances –design, manipulation and management
- Case selection and evaluation of the treatment results
- Review of the current literature.

**Dentofacial Orthopedics:**

- Principles
- Biomechanics
- Appliance design and manipulation
- Review of contemporary literature

**Cleft lip and palate rehabilitation:**

- Diagnosis and treatment planning
- Mechanotherapy
- Special growth problems of cleft cases
- Speech physiology, pathology and elements of therapy as applied to orthodontics
- Team rehabilitative procedures.

**Biology of tooth movement:**

- Principles of tooth movement-review
- Review of contemporary literature
- Applied histophysiology of bone, periodontal ligament
- Molecular and ultra-cellular consideration in tooth movement

**Orthodontic / Orthognathic surgery:**

- Orthodontist's role in conjoint diagnosis and treatment planning
- Pre and post-surgical Orthodontics
- Participation in actual clinical cases, progress evaluation and post retention study
- Review of current literature

**Ortho / Perio / Prostho/Endo inter relationship:**

- Principles of interdisciplinary patient treatment
- Common problems and their management

**Basic principles of mechanotherapy includes removable appliances and fixed appliances:**

- Design
- Construction
- Fabrication
- Management
- Review of current literature on treatment methods and results

**Applied preventive aspects in Orthodontics:**

- Caries and periodontal disease prevention
- Oral hygiene measures
- Clinical procedures a. Principles, Growth guidance
- Diagnosis and treatment planning, Therapy emphasis on:
  - Dento-facial problems
    - Tooth material discrepancies
    - Minor surgery for Orthodontics

**Interceptive Orthodontics:**

**Evidence Based Orthodontics:**

**Different types of fixed Mechanotherapy:**

Orthodontic Management of TMJ problems, sleep-apnea etc.: Retention and relapse:

- a. Mechanotherapy – special reference to stability of results with various procedures
- b. Post retention analysis
- c. Review of contemporary literature

**Recent Advances:**

- Use of implants
- Lasers
- Application of F.E.M. Distraction Osteogenesis
- Invisible Orthodontics
- 3D imaging Digital Orthodontics, Virtual Treatment Planning
- CAD-CAM bracket Customization
- Robotic Wire Bending



- Accelerated Orthodontics
- Surgical
- Device assisted or mechanical stimulation
- Biochemical Mediators
- Lingual Orthodontics

**Paper-III:** Essays (descriptive and analyzing type questions)

### **Pre – Clinical Exercises**

(Should be completed within 3 months)

A general outline of the type of exercises is given here:

1. General Wire bending exercises to develop the manual dexterity.
  2. Clasps, Bows and springs used in the removable appliances.
  3. Soldering and welding exercises.
  4. Fabrication of removable, habit breaking, mechanical and functional appliances, also all types of space maintainers and space regainers.
  5. Bonwill Hawley Ideal arch preparation.
  6. Construction of orthodontic models trimmed and polished.
  7. Cephalometric tracing and various Analyses, also superimposition methods –
  8. Fixed appliance typodont exercises.
    - a) Training shall be imparted in one basic technique i.e. Standard Edgewise / Begg technique or its derivative / Straight wire etc., with adequate exposure to other techniques.
    - b) Typodont exercise
      - • Band making
      - • Bracket positioning and placement
      - • Different stages in treatment appropriate to technique taught
1. Clinical photography
  2. Computerized imaging
  3. Preparation of surgical splints, and splints for TMJ problems.
  4. Handling of equipment like vacuum forming appliances and hydro solder etc.

Clinical procedures

- a. Principles
- b. Growth guidance
- c. Diagnosis and treatment planning

- Therapy emphasis on: • Dento-facial problems
- Tooth material discrepancies, Minor surgery for Orthodontics

**Study model preparation:**

- **Model analysis – Mixed and permanent Dentition:**
- **Cephalometrics:**

<b>S..No.</b>	<b>Exercise</b>
1	Lateral cephalogram to be traced in different colors and super imposed to see the accuracy of tracing
2	Vertical and Anterio-Posterior Cephalometric analysis
3	Soft tissue analysis – Holdaway and Burstone
4	Various superimposition methods

- **Basics of Clinical Photography including Digital Photography:**
- **Typodont exercises: Begg or P.E.A. method/Basic Edgewise:**

<b>Sl.No</b>	<b>Exercise</b>
1	Teeth setting in Class-II division I malocclusion with maxillary anterior Proclination and mandibular anterior crowding
2	Band pinching, welding brackets

**Clinical Work:**

Once the basic pre-clinical work is completed in three months, the students can take up clinical cases and the clinical training.

**Each postgraduate student should start with a minimum of 50 fixed orthodontics cases and 20 removable including myofunctional cases of his/her own. Additionally he/she should handle a minimum of 25 transferred cases.**

The type of cases can be as follows:

- • Removable active appliances
- • Class-I malocclusion with Crowding
- • Class-I malocclusion with bi-maxillary protrusion
- • Class-II division – 1
- • Class-II division – 2
- • Class-III (Orthopedic, Surgical, Orthodontic cases)
- • Inter disciplinary cases
- • Removable functional appliance cases like activator, Bionator, functional regulator, twin block and new developments
- • Fixed functional appliances – Herbst appliance, jasper jumper etc
- • Dento-facial orthopedic appliances like head gears, rapid maxillary expansion, NiTi expander etc.,
- • Appliance for arch development such as molar distalization

**Scheme of examination:**

**A. Theory: Part-I: Basic Sciences Paper - 100 Marks**

**B. Part-II: Paper-I, Paper-II & Paper-III - 300 Marks**

(100 Marks for each Paper)

Written examination shall consist of Basic Sciences Paper (Part-I) of three hours duration and should be conducted at the end of First year of MDS course. Part-II Examination will be conducted at the end of Third year of MDS course. Part-II Examination will consist of Paper-I, Paper-II & Paper-III, each of three hours duration. Paper-I & Paper-II shall consist of two long answer

questions carrying 25 marks each and five questions carrying 10 marks each. Paper-III will be on Essays. In Paper-III three Questions will be given and student has to answer any two questions. Each question carries 50 marks. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows:

<b>Part-I:</b>	Applied Basic Sciences: Applied anatomy, Physiology, Dental Materials, Genetics, Pathology, Physical Anthropology, Applied Research methodology, Bio-Statistics and Applied Pharmacology.
<b>Part-II</b>	Orthodontic history, Concepts of occlusion and esthetics, Child and Adult Psychology, Etiology and classification of malocclusion, Dentofacial Anomalies, Diagnostic procedures and treatment planning in Orthodontics, Practice management in Orthodontics
<b>Paper I:</b>	Clinical Orthodontics
<b>Paper II :</b>	Essays (descriptive and analyzing type questions)
<b>Paper III :</b>	

**Practical/ Clinical Examination : 200**

**Marks Exercise No: 1 50 Marks**

**Functional Case :**

Selection of case for functional appliance and recording of construction bite.

Fabrication and delivery of the appliance the next day.

**Exercise No: 2 : 50 Marks**

1. III stage with auxiliary springs/Wire bending of any stage of fixed

orthodontics (OR)

2. Bonding of SWA brackets and construction of suitable arch wire.

**Exercise No. 3 75 Marks**

**Display of records of the treated cases (Minimum of 5 cases)**

**Exercise No: 4**

**25 Marks Long**

**case discussions**

**Time allotted for each exercise:**

<b>No</b>	<b>Exercise</b>	<b>Marks allotted</b>	<b>Approximate Time</b>
1	Functional appliance	50	1 hour (each day)
2	III stage mechanics / Bonding and arch wire fabrication	50	1 hr 30 min

3	Display of case records (a minimum of 5 cases to be presented along with all the patients and records)	75	1 hour
4	Long cases	25	2 hours

**Note: The complete records of all the cases should be displayed (including transferred cases)**

### **C. Viva Voce : 100 Marks**

#### *i. Viva-Voce examination: 80 marks*

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

#### *ii. Pedagogy Exercise: 20 marks*

A topic be given to each candidate in the beginning of clinical examination. He/she is asked to make a presentation on the topic for 8-10 minutes.

