

ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS-DS205

1. AIM:

- To train dental graduates as to ensure higher competence in both general and special areas of Orthodontics
- To prepare a candidate for teaching, research and clinical abilities, including prevention and after care in Orthodontics including growth modulation and micro implants.

2. OBJECTIVES:

- Training programme in Orthodontics and dento-facial orthopaedics is structured to achieve knowledge and skill in theoretical and clinical laboratory, attitude, communicative skills and ability to research with understanding of social, cultural, educational and environmental background of the society.
- Have acquired adequate knowledge and understanding of applied basic and systemic medical science, knowledge in general and particularly of head and neck.
- The postgraduates will be able to provide Orthodontic therapy for patients with competence and working knowledge with understanding of applied medical, behavioural and clinical science that are beyond the treatment skills of the general BDS graduate and MDS graduate of other specialities, to demonstrate evaluative and judgment skills in making appropriate decisions regarding prevention, treatment, after care and referral to deliver comprehensive care to patients.

3. KNOWLEDGE:

- The dynamic interaction of biological processes and mechanical forces acting on the stomatognathic system during orthodontic treatment.
- The etiology, patho-physiology, diagnosis and treatment planning of various common orthodontic problems.
- Various treatment modalities in preventive, interceptive and corrective Orthodontics.
- Basic sciences relevant to the practice of Orthodontics.
- Interaction of social, cultural economic, genetic and environmental factors and their relevance to management of oro – facial deformities.
- Factors affecting the long-range stability of orthodontic correction and their management.
- Personal hygiene and infection control, prevention of cross infection and safe disposal of hospital waste, keeping in view the high prevalence of Hepatitis B, HIV and other highly contagious diseases.

4. SKILLS:

- To obtain proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at reasonable diagnosis about the Dentofacial deformities.
- To be competent to fabricate and manage the most appropriate appliance – intra or extra oral, removable or fixed, mechanical or functional, and active or passive – for the treatment of any orthodontic problem to be treated singly or as a part of multidisciplinary treatment of oro-facial deformities.

5. ATTITUDES:

- Develop an attitude to adopt ethical principles in all aspects of Orthodontic practice.
- Professional honesty and integrity are to be fostered.
- Treatment care is to be delivered irrespective of the social Status, cast, creed or colleagues.
- Willingness to share the knowledge and clinical experience with professional colleagues.
- Willingness to adopt, after a critical assessment, new methods and techniques of orthodontic management developed from time to time based on scientific research, which are in the best interest of the patient.
- Respect patient's rights and privileges, including patient's right to information and right to seek a second opinion.
- Develop attitude to seek opinion from allied medical and dental specialists as and when required.

6. COMMUNICATION SKILLS:

- Develop adequate communication skills particularly with the patients giving them the various options available to manage a particular dento-facial problem and to obtain a true informed consent from them for the most appropriate treatment available at that point of time.
- Develop the ability to communicate with the professional colleagues, in orthodontics or other specialties through various media like correspondence, Internet, e-video, conference etc. to render the best possible treatment.

7. COURSE CONTENT:

- The program outlined, addresses both the knowledge needed in orthodontics and allied Medical specialties in its scope. A minimum of Three years of formal training through a graded system of education as specialties, will equip the trainee with skill and knowledge at its completion to be able to practice basic orthodontics and have the ability to intelligently pursue further apprenticeship towards advanced orthodontics.

8. SYLLABUS DISTRIBUTION:

Part-I

8.1 PAPER-I: APPLIED BASIC SCIENCES Applied anatomy, Physiology, Dental Materials, Genetics, Pathology, Physical Anthropology, Applied Research methodology, Bio-Statistics and Applied Pharmacology.

8.1.1 APPLIED ANATOMY

8.1.1.1 Prenatal growth of head - Stages of embryonic development, origin of head, origin of face, and origin of teeth.

8.1.1.2 Post-natal growth of head - Bones of skull, the oral cavity, development of chin, the hyoid bone, general growth of head, face growth.

