MAEER'S
MAHARASHTRA INSTITUTE OF DENTAL SCISCIENCES & RESEARCH (DENTAL COLLEGE)

Address: Vishwnath Puram,
Ambajogai Road
Latur.413531 (Maharashtra)

Tel. (02382) 228063, 227703,
227444, fax : (02382) 228063

Email:
principal@mitmidsr.edu.in
midsr.latur@gmail.com
Website: www.mitmidsr

2.6.3 Programme - Specific Learning Outcomes

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INDEX

Principal
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1. DEPARTMENT OF PERIODONTOLOGY
PROGRAMME-SPECIFIC LEARNING OUTCOME FOR POSTGRADUATES

COURSE CONTENTS:

PART-I:

APPLIED BASIC SCIENCES

APPLIED ANATOMY:

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

PHYSIOLOGY:

1. Blood
2. Respiratory system – knowledge of the respiratory diseases which are a cause of periodontal diseases (periodontal Medicine)
3. Cardiovascular system
    - Blood pressure
    - Normal ECG
    - Shock
4. Endocrinology – hormonal influences on Periodontium
5. Gastrointestinal system

c. Hormones – Actions and regulations, role in periodontal disease

d. Family planning methods

6. Nervous system
7. Hemostasis

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BIOCHEMISTRY:

1. Basics of carbohydrates, lipids, proteins, vitamins, enzymes and minerals
2. Diet and nutrition and periodontium
3. Biochemical tests and their significance
4. Calcium and phosphorus

PATHOLOGY:

1. Cell structure and metabolism
2. Inflammation and repair, necrosis and degeneration
3. Immunity and hypersensitivity
4. Circulatory disturbances – edema, hemorrhage, shock, thrombosis, embolism, infarction and hypertension
5. Disturbances of nutrition
6. Diabetes mellitus
7. Cellular growth and differentiation, regulation
8. Lab investigations
9. Blood

MICROBIOLOGY:

1. General bacteriology
    - Identification of bacteria
    - Culture media and methods
    - Sterilization and disinfection
2. Immunology and Infection
3. Systemic bacteriology with special emphasis on oral microbiology – staphylococci, genus actinomyces and other filamentous bacteria and actinobacillus actinomycetum comitans
4. Virology

a. General properties of viruses

b. Herpes, Hepatitis, virus, HIV virus

5. Mycology

a. Candidiasis

6. Applied microbiology
7. Diagnostic microbiology and immunology, hospital infections and management

PHARMACOLOGY:

1. General pharmacology
    - Definitions – Pharmacokinetics with clinical applications, routes of administration including local drug
    - General anesthetics
    - Antipsychotics

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- Antidepressants
- Anxiolytic drugs
- Sedatives
- Antiepileptics
- Antihypertensives
- Antianginal drugs
- Diuretics
- Hormones
- Pre-anesthetic medications
- delivery in Periodontics
- Adverse drug reactions and drug interactions

2. Detailed pharmacology of
3. Brief pharmacology, dental use and adverse effects of
4. Drugs used in Bronchial asthma, cough
5. Drug therapy of
   - Emergencies
   - Seizures
   - Anaphylaxis
   - Bleeding
   - Shock
   - Diabetic ketoacidosis
   - Acute addisonian crisis
6. Dental Pharmacology
   - Antiseptics
   - Astringents
   - Sialogogues
   - Disclosing agents
   - Antiplaque agents
7. Fluoride pharmacology

BIOSTATISTICS:

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

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PART II

PAPER 1

ETIOPATHOGENESIS:

1. Classification of periodontal diseases and conditions
2. Epidemiology of gingival and periodontal diseases
3. Defense mechanisms of gingival
4. Periodontal microbiology
5. Basic concepts of inflammation and immunity
6. Microbial interactions with the host in periodontal diseases
7. Pathogenesis of plaque associated periodontal diseases
8. Dental calculus
9. Role of iatrogenic and other local factors
10. Genetic factors associated with periodontal diseases
11. Influence of systemic diseases and disorders of the periodontium
12. Role of environmental factors in the etiology of periodontal disease
13. Stress and periodontal diseases
14. Occlusion and periodontal diseases
15. Smoking and tobacco in the etiology of periodontal diseases
16. AIDS and periodontium
17. Periodontal medicine
18. Dentinal hypersensitivity

CLINICAL AND THERAPEUTIC PERIODONTOLOGY AND ORAL IMPLANTOLOGY

Please note:

Clinical periodontology includes gingival diseases, periodontal diseases, periodontal instrumentation, diagnosis, prognosis and treatment of periodontal diseases.

(i) GINGIVAL DISEASES

1. Gingival inflammation
2. Clinical features of gingivitis
3. Gingival enlargement
4. Acute gingival infections
5. Desquamative gingivitis and oral mucous membrane diseases
6. Gingival diseases in the childhood

(ii) PERIODONTAL DISEASES

1. Periodontal pocket

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2. Bone loss and patterns of bone destruction
3. Periodontal response to external forces
4. Masticatory system disorders
5. Chronic periodontitis
6. Aggressive periodontitis
7. Necrotising ulcerative periodontitis
8. Interdisciplinary approaches
   - Orthodontic
   - Endodontic

(iii) TREATMENT OF PERIODONTAL DISEASES

A. History, examination, diagnosis, prognosis and treatment planning

1. Clinical diagnosis
2. Radiographic and other aids in the diagnosis of periodontal diseases
3. Advanced diagnostic techniques
4. Risk assessment
5. Determination of prognosis
6. Treatment plan
7. Rationale for periodontal treatment
8. General principles of anti-infective therapy with special emphasis on infection control in periodontal practice
9. Halitosis and its treatment
10. Bruxism and its treatment

B. Periodontal instrumentation

1. Periodontal Instruments
2. Principles of periodontal instrumentation

C. Periodontal therapy

1. Preparation of tooth surface
2. Plaque control
3. Antimicrobial and other drugs used in periodontal therapy and wasting diseases of teeth
4. Periodontal management of HIV infected patients
5. Occlusal evaluation and therapy in the management of periodontal diseases
6. Role of orthodontics as an adjunct to periodontal therapy
7. Special emphasis on precautions and treatment for medically compromised patients
8. Periodontal splints
9. Management of dentinal hypersensitivity

D. Periodontal surgical phase – special emphasis on drug prescription

1. General principles of periodontal surgery

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2. Surgical anatomy of periodontium and related structures
3. Gingival curettage
4. Gingivectomy technique
5. Treatment of gingival enlargements
6. Periodontal flap
7. Osseous surgery (resective and regenerative)
8. Furcation; Problem and its management
9. The periodontic – endodontic continuum
10. Periodontic plastic and esthetic surgery
11. Recent advances in surgical techniques

E. Future directions and controversial questions in periodontal therapy

1. Future directions for infection control
2. Research directions in regenerative therapy
3. Future directions in anti-inflammatory therapy
4. Future directions in measurement of periodontal diseases

F. Periodontal maintenance phase

1. Supportive periodontal treatment
2. Results of periodontal treatment

(iv) ORAL IMPLANTOLOGY

1. Introduction and historical review
2. Biological, clinical and surgical aspects of dental implants
3. Diagnosis and treatment planning
4. Implant surgery
5. Prosthetic aspects of dental implants
6. Diagnosis and treatment of Peri-implant complications
7. Special emphasis on plaque control measures in implant patients
8. Maintenance phase

(v) 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-esthetics, bio-phonetics and all treatment should be carried out in more number for developing clinical skill.

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TEACHING / LEARNING ACTIVITIES:

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

S. No.	Year wise	ACTIVITIES WORKS TO BE DONE
1.	**Module 1 (First year)**	Orientation to the PG program **Pre-clinical work (4 months)** **a. Dental** 1. Practice of incisions and suturing techniques on the typodont models. 2. Fabrication of bite guards and splints. 3. Occlusal adjustment on the casts mounted on the articulator 4. X-ray techniques and interpretation. 5. Local anaesthetic techniques. 6. Identification of Common Periodontal Instruments. 7. To learn science of Periodontal Instruments maintance (Sharpening , Sterlization and Storate) 8. Concept of Biological width a. Typhodont Exercise (i) Class II Filling with Band and Wedge Application (ii) Crown cuttings **b. Medical** 1. Basic diagnostic microbiology and immunology, collection and handling of sample and culture techniques. 2. Introduction to genetics, bioinformatics. 3. Basic understanding of cell biology and immunological diseases. **Clinical work** 1. Applied periodontal indices 10 cases 2. Scaling and root planning: with Proper written history a. Manual 20 Cases b. Ultrasonic 20 Cases 3. Observation / assessment of all periodontal procedures including implants
2.	**Module 2 (First year)**	1. Interpretation of various bio-chemical investigations. 2. Practical training and handling medical emergencies and basic life support devices. 3. Basic biostatistics – Surveying and data analysis.