### **References:**

1. Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics. Elsevier Health Sciences; 2006 Dec 8.
2. Graber TM, Vanarsdall R. Orthodontics Current Principles and Techniques 2 nd ed, St. Louis: Mosby. 1994.
3. Burstone CJ, Choy K. The biomechanical foundation of clinical orthodontics. Quintessence Publishing Company, Incorporated; 2015.
4. Phulari BS. Orthodontics: principles and practice. JP Medical Ltd; 2011 May 30.
5. Rakosi T, Jonas I, Graber TM. Orthodontic diagnosis. Thieme; 1993.
6. Heasman P. Restorative Dentistry, Paediatric Dentistry and Orthodontics. 2010, UK. Elsevier.
7. Tsipkis A, Noar J. History of interceptive orthodontics. Orthodontic Update. 2021 .Willey Blackwell s



## **Course Contents:**

### **Theory- Course Outline for MDS**

#### **Periodontology and Oral Implantology - Part-I:**

##### **Applied Basic Sciences**

###### **Applied Anatomy:**

- Development of the Periodontium
- Micro and Macro structural anatomy and biology of the periodontal tissues
- Age changes in the periodontal tissues
- Anatomy of the Periodontium • Macroscopic and microscopic anatomy • Blood supply of the Periodontium.
- Lymphatic system of the Periodontium • Nerves of the Periodontium
- Temporomandibular joint, Maxillae and Mandible
- Tongue, oropharynx
- Muscles of mastication / Face
- Blood Supply and Nerve Supply of Head & Neck and Lymphatics.
- Spaces of Head & Neck

###### **Physiology:**

- Blood
- Respiratory system – knowledge of the respiratory diseases which are a cause of periodontal diseases (periodontal Medicine)
- Cardiovascular system a. Blood pressure b. Normal ECG c. Shock
- Endocrinology – hormonal influences on Periodontium
- Gastrointestinal system a. Salivary secretion – composition, function & regulation b. Reproductive physiology c. Hormones – Actions and regulations, role in periodontal disease d. Family planning methods
- Nervous system a. Pain pathways b. Taste – Taste buds, primary taste sensation & pathways for sensation.
- Haemostasis

###### **Biochemistry:**

- Basics of Carbohydrates, Lipids, Proteins, Vitamins, Enzymes and Minerals
- Diet and Nutrition and Periodontium
- Biochemical Tests and their significance.
- Calcium and Phosphorus



## **Pathology:**

- Cell structure and Metabolism
- Inflammation and repair, necrosis and degeneration
- Immunity and hypersensitivity
- Circulatory disturbances – Edema, haemorrhage, shock, thrombosis, embolism, infarction and hypertension
- Disturbances of nutrition
- Diabetes mellitus
- Cellular growth and differentiation, regulation
- Lab investigations
- Blood

## **Microbiology:**

- General bacteriology a. Identification of bacteria b. Culture media and methods c. Sterilization and disinfection.
- Immunology and Infection.
- Systemic bacteriology with special emphasis on Oral Microbiology- Staphylococci, genus, Actinomyces and other filamentous bacteria and Actinobacillus Actinomycetum comitans.
- Virology a. General properties of viruses b. Herpes, Hepatitis, virus, HIV virus.
- Mycology a. Candidiasis.
- Applied microbiology.
- Diagnostic microbiology and immunology, hospital infections and management.

## **Pharmacology:**

- General pharmacology a. Definitions – Pharmacokinetics with clinical applications, routes of administration including local drug delivery in Periodontics b. Adverse drug reactions and drug interactions.
- Detailed pharmacology of a. Analgesics – opioid and nonopioid b. Local anaesthetics c. Haematinics and coagulants, Anticoagulants d. Vit D and Calcium preparations e. Antidiabetics drugs f. Steroids g. Antibiotics h. Antihypertensive i. Immunosuppressive drugs and their effects on oral tissues j. Antiepileptic drugs.
- Brief pharmacology, dental use and adverse effects of a. General anaesthetics b. Antipsychotics c. Antidepressants d. Anxiolytic drugs e. Sedatives f. Antiepileptics g. Antihypertensives h. Antianginal drugs i. Diuretics j. Hormones k. Pre-anesthetic medications.
- Drugs used in Bronchial asthma, cough.
- Drug therapy of a. Emergencies b. Seizures c. Anaphylaxis d. Bleeding e. Shock f. Diabetic ketoacidosis g. Acute Addisonian crisis.

- Dental Pharmacology a. Antiseptics b. Astringents c. Sialagogues d. Disclosing agents e. Antiplaque agents.
- Fluoride pharmacology

### **Biostatistics:**

- Introduction, definition and branches of biostatistics
- Collection of data, sampling, types, bias and errors
- Compiling data-graphs and charts
- Measures of central tendency (mean, median and mode), standard deviation and variability
- Tests of significance (chi square test, t-test and z-test) Null hypothesis

### **Paper I: Etiopathogenesis:**

- Classification of periodontal diseases and conditions
- Epidemiology of gingival and periodontal diseases
- Defence mechanisms of gingival
- Periodontal microbiology
- Basic concepts of inflammation and immunity
- Microbial interactions with the host in periodontal diseases
- Pathogenesis of plaque associated periodontal diseases
- Dental calculus
- Role of iatrogenic and other local factors
- Genetic factors associated with periodontal diseases 11. Influence of systemic diseases and disorders of the periodontium
- Role of environmental factors in the aetiology of periodontal disease
- Stress and periodontal diseases
- Occlusion and periodontal diseases
- Smoking and tobacco in the aetiology of periodontal diseases
- AIDS and periodontium
- Periodontal medicine
- Dentinal hypersensitivity

### **Paper II: Clinical and Therapeutic Periodontology and Oral Implantology**

- **Gingival Diseases**
  - Gingival inflammation
  - Clinical features of gingivitis
  - Gingival enlargement
  - Acute gingival infections

- Desquamative gingivitis and oral mucous membrane diseases
- Gingival diseases in the childhood
- **Periodontal Diseases**
  - Periodontal pocket
  - Bone loss and patterns of bone destruction
  - Periodontal response to external forces
  - Masticatory system disorders
  - Chronic periodontitis
  - Aggressive periodontitis
  - Necrotising ulcerative periodontitis
  - Interdisciplinary approaches - Orthodontic – Endodontic
- **Treatment of Periodontal Diseases**
  - History, examination, diagnosis, prognosis and treatment planning
  - Clinical diagnosis
  - Radiographic and other aids in the diagnosis of periodontal diseases
  - Advanced diagnostic techniques
  - Risk assessment
  - Determination of prognosis
  - Treatment plan
  - Rationale for periodontal treatment
  - General principles of anti-infective therapy with special emphasis on infection control in periodontal practice
  - Halitosis and its treatment
  - Bruxism and its treatment
- **Periodontal Instrumentation**
  - Periodontal Instruments
  - Principles of periodontal instrumentation
- **Periodontal Therapy**
  - Preparation of tooth surface
  - Plaque control
  - Anti-microbial and other drugs used in periodontal therapy and wasting diseases of teeth.
  - Periodontal management of HIV infected patients
  - Occlusal evaluation and therapy in the management of periodontal diseases
  - Role of orthodontics as an adjunct to periodontal therapy
  - Special emphasis on precautions and treatment for medically compromised patients
  - Periodontal splints
  - Management of dentinal hypersensitivity

- **Periodontal Surgical Phase – Special Emphasis on Drug Prescription**

- General principles of periodontal surgery
- Surgical anatomy of periodontium and related structures
- Gingival curettage
- Gingivectomy technique
- Treatment of gingival enlargements
- Periodontal flap
- Osseous surgery (resective and regenerative)
- Furcation; Problem and its management
- The periodontic – endodontic continuum
- Periodontic plastic and aesthetic surgery
- Recent advances in surgical techniques
- E. Future directions and controversial questions in periodontal therapy
- Future directions for infection control
- Research directions in regenerative therapy
- Future directions in anti-inflammatory therapy
- Future directions in measurement of periodontal diseases

- **Periodontal Maintenance Phase**

- Supportive periodontal treatment
- Results of periodontal treatment

- **Oral Implantology**

- Introduction and historical review
- Biological, clinical and surgical aspects of dental implants
- Diagnosis and treatment planning
- Implant surgery
- Prosthetic aspects of dental implants
- Diagnosis and treatment of Peri implant complications
- Special emphasis on plaque control measures in implant patients
- Maintenance phase

- **Management Of Medical Emergencies In Periodontal Practice**

- Periodontology treatment should be practiced by various treatment plans and more number of patients to establish skill for diagnosis and treatment and after care with bio- mechanical, biological, bio-aesthetics, bio-phonetics and all treatment should be carried out in more number for developing clinical skill.

## **Teaching / Learning Activities:**

The post graduate is expected to complete the following at the end of:

### **1. Module 1 (First Year)- Activities Works To Be Done**

#### **1. Orientation to the PG program pre-clinical work (4 months)**

##### **a. Dental**

Practice of incisions and suturing techniques on the tyodont models.

- Fabrication of bite guards and splints.
- Occlusal adjustment on the casts mounted on the articulator
- X-ray techniques and interpretation.
- Local anaesthetic techniques.
- Identification of Common Periodontal Instruments.
- To learn science of Periodontal Instruments maintenance (Sharpening, Sterilization and Storage)
- Concept of Biological width a. Tyodont Exercise (i) Class II Filling with Band and Wedge Application (ii) Crown cuttings

##### **b. Medical**

- Basic diagnostic microbiology and immunology, collection and handling of sample and culture techniques.
- Introduction to genetics, bioinformatics.
- Basic understanding of cell biology and immunological diseases.