8.1.1.3 Bone growth -Origin of bone, composition of bone, units of bone structure, schedule of ossification, mechanical properties of bone, Roentgenographic appearance of bone.

8.1.1.4. Assessment of growth and development - Growth prediction, growth spurts, the concept of normality and growth increments of growth, differential growth, and gradient of growth, methods of gathering growth data. Theories of growth and recent advances, factors affecting physical growth.

8.1.1.5 Muscles of mastication - Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion.

8.1.1.6 Development of dentition and occlusion - Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of occlusal development, pattern of occlusion.

8.1.1.7 Assessment of skeletal age- The carpal bones, carpal X – rays, cervical vertebrae.

8.1.2 APPLIED PHYSIOLOGY –

8.1.2.1 Endocrinology and its disorders pituitary gland hormones, thyroid gland hormones, parathyroid gland hormones

8.1.2.2 Calcium and its metabolism

8.1.2.3 Nutrition-metabolism and their disorders: proteins, carbohydrates, fats, vitamins and minerals

8.1.2.4 Muscle physiology

8.1.2.5 Craniofacial Biology: cell adhesion molecules and mechanism of adhesion

8.1.2.6 Bleeding disorders in orthodontics; Hemophilia

8.1.3 DENTAL MATERIALS

8.1.3.1 Gypsum products: Dental plaster, dental stone and their properties, setting reaction
Etc.

8.1.3.2 Impression materials in general and particularly alginate impression material.

8.1.3.3 Acrylics: chemistry, composition physical properties.

8.1.3.4 Composites: composition, types, properties, setting reaction

- 8.1.3.5 Banding and bonding cements: Zn (PO₄)₂, zinc silicophosphate, Zinc Polycarboxylate, resin cements and glass ionomer cements
- 8.1.3.6 Wrought metal alloys: deformation, strain hardening, annealing recovery, recrystallization, grain growth properties of metal alloys.
- 8.1.3.7 Elastics: Latex and non-latex elastics.
- 8.1.3.8 Applied physics, Bioengineering and metallurgy.
- 8.1.3.9 Specification and tests methods used for materials used in Orthodontics
- 8.1.3.10 Survey of all contemporary literature and recent advances in above – mentioned materials.

8.1.4 GENETICS:

- 8.1.4.1 Cell structure, DNA, RNA, protein synthesis, cell division
- 8.1.4.2 Chromosomal abnormalities.
- 8.1.4.3 Principles of oro-facial genetics
- 8.1.4.4 Genetics in malocclusion
- 8.1.4.5 Molecular basis of genetics.
- 8.1.4.6 Studies related to malocclusion
- 8.1.4.7 Recent advances in genetics related to malocclusion
- 8.1.4.8 Genetic counseling
- 8.1.4.9 Bioethics and relationship to Orthodontic management of patients.

8.1.5 PHYSICAL ANTHROPOLOGY:

- 8.1.5.1 Evolutionary development of dentition
- 8.1.5.2 Evolutionary development of jaws.

8.1.6 PATHOLOGY

- 8.1.6.1 Inflammation
- 8.1.6.2 Necrosis

8.1.7 BIOSTATISTICS

- 8.1.7.1 Statistical principles
- 8.1.7.2 Data Collection
- 8.1.7.3 Method of Presentation
- 8.1.7.4 Method of Summarizing
- 8.1.7.5 Methods of analysis – different tests – errors
- 8.1.7.6 Sampling and Sampling technique
- 8.1.7.7 Experimental models, design and interpretation.
- 8.1.7.8 Development of skills for preparing clear concise and cogent scientific abstracts and publication.

8.1.8 APPLIED RESEARCH METHODOLOGY IN ORTHODONTICS

- 8.1.8.1 Experimental design
- 8.1.8.2 Animal experimental protocol
- 8.1.8.3 Principles in the development, execution and interpretation of methodologies in Orthodontics
- 8.1.8.4 Critical Scientific appraisal of literature.