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		Clinical 1. Case history and treatment planning 10 cases 2. Root planning 50 cases 3. Observation / assessment of all periodontal procedures including implant. 4. Selection of topic for Library dissertation and submission of Dissertation Synopsis.
3.	**Module 3 (First year)**	Minor surgical cases 20 cases (i) Gingival Depigmentation - 3 Cases (ii) Gingival Curettage - no limits (iii) ENAP - 1 Case (iv) Gingivectomy/ Gingivoplasty - 5 cases (v) Operculectomy - 3 cases Poster Presentation at the Speciality conference
4.	**Module 4 (Second year)**	**Clinical work** 1. Case history and treatment planning - 10 cases 2. Occlusal adjustments - 10 cases 3. Perio splints - 10 cases 4. Local drug delivery techniques - 5 cases 5. Screening cases for dissertation
5.	**Module 5 (Second year)**	1. Periodontal surgical procedures. a. Basic flap procedures - 20 cases 2. Periodontal plastic and esthetic - 10 cases a. Increasing width of attached gingiva - 5 cases b. Root coverage procedures / Papilla Preservation and Reconstruction - 5 cases c. Crown lengthening procedures - 5 cases d. Frenectomy - 5 cases e. Vestibuloplasty - 5 cases 3. Furcation treatment (Hemisection, Rootsection, Tunelling) - 5 cases 4. Surgical closure of diastema - 2 cases
6.	**Module 6 (Second year)**	1. Ridge augmentation procedures - 5 cases 2. Implants Placements and monitoring - 5 cases 3. Sinus lift procedures - 2 cases 4. Case selection, preparation and investigation of implants. 5. Interdisciplinary Periodontics - 2 each (i) Ortho – Perio (ii) Endo – Perio

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		(iii) Restorative Perio (iv) Preprosthetic (v) Crown Prep 6. Osseous Surgery - 2 each (i) Resective (ii) Regenerative 7. 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) 2. Assistance / observation of advanced surgical procedure - 5 each 3. Micro Surgery - 5 each 4. Record maintenance & follow-up of all treated cases including implants. 5. Submission of dissertation – 6 months before completion of III year. 6. Scientific paper presentation at conferences
8.	**Module 8 (Third year)**	1. Refining of surgical skills. 2. Publication of an article in a scientific journal. 3. Preparation for final exams.
9.	**Module 9 (Third year)**	1. Preparation for final exams. 2. University exam

Note: Maintenance of Work Diary / Check list / Log books as prescribed.

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2. DEPARTMENT OF ORAL & MAXILLOFACIAL SURGERY

PROGRAMME-SPECIFIC LEARNING OUTCOME FOR POSTGRADUATES

SR No.	Topic	Learning objectives (Student should know)
1.	Introduction to oral and maxillofacial surgery	Students should know 1.definition 2.scope 3.multidisciplinary team approach
2.	Art of diagnosis	1.history taking
3.	Diagnostic imaging	1.ALARA principle 2.plain conventional radiography 3.MRI 4.USG 5.CT scan
4.	Management of medically compromised patients in oral surgery	1.classification of physical status 2.management of systemic diseases
5.	Armamentarium used in oral and maxillofacial surgery	1.various instruments used in major and minor surgical procedures 2.surgical diathermy 3.cryosurgery
6.	Suturing material and techniques	1.suture materials 2.principle of suture material selection 3.suturing techniques
7.	Asepsis and sterilization	1.definition 2.cleansing of instruments 3.methods of sterilization
8.	Infection control	1.definition 2.routes of transmission
9.	Antimicrobial therapy	Stdents should know 1.classification 2.mechanism of actions
10.	Minor oral surgical procedures	1.principles of oral surgery 2.surgical management of impacted teeth
11.	Introduction to general anesthesia and sedation	1.problems of dental anesthesia
12.	Pre-anesthetic evaluation	1.purpose of preoperative evaluation
13.	Preoperative preparation and	1.Basic plans of preoperative preparations

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	premedication	
14.	Anesthetic equipments	1.anesthesia and resuscitation equipments
15.	Pharmacology of commonly used anesthetic drugs	1.IV induction agents 2.inhalational agents 3.muscle relaxants
16.	Sedation techniques for dentistry	1.definition 2.sedative techniques
17.	Short anesthesia in a dental chair	1.definiton 2.indications 3.maintenance of anesthesia
18.	Tracheal intubation for a patient undergoing oral and maxillofacial surgery	1.indications 2.complications during intubation
19.	Complication of general anesthesia	1.anesthetic complications
20.	Cardiopulmonary resuscitation	1.cardiac arrest 2.CPR technique
21.	Temperomandibular joint: afflictions and management	Students should know 1.TMJ anatomy 2.TMJ disorders 3. surgical approach to TMJ
22.	Amkylosis of TMJ and its management	1.classification of ankylosis 2.etiopathology 3.clinical manifestation 4.management
23.	Myofacial pain dysfunction syndrome	1.etiology 2.symptoms 3.treatment objectives
24.	Orthognathic surgery: diagnosis and treatment planning	1.types of skeletal deformities 2.cephalometric planner
25.	Presurgical orthodontic phase	1.meticulous presurgical orthodontics 2.post-surgical orthodontics
26.	Orthognathic surgery: osteotomy procedures	1.osteotomy procedures 2.total maxillary surgery
27.	Basic principles for management of maxillofacial injuries	1.general care of injured patient 2.softtissue injuries
28.	Injuries of maxillofacial skeleton	1.etiology 2.local clinical examination 3.dental wiring techniques 4.methods of fixation
29.	Fractures of middle third of facial skeleton	1.anatomy 2.classification 3.enophthalmos
30.	Principles of treatment of midfacial fractures	1.methods of reduction 2.treatment of fractures of zygomatic bones

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		3.fractures of nasal bone
31.	Applied surgical anatomy of mandibleand classification of mandibular fractures	1.anatomy of mandible 2.mandibular fractures
32.	Management of mandibular fractures	1.mandibular fracture in children 2.mandibular fracture in adults 3.bone plating
33.	Fractures of condylar process and its management	1.classification 2.diagnostic findings 3.treatment
34.	Preprosthetic surgery	1.alveolar ridge correction 2.alveolar ridge extension 3.alveolar ridge augmentation
35.	Cysts of jaws and oral/facial soft tissue	1.classification 2.treatment modalities
36.	Benign tumours of jaw bones	1.odontogenic tumours 2.non-odontogenic tumours 3.management
37.	Diseases of salivary gland	1.classification 2.salivary gland dysfunction 3.cysts and tumours 4.surgical management
38.	Cleft lip and cleft palate management	1.etiology 2.classification 3.magaement
39.	Maxillary sinus and its implications	1.anatomy 2.clinical examination 3.infections 4.oroantral communication and fistula
40.	Orofacial and neck infections and their management	1.etiology 2.spread of orofacial infections 3.patient evaluation 4.potential spaces and classification 5.life threatening complications
41.	Osteomyelitis and osteoradionecrosis of jaw bones	1.definition 2.etiology 3.classification 4.management
42.	Trigeminal nerve	Function,course and division
43.	Orofacial region pain	1.definition 2.classification
44.	Trigeminal neuralgia and its management	Definition,etiology,management
45.	Sensory disturbances of face and jaws	1.classification of mechanical nerve injuries
46.	Facial nerve and motor disturbances of	1.facial nerve anatomy

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	face and jaw	2.motor disturbances of face and jaws
47.	Oral cancer	1.anatomical subsites of cancer in oral cavity 2.etiology 3.diagnosis and staging 4.management of neck lymph nodes 5.classification of neck dissection
48.	Dental implants	1.implant material 2.classification 3.parts 4.indications and contraindications 5.complications
49.	Hemorrhage and shock: its management in oral surgery	1.hemorrhage 2.shock

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3. DEPARTMENT OF PROSTHODONTICS

PROGRAMME-SPECIFIC LEARNING OUTCOME FOR POSTGRADUATES

GENERAL OBJECTIVE OF THE COURSE

- To have adequate acquired knowledge and understanding of applied basic and systemic medical sciences, both in general and in particularly in head and neck region.
- The postgraduate should able to provide the prosthodontic therapy for patients with competence and working knowledge with understanding applied medical, behavioral and clinical science, that are beyond the treatment skills of the general BDS graduate and MDS graduate for other specialties,
- To demonstrate evaluative and judgment skills in making appropriate decisions regarding prevention treatment after care and referrals to deliver comprehensive care to patients.

SUBJECT KNOWLEDGE

The candidate should possess knowledge of applied basic and systemic medical sciences.

1. On human anatomy, embryology, histology, applied in general and particularly to head and neck, Physiology & Biochemistry, Pathology Microbiology & virology; health and diseases of various systems of the body (systemic) principles in surgery and medicine, pharmacology, nutrition, behavioral science, age changes, genetics, Immunology, Congenital defects & syndromes and Anthropology, Bioengineering, Bio-medical & Biological Principles
2. The student shall acquire knowledge of various Dental Materials used in the specialty and be able to provide appropriate indication, understand the manipulation characteristics, compare with other materials available, be adept with recent advancements of the same
3. Students shall acquire knowledge and practice of history taking, Diagnosis, treatment planning, prognosis, record maintenance of oral, craniofacial and systemic region.
4. Ability for comprehensive rehabilitation concept with pre prosthetic treatment plan including surgical re-evaluation and prosthodontic treatment planning, impressions, jaw relations, utility of face bows, articulators, selection and positioning of teeth, teeth arrangement for retention, stability, esthetics, phonation, psychological comfort, fit and insertion.
5. Instructions for patients in after care and preventive Prosthodontics and management of failed restorations shall be possessed by the students.