##### **Clinical work**

- Applied periodontal indices 10 cases
- Scaling and root planning: - with Proper written history
- Manual 20 Cases
- Ultrasonic 20 Cases
- Observation / assessment of all periodontal procedures including implants

### **2. Module 2 (First Year)**

- Interpretation of various bio- chemical investigations.
- Practical training and handling medical emergencies and basic life support devices.
- Basic biostatistics – Surveying and data analysis.
- Clinical
- Case history and treatment planning 10 cases
- Root planning 50 cases
- Observation / assessment of all periodontal procedures including implant.
- Selection of topic for Library dissertation and submission of
- Dissertation Synopsis.

### **3. Module 3 (First Year)**

Minor surgical cases 20 cases

- Gingival Depigmentation 3 Cases
- Gingival Curettage no limits
- ENAP 1 Case

- Gingivectomy/ Gingivoplasty 5 cases
- Operculectomy 3 cases Poster Presentation at the Speciality conference

#### **4. Module 4 (Second Year)**

Clinical work

- Case history and treatment planning 10 cases
- Occlusal adjustments 10 cases
- Perio splints 10 cases
- Local drug delivery techniques 5 cases
- Screening cases for dissertation

#### **5. Module 5 (Second Year)**

- Periodontal surgical procedures.
  - Basic flap procedures 20 cases
- Periodontal plastic and esthetic 10 cases
  - Increasing width of attached gingival 5 cases
  - Root coverage procedures / Papilla Preservation and Reconstruction 5 cases
  - Crown lengthening procedures 5 cases
  - Frenectomy 5 cases
  - Vestibuloplasty 5 cases
- Furcation treatment (Hemisection, Rootsection, Tunelling) 5 cases
- Surgical closure of diastema. 2 cases

#### **6. Module 6 (Third Year)**

- Ridge augmentation procedures 5 cases
- Implants Placements and monitoring 5 cases
- Sinus lift procedures 2 cases 4. Case selection, preparation and investigation of implants.
- Interdisciplinary Periodontics 2 each
- Ortho – Perio (ii) Endo – Perio (iii) Restorative Perio (iv) Preprosthetic (v) Crown Prep
- Osseous Surgery 2 each (i) Resective ii) Regenerative
- Scientific paper/ poster presentation at the conference.

#### **7. Module 7 (Third Year)**

- Clinical work 1. Flap surgeries & regenerative techniques 25 cases (using various grafts & barrier membranes)
- Assistance / observation of advanced surgical procedure 5 each
- Micro Surgery 5 each
- Record maintenance & follow-up of all treated cases including implants.
- Submission of dissertation – 6 months before completion of III year.
- Scientific paper presentation at conferences.

#### **8. Module 8 (Third Year)**

- Refining of surgical skills.
- Publication of an article in a scientific journal.
- Preparation for final exams.

## 9. Module 9 (Third Year)

- Preparation for final exams.
- University exam

### Reference Books:

1. Goss CM. Gray's anatomy of the human body. Academic Medicine. 1960 Jan 1990, Elseveir .
2. Ham AW. Histology. JB Lippincott; 1965.
3. Satyanarayana U. Biochemistry, 6<sup>th</sup> Edition. Elsevier Health Sciences; 2021 Sep 10.
4. Peter S. Essentials of preventive and community dentistry. Arya (Medi) Publishing House; 2006.
5. Tripathi KD. Essentials of pharmacology for dentistry. Jaypee Brothers Medical Publishers; 2020 Nov 23.
6. Mohan H. Textbook of pathology. Jaypee Brothers Medical Publishers; 2018 Nov 30.
7. Newman MG, Takei H, Klokkevold PR, Carranza FA. Newman and Carranza's Clinical periodontology. Elsevier Health Sciences; 2018 May 29.
8. Cowley G, MacPhee T. Essentials of periodontology and periodontics. Blackwell; 1975.
9. Rose LF, Cohen DW. Periodontics: medicine, surgery, and implants. Mealey BL, Genco RJ, editors. St. Louis^ eMissouri Missouri: Elsevier Mosby; 2004 Aug 6.
10. Convissar RA. Laser Dentistry in 2020: Technology Excels While Training Has Flaws. Compendium. 2020 Jan;41(1).





## **Course Contents:**

The course content has been identified and categorized as essential knowledge given below.

### **Essential Knowledge:**

The topics to be considered are Applied Basic Sciences, Oral and Maxillofacial Prosthodontics and Implantology.

### **Applied Basic Sciences:**

Should develop thorough knowledge on the applied aspects of Anatomy, Embryology, Histology particularly Head and Neck, Physiology, Biochemistry, Pathology, Microbiology, Virology, Pharmacology, Health and Systematic diseases principles in surgery medicine and Anaesthesia, Nutrition, Behavioural sciences, age changes, genetics, Dental Material Science, congenital defects and Syndromes and Anthropology, Biomaterial Sciences, Bio-engineering and Bio-medical and Research Methodology as related to Masters degree Prosthodontics and Crown & Bridge including Implantology.

It is desirable to have adequate knowledge in Bio-statistics, Research Methodology and use of computers to develop necessary teaching skills in the specialty of Prosthodontics including crown and bridge.

## **Applied Anatomy of Head and Neck:**

### **General Human Anatomy:**

- Gross Anatomy, Anatomy of Head and Neck in Detail:
- Cranial and Facial Bones,
- TMJ and Function,
- Muscles of Mastication and Facial Expression,
- Muscles of Neck and Back including Muscles of Deglutition and Tongue,
- Arterial Supply and Venous Drainage of the Head and Neck,
- Anatomy of the Para Nasal Sinuses in Relation to the Vth Cranial Nerve.
- General Considerations of the Structure and Function of the Brain,
- Brief Considerations of V, VII, XI, XII, Cranial Nerves and Autonomic Nervous System of the Head and Neck.
- The Salivary Glands, Pharynx, Larynx Trachea, Oesophagus, Functional Anatomy of Masticatory Muscles, Deglutition, Speech, Respiration, and Blood Circulation,
- Teeth Eruption, Morphology, Occlusion and Function.
- Anatomy Of TMJ, its Movements and Myofacial Pain Dysfunction Syndrome.

### **Embryology:**

- Development of the Face, Tongue, Jaws, TMJ, Paranasal Sinuses, Pharynx, Larynx, Trachea, Oesophagus, Salivary Glands, Development of Oral and Para Oral Tissues including detailed aspects of Tooth Formation.

### **Growth & Development:**

- Facial Form and Facial Growth and Development Overview of Dentofacial Growth Process and Physiology from Foetal Period to Maturity and Old Age.

- General Physical Growth, Functional and Anatomical Aspects of the Head, Changes in Craniofacial Skeletal Development, Relationship between Development of the Dentition and Facial Growth.

### **Dental Anatomy:**

- Anatomy of Primary and Secondary Dentition, Concept of Occlusion, Mechanism of Articulation and Masticatory Function.
- Detailed Structural and Functional Study of the Oral and Para Oral Tissues, Normal Occlusion, Development of Occlusion in Deciduous Mixed and Permanent Dentitions, Root Length, Root Configuration & Tooth-Numbering Systems.

### **Histology:**

- Histology of Enamel, Dentin, Cementum, Periodontal Ligament and Alveolar Bone, Pulpal Anatomy, Histology and Biological Consideration.
- Salivary Glands and Histology of Epithelial Tissues including Glands.
- Histology of General and Specific Connective Tissue including Bone, Salivary Glands.
- Histology of Skin, Oral Mucosa, Respiratory Mucosa, Connective Tissue, Bone, Cartilage, Cellular Elements of Blood Vessels, Blood, Lymphatics, Nerves, Muscles, Tongue and Tooth.

### **Cell biology:**

- Brief study of the structure and function of the mammalian cell. Components of the cell and functions of various types of cells and their consequences with tissue injury.

### **Applied Physiology and Nutrition:**

- Introduction, Mastication, Deglutition, Digestion and Assimilation.
- Homeostasis, Fluid and Electrolyte Balance, Blood Composition, Volume, Function, Blood Groups and Hemorrhage, Blood Transfusion, Blood Circulation, Heart Rate, Pulse, Blood Pressure, Capillary and Lymphatic Circulation.
- Shock, Respiration, Anoxia, Hypoxia, Asphyxia, Artificial Respiration.
- Endocrine Glands in Particular Reference to Pituitary, Parathyroid and Thyroid Glands and Sex Hormones.
- Role of Calcium and Vit D in Growth and Development of Teeth, Bone and Jaws.
- Role of Vit. A, C and B Complex in Oral Mucosal and Periodontal Health.
- Physiology and Function of the Masticatory System.
- Speech Mechanism, Mastication, Swallowing and Deglutition Mechanism, Salivary Glands and Saliva.

### **Endocrines:**

- General Principles of Endocrine Activity and Disorders relating to Pituitary, Thyroid, Pancreas, Parathyroid, Adrenals, Gonads, including Pregnancy and Lactation.
- Physiology of Saliva, Urine Formation, Normal and Abnormal Constituents,

- Physiology of Pain, Sympathetic and Parasympathetic Nervous System, Neuromuscular co-ordination of the stomatognathic system.