8.1.9 APPLIED PHARMACOLOGY

Part II

Paper-I: 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 Orthodontic

8.2 PAPER-II: DIAGNOSIS AND TREATMENT PLANNING

8.2.1 Orthodontic History

- 8.2.1.1 Historical perspective,
- 8.2.1.2 Evolution of orthodontic appliances,
- 8.2.1.3 Pencil sketch history of Orthodontic peers.
- 8.2.1.4 History of Orthodontics in India.

8.2.2 Concepts of Occlusion and Esthetics

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

8.2.3 Etiology and Classification of malocclusion:

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

8.2.4 Dentofacial Anomalies:

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

8.2.5 Child and Adult Psychology:

- 8.2.5.1 Stages of child development
- 8.2.5.2 Theories of psychological development
- 8.2.5.3 Management of child in orthodontic treatment.
- 8.2.5.4 Management of handicapped child.
- 8.2.5.5 Motivation and Psychological problems related to malocclusion / orthodontics
- 8.2.5.6 Adolescent psychology
- 8.2.5.7 Behavioral psychology and communication

8.2.6 Diagnostic procedures, Prognosis and treatment planning in orthodontics

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

8.2.7 Cephalometrics

8.2.7.1 Instrumentation

8.2.7.2 Image processing

8.2.7.3 Tracing and analysis of errors and applications

8.2.7.4 Radiation hazards

8.2.7.5 Advanced Cephalometrics techniques.

8.2.7.6 Comprehensive review of literature.

8.2.7.7 Video imaging principles and application.

8.2.8 Practice management in Orthodontics

8.2.8.1 Economics and dynamics of solo and group practices

8.2.8.2 Personal management

8.2.8.3 Materials management

8.2.8.4 Public relations

8.2.8.5 Professional relationship

8.2.8.6 Dental ethics and jurisprudence

8.2.8.7 Office sterilization procedures

8.2.8.8 Community based Orthodontics

PAPER-II: Clinical Orthodontics**8.3: Clinical Orthodontics****8.3. Clinical Orthodontics 8.3.1 Myofunctional Orthodontics:**