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6. Understanding of all the applied aspects of achieving physical, psychological well-being of the patients for control of diseases and / or treatment related syndromes with the patient satisfaction and restoring function.
7. Ability to diagnose and plan treatment for patients requiring Prosthodontic therapy
8. Ability to read and interpret radiographs, and other investigations for the purpose of diagnosis and treatment planning.
9. The theoretical knowledge and clinical practice shall include principles involved for support, retention, stability, esthetics, phonation, mastication, occlusion, behavioral, psychological, preventive and social aspects of Prosthodontics science of Oral and Maxillofacial Prosthodontics and Implantology
10. Tooth and tooth surface restorations, Complete denture Prosthodontics, removable partial denture Prosthodontics, fixed prosthodontics and maxillofacial and Craniofacial Prosthodontics, implants and implant supported Prosthodonties, T.M.J. and occlusion, craniofacial esthetics, and biomaterials, craniofacial disorders, problems of psychogenic origin.
11. Should have knowledge of age changes, geriatric psychology, nutritional considerations and prosthodontic therapy in the aged population.
12. Should have ability to diagnose failed restoration and provide prosthodontic therapy and after care. Should have essential knowledge on ethics, laws, and Jurisprudence and Forensic Odontology in Prosthodontics.
13. Should know general health conditions and emergency as related to prosthodontics treatment like allergy of various materials and first line management of aspiration of prosthesis
14. Should identify social, cultural, economy, environmental, educational and emotional determinants of the patient and consider them in planning the treatment.
15. Should identify cases, which are outside the area of his specialty/competence, refer them to appropriate specialist sand interdisciplinary case management. perform to advice regarding case management
16. Should have an ability to plan and establish Prosthodontics clinic/hospital department and practice management.
17. Should have a sound knowledge (of the applications in pharmacology, effects of drugs on oral tissues and systems of body and in medically compromised patients.

CLINICAL SKILLS

1. The candidate should be able to examine the patients requiring Prosthodontic therapy, investigate the patient systemically, analyze the investigation results, radiographs, diagnose the ailment, plan the treatment, communicate it with the patient and execute it.

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2. To understand the prevalence and prevention of diseases of craniomandibular system related to prosthetic dentistry. The candidate should be able to restore lost functions of stomatognathic system like mastication, speech, appearance and psychological comforts by understanding biological, biomedical, bioengineering principles and systemic conditions, of the patients to provide quality health care in the craniofacial regions.
3. The candidate should be able to demonstrate good interpersonal, communication skills and team approach in interdisciplinary care by interacting with other specialties including medical specialty for planned team management of patients for craniofacial & oral acquired and congenital defects, temporomandibular joint syndromes, esthetics, Implant supported Prosthetics and problems of Psychogenic origins
4. To identify target diseases and create awareness amongst the population regarding Prosthodontic therapy.
5. To perform Clinical and Laboratory procedures with a clear understanding of biomaterials, tissue conditions related to prosthesis and have required dexterity & skill for performing clinical and laboratory all procedures in fixed, removable, implant, maxillofacial, Prosthodontics, TMJ and esthetics
6. To carry out necessary adjunctive procedures to prepare the patient before prosthesis like tissue preparation and preprosthetic surgery and to prepare the patient before prosthesis / prosthetic procedures
7. To understand demographic distribution and target diseases of Cranio mandibular region related to Prosthodontics.

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4. DEPARTMENT OF CONSERVATIVE DENTISTRY AND ENDODONTICS

PROGRAMME-SPECIFIC LEARNING OUTCOME FOR POSTGRADUATES

Sr No	Topic	Outcomes	Learning objectives
1.	Applied Basic Sciences: Applied Anatomy of Head and Neck	muscles of mastication and deglutition Anatomy of permanent teeth	• Development of face, paranasal sinuses and the associated structures and their anomalies, cranial and facial bones, TMJ anatomy and function, arterial and venous drainage of head and neck, muscles of face and neck including muscles of mastication and deglutition, brief consideration of structures and function of brain. Brief consideration of all cranial nerves and autonomic nervous system of head and neck. Salivary glands, Functional anatomy of mastication, deglutition and speech. Detailed anatomy of deciduous and permanent teeth, general consideration in physiology of permanent dentition, form, function, alignment, contact, occlusion. • Internal anatomy of permanent teeth and its significance.
2.	Applied histology	Skin Mucosa Nerves Tongue	histology of skin, oral mucosa, connective tissue, bone, cartilage, blood vessels, lymphatics, nerves, muscles, tongue.
3.	Anatomy and Development of Teeth	Enamel Dentin Pulp	• 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 and clinical considerations. • Pulp – development, histological structures, innervations, functions, regressive changes, clinical considerations. • Dentin and pulp

Principal
M. I. D. S. R. Dental College

Address: Vishwnath Puram, Ambajogai Road Latur.413531 (Maharashtra)
Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

			complex. • Cementum – composition, cementogenesis, structure, function, clinical considerations. • Knowledge of internal anatomy of permanent teeth, anatomy of root apex and its implications in endodontic treatment. • Periodontal ligament – development, structure, function and clinical considerations. • Salivary glands – structure, function, clinical considerations.
4.	Applied Physiology	Deglutition Physiology of saliva Physiology of pain, sympathetic and Para sympathetic nervous system, pain pathways,	• Mastication, deglutition, digestion and assimilation, fluid and electrolyte balance. • Blood composition, volume, function, blood groups, haemostasis, coagulation, bloodtransfusion, circulation, heart, pulse, blood pressure, shock, respiration-control, anoxia,hypoxia, asphyxia, artificial respiration, and endocrinology – general principles ofendocrine activity and disorders relating to pituitary, thyroid, parathyroid, adrenalsincluding 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 andtheir metabolism. Enzymes, vitamins and minerals, metabolism of inorganic elements,detoxification in the body, anti metabolites, chemistry of blood lymph and urine.
5.	Pathology	Developmental disturbances of oral and Para oral structures, dental caries, regressive changes of teeth, pulp, periapical pathology	• Inflammation, repair, degeneration, necrosis and gangrene. • Circulatory disturbances – ischemia, hyperemia, edema, thrombosis, embolism,infarction, allergy and hypersensitivity reaction. • Neoplasms – classifications of tumors,

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M. I. D. S. R. Dental College

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Ambajogai Road
Latur.413531 (Maharashtra)

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227444, fax : (02382) 228063

Email:
principal@mitmidsr.edu.in
midsr.latur@gmail.com
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			characteristics of benign and malignant tumors,spread of tumors. • Blood dyscrasias. • Developmental disturbances of oral and Para oral structures, dental caries, regressivechanges of teeth, pulp, periapical pathology, pulp reaction to dental caries and dentalprocedures. • Bacterial, viral, mycotic infections of the oral cavity
6.	Microbiology	Pathogenesis, host defense, bacterial virulence factors Cross infections Endodontic infections	• Pathways of pulpal infection, oral flora and micro organisms associated with endodonticdiseases, pathogenesis, host defense, bacterial virulence factors, healing, theory of focalinfections, microbes relevance to dentistry – strepto, staphylococci, lactobacilli,cornyebacterium, actinomycetes, clostridium, neisseria, vibrio, bacteriods, fusobacteria,spirochetes, mycobacterium, virus and fungi. • Cross infection, infection control, infection control procedure, sterilization and disinfection. • Immunology – antigen antibody reaction, allergy, hypersensitivity and anaphylaxis, autoimmunity, grafts, viral hepatitis, HIV infections and aids. Identification and isolation ofmicroorganisms from infected root canals. Culture medium and culturing technique(Aerobic and anaerobic interpretation and antibiotic sensitivity test).
7.	Pharmacology	Local and general anesthesia Analgesics and antibiotits	• Dosage and route of administration of drugs, actions and fate of drug in body, drugaddiction, tolerance of hypersensitivity reactions. • Local anesthesia – agents and chemistry, pharmacological actions, fate and metabolismof anaesthetic, ideal properties, techniques and complications. • General anesthesia – pre medications, neuro muscular blocking agents, induction agents,inhalation anesthesia, and agents used, assessment of anesthetic problems in medicallycompromised patients. • Anaesthetic emergencies • Antihistamines, corticosteroids,

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M. I. D. S. R. Dental College
LATUR

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Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

			chemotherapeutic and antibiotics, drug resistance,haemostasis, and haemostatic agents, anticoagulants, sympathomimitic drugs, vitaminsand minerals (A, B, C, D, E, K IRON), anti sialogogue, immunosupressants, druginteractions, antiseptics, disinfectants, anti viral agents, drugs acting on CNS.
8.	Biostatistics	Tests of significance – parametric and non – parametric tests Statistical averages – measures of central tendency, measures of dispersion, Normal distribution.	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 extract test, Sign test, Median test, Mann Whitney test, Kruskal Wallis one way analysis, Friedmann two way analysis, ANOVA, Regression analysis), Correlation and regression,Use of computers.
9.	Research Methodology	Ethics Study designs	• Essential features of a protocol for research in humans • Experimental and non-experimental study designs • Ethical considerations of research
10.	Applied Dental Materials	Dental ceramics Impression materials various restorative materials	• Physical and mechanical properties of dental materials, biocompatibility. • Impression materials, detailed study of various restorative materials, restorative resin andrecentadvances in composite resins, bonding- recent developments, tarnish andcorrosion, dental amalgam, direct filling gold, casting alloys, inlay wax, die materials,investments, casting procedures, defects, dental cements for restoration and pulpprotection (luting, liners, bases) cavity varnishes. • Dental ceramics-recent advances, finishing and polishing materials. • Dental burs – design and mechanics of cutting – other modalities of tooth preparation.Methods of testing biocompatibility of materials used.
11.	Infection control procedures in	Importance of moisture control during operative	a) Light source b) Sterilisation