### **Applied Nutrition:**

- General Principles, Balanced Diet, Effect of Dietary Deficiencies and Starvation, Diet, Digestion, Absorption, Transportation and Utilization & Diet for Elderly Patients.

### **Applied Biochemistry:**

- General principles governing the various biological activities of the body, such as osmotic pressure, electrolytic dissociation, oxidation-reduction.
- Carbohydrates, proteins, lipids and their metabolism, Enzymes, Vitamins, and minerals, Hormones, Blood.
- Metabolism of inorganic elements, Detoxification in the body & anti metabolites.

### **Applied Pharmacology and Therapeutics:**

- Dosage and Mode of Administration of Drugs. Action and Fate of Drugs in the Body, Drug Addiction, Tolerance and Hypersensitive Reactions, Drugs Acting on the Central Nervous System.
- General Anesthetics Hypnotics, Analeptics and Tranquilizers. Local Anesthetics
- Chemotherapeutics and Antibiotics, Antitubercular and Anti-Syphilitic Drugs.
- Analgesics and Antipyretics, Antiseptics, Styptics, Sialagogues and Anti-Sialagogues. Haematinics, Cortisones, ACTH, Insulin and other Antidiabetics Vitamins: A, D, B – Complex Group C, K etc.
- Chemotherapy and Radiotherapy. Drug Regime for Antibiotic Prophylaxis and Infectious Endocarditis.
- Drug Therapy following Dental Surgical Treatments like Placement of Implants, Pre and Peri Prosthetic Surgery.

### **Applied pathology:**

- Inflammation, Repair and Degeneration, Necrosis and Gangrene.
- Circulatory Disturbances, Ischaemia, Hyperaemia, Chronic Venous Congestion, Oedema, Thrombosis, Embolism and Infarction. Infection and Infective Granulomas.
- Allergy and Hypersensitive Reactions.
- Neoplasms; Classification of Tumors, Carcinogenesis, Characteristics of Benign and Malignant Tumors, Spread of Tumors. Applied Histo Pathology and Clinical Pathology.

### **Applied Microbiology:**

- Immunity, Knowledge of Organisms commonly associated with diseases of the Oral Cavity (Morphology Cultural Characteristics etc) of Strepto, Staphylo, Clostridia group of organisms, Spirochaetes, organisms of Tuberculosis, Leprosy, Diphtheria, Actinomycosis and Moniliasis Etc. Virology, Cross Infection Control, Sterilization

and Hospital Waste management.

### **Applied Oral Pathology:**

- Developmental Disturbances of Oral and Para Oral Structures.
- Regressive Changes of Teeth, Bacterial, Viral and Mycotic Infections of the Oral Cavity.
- Dental Caries, Diseases of Pulp and Periapical Tissues.
- Physical and Chemical Injuries of the Oral Cavity, Oral Manifestations of Metabolic and Endocrine Disturbances.
- Diseases of the Blood and Blood Forming Organism in relation to the Oral Cavity, Periodontal Diseases.
- Diseases of the Skin.
- Nerves and Muscles in Relation to the Oral Cavity.

### **Laboratory Determinations:**

- Blood groups, blood matching, R.B.C. and W.B.C. count, Bleeding and clotting time, PT, PTT and INR Smears and cultures – urine analysis and culture. Interpretation of RBS, Glycosylated Hb, GTT.

### **Biostatistics:**

- Characteristics and limitations of statistics, planning of statistical experiments, sampling, collection, classification and presentation of data (Tables, graphs, pictograms etc).
- Analysis of data, parametric and non-parametric tests.
- Introduction to Biostatistics - Scope and need for statistical application to biological data.
- Definition of selected terms – scale of measurements related to statistics, Methods of collecting data, presentation of the statistical diagrams and graphs.
- Frequency curves, mean, mode of median, Standard deviation and co-efficient of variation, Correlation – Co-efficient and its significance, Binominal distributions normal distribution and Poisson's distribution, Tests of significance.

### **Research Methodology:**

- Understanding and evaluating dental research, scientific method and the behavior of scientists, understanding to logic – inductive logic – analogy, models, authority, hypothesis and causation.
- Measurement and Errors of measurement, presentation of results, Reliability, Sensitivity and specificity diagnosis tests and measurements.
- Research Strategies, Observation, Correlation, Experimentation and Experimental design. Logic of statistical interferences, balance judgements, judgement under uncertainty, clinical vs., scientific judgement, problems with clinical judgement, forming scientific judgements, the problem of contradictory evidence, citation analysis as a Means of literature evaluation, influencing judgement.
- Protocol writing for experimental, observational studies, survey including hypothesis,

PICO statement, aim objectives, sample size justification, use of control/placebo, standardization techniques, bias and its elimination, blinding, evaluation, inclusion and exclusion criteria.

### **Applied Radiology:**

- Introduction, radiation, background of radiation, sources, radiation biology, somatic damage, genetic damage, protection from primary and secondary radiation.
- Principles of X-ray production, Applied principles of radio therapy and after care.

### **Roentgenographic Techniques:**

- Intra oral, extra oral roentgenography, Methods of localization digital radiology and ultrasounds.
- Normal anatomical landmarks of teeth and jaws in radiograms, temporomandibular joint radiograms, neck radiograms.
- Use of CT and CBCT in prosthodontics.

### **Applied Medicine:**

- Systemic diseases and (its) their influence on general health and oral and dental health.
- Medical emergencies like syncope, hyperventilation, angina, seizure, asthma and allergy/anaphylaxis in the dental offices – Prevention, preparation, medico legal consideration, unconsciousness, respiratory distress, altered consciousness, seizures, drug related emergencies, chest pain, cardiac arrest, premedication, prophylaxis and management of ambulatory patients, resuscitation, applied psychiatry, child, adult and senior citizens.

### **Applied Surgery & Anaesthesia:**

- General principles of surgery, wound healing, incision wound care, hospital care, control of hemorrhage, electrolyte balance. Common bandages, sutures, splints, shifting of critically ill patients, prophylactic therapy, bone surgeries, grafts, etc., surgical techniques, nursing assistance, anesthetic assistance.
- Principles in speech therapy, surgical and radiological craniofacial oncology, applied surgical ENT and ophthalmology.

### **Applied Plastic Surgery:**

- Applied understanding and assistance in programs of plastic surgery for prosthodontics therapy.

### **Applied Dental Materials:**

- Students should have understanding of all materials used for treatment of craniofacial disorders – Clinical, treatment, and laboratory materials, associated materials, technical considerations, shelf life, storage, manipulations, sterilization, and waste

management.

- Students shall acquire knowledge of testing biological, mechanical and other physical properties of all materials used for the clinical and laboratory procedures in prosthodontic therapy.
- Students shall acquire full knowledge and practice of Equipment's, instruments, materials, and laboratory procedures at a higher level of competence with accepted methods.
- All clinical practices shall involve personal and social obligation of cross infection control, sterilization and waste management.

## **Oral and Maxillofacial Prosthodontics and Implantology:**

### **I. Non-Surgical and Surgical Methods of Prosthodontics and Implantology:**

a. Prosthodontic treatment for completely edentulous patients – Complete dentures, immediate complete dentures, single complete dentures, tooth supported complete dentures & Implant supported Prosthesis for completely edentulous patients for typical and atypical cases.

b. Prosthodontic treatment for partially edentulous patients: - Clasp-retained acrylic and cast partial dentures, transitional dentures, immediate dentures, intra coronal and extra coronal precision attachments retained partial dentures & maxillofacial prosthesis for typical and atypical cases.

**Prosthodontic treatment for edentulous patients:** - Complete Dentures and Implant supported Prosthesis.

Complete Denture Prosthesis – Definitions, terminologies, G.P.T., Boucher's clinical dental terminology.

Scope of Prosthodontics – The Cranio-Mandibular system and its functions, the reasons for loss of teeth, consequences of loss of teeth and treatment modality with various restorations and replacements.