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M.A.R.S.P. Dental College

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Ambajogai Road
Latur.413531 (Maharashtra)

Tel. (02382) 228063, 227703,
227444, fax : (02382) 228063

Email:
principal@mitmidsr.edu.in
midsr.latur@gmail.com
Website: www.mitmidsr

	conservative dentistry, isolation equipments	procedure Parts of rubber dam Colour coding of rubber dam Drugs used to moisture control	c) Field of operation d) Control of moisture e) Rubber dam in detail f) Cotton rolls g) Anti sialagogues.
12.	Amalgam Restoration	Definition of silver amalgam alloy History Classification Cavity preparation Indications and contraindications	a) Indication b) Contraindication c) Physical and mechanical properties d) clinical behaviour e) Cavity preparation for Class I, II, V and III Step wise procedure for cavity preparation and restoration. f) Failure of amalgam restoration
13.	Pulp Protection	Various pulp capping agents Classiciation and general properties	a) Liners b) Varnishes c) Bases d) Zinc phosphate, zinc polycarboxylate, zinc oxide eugenol and glass ionomer cements
14.	Direct and indirect composite restorations.	texture, anatomic form, occlusion, tooth integrity, lesser sensitivity, gingival bleeding	Introduction Selection of case Advantages Disadvantage
15.	Anterior Restorations	Case and Material selection Various cements available and their classification Bevels and its types Final finishing and polishing of restoration	a) Selection of cases b) Selection of material c) Step wise procedures for using restorations d) Silicate cements e) glass ionomers f) composites, including sandwitch restorations g) Bevels of the same with a note on status of the dentine bonding agents.
16.	Impression procedures used for indirect restorations.	Accurate impressions *record intraoral structures* technique for impression selection of material	*Ideal requirements* *Classification* *Impression materials* Elastomeric materials Hydrocollides Latest adavnces Impression techniques
17.	Recent advances in restorative materials.	Pit and fissure sealent Direct and indirect restorative	Restorative materials Preventive

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		material	Restorative Auxiliary Impression material Investment material
18.	Esthetics including smile design	The art of illusion Process of smile design and analysis Esthetic contouring	Definition Classification Esthetic diagnosis and treatment planning Esthetic sequencing
19.	Recent advances in restoration of endodontically treated teeth and grossly mutilated teeth.	Endocrowns Full crowns Why tooth fracture Post and core Fiber post Cast post Amalgam GIC composite	Status of root filled teeth Vulnerable to tooth loss Factors selecting restorative approach Residual root structure Direct and indirect composite
20.	Hypersensitivity-theories, causes and management.	Methods of measuring hypersensitivity Management of dentin hypersensivity	Definition Etiology Mechanism of dentin sensitivity Theories Clinical consideration
21.	Direct Gold Restorations	Definition Classification History Cavity preparation and restoration	a) Types of direct filling gold b) Indications and limitations of cohesive gold c) Annealing of gold foil d) Cavity preparation and condensation of gold foils
22.	Preventive Measures In Restorative Practice	Plaque control measures Minimal invasive dentistry Various agents used in preventive Dentistry Matrices and wedging	a) Plaque Control b) Pit and fissure sealants c) Dietary measures d) Restorative procedure and periodontal health e) Contact and contour of teeth f) Restorations g) Matrices h) Tooth separation and wedges
23.	Temporisation or Interim Restoration	Introduction Classification Materials used Fabrication	a) Introduction b) Definition c) Materials and classification

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principal@mitmidsr.edu.in
midsr.latur@gmail.com
Website: www.mitmidsr

24.	Pin Amalgam Restoration	Introduction Types of pins Classification Indications and Contraindications	a) Indication b) ContraIndication c) Advantages d) Disadvantages of each types of pins e) methods of placement f) Use of auto matrix g) Failure of pin amalgam restoration.
25.	Management Of Deep Carious Lesions	Introduction Materials used Techniques of restoration	Indirect And Direct Pulp Capping
26.	Management of non-carious lesions.	Types of non carious lesions Materials used for restoration	Tooth Structures Diagnosis and Clinical Management
27.	Hyper Sensitive Dentine And Its Management.	Definition Introduction . Etiology . Agents used for management Preventive measure	a) Introduction b) Etiology c) Agents used for management
28.	Cast Metal Restorations	Introduction History Materials used Classification Methods of fabrication	d) Indications e) Contraindications f) Advantages and disadvantages g) Materials used for same h) Class II and Class I cavity preparation for inlays fabrication of wax pattern **i)** Spurring inverting and casting procedures & casting defects
29.	Die Materials And Preparation Of Dies	Introduction Definition Classification What are the materials used for die fabrication	a. Introduction b. Classification c. Materials used d. Fabrication of dies
30.	Minimal intervention dentistry	• Decreasing the Risk of Further Demineralization and Arresting Active Lesion • Remineralization of Initial Lesions and Reduction in Cariogenic Bacteria • Minimal Intervention of Cavitated Lesions	• Concepts (Given by Tyas et al) • Early Diagnosis • Caries Classification Based on Site and Size of Lesion • Assessment of Caries Risk • Decreasing the Risk of Further Demineralization and Arresting Active Lesion • Remineralization of Initial Lesions and Reduction in Cariogenic Bacteria

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			• Minimal Intervention of Cavitated Lesions • Repair Instead of Replacement of the Restoration • Disease Control • Conclusion
31.	Gingival Tissue Management	Methods of gingival retraction Agents used Indications Importance of biological width	a) Introduction b) Methods of gingival retraction c) Mechnical d) Chemical e) Chemomechanical f) Biological width g) Importance in restorative dentistry
32.	Recent Cavity Modification Amalgam Restoration	Conventional versus modifications in cavity preparation designs	a. Conventional cavity preparation designs b. Modifications in cavity preparation designs
33.	Differences between Amalgam And Inlay Cavity preparation	Amalgam versus inlay cavity preparation	a) Principles for amalgam cavity preparation b) Principle for inlay cavity preparation
34.	Endodontic emergencies and management	Introduction Classification Etiology Management	a) Introduction b) Classification according to various authors c) etiopathogenesis d) Management
35.	Pulp and periapical pathology	Classification Etiopathogenesis	a. Causes b. Types c. treatment
36.	Pathobiology of periapex	Classification etiopathogenesis	a. Acute periapical abscess b. Acute periodontal abscess c. Phoeix abscess d. Chronic alveolar abscess e. Granuloma, cysts f. Condensing osteits g. External resorption

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227444, fax : (02382) 228063

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midsr.latur@gmail.com
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37.	Endodontic instruments and instrumentation – recent developments, detailed description of hand, rotary, sonic, ultra sonic etc.	Root canal instruments Hand instruments Power driven instruments Standardisation color coding Principle of using endodontic instruments	a) Mouth preparation b) Root canal instruments c) Hand instruments d) Power driven instruments e) Standardisation color coding f) Principle of using endodontic instruments g) Sterilisation of root canal instruments and materials rubber dam application.
38.	Access cavity preparation – objectives and principles	Root canals Anomalies of pulp cavities Access cavity preparation of anterior and premolar teeth	a. Root canals b. Apical foramen c. Anomalies of pulp cavities d. Access cavity preparation of anterior and premolar teeth
39.	Working length determination, cleaning and shaping of root canal system and recent developments in techniques of canal preparation.	Principles of canal instrumentation Steps in BMP Straight line access	a) Determination of working length b) Cleaning and shaping of root canals c) Irrigating solution chemical aids to instrumentation
40.	Root canal irrigants and intra canal medicaments	Classification of irrigants Sodium hypochloride CHX irrigant solution	a) Intracanal medicaments b) Poly antibiotic paste c) Grossman's paste d) Mummifying agents. e) Outline of root canal treatment f) Bacteriological examinations g) Culture methods
41.	Problems during cleaning and shaping of root canal spaces	Ledge formation Apical transportation Strip perforation	a) Perforation and its management b) Broken instruments and its management c) Management of single and double curved root canals
42.	Methods of cleaning and shaping	Hand and rotary instruments Apical access Apical patency Techniques of BMP	a) Step back b) Crown down c) Conventional methods

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43.	Obturation materials, techniques and recent advances	Definition History Technique Rationale When is the root canal ready for obturation?	a) Requirements of an ideal root canal filling material b) Obturation methods using gutta percha c) Healing after endodontic treatment d) Failures in endodontics
44.	Root canal sealers.	Definition Classification Ideal requirements Properties Recent advances	a) Ideal properties b) Classification c) Manipulation of root canal sealers
45.	Traumatic injuries and management – endodontic treatment for young permanent teeth	Trauma Classification Management on basis of type of trauma	Management of fractured tooth and root Luxated teeth and its managemen
46.	Endodontic surgeries, recent developments in technique and devices and wound healing.	Introduction Classification . Armamentarium . Incision and drainage	a) Indication b) Contraindications c) Pre operative preparation d) Pre medication surgical instruments and techniques e) Apicectomy f) Retrograde filling g) Post-operative sequale h) Terphination i) Hemisection j) Radiscetomy techniques of tooth reimplantation (both intentional and accidental) k) Endodontic implants
47.	Procedural errors in endodontics and their management.	Instrument seperation Perforation Sodium hypochloride accident	a) Pain b) Instrument seperation c) Perforation d) Sodium hypochloride accident e) Ledge and apical transportation
48.	Lasers in Endodontics.	Introduction Pulp capping Pulpal analgesia disinfection of canal	a) Introduction b) Classification c) Types of laser used in particular procedure

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M. I. D. S. R. Dental College
LATUR

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Ambajogai Road
Latur.413531 (Maharashtra)

Tel. (02382) 228063, 227703,
227444, fax : (02382) 228063

Email:
principal@mitmidsr.edu.in
midsr.latur@gmail.com
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49.	Case selection and treatment planning	• why case selection is essential? • considerations prior to endo treatment factors of case selection • factors associated with teeth • factors associated with patient's health • factors associated with the clinician case difficulty assessment form and guidelines	• considerations prior to endo treatment factors of case selection • factors associated with teeth • factors associated with patient's health • factors associated with the clinician -AAE case difficulty assessment form and guidelines
50.	Diagnostic procedures	Through case history Radiographic diagnosis and special diagnostic approaches	Dental history Medical history Pulp testing Palpation Percussion diagnostic approaches Bite best Test cavity Staining/ Transillumination Radiography
51.	Endoperio interrelationship and management	Primary endo and secondary perio or primary perio and secondary endo lesion Mixed lesions	Introduction • Pathways of Communication • Classification • Symptoms • Investigation • Decision Tree • Case Reports
52.	Multidisciplinary approach to endodontic situations.	Cases with questionable prognosis Need of invention in the present physiologic position of the tooth in arch	Crown lengthing Hemisection Root resection
53.	Radiology and CBCT in endodontic practice.	Role of CBCT Diagnostic accuracy	3D imaging Small field of view Location of pulp space obliteration Extent of periapical pathosis

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54.	Endodontic failures and retreatment.	Causes of RCT failure Armamentarium Role of disinfectants Recent advances for management of failed cases	Introduction • Definition • Etiology • Evaluation • Indications & Contraindications • Treatment planning • Nonsurgical Endodontic Retreatment • Coronal Access Cavity Preparation • Post removal • Regaining access to periapical area • Removal of separated instruments • Management of canal impediments • Repair of perforations • Heat generation
55.	Resorptions and its management	Classification Etiology Management of resorption	Introduction Classification Etiopathogenesis Replacement resorption External and internal resorption
56.	Microscopes and Microsurgery in endodontics.	What is the role of magnification in endodontics What are different magnifications Their advantages and disadvantages	Introduction Ergonomics Magnifications Indications
57.	Single visit endodontics, current concepts and controversies.	Complete debridement of root canal in single procedure What are the shortcomings Are there any advantages ?	Introduction Advantages Disadvantages
58.	Regenerative Endodontics	Recent trends Revascularization	Introduction Recent trends Revascularization Regeneration

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Address: Vishwnath Puram, Ambajogai Road Latur.413531 (Maharashtra)
Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

5. DEPARTMENT OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS

PROGRAMME-SPECIFIC LEARNING OUTCOME FOR POSTGRADUATES

SR NO	TOPIC	LEARNING OUTCOME
1.	Applied Basic science	**1.Applied anatomy** Under anatomy they would have learnt about Prenatal and postnatal growth of head, bone growth, assessment of growth and development muscles of mastication, development of dentition and occlusion. **2.Applied physiology** Undergraduate physiology they would have learnt about Endocrinology and its disorders, calcium and its metabolism, Nutrition metabolism and their disorders, Muscle physiology, craniofacial biology, bleeding disorders. **3.Dental materials** Under Dental Material they would have learnt about Gypsum products, impression materials, bonding cements, wrought metal alloys, orthodontic wires, elastics, applied physics, specification and tests methods, and survey of all contemporary and recent advances of above. **4.Genetics** Under genetics they would have learnt about Cell structure DNA, RNA ,protein synthesis ,cell division ,Chromosomal abnormalities, Principal of orofacial genetics, Genetics in malocclusion, molecular basis of genetics .Studies related to malocclusion .Recent advances in genetics related to malocclusion. Specification and test methods survey of all contemporary and recent advances of above. **5.Physical anthropology** Under Physical Anthropology they would have learnt about Evolutionary development of dentition ,Evolutionary development of jaws **6.Pathology** Under Pathology they would have learnt about inflammation and necrosis **7.Biostatistics** Under Biostatistics they would have learnt about statistical principle, sampling and sampling technique, Experimental

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
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		models, design interpretation, Development of skill for preparing clear concise and scientific abstracts and publication. **8. Applied research methodology in Orthodontics** Under Applied research methodology in Orthodontics they would have learnt about Experimental design Animal experimental protocol Principal in the development execution and interpretation of methodologies in Orthodontics Critical Scientific appraisal of literature
2.	Diagnosis and treatment planning	**1.Orthodontic history** Under Orthodontic History they would have learnt about historical perspective, Evolution of orthodontic appliances, Pencil sketch history of orthodontic peers. History of orthodontics in India. **2.Concept of occlusion and aesthetics** Under this, the students would learn about 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. **3.Etiology and classification of malocclusion** Under this students would learn about, a comprehensive review of the local and systemic factor in the causation of malocclusion and the various classification of malocclusion. **4.Dentofacial anomalies** Under this, the students would learn about, anatomical, physiological and pathological characteristics of developmental defects of orofacial structure. **5.Child and Adult Psychology** Under this, the students would learn about Stages of child development ,Theories of psychological development , Management of an orthodontic treatment , Management of an orthodontic treatment , Management of handicapped child, motivation and Psychological problems related malocclusion orthodontics , Adolescent psychology Behavior psychology And communication. **6.Diagnostic procedure and treatment planning in orthodontics** Under this, the students would learn about stages of child development and management , orthodontic treatment ,Management of handicapped child, Motivation and psychological problem relation malocclusion/orthodontics, Adolescent psychology Behavioral psychology and communication **7. Cephalometric**

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		Under this the student would learn about, Instrumentation, Image processing. Tracing and analysis of errors and application, Radiation hygiene. Advanced cephalometric techniques, review of literature, Video imaging principal and application **8. Practice management in Orthodontics.** Under this the student would learn about, Economics and dynamics of solo and group practices, Personal management, Materials management, Public relation, professional relationship, Dental ethics and jurisprudence, office sterilization procedures, community based orthodontics
3.	Clinical orthodontics	**1.Myofunctional Appliances** The students will be capable of diagnosing and interpreting the knowledge obtained to treat developing malocclusion at a younger age. **2. Dentofacial Orthopaedics** The students will develop acumen to identify and deliver treatment regimes using orthopaedics appliance to the appropriate cases. **3.Cleft Lip and Palate Rehabilitation** The students will be trained to treat the CLCP cases with empathy starting with Naso alveolar moulding at the infant stage and then systematically treat the malocclusion using removable/fixed orthodontics during the mixed and permanent dentition by harmonizing the treatment plan with the other member of the multidisciplinary cleft team. **4.Biology of tooth movement** Basic understanding of the applied anatomy and physiology regarding to tooth and its surrounding structure will be included into the student, so that the results of application of orthodontic forces can be understood and clinically used. **5. Orthodontics/ Orthognathic surgery** Student will thoroughly trained in conjoint diagnosis and treatment planning Of cases requiring surgical intervention. **6. Ortho/ Perio/ prostho interrelationship** Students will be trained in trained in treating complicated cases requiring a multidisciplinary approach in patient management **7. Basic principles of Mechanotherapy** Students will be trained in designing, construction, fabrication and management of cases using orthodontics **8. Applied preventive aspects in orthodontics** A comprehensive view of diagnosing and preventing caries, periodontal diseases to maintain proper inter arch relationship. **9. Interceptive orthodontics**

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M.I.D.S.R. Dental C...

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		Students will be trained in growth guidance, diagnosing and treatment Planning of early malocclusion both at mixed/ permanent dentition. **10. Retention and relapse** To analyse post treatment stability prevent to any relapse.
4.	Essay	**1.Recent advances** The students would be trained in above mentioned topics in detail so that the student would know the recent updates along with the previous literature available

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
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6. DEPARTMENT OF PAEDIATRIC & PREVENTIVE DENTISTRY

PROGRAMME-SPECIFIC LEARNING OUTCOME FOR POSTGRADUATES

Sr. No	Topic	Learning Outcome
1	Introduction, Definition, Scope and Practice Management and Importance of Pedodontics:	• Overall health of the child should be of primary concern. • Prevention should be the primary objective rather than the treatment. • While selecting the treatment modality, Pedodontist should always focus on comprehensive oral health of the child. • Developing dentition in child need to be monitored by the Pedodontist constantly from the beginning. • Pedodontist should always trained psychologist and should form solid institution for child patient by instilling in him positive dental attitude.. • Paediatric dentistry include treatment and early diagnosis of oral diseases and condition in child and adolescent mouth including caries and periodontal abscesses, mineralisation defects, etc . • Paediatric dentistry is an integrated science of all dental practices.
2	Diagnosis In Paediatric Dentistry	• Oral examination includes the records of history, examination of patient, provisional diagnosis, special examination, final diagnosis, and treatment plan. • History includes information about history of present illness, family history, medical history, past dental history, behavioural history etc. • Chief complaint should be in own words of patient. • History of present illness should be elaboration of chief complaint. • Oral mucosa examination is helpful for underlying systemic disease or nutritional deficiency. • Occlusion examination will help in early diagnosis of malocclusion and will help in proper treatment planning
3	Paediatric Oral Pathology	• Diagnosis in paediatric dentistry is based on pathological diagnosis which includes various pathological lesions. • There are various developmental defects related to number, shape, size, and structure of teeth.
4	Growth and Development of Orofacial Structure	• Development orofacial structure occurs during 4^{th} to 12^{th} week of prenatal development, spanning the later embryonic