- **Edentulous Predicament**, Biomechanics of the edentulous state, Support mechanism for the natural dentition and complete dentures, biological considerations, Functional and Para functional considerations, Esthetic, behavioral and adaptive responses, Temporomandibular joints changes.
- **Effects of aging of edentulous patients** –aging population, distribution and edentulism in old age, impact of age on edentulous mouth – Mucosa, Bone, saliva, jaw movements in old age, taste and smell, nutrition, aging, skin and teeth, concern for personal appearance in old age.
- **Sequelae caused by wearing complete denture** –the denture in the oral environment – Mucosal reactions, altered taste perception, burning mouth syndrome, gagging, residual ridge (reduction) resorption, denture stomatitis, flabby ridge, denture irritation hyperplasia, traumatic Ulcers, Oral cancer in denture wearers, nutritional deficiencies, masticatory ability and performance, nutritional status and masticatory functions.
- **Temporomandibular disorders in edentulous patients** –Epidemiology, etiology and management, Pharmacotherapy, Physical modalities, and Bio-behavioral

modalities

- **Nutrition Care for the denture wearing patient** –Impact of dental status on food intake, Gastrointestinal functions, nutritional needs and status of older adults, Calcium and bone health, vitamin and herbal supplementation, dietary counseling and risk factor for malnutrition in patients with dentures and when teeth are extracted.
- **Preparing patient for complete denture patients** –Diagnosis & treatment planning for edentulous and partially edentulous patients – familiarity with patients, principles of perception, health questionnaires and identification data, problem identification, prognosis and treatment identification data, problem identification, prognosis and treatment planning – contributing history – patient’s history, social information, medical status –
  - systemic status with special reference to debilitating diseases, diseases of the joints, cardiovascular disorders, diseases of the skin, neurological disorders, oral malignancies, climacteric, use of drugs, mental health – mental attitude, psychological changes, adaptability, geriatric changes – physiologic, pathological, pathological and intra oral changes. Intra oral health – mucus membrane, alveolar ridges, palate and vestibular sulcus and dental health.
  - Data collection and recording, visual observation, radiography, palpation, measurement of sulci or fossae, extra oral measurement, the vertical dimension of occlusion, diagnostic casts.
  - Specific observations – existing dentures, soft tissue health, hard tissue health – teeth, bone.
  - Biomechanical considerations – jaw relations, border tissues, saliva, muscular development – muscle tone, neuromuscular co-ordination, tongue, cheek and lips.
  - Interpreting diagnostic findings and treatment planning.
- **Pre prosthetic surgery** –Improving the patients denture bearing areas and ridge relations.
- **Non-surgical methods** –rest for the denture supporting tissues, occlusal correction of the old prosthesis, good nutrition, conditioning of the patient’s musculature.
- **Surgical methods** –Correction of conditions, that preclude optimal prosthetic function – hyperplastic ridge – epulis fissuratum and papillomatosis, frenular attachments and pendulous maxillary tuberosities, ridge augmentation, maxillary and mandibular oral implants, corrections of congenital deformities, discrepancies in jaw size, relief of pressure on the mental foramen, enlargement of denture bearing areas, vestibuloplasty, ridge augmentation, replacement of tooth roots with Osseo integrated denture implants.
- **Immediate Denture** –Advantages, Disadvantages, Contraindications, Diagnosis, treatment planning and Prognosis, Explanation to the patient, Oral examinations, Examination of existing prosthesis, Tooth modification, Prognosis, Referrals/adjunctive care, oral prophylaxis and other treatment needs.
  - First visit, preliminary impressions and diagnostic casts, management of loose teeth, custom trays, final impressions and master casts, two tray or sectional custom impression tray, location of posterior limit and jaw relation records,

setting of the posterior denture teeth / verifying jaw relations and the patient try in.

- Laboratory phase, setting of anterior teeth, Wax contouring, flasking and boil out, processing and finishing, surgical templates, surgery and immediate denture insertion, post operative care and patient instructions, subsequent service for the patient on the immediate denture.
- **Over dentures (tooth supported complete dentures)**– indications and treatment planning, advantages and disadvantages, selection of abutment teeth, loss of abutment teeth, tooth supported complete dentures. Non-coping abutments, abutment with copings, abutments with attachments, submerged vital roots, preparations of the retained teeth.
- **Single Dentures:** Single Mandibular denture to oppose natural maxillary teeth, single complete maxillary denture to oppose natural Mandibular teeth to oppose a partially edentulous Mandibular arch with fixed prosthesis, partially edentulous Mandibular arch with removable partial dentures. Opposing existing complete dentures, preservation of the residual alveolar ridge, necessity for retaining maxillary teeth and preventing mental trauma.
- **Art of communication in the management of the edentulous predicament** – Communication–scope, a model of communication, why communication is important? What are the elements of effective communication? special significance of doctor / patient communication, doctor behavior, The iatro sedative (doctor & act of making calm) recognizing and acknowledging the problem, exploring and identifying the problem, interpreting and explaining the problem, offering a solution to the problem for mobilizing their resources to operate in a most efficient way, recognizing and acknowledging the problem, interpreting and explaining the problem, offering a solution to the problem.
- **Materials prescribed in the management of edentulous patients** - Denture base materials, General requirements of biomaterials for edentulous patients, requirement of an ideal denture base, chemical composition of denture base resins, materials used in the fabrication of prosthetic denture teeth, requirement of prosthetic denture teeth, denture lining materials and tissue conditioners, cast metal alloys as denture bases-base metal alloys.
- **Articulators** – Evolution of concepts, Classification, selection, limitations, precision, accuracy and sensitivity, and Functions of the articulator and their uses. Recent advancements including virtual articulator
- **Fabrication of complete dentures** –complete denture impressions–muscles of facial expressions and anatomical landmarks, support, retention, stability, aims and objectives of preservation, support, stability, aesthetics, and retention. Impression materials and techniques – need of 2 impressions the preliminary impression and final impressions.
  - Developing an analogue / substitute for the maxillary denture bearing area – anatomy of supporting structures – mucous membrane, hard palate, residual ridge, shape of the supporting structure and factors that influence the form and size of the supporting bones, incisive foramen, maxillary tuberosity, sharp



spiny process, torus palatinus, Anatomy of peripheral or limiting structures, labial vestibule, Buccal vestibule, vibrating lines. Preliminary and final impressions, impression making, custom tray and refining the custom tray, preparing the tray to secure the final impression, making the final impression, boxing impression and making the casts.

- Developing an analogue / substitute for the Mandibular denture bearing area anatomy of supporting structure, crest of the residual ridge, buccal shelf, shape of supporting structure, mylohyoid ridge, mental foramen, genial tubercles, torus mandibularis, Anatomy of peripheral or limiting structure – labial vestibule, Buccal vestibule, lingual border, mylohyoid muscle, retromylohyoid fossa, sublingual gland region, alveolingual sulcus, Mandibular impressions – preliminary impressions, custom tray, refining, preparing the tray\, final impressions.

- **Mandibular movements, Maxillo-mandibular relations and concepts of occlusion-** Gnathology, identification of shape and location of arch form–Mandibular and maxillary occlusion rims, level of occlusal plane and recording of trail denture base, tests to determine vertical dimension of occlusion, interocclusal & centric relation records. Biological and clinical considerations in making jaw relation records and transferring records from the patients to the articulator, Recording of Mandibular movements – influence of opposing tooth contacts, temporomandibular joint, muscular involvements, neuromuscular regulation of Mandibular motion, the envelope of motion, rest position.
  - Maxillo-Mandibular relations – the centric, eccentric, physiologic rest position, vertical dimension, occlusion, recording methods – mechanical, physiological, Determining the horizontal jaw relation – Functional graphics, tactile or interocclusal check record method, Orientation / sagittal relation records, Arbitrary/ Hinge axis and face bow record, significance and requirement, principles and biological considerations and securing on articulators.
- **Selecting and arranging artificial teeth and occlusion for the edentulous patient –** anterior tooth selection, posterior tooth selection, and principles in arrangement of teeth, and factors governing the position of teeth – horizontal & vertical relations. The inclinations and arrangement of teeth for aesthetics, phonetics and mechanics – to concept of occlusion.
- **The Try in** –verifying vertical dimension, centric relation, establishment of posterior palatal seal, creating a facial and functional harmony with anterior teeth, harmony of spaces of individual teeth position, harmony with sex, personality and age of the patient, co-relating aesthetics and incisal guidance.
- **Speech considerations with complete dentures & speech production** –structural and functional demands, neuropsychological background, speech production and the roll of teeth and other oral structures – bilabial sounds, labiodental(s) sounds, linguodental sounds, linguoalveolar sound, articulatory characteristics, acoustic characteristics, auditory characteristics, linguopalatal and linguoalveolar sounds, speech analysis and prosthetic considerations.
- **Waxing contouring and processing the dentures their fit and insertion and after**

**care** –laboratory procedure–wax contouring, flasking and processing, laboratory remount procedures, selective grinding, finishing and polishing. Critiquing the finished prosthesis – doctors’ evaluation, patients’ evaluation, friends evaluation, elimination of basal surface errors, errors in occlusion, interocclusal records for remounting procedures – verifying centric relation, eliminating occlusal errors. Special instructions to the patient – appearance with new denture, mastication with new dentures, speaking with new dentures, oral hygiene with dentures, preservation of residual ridges and educational material for patients, maintaining the comfort and health of the oral cavity in the rehabilitated edentulous patients. Twenty-four hours oral examination and treatment and (preventive) Prosthodontic – periodontic recall for oral examination 3 to 4 months intervals and yearly intervals.