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		period and early fetal period. • Structure of oral cavity derived from the first brachial arch. • By the end of 4th week of development the frontonasal, 2 maxillary, 2 mandibular processes are visible. • Mandible develops from the cartilage of 1st arch i.e. Merkel's cartilage. • Postnatal growth of maxilla is by displacement, remodelling, and growth at sutures. • Postnatal growth of mandible is based on displacement and Enlow's principle
5	Development of Occlussion	• Occlusion in the primary dentition plays a significant role in determining the space for and occlusion in the succeeding permanent dentition. • Periods of occlusion development is divided in developmental periods like: • Neonatal period (last upto 6 months after birth) 2. Primary dentition (6month to 6 years) 3. Mixed dentition (6 years to 12 years) 4. Permanent dentition. • Primate spaces present mesial to maxillary deciduous canines and distal to mandibular deciduous canine. Total physiologic space in maxillary arch is 4mm and in mandibular arch is 3mm. • There is andrew's six keys of occlusion for permanent dentition are molar inter-arch relationship, crown angulation, labiolingual crown inclination, absence of rotation, tight contacts, curve of spee, bolton's descrepency
6	Gingival and Periodontal Disorders in Children:	• Plaque induced gingivitis is seen most commonly in children. • Inflammatory response of gingiva without destruction of surrounding tissues is called gingivitis. • There are various systemic condition that may reduce the host response in children and adolescents thus increasing their susceptibility to periodontal bone loss and ultimately loss of teeth. • Periodontal diseases can be characterised by destruction of periodontal connective tissue attachment and alveolar bone. • Various genetic disorder also involves periodontal and gingival diseases. • Plaque control record and periodontal screening and recording are various method used for assessment for gingival and periodontal diseases.
7	Diet and Nutrition	• Balanced diet is the one which supplies all the nutrients in the right quantity and proportion. • Carbohydrate: 55-60%, Proteins: 10-15%, Fats: 30-35% • According to RDA levels of intake of essential nutrients are

Principal
M. I. D. S. R. Dental College

Address: Vishwnath Puram,
Ambajogai Road
Latur.413531 (Maharashtra)

Tel. (02382) 228063, 227703,
227444, fax : (02382) 228063

Email:
principal@mitmidsr.edu.in
midsr.latur@gmail.com
Website: www.mitmidsr

		currently considered essential and which meet the physiological needs of nearly all individual. • USDA daily food guide divides commonly eaten food into five groups: 1. Vegetable-fruit, 2. Bread-cereals, 3.milk-cheese, 4.meat, poultry, fish and beans, 5. Fats, sweets, and alcohol. • First food pyramid was published in Sweden in 1974.
8	Oral Habits	• Habit is fixed or constant practise established by frequent repetition. • Mouth breathing, thumb sucking, tongue thrusting, bruxism, nail biting are the most common oral habit. • Various oral habits affects the normal occlusion. • Tongue thrust is the forward movement of tongue tip between teeth to meet the lower lip during deglutition and in sounds of speech. It can be habitual, anatomic, functional or physiologic. Clinical feature are open bite, cross bite, bimaxillary protrusion and incompetent lip. • Mouth breathing is habitual respiration through mouth instead of nose. It may be obstructive, habitual or anatomic. Clinical features are adenoid facies, gingivitis, and anterior maxillary caries. Treatment is lip exercise and oral screen. • Bruxism is habitual grinding of teeth when individual is not chewing or swallowing
9	Cariology	• Dental caries is an infectious microbiologic disease of the teeth that results in localised dissolution and destruction of calcified tissue. • Theories of caries: vital theory, chemical theory, parasitic theory, milller's chemoparasitic theory, proteolytic theory, chelation theory, sulfatase theory and complexing and phosphorylation theory. • Concept of caries was given by Keyes as an epidemiological model contains factors: host, agent and environmental influences. • There are 3 major hypothesis for eitiology of dental caries: 1. Specific plaque hypothesis, 2. Nonspecific plaque hypothesis 3. Ecological plaque hypothesis. • Window of infectivity: 1st window: 7-31 months :teeth erupt o 2nd window:6-12 years: permanent teeth erupt. • Caries progression is at its peak rate at 3 years after eruption of teeth. • Demineralisation-remineralisation is caries not result of single acid attack caused by acid formed as a result of fermentation of dietary substrate by oral microflora. • Histologically, enamel caries has four zones 1. Translucent

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M. I. D. S. R. Dental College

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Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		zone. 2. Dark zone, 3. Body of lesion 4. Surface intact zone. • Histologically, dentinal caries has five zones 1. Decomposed zone 2.bacterial invasion 3. Demineralisation 4. Dentinal sclerosis 5. Fatty degeneration.
10	Restorative Dentistry	• This best practice provides clinicians with guidance to form decisions about restorative dentistry, including when treatment is necessary and which techniques and materials are appropriate for restorative dentistry in pediatric patients. • Not every caries lesion requires restoration, and restorative treatment of caries alone does not stop the disease process. • Restorative approaches and supporting evidence for the excavation and restoration of deep caries lesions, including complete excavation, stepwise (i.e., two-step) excavation, partial (i.e., one-step) excavation, and no removal of caries prior to restoration • GV Black in 1924 outlined the classification of cavity preparation into 5 later it was modified by Simon. • Finn classification is used in paediatric dentistry. • Mount and Hume classification exemplifies the complexity of lesion. • Principal of tooth preparation: 1. Initial tooth preparation includes; outline form, resistance form, retention form, convenience form. Whereas final tooth preparation involves; removal of remaining infected dentin and old restorative material, pulp protection, secondary resistance and retention form and finishing external walls and cleaning. • Cementation aims to bond the prosthetic restoration to the prepared enamel or enamel and dentine. • The type, shade, thickness of resin cement and the shade of the ceramic, all together, have a tangible influence on the final restoration color. • Dental luting cements can be classified according to their chemical composition and application. • Dental cement can be oil-, water-, or resin-based
11	Child Psychology	• The attitudes and feelings of the patient toward the dentist and the dental procedures are as important to successful treatment as are the technical skills of the dentist. • The attitudes and feelings of the patient toward the dentist and the dental procedures are as important to successful treatment as are the technical skills of the dentist. • A. Psychodynamic Theory: Psychosexual Concept by Sigmund Freud in 1905 Psychosocial / Personality

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M. I. D. S. R. Dental College

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Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		development Theory by Erik Erikson in 1963 Cognitive development theory by Jean Piaget in 1952 B. Behavioural Learning Theory Classical conditioning Theory by Ivan Pavlov in 1927 Operant conditioning Theory by Skinner in 1938 Social learning Concept by Albert Bandura in 1963 Hierarchy needs theory by Abraham Maslow in 1954 • Erik Erikson has eight sequential stages of individual development that have an influence on the socio-economical, psychological and biological status of an individual throughout their lifespan. • Freud Psychosexual theory focuses on two elements of human nature such as "sex" and "aggression" • Child psychology is considered to be an important component of a pedodontist's training as it plays a major role in the clinical practice of many pediatric practitioners to handle the behaviour of pediatric patients efficiently
12	Behaviour Management	• Behavior guidance is a continual process from basic to advanced techniques, using non-pharmacological and pharmacological options. • The following items should be addressed before, during, and after patient treatment: informed consent, pain assessment, behavior documentation, and preventive and deferred treatment considering all behavior guidance options • Basic behaviour guidance includes communication guidance, positive pre-visit imagery, direct observation, tell-show-do, ask-tell-ask, voice control, non-verbal communication, positive reinforcement and descriptive praise, distraction, and desensitization • For anxious patients and those with special health care needs, additional behaviour guidance options include sensory adapted dental environments, animal assisted therapy, picture exchange communication systems, and nitrous oxide-oxygen inhalation. Advanced behaviour guidance includes protective stabilization, sedation, and general anesthesia • Goals of behaviour guidance are to: 1) establish communication, 2) alleviate the child's dental fear and anxiety, 3) promote patient's and parents' awareness of the need for good oral health and the process by which it is achieved, 4) promote the child's positive attitude toward oral health care, 5) build a trusting relationship between dentist/staff and child/parent, and 6) provide quality oral health care in a comfortable, minimallyrestrictive, safe, and effective manner.

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		• Tell-show-do is the technique involves verbal explanations of procedures in phrases appropriate to the developmental level of the patient (tell); demonstrations for the patient of the visual, auditory, olfactory, and tactile aspects of the procedure in a carefully defined, nonthreatening setting (show); and then, without deviating from the explanation and demonstration, completion of the procedure (do). • Ask-tell-ask is technique involves inquiring about the patient's visit and feelings toward or about any planned procedures (ask); explaining the procedures through demonstrations and non-threatening language appropriate to the cognitive level of the patient (tell); and again inquiring if the patient understands and how she feels about the impending treatment (ask). • Positive reinforcement and descriptive praise: In the process of establishing desirable patient behaviour, it is essential to give appropriate feedback. Positive reinforcement rewards desired behaviours thereby strengthening the likelihood of recurrence of those behaviours • Distraction is the technique of diverting the patient's attention from what may be perceived as an unpleasant procedure. • Desensitization to dental setting and procedures: Systematic desensitization is a psychological technique that can be applied to modify behaviours of anxious patients in the dental setting. • Sedation can be used safely and effectively with patients who are unable to cooperate due to lack of psychological or emotional maturity and/or mental, physical, or medical conditions. Background information and documentation for the use of sedation is detailed in the Guideline for Monitoring and Management of Paediatric Patients During and After Sedation for Diagnostic and Therapeutic Procedures
13	Traumatic Injury	• The greatest incidence of trauma to the primary teeth occurs at 2 to 3 years of age, when motor coordination is developing • The most common injuries to permanent teeth occur secondary to falls, followed by traffic accidents, violence, and sports. • Subluxation: Mobility of the tooth due to injury to the supporting structures of the tooth. • Avulsion: tooth is completely displaced out of the tooth socket • Lateral Luxation: the tooth is displaced and a neighbouring

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		bone is fractured. • Intrusion: the tooth is pushed into the bone • Extrusion: The tooth is pushed out of the bone • Fracture of the tooth • Ellis and Davey in 1970 proposed a classification system for tooth fractures based on the extent of damage to the tooth structure. ▪ Class 1: Simple fracture of the crown involving little or no dentin ▪ Class 2: Extensive fracture of the crown involving considerable dentin but not pulp ▪ Class 3: Extensive fracture of the crown involving considerable dentin, and exposing the dental pulp ▪ Class 4: The traumatized tooth which becomes nonvisual with or without loss of crown ▪ Class 5: Teeth lost as a trauma ▪ Class 6: Fracture of the root with or without loss of crown structure ▪ Class 7: Displacement of the tooth without fracture of crown or root ▪ Class 8: Fracture of the crown en masse and its replacement ▪ Class 9: Traumatic Injury to primary dentition • Different types of storage media are Saline solution, Tap water, Saliva, Milk, Hank's Balanced Salt Solution, ViaSpan, Gatorade, etc. • In case of primary tooth if the tooth is displaced and not obstructing permanent tooth then allow it to erupt on its own and if it is obstructing it is best to extract. • In case of avulsion reimplantation is contraindicated.
14	Paediatric Endodontics	• The dental diseases affecting the pulp and periapical tissues in the primary and permanent dentitions pose treatment challenges for the endodontists because of the vast variations in these dentitions basically due to factors like longetivity of primary teeth , coronal structure and root canal morphology and anatomy of the teeth which needs to be critically analysed before rendering treatment. • In recent years, new materials, equipments and instruments have evolve to a great extent and simplified the endodontic treatment procedures for the clinicians. • In case of incisors the pulp chamber is fan shaped when viewed from labial aspect and corresponds with shape of crown. • Pulp chamber of canine is similar to deciduous incisor in many aspects except that it has a single pulp horn.

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		• Pulp chamber of molars is very large extending to external walls of crown. Root canals are more irregular and complicated that in permanent molar
15	Handicapped Children	• The AAPD defines special health care needs as "any physical, developmental, mental, sensory, behavioural, cognitive, or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialized services or programs. The condition may be congenital, developmental, or acquired through disease, trauma, or environmental cause and may impose limitations in performing daily self-maintenance activities or substantial limitations in a major life activity. • Children may include those with behavioural (e.g., anxiety, attention deficit hyperactivity disorder, autism spectrum disorder), congenital (e.g., trisomy 21, congenital heart disease), developmental (e.g., cerebral palsy) or cognitive (e.g., intellectual disability) disorders, and systemic diseases (e.g., childhood cancer, sickle cell disesase). • Oral health conditions include: • build-up of calculus resulting in increased gingivitis and risk for periodontal disease. • enamel hypoplasia. • dental caries. • oral aversion and behaviour problems. • dental crowding. • malocclusion. • anomalies in tooth development, size, shape, eruption, and arch formation. • bruxism and wear facets. • fracture of teeth or trauma • The goals of care include: (1) establishing dental home at an early age, (2) obtaining thorough medical, dental, and social patient histories, (3) creating an environment conducive for the child to receive care, (4) providing comprehensive oral health education and anticipatory guidance to the child and caregiver, and (5) providing preventive and therapeutic services including behaviour guidance and a multidisciplinary approach when needed. • Medical consultation: When appropriate, the physician should be consulted regarding medications, sedation, general anesthesia, and special restrictions or preparations that may be required to ensure the safe delivery of oral health care. A multidisciplinary approach may be necessary in complex case management. The dentist and staff always should be prepared to manage a medical emergency. • According to revised guidelines by AAPD (2011): minimal use of antibiotics is indicated to avoid the risk of developing resistance due to antibiotics usage.

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LATUR

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Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

16	Fluorides	• Dental caries (cavities) continues to be the most chronic disease of childhood. Although dental caries is multifactorial in its etiology, fluoride is an important chemotherapeutic intervention to strengthen teeth and prevent disease progression. • Fluoride works to prevent dental caries through both topical and systemic mechanisms via 3 processes: inhibiting tooth demineralization, enhancing remineralization, and inhibiting bacterial metabolism. The topical effect provides the majority of the benefit. • Topical fluoride in the form of toothpaste (at-home use) and varnish (in-office use) should be recommended for all children starting at tooth eruption. • TOPICAL FLUORIDE: Toothpaste: Fluoridated toothpaste is recommended upon initial tooth emergence during infancy and throughout life. Do not recommend fluoride-free "training toothpaste."1. From tooth emergence until age 3 years, a grain of rice-sized (or "dab") amount of fluoride toothpaste should be used to brush the teeth both morning and night.2. For children aged older than 3 years, or when a child can effectively spit, a pea-sized amount of fluoride toothpaste should be applied morning and night. • Mouth rinses: Over-the-counter fluoride rinses may be beneficial for use for children, particularly those who have high caries risk or live in fluoride-deficient areas. Mouth rinses should be reserved for high-risk children aged older than 6 years who can rinse and spit. • Varnish: Fluoride varnish is a highly concentrated form of topical fluoride that is applied to teeth in a professionally supervised setting. Durapat is highly recommended varnish. • Dental providers may recommend other forms of topical fluoride, including highly concentrated fluoride gels. Community water fluoridation: Lastly, fluoridated community water aids in prevention of dental caries by up to 27%21 and reduces dental expenditures per capita22 by providing both topical and systemic routes of fluoride. Fluoridated tap water use should be encouraged instead of bottled water use, which may not contain fluoride and may be more acidic than previously anticipated, thus promoting demineralization of tooth structure. • 1st defluoridation project was taken up by NEERI at Nagpur in 1961. • Nalgonda technique was given by WG Nawalakhe in 1974. It involves addition of 3 readily available chemicals i.e. sodium aluminate, bleaching powder and filter alum in same

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		sequence.
17	Vital Pulp Therapy	• Indirect pulp treatment is recommended as the most appropriate procedure for treating primary teeth with deep caries and reversible pulp inflammation provided that the tooth has been sealed with a leakage free restoration. • Direct pulp capping of a carious pulp exposure in a primary tooth is not recommended as treatment failure might result in internal resorption or acute dentoalveolar abscess. In primary teeth after direct pulp capping or pulpotomy with MTA (Mineral Trioxide Aggregate) and concluded that MTA might be a favourable material for pulp capping and pulpotomy in primary teeth. • Pulpotomy and partial pulpectomy techniques for devitalized primary teeth have been developed to preclude an almost impossible obturation problem. Pulpotomy is still the most common treatment for cariously exposed pulp in symptom free primary molars • Formocresol was introduced by Buckley in 1904 its composition is cresol-35%, gresol-15%, formaldehyde-19% and water-31%.
18	Pulp Treatment (non-vital pulp therapy)	• PulpectomyNon-vital primary teeth may be retained successfully when pulpectomy procedure is employed. A single visit or two- visit pulpectomy may be undertaken. Primary molar roots are severely curved and the pulps are flat and tortuous with numerous branches and interconnections. • Apexification and apexogenesis : When providing treatment for patients with mixed and young permanent dentitions, certain clinical scenarios may require interdisciplinary consultation and intervention such as following traumatic injuries and whenever permanent teeth require endodontic therapy. Young pulps in immature permanent teeth are larger than at a more mature stage. Immature permanent teeth have funnel shaped apical foramina which are commonly called "blunderbuss."
19	Preventive Orthodontics	• Preventive orthodontics is that part of orthodontic practice which is concerned with patients and parents education, supervision of the growth and development of the dentition and cranio-facial structures. • Interceptive orthodontics is defined as that phase of science and art of orthodontics employed to recognised and eliminate potential irregularities and malpositioned in developing dentofacial complex.