- **Implant supported Prosthesis for partially edentulous patients** –Science of Osseo integration, clinical protocol (diagnostic, surgical and prosthetic) for treatment with implant supported over dentures, managing problems and complications. Implant Prosthodontics for edentulous patients: current and future directions.
  - Implant supported prosthesis for partially edentulous patients – Clinical and laboratory protocol: Implant supported prosthesis, managing problems and complications.
  - Introduction and Historical Review, Biological, clinical and surgical aspects of oral implants, Diagnosis and treatment planning, Radiological interpretation for selection of fixtures. Splints for guidance fort surgical placement of fixtures. Surgical and Intra oral plastic surgery, if any Guided bone and Tissue regeneration consideration for implants fixture. Implant supported prosthesis for complete edentulism and partial edentulism. Occlusion for implant supported prosthesis. Peri-implant tissue and Management of peri-implantitis. Maintenance and after care. Management of failed restoration. Work authorization for implant supported prosthesis – definitive instructions, legal aspects, delineation of responsibility.

### **Prosthodontic Treatment for Partially Edentulous Patients – Removable Partial Prosthodontics –**

- **Scope, definition and terminology**, Classification of partially edentulous arches - requirements of an acceptable method of classification, Kennedy’s classification, Applegate’s rules for applying the Kennedy classification.
- **Components of RPD –**
  - i) major connector–mandibular and maxillary
  - ii) minor connectors, design, functions & form and location of major and minor connectors, tissue stops, finishing lines, reaction of tissue to metallic coverage
  - iii) Rest and rest seats – form of the Occlusal rest and rest seat, interproximal, Occlusal rest seats, internal Occlusal rests, possible movements of partial dentures, support for rests, lingual rests on canines and incisor teeth, incisal rest and rest seat.
  - iv) Direct retainers- Internal attachments & extracoronal direct retainers. Relative uniformity of retention, flexibility of clasp arms, stabilizing reciprocal clasp, criteria for selecting a given clasp design, the basic principles of clasp design, circumferential clasp, bar clasp, combination clasp and other type of retainers.
  - v) Indirect Retainers – denture rotation about an axis, factors influencing effectiveness of indirect retainers, forms of indirect retainers, auxiliary Occlusal rest, canine

extensions from Occlusal rests, canine rests, continuous bar retainers and linguoplasts, modification areas, rugae support, direct – indirect retention.

(vi) Teeth and denture bases – types, materials, advantages and dis-advantages, indications and contraindications and clinical use.

- **Principles of removable partial Denture design** – Bio mechanical considerations, and the factors influencing after mouth preparations – Occlusal relationship of remaining teeth, orientation of Occlusal plane, available space for restoration, arch integrity, tooth morphology, response of oral structure to previous stress, periodontal conditions, abutment support, tooth supported and tooth and tissue supported, need for indirect retention, clasp design, need for rebasing, secondary impression, need for abutment tooth modification, type of major connector, type of teeth selection, patients past experience, method of replacing single teeth or missing anterior teeth.
- Difference between tooth supported and tissue supported partial dentures. Essentials of partial denture design, components of partial denture design, tooth support, tissue support, stabilizing components, guiding planes, use of splint bar for denture support, internal clip attachments, overlay abutment as support for a denture base, use of a component partially to gain support.
- Education of patient
- Diagnosis and treatment planning.
- Design, treatment sequencing and mouth preparation
- **Surveying** –Description of dental surveyor, purposes of surveying, Aims and objectives in surveying of diagnostic cast and master cast, Final path of insertion, factors that determine path of insertion and removal, recording relation of cast to surveyor, measuring amount of retentive area Blocking of master cast – paralleled blockout, shaped blockout, arbitrary blockout and relief.
- **Diagnosis and treatment planning** –Infection control and cross infection barriers – clinical and laboratory and hospital waste management, Objectives of prosthodontic treatment, Records, systemic evaluation, Oral examination, preparation of diagnostic cast, interpretation of examination data, radiographic interpretation, periodontal considerations, caries activity, prospective surgical preparation, endodontic treatment, analysis of occlusal factors, fixed restorations, orthodontic treatment, need for determining the design of components, impression procedures and occlusion, need for reshaping remaining teeth, reduction of unfavorable tooth contours, differential diagnosis : fixed or removable partial dentures, choice between complete denture and removable partial dentures, choice of materials.
- **Preparation of Mouth for removable partial dentures** –Oral surgical preparation, conditioning of abused and irritated tissues, periodontal preparation – objectives of periodontal therapy, periodontal diagnosis, control therapy, periodontal surgery.
- **Preparation of Abutment teeth** – Classification of abutment teeth, sequence of abutment preparations on sound enamel or existing restorations, conservative

restorations using crowns, splinting abutment teeth, utilization, temporary crowns to be used as abutment.

- **Impression Materials and Procedures for Removable Partial Dentures** –Rigid materials, thermoplastic materials, Elastic materials, Impressions of the partially edentulous arch, Tooth supported, tooth tissue supported, Individual impression trays.
- **Support for the Distal Extension Denture Base** –Distal extension removable partial denture, Factors influencing the support of distal extension base, Methods of obtaining functional support for the distal extension base.
- **Laboratory Procedures** –Duplicating a stone cast, Waxing the partial denture framework, Anatomic replica patterns, Spruing, investing, burnout, casting and finishing of the partial denture framework, making record bases, occlusion rims, making a stone occlusal template from a functional occlusal record, arranging posterior teeth to an opposing cast or template, arrangement of anterior teeth, waxing and investing the partial denture before processing acrylic resin bases, processing the denture, remounting and occlusal correction to an occlusal template, polishing the denture.
- **Initial placement, adjustment and servicing of the removable partial denture**–adjustments to bearing surfaces of denture framework, adjustment of occlusion in harmony with natural and artificial dentition, instructions to the patient, follow – up services
- Relining and Rebased the removable partial denture –Relining tooth supported dentures bases, relining distal extension denture bases, methods of reestablishing occlusion on a relined partial denture.
- **Repairs and additions to removable partial dentures** –Broken clasp arms, fractured occlusal rests, distortion or breakage of other components – major and minor connectors, loss of a tooth or teeth not involved in the support or retention of the restoration, loss of an abutment tooth necessitating its replacement and making a new direct retainer, other types of repairs & repairs by soldering.
- **Removable partial denture considerations in maxillofacial prosthetics** – Maxillofacial prosthetics, intra oral prosthesis, design considerations, maxillary prosthesis, Obturators, speech aids, palatal lifts, palatal augmentations, mandibular prosthesis, treatment planning, framework design, class I resection, Class II resection, mandibular flange prosthesis, jaw relation records.
- **Management of failed restorations and work authorization details.**

### **Maxillofacial Rehabilitation:**

- Scope, terminology, definitions, cross infection control and hospital waste management, work authorization.
- Behavioral and psychological issues in Head and neck cancer, Psychodynamic

interactions between clinician and patient. Cancer Chemotherapy: Oral Manifestations, Complications, and management, Radiation therapy of head and neck tumors: Oral effects, Dental manifestations and dental treatment:

- Etiology, treatment and rehabilitation (restoration).
- Acquired defects of the mandible, acquired defects of hard palate, soft palate, clinical management of edentulous and partially edentulous maxillectomy patients, Facial defects, Restoration of speech, Velopharyngeal function, cleft lip and palate, cranial implants, maxillofacial trauma, Lip and cheek support prosthesis, Laryngectomy aids.
- Obstructive sleep apnoea, Tongue prosthesis, Oesophageal prosthesis, radiation carriers, Burn stents, Nasal stents, Vaginal and anal stents, Auditory inserts, Trismus appliances, mouth-controlled devices for assisting the handicapped, custom prosthesis, conformers, and orbital prosthesis for ocular and orbital defects. Osseo integrated supported facial and maxillofacial prosthesis. Resin bonding for maxillofacial prosthesis, cranial prosthesis Implant rehabilitation of the mandible compromise by radiotherapy, Prosthodontic treatment, Material and laboratory procedures for maxillofacial prosthesis.

## **Occlusion**

### **Evaluation, Diagnosis And Treatment Of Occlusal Problems:**

- Scope, definition, terminology, optimum oral health, anatomic harmony, functional harmony, occlusal stability, causes of deterioration of dental and oral health.
- Anatomical, physiological, neuro – muscular, psychological considerations of teeth; muscles of mastication; temporomandibular joint; intra oral and extra oral and facial musculatures and the functions of Cranio mandibular system.
- Occlusal therapy, the stomatognathic system, centric relation, vertical dimension, the neutral zone, the occlusal plane, differential diagnosis of temporomandibular disorders, understanding and diagnosing intra articular problems, relating treatment to diagnosis of internal derangements of TMJ, Occlusal splints. Selecting instruments for occlusal diagnosis and treatment, mounting casts, Pankey-Mann-Schuyler philosophy of complete occlusal rehabilitation, long centric, anterior guidance, restoring lower anterior teeth, restoring upper anterior teeth, determining the type of posterior occlusal contours, methods for determining the plane of occlusion, restoring lower posterior teeth, restoring upper posterior teeth, functionally generated path techniques for recording border movements intra orally, occlusal equilibration.
- Bruxism, Procedural steps in restoring occlusion, requirements for occlusal stability, solving occlusal problems through programmed treatment planning, splinting, solving
  - occlusal wear problems, deep overbite problems, anterior overjet problems, anterior open bite problems. Treating – end to end occlusion, splaed anterior teeth, cross bite problems, Crowded, irregular, or interlocking anterior bite. Using Cephalometric for occlusal analysis, solving severe arch malrelationship problems, transcranial radiography, postoperative care of occlusal therapy.