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Ambajogai Road
Latur.413531 (Maharashtra)

Tel. (02382) 228063, 227703,
227444, fax : (02382) 228063

Email:
principal@mitmidsr.edu.in
midsr.latur@gmail.com
Website: www.mitmidsr

		• Kjellgren (1929) Sweden coined the term serial extraction. • Nance is father of serial extraction. • Space maintainer is device used to maintain the space created by loss of deciduous tooth. • Commonly use space regainer are Gerber space reagainer, jack screw, cantilever spring.
20	Space Management	• Space maintenance was coined by JC Brauer in 1941. • Management of space problems associated with the transitional stages from primary to permanent dentition is a routine component of Pedodontic practice and a complex phenomenon with a variety of physiological adaptations of occlusion. Problems in the dental arches involve lack of space, space loss, maleruption, malposition, and malalignment of teeth. All such problems relate to the following modes of treatment: space maintenance, space gaining and guidance in alignment and occlusion. • Space Maintenance in Anterior Segment 1) Removable partial denture -This can be given for young children who show a degree of cooperation and interest. It is not advisable to give a removable space maintainer in children with uncontrolled dental caries or who cannot maintain a proper oral hygiene to reduce the caries activity.2) Fixed Appliances - If a fixed appliance is required, one approach is to attach the anterior replacement teeth to a 0.040 or 0.045 inch stainless steel wire frame work retained with bands or crowns on the second primary molar. • Space Maintenance in Buccal Segment 1) Removable appliances - Acrylic partial denture is indicated when there has been bilateral loss of more than a single tooth.9 2) Fixed Space Maintainers - Band and loop appliances - It is usually used for preserving space created by premature loss of single primary molar. 13 It consists of a band cemented commonly to the tooth posterior to the edentulous space and a loop of wire across the edentulous space abutting the anterior tooth. 17The loop should be fabricated wide enough so that the succedaneous tooth can erupt into it. 18 The crown and loop is a variation of the band and loop appliance, and is used where stainless steel crown therapy is necessary on the abutment teeth. • Nance palatal arch appliance8 - This is a maxillary custom-made fixed appliance developed by H.N. Nance in 1947, consisting of a heavy gauge stainless steel wire soldered to the palatal aspect of the first permanent molar bands. The wire is directed from the molars anteriorly and is attached to

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		an acrylic button, about 0.5 inches in diameter. 13 Transpalatal arch8 - Originally described by Robert Goshgarian in 1972, the transpalatal arch is a maxillary fixed appliance consisting of a heavy gauge stainless steel wire that extends from one maxillary first permanent molar, along the contour of the palate, to the contralateral first molar. It is adapted to the curvature of the palatal vault, so that it lies 2-3 mm away from the palatal mucosa, and an omega loop is usually incorporated midway across the span. The original design included a straight bar extending across the palate. It is referred as transpalatal bar.
21	Child Abuse and Neglect	• First documented and reported case of CA/CN occurred in 1874 with a child named Mary Ellen. • Physical Abuse Craniofacial, head, face, and neck injuries occur in more than half of child abuse cases. All suspected victims of abuse or neglect, including children in state custody or foster care, should be examined carefully by the appropriate provider at some point during the course of the evaluation for signs of oral trauma, caries, gingivitis, and other oral health problems, which are more prevalent in maltreated children than in the general pediatric population. • Sexual Abuse Although the oral cavity is a frequent site of sexual abuse in children,16 visible oral injuries or infections are rare. When orogenital contact is suspected, referral to specialized clinical settings equipped to conduct comprehensive examinations is recommende • Bite Marks Acute or healed bite marks may indicate abuse. Dentists trained as forensic odontologists can assist health care providers in the detection and evaluation of bite marks related to physical and sexual abuse. Bite marks found on human skin are challenging to interpret because of the distortion presented and the time elapsed between the injury and the analysis. • Bullying Thirty percent of children in the sixth to 10th grades report having been bullied and/or having bullied others. Children with orofacial or dental abnormalities (including malocclusion) are frequently subjected to bullying. • Dental Neglect Dental neglect, as defined by the American Academy of Pediatric Dentistry, is the "wilful failure of parent or guardian, despite adequate access to care, to seek and follow through with treatment necessary to ensure a level of oral health essential for adequate function and freedom from pain and infection."Dental caries, periodontal

Principal
M. I. D. S. R. Dental College

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		diseases, and other oral conditions can lead to pain, infection, loss of function, and worse if left untreated. • Dentists are at an advantage when it comes to identifying child abuse. As most of the characteristic signs can be visualized in the craniofacial and oral regions
22	Crowns in Paediatric Dentistry	• PRE-FORMED METAL CROWN Preformed metal crown (PMCs) for primary molar teeth were first described in 1950 by Engel followed by Dr. William Humphrey(1950). They were made of stainless steel and were referred to by an acronym of SSC. • Preveneered stainless steel crowns (PVSCCs) offer a potential esthetic and durable restoration for grossly decayed primary teeth, as these crowns allegedly combine the durability of conventional SSC with the esthetic appeal of composite resin.These crowns are available with a variety of facing materials such as composite resin or thermoplastic resin bonded to the stainless steel crown. Esthetic veneers are retained on the stainless steel crowns using a variety of mechanical and chemical bonding approaches. • STRIP CROWN Among the most esthetic and popular restorations for carious primary anterior incisors are composite resin strip crowns. Resin composite strip crowns (SCs) have been utilized for over 2 decades to restore carious primary teeth • POLYCARBONATE CROWN Conventional Class III carious lesions in primary teeth are usually treated with composite resins or amalgam. However, more severely decayed teeth require stainless steel crowns, composite crowns or polycarbonate crowns. • ZIRCONIA PAEDIATRIC CROWN: These are crowns made of zirconia for the primary dentition that contain no metal. Zirconia restorations are not new to the dental world and are one of the dominant types of ceramics used for a variety of computer aided design /computer aided manufacturing restorations, including framework/hand veneer, framework/milled veneer, full-contour fixed prosthodontics, implant abutments, and large im
23	Presurgical Nasoalveolar Molding in Management of Cleft Lip and Palate	• Cleft lip and cleft palate (CLCP) is the most common congenital craniofacial anomaly caused by abnormal facial development during gestation. • The severity and form of cleft lip and palate can vary considerably among the patients. • The unilateral cleft deformity is characterized by a wide nostril base and separated lip segments on the cleft side.

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Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		• Nasolabial deformity is seen in all the CLCP cases and is more significant in wider and extensive cleft cases. • Presurgical nasoalveolar molding (PNAM) helps to achieve this principal objective by reducing the severity of the initial cleft deformity, thereby enabling the surgeon and the patient to enjoy the benefits equivalent to the repair of a minimal cleft deformity. • The objective of PNAM is to reduce the severity of the initial cleft deformity, thereby enabling the surgeon and the patient to have esthetically better correction of the CLCP. • The favorable time to start PNAM procedure is immediately after the birth and very much within the first 6 weeks of birth. ‰Impression should be made while the patient is in inverted position. • A small opening measuring 6–8 mm in diameter should be mandatorily made at about 5 mm anterior to the posterior most border of the molding plate to provide an airway in the event that the plate drops down posteriorly. • Alveolar and nasal molding can be either started simultaneously or nasal molding can be delayed for few weeks, the decision of which is made depending on the age of the patient. • Appliance activation is based on the principle of "Negative sculpturing and Passive molding". • Recall and follow up plays an important role in the success of PNAM. • Prognosis of PNAM procedure is highly dependent on the age at which it was started and the parent and patient compliance
24	Conscious Sedation	• Children, occasionally present with behavioral considerations that require more advanced techniques. These children often cannot cooperate due to lack of psychological or emotional maturity and/or mental, physical, or medical disability. • The advanced behavior guidance techniques commonly used include protective stabilization and sedation. Current understanding of pediatric oral health includes absence of dental fear and anxiety as well as healthy oral structures with the aim of forming the basis for good oral health throughout life. • .Use of sedation is advocated in children lacking cooperation for the short duration periods. • Conscious sedation is defined as a minimally depressed level of consciousness that retains the patient's ability to

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M. I. D. S. R. Dental College
LATUR

Address: Vishwnath Puram, Ambajogai Road Latur.413531 (Maharashtra)
Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		independently and continuously maintain an airway and respond appropriately to physical stimulation or verbal command and that is produced by a pharmacological or nonpharmacological method or a combination thereof. • Objectives of conscious sedation are to reduce or eliminate anxiety, reduce untoward movement and reaction to dental treatment, enhance communication and patient cooperation, raise the pain reaction threshold, aid in treatment of the mentally/physically disabled or medically compromised patient. • Indications of conscious sedation are lack of psychological or emotional maturity, medical, physical, cognitive disability, fearful, highly anxious or obstreperous patient, a patient whose gag reflex interferes with dental care, a patient for whom profound local anesthesia cannot be obtained. • There is only one inhalation agent that meets the requirement of conscious sedation and that is nitrous oxide ideal concentration for nitrous oxide sedation is 30% N2 O and 70% O2 . • Diffusion hypoxia may occur as the nitrous oxide sedation is reversed; this can be checked by administrating oxygen for 3–5 minutes. • Reversal agents used for benzodiazepines sedation are flumazanil and that for opioids sedation is naloxone. • ‰ Midazolam is the best drug of choice for sedation in children with oral route being most preferred and intranasal most effective.
25	General Anesthesia in Pediatric Dentistry	• Most children and adolescents can receive effective dental care by traditional methods through the successful use of behavioral management techniques in the dental clinic. • But, pediatric dentists routinely treating children do come across patients whose behavior cannot be managed adequately even with the use of non-pharmacological behavior management techniques. • When the procedure cannot be done in the dental clinic, hospitalization for dental treatment under general anesthesia (GA) can and should be considered. • Active involvement in hospital-based dentistry has added a rewarding component to the practice of many pediatric dentists • The most important indication for GA is patients who cannot co-operate due to lack of physiological maturity or any disability. • The advantage of GS is that all treatment can be finished in

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M. I. D. S. R. Dental College

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Tel. (02382) 228063, 227703, 227444, fax : (02382) 228063
Email: principal@mitmidsr.edu.in midsr.latur@gmail.com
Website: www.mitmidsr

		one appointment with minimal patient compliance. • The increased rate of complexity and care and various complications are the obvious disadvantage. • Factors that affect GA decision making are age, cooperation, risk assessment

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