## **Fixed Prosthodontics**

- Scope, definitions and terminology, classification and principles, design, mechanical and biological considerations of components – Retainers, connectors, pontics, work authorization.

- Diagnosis and treatment planning –patients history and interview, patients desires and expectations and needs, systemic and emotional health, clinical examinations – head and neck, oral – teeth, occlusal and periodontal, Preparation of diagnostic cast, radiographic interpretation, Aesthetics, endodontics considerations, abutment selection – bone support, root proximities and inclinations, selection of abutments for cantilever, pier abutments, splinting, available tooth structures and crown morphology, TMJ and muscles of mastication and comprehensive planning and prognosis.
- Management of Carious teeth –caries in aged population, caries control, removal caries, protection of pulp, reconstruction measure for compromised teeth – retentive pins, horizontal slots, retentive grooves, prevention of caries, diet, prevention of root caries and vaccine for caries.
- Periodontal considerations –attachment units, ligaments, prevention of gingivitis, periodontitis. Microbiological aspect of periodontal diseases, marginal lesion, occlusal trauma, periodontal pockets in attached gingiva, interdental papilla, gingival embrasures, gingival/periodontal prosthesis, radiographic interpretations of Periodontia, intraoral, periodontal splinting – Fixed prosthodontics with periodontally compromised dentitions, placement of margin restorations.
- **Biomechanical principles of tooth preparation** –individual tooth preparations - Complete metal Crowns – P.F.C., All porcelain – Cerestore crowns, dicor crowns, inceram etc. porcelain jacket crowns; partial 3/4, 7/8, telescopic, pin– ledge, laminates, inlays, onlays. Preparations for restoration of teeth– amalgam, glass Ionomer and composite resins. Resin bond retainers, Gingival marginal preparations – Design, material selection, and biological and mechanical considerations – intracoronar retainer and precision attachments – custom made and prefabricated.
- **Isolation and fluid control** – Rubber dam application(s), tissue dilation–soft tissue management for cast restoration, impression materials and techniques, provisional restorations, interocclusal records, laboratory support for fixed Prosthodontics, Occlusion, Occlusal equilibration, articulators, recording and transferring of occlusal relations, cementing of restorations.
- **Resins, Gold and gold alloys, glass Ionomer, restorations.**
- **Restoration of endodontically treated teeth, Stomatognathic Dysfunction and management**
- **Management of failed restorations**
- **Osseo integrated supported fixed Prosthodontics –Osseo integrated supported and tooth supported fixed Prosthodontics**
- **CAD – CAM Prosthodontics**

### **TMJ – Temporomandibular Joint Dysfunction – Scope, Definitions and Terminology**

- Temporomandibular joint and its function, Orofacial pain, and pain from the temporomandibular joint region, temporomandibular joint dysfunction, temporomandibular joint sounds, temporomandibular joint disorders, Anatomy related, trauma, disc displacement, Osteoarthritis/Osteoarthritis, Hyper mobility and dislocation, infectious arthritis, inflammatory diseases, Eagle's syndrome (Styloid – stylohyoid syndrome), Synovial chondromatosis, Osteochondrosis disease, Osteonecrosis, Nerve entrapment process, Growth changes, Tumors, Radiographic imaging.
- Etiology, diagnosis and cranio mandibular pain, differential diagnosis and management of orofacial pain – pain from teeth, pulp, dentin, muscle pain, TMJ pain – psychologic, physiologic – endogenous control, acupuncture analgesia, Placebo effects on analgesia, Trigeminal neuralgia, Temporal arteritis
- **Occlusal splint therapy** – construction and fitting of occlusal splints, management of occlusal splints, therapeutic effects of occlusal splints, occlusal splints and general muscles performance, TMJ joint unloading and anterior repositioning appliances, use and care of occlusal splints.
- **Occlusal adjustment procedures** – Reversible – occlusal stabilization splints and physical therapies, jaw exercises, jaw manipulation and other physiotherapy or irreversible therapy – occlusal repositioning appliances, orthodontic treatment, Orthognathic surgery, fixed and removable prosthodontic treatment and occlusal
  - adjustment, removable prosthodontic treatment and occlusal adjustment. Indication
  - for occlusal adjustment, special nature of orofacial pain, Psychopathological
  - considerations, occlusal adjustment philosophies, mandibular position, excursive
  - guidance, occlusal contact scheme, goals of occlusal adjustment, significance of a
  - slide in centric, Preclinical procedures, clinical procedures for occlusal adjustment.

## **Esthetics**

- **Scope, Definitions:** Morpho psychology and esthetics, structural esthetic rules –facial components, dental components, gingival components and physical components. Esthetics and its relationship to function – Crown morphology, physiology of occlusion, mastication, occlusal loading and clinical aspect in bio esthetic aspects, Physical and physiologic characteristic and muscular activities of facial muscle, perioral anatomy and muscle retaining exercises Smile – classification and smile components, smile design, esthetic restoration of smile, Esthetic management of the dentogingival unit, intraoral materials for management of gingival contours, and ridge contours, Periodontal esthetics, Restorations – Tooth colored restorative materials, the clinical and laboratory aspects, marginal fit, anatomy, inclinations, form, size, shape, color, embrasures & contact point.
- Prosthodontic treatment should be practiced by developing skills, by treating various and a greater number of patients to establish skill to diagnose and treatment and after care with bio-mechanical, biological, bio-esthetics, bio-phonetics. All treatments should be carried out in more numbers for developing clinical skills.
- Infection control, cross infection barrier – clinical & lab ; hospital & lab waste management

**Teaching / Learning Activities** The post graduate is expected to complete the following at the end of:

### **I Year M.D.S.**

- Theoretical exposure of all applied sciences.
- Pre-clinical exercises involved in prosthodontic therapy for assessment.
- Commencement of library assignment within six months.
- To carry out short epidemiological study relevant to prosthodontics.
- Acquaintance with books, journals and referrals.
- To differentiate various types of articles published in and critically appraise based on standard reference guidelines.
- To develop the ability to gather evidence from published articles.
- To acquire knowledge of published books, journals and websites for the purpose of gaining knowledge and reference – in the field of Oral and Maxillofacial Prosthodontics and Implantology.
- Acquire knowledge of instruments, equipment, and research tools in Prosthodontics.
- To acquire knowledge of Dental Material Science – Biological and biomechanical & bio-esthetics, knowledge of using material in laboratory and clinics including testing methods for dental materials.
- Submit a protocol for their dissertation before Institutional Review Board and Institutional Ethics Committee.
- Participation and presentation in seminars, didactic lectures.

### **II Year M.D.S.**

- Acquiring confidence in obtaining various phases and techniques in removable and fixed prosthodontics therapy.
- Acquiring confidence by clinical practice with sufficient number of patients requiring tooth and tooth surface restorations.
- Fabrication of adequate number of complete denture prosthesis following, higher clinical approach by utilizing semi-adjustable articulators, face bow and graphic tracing.
- Understanding the use of dental surveyor and its application in diagnosis and treatment plan in R.P.D.
- Adequate number of R.P.D's covering all partially edentulous situations.
- Adequate number of Crowns, Inlays, laminates, FDP (fixed dental prosthesis) covering all clinical situations.
- Selection of cases and following principles in treatment of partially or complete edentulous patients by implant supported prosthesis.
- Treating single edentulous arch situations by implant supported prosthesis.
- Diagnosis and treatment planning for implant prosthesis.
- Ist stage and IInd stage implant surgery
- Understanding the maxillofacial Prosthodontics, treating craniofacial and management of orofacial defects
- Prosthetic management of TMJ syndrome
- Occlusal rehabilitation
- Management of failed restorations.
- Prosthodontic management of patient with psychogenic disorder.



- Practice of child and geriatric prosthodontics.
- Participation and presentation in seminars, didactic and non-didactic Teaching and Training students.

### **III Year M.D.S**

- Clinical and laboratory practice continued from IIInd year.
- Occlusion equilibration procedures – fabrication of stabilizing splint for parafunctional disorders, occlusal disorders and TMJ functions.
- Practice of dental, oral and facial esthetics
- The clinical practice of all aspects of Prosthodontic therapy for elderly patients.
- Implants Prosthodontics – Rehabilitation of Partial Edentulism, Complete edentulism and craniofacial rehabilitation.
- Failures in all aspects of Prosthodontics and their management and after care.
- Team management for esthetics, TMJ syndrome and Maxillofacial & Craniofacial Prosthodontics
- Management of Prosthodontic emergencies, resuscitation.
- Candidate should complete the course by attending a large number and variety of patients to master the prosthodontic therapy. This includes the practice management, examinations, treatment planning, communication with patients, clinical and laboratory techniques materials and instrumentation required in different aspects of prosthodontic therapy, Tooth and Tooth surface restoration, Restoration of root treated teeth, splints for periodontal rehabilitations and fractured jaws, complete dentures, R.P.D's, F.D.P's,
- Immediate dentures, over dentures, implant supported prosthesis, maxillofacial and body prosthesis, occlusal rehabilitation.
- Prosthetic management of TMJ syndrome
- Management of failed restorations
- Should complete and submit Main Dissertation assignment 6 months prior to examination.
- Candidates should acquire complete theoretical and clinical knowledge through seminars, symposium, workshops and reading.
- Participation and presentation in seminars, didactic lectures.

### **The Bench Work Should Be Completed Before The Start Of Clinical Work During The first year of the MDS Course**

#### I. Complete dentures

##### 1. Arrangements on adjustable articulator for

- Class I
- Class II
- Class III

##### 2. Various face bow transfers to adjustable articulators

##### 3. Processing of characterized anatomical dentures

#### II. Removable partial dentures

## 1. Design for Kennedy's Classification

(Survey, block out and design)

- a. Class I
- b. Class II
- c. Class III
- d. Class IV

## 2. Designing of various components of RPD

### 3. Wax pattern on refractory cast

- a. Class I
- b. Class II
- c. Class III
- d. Class IV

## 4. Casting and finishing of metal frameworks

### 5. Acrylisation on metal frameworks for

Class I

Class III with modification

## III. Fixed Partial Denture

### 1. Preparations on ivory teeth / natural teeth

- FVC for metal
- FVC for ceramic
- Porcelain jacket crown
- Acrylic jacket crown
- PFM crown
- 3/4th (canine, premolar and central)
- 7/8th posterior
- Proximal half crown
- Inlay – Class I, II, V
- Onlay – Pin ledged, pinhole
- Laminates

### 2. Preparation of different die systems

### 3. Fabrication of wax patterns by drop wax build up technique

- Wax in increments to produce wax coping over dies of tooth preparations on substructures
- Wax additive technique
- 3-unit wax pattern (maxillary and Mandibular)
- Full mouth

### 4. Pontic designs in wax pattern

- Ridge lap
- Sanitary
- Modified ridge lap
- Modified sanitary
- Spheroidal or conical

### 5. Fabrication of metal frameworks

- Full metal bridge for posterior (3 units)
- Coping for anterior (3 unit)
- Full metal with acrylic facing
- Full metal with ceramic facing
- Adhesive bridge for anteriors
- Coping for metal margin ceramic crown
- Pin ledge crown

### 6. Fabrication of crowns

- All ceramic crowns with characterisation
- Metal ceramic crowns with characterisation
- Full metal crown
- Precious metal crown
- Post and core

### 7. Laminates

- Composites with characterisation
- Ceramic with characterisation

- Acrylic

## 8. Preparation for composites

- Laminates
- Crown
- Inlay
- Onlay
- Class I
- Class II
- Class III
- Class IV
- Fractured anterior tooth

## IV. Maxillofacial prosthesis

- Eye, Ear
- Nose
- Face
- Body defects
  - o Cranial
  - o Maxillectomy
  - o Hemimandibulectomy
  - o Finger prosthesis
  - o Guiding flange
  - o Obturator

## V. Implant supported prosthesis

1. Step by step procedures –Surgical and laboratory phase

## VI. Other exercises

1. TMJ splints – stabilization appliances, maxillary and Mandibular repositioning appliances
2. Anterior disocclusion appliances

3. Chrome cobalt and acrylic resin stabilization appliances
4. Modification in accommodation of irregularities in dentures
5. Occlusal splints
6. Periodontal splints
7. Precision attachments – custom made
8. Over denture coping
9. Full mouth rehabilitation (by drop wax technique, ceramic build up)
10. TMJ appliances – stabilization appliances

**Scheme of Examination:**

**A. Theory:** Part-I : Basic Sciences Paper - 100 Marks

Part-II : Paper-I, Paper-II & Paper-III - 300 Marks

(100 Marks for each Paper)

Written examination shall consist of Basic Sciences Paper (Part-I) of three hours duration and should be conducted at the end of First year of MDS course. Part 1 examination consists of two essays of 25 marks each and 10 short answers of 5 marks each. Part-II Examination will be conducted at the end of Third year of MDS course. Part-II Examination will consist of Paper-I, Paper-II & Paper-III, each of three hours duration. Paper-I , Paper-II and Paper III shall consist of two long answer questions carrying 25 marks each and five questions carrying 10 marks each. Distribution of topics for each paper will be as follows:

Part-I :

Applied Basic Sciences: Applied Anatomy, Nutrition & Biochemistry, Pathology & Microbiology, virology, Applied Dental anatomy & histology, Oral pathology & oral Microbiology, Adult and geriatric psychology. Applied dental materials.

Part-II

Paper-I : Removable Prosthodontics and Implant supported prosthesis (Implantology), Geriatric dentistry and Cranio facial Prosthodontics

Paper-II : Fixed Prosthodontics, Occlusion, TMJ and esthetics.

Paper-III : Essays (descriptive and analyzing type questions)

\*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

## **A. Practical / Clinical Examination : 200 Marks**

### 1. Presentation of treated patients and records during their 3 years Training period 35 Marks

- a. C.D. 1 mark
- b. R. P.D. 2 marks
- c. F.P.D. including single tooth and surface restoration 2 marks
- d. I.S.P. 5 marks
- e. Occlusal rehabilitation 5 marks
- f. T.M.J. 5 marks
- g. Maxillofacial Prosthesis 5 marks
- h. Pre-Clinic Exercises 10 marks

### 2. Presentation of Clinical Exam CD patient's prosthesis including insertion 75 Marks

1. Discussion on treatment plan and patient review 10 marks
2. Tentative jaw relation records 5 marks
3. Face Bow – transfer 5 marks
4. Transferring it on articulators 5 marks
5. Extra oral tracing and securing centric protrusive/lateral, record 15 Marks
6. Transferring records on articulator and programming. 5 marks
7. Selection of teeth 5 marks
8. Arrangement of teeth 10 marks
9. Waxed up denture trial 10 marks
10. Check of Fit, insertion and instruction of previously processed characterised, anatomic complete denture Prosthesis. 5 marks

## **All Steps Will Include Chairside, Lab and Viva Voce**

### 3. Fixed Partial Denture 35 Marks

- a. Case discussion including treatment planning and selection of patient for F.P.D. 5 Marks
- b. Abutment preparation isolation and fluid control 15 marks
- c. Gingival retraction and impressions (conventional/ CAD CAM impressions) 10 marks
- d. Cementation of provisional restoration 5 marks

### 4. Removable Partial Denture 25 Marks

- a. Surveying and designing of partial dentate cast. 5 marks
- b. Discussion on components and material selection including occlusal schemes. 10 marks

5. Implant supported prosthesis (2nd stage- protocol) 30 marks

- a. Case discussion including treatment planning and selection of patient for ISP 10 marks
- b. II stage preparation, Abutment selection, placement, evaluation 10 marks
- c. Implant impression and making of cast 10 marks

**B. Viva Voce : 100 Marks**

I. Viva-Voce examination: 80 marks

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expressions, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

II. Pedagogy 20 marks

**Reference books:**

1. Rangarajan V, Padmanabhan TV. Textbook of Prosthodontics- 2<sup>nd</sup> edition Book. Elsevier Health Sciences; 2017 Jul 18.
2. Misch CE. Dental implant prosthetics-4<sup>th</sup> edition. Elsevier Health Sciences; 2004 Sep 20.
3. Misch CE, Resnik R. Misch's avoiding complications in oral implantology. Elsevier Health Sciences; 2017 Mar 24.
4. Aggarwal S. Textbook of prosthodontics. Astrocyte. 2014 Apr 1;1(2):161-.
5. Lakshmi S. Preclinical Manual of Prosthodontics-E Book. Elsevier Health Sciences; 2018 May 25.
6. Rahn AO, Ivanhoe JR, Plummer KD. Textbook of complete dentures. PMPH-USA; 2009.
7. Boucher CO, Hickey JC, Zarb GA. Prosthodontic treatment for edentulous patients. St. Louis: CV Mosby Company; 1975.
8. Winkler S, editor. Essentials of complete denture prosthodontics. Year Book Medical Pub; 1988.
9. Carr AB, Brown DT. McCracken's removable partial prosthodontics-e-book. Elsevier Health Sciences; 2010 Jun 22.
10. Stratton RJ, Wiebelt FJ. An atlas of removable partial denture design. Chicago: Quintessence Publishing Company; 1988 Jan.
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