8.3.1.1 Basic principles

8.3.1.2 Contemporary appliances – their design and manipulation

8.3.1.3 Case selection and evaluation of the treatment results.

8.3.1.4 Review of the current literature

8.3.2 Dentofacial Orthopedics

8.3.2.1 Principles

8.3.2.2 Biomechanics

8.3.2.3 Appliance design and manipulation

8.3.2.4 Case selection and evaluation of the treatment results.

8.3.2.5 Review of the current literature.

8.3.3 Cleft lip and palate rehabilitation

8.3.3.1 Diagnosis and treatment planning

8.3.3.2 Mechanotherapy

8.3.3.3 Special growth problems of cleft cases

8.3.3.4 Speech physiology, pathology and elements of therapy as applied to orthodontics

8.3.3.5 Team rehabilitative procedures.

8.3.4 Biology of tooth movement:

8.3.4.1 Principles of tooth movement-review

8.3.4.2 Review of contemporary literature

8.3.4.3 Applied histophysiology of bone, periodontal ligament

8.3.4.4 Molecular and ultra cellular consideration in tooth movement

8.3.5 Orthodontic / Orthognathic surgery:

8.3.5.1 Orthodontist' role in conjoint diagnosis and treatment planning

8.3.5.2 Pre and post-surgical Orthodontics

8.3.5.3 Participation in actual clinical cases, progress evaluation and post retention study

8.3.5.4 Review of current literature

8.3.6 Ortho / Perio / Prosth inter relationship

8.3.6.1 Principles of interdisciplinary patient treatment.

8.3.6.2 Common problems and their management

8.3.7 Basic principles of Mechanotherapy includes Removable appliances and fixed appliances

8.3.7.1 Design

8.3.7.2 Construction

8.3.7.3 Fabrication

8.3.7.4 Management

8.3.7.5 Review of current literature on treatment methods and results.

8.3.8 Applied preventive aspects in Orthodontics

8.3.8.1 Caries and periodontal disease prevention

8.3.8.2 Oral hygiene measures

8.3.8.3 Clinical procedures

8.3.9 Interceptive preventive aspects in Orthodontics

8.3.9.1 Principles

8.3.9.2 Growth guidance

8.3.9.3 Diagnosis and treatment planning

8.3.9.4 Therapy emphasis on

a. Dento-facial problems

b. Tooth material discrepancies

c. Minor surgery for Orthodontics

8.3.10 Retention and relapse

8.3.10.1 Mechanotherapy – special reference to stability of results with various procedures

8.3.10.2 Post retention analysis

8.3.10.3 Review of contemporary literature

8.3.11 Recent advances like:

8.3.11.1 Use of implants

8.3.11.2 Lasers

8.3.11.3 Application of F.E.M.

8.3.11.4 Distraction Osteogenesis

8.4 Paper III : Descriptive and analysing type question

9. YEARLY PRACTICAL/CLINICAL SCHEDULE:

9.1 FIRST YEAR

PRE – CLINICAL EXERCISES- A general outline of the type of exercises is given here.

9.1.1 General Wire bending exercises to develop the manual dexterity.

9.1.2 Clasps, Bows and springs used in the removable appliances.

9.1.3 Soldering and welding exercises.

9.1.4 Fabrication of removable habit breaking, mechanical and functional appliances, also all types of space maintainers and space regainers.

9.1.5 Bonwill Hawley Ideal arch preparation.

9.1.6 Construction of orthodontic study models.

9.1.7 Cephalometric tracing and various Analysis and superimposition methods.

9.1.8 Fixed appliance typhodont exercises.

9.1.9 Training shall be imparted in Begg technique.

9.1.10 Typhodont exercise

i. Band making

ii. Bracket positioning and placement

iii. Different stages of treatment

9.1.11 Clinical Photography

9.1.12 Computerized imaging

9.1.13 Preparation of surgical splints, and splints for TMJ problems

9.1.14 Handling of equipments like vacuum forming appliances and hydro solder etc.

9.1.1. Basic Pre-Clinical Exercise Work for the MDS Students

9.1.1.1 Non-appliance exercises

Sr. No.	Exercise	No.
1	Straightening of wire 6" long	1
2.	Square	1
3.	Rectangle	1
4	Triangle of 2" side	1
5.	Circle of 2" side	1
6.	Bending of U's and V's	1

9.1.1.2

Sr. No.	Exercise	No.
1.	$\frac{3}{4}$ Clasps	2
2.	Full Clasps	2
3.	Triangular Clasps	2

4.	Adam's clasp –Upper molar	2
5	Adam's clasp –Lower molar	2
6.	Adam's clasp –Pre- molar	2
7.	Adam's clasp –Incisor	2
8.	Modification of Adam's – With Helix	2
9.	Modification of Adam's – With distal extension	2
10.	Modification of Adam's –With soldered tube	2
11.	Duyzing Clasp on Molars	2
12.	Southend Clasp	1

9.1.1.3. LABIALBOWS

Sr. No.	Exercise	No.
1.	Short labial bow(upper &lower)	1
2.	Long labial bow(upper &lower)	1
3.	Robert's retractor	1
4.	High Labial bow-with apron spring's	1
5	Reverse loop labial bow	1
6.	Retention labial bow soldered to Adam's clasp	1
7.	Retention labial bow extending distal to second molar	1
8.	Fitted labial bow	1
9.	Split high labial bow	1
10.	Mill's Labial Bow	

9.1.1.4. SPRINGS

Sr. No.	Exercise	No.
1.	Finger spring–mesial movement	2
2.	Finger spring-distal movement	2
3.	Double cantilever spring	2
4.	Coffin spring	2
5.	T spring	2
6.	Flapper spring	

9.1.1.5. CANINE RETRACTORS

Sr. No.	Exercise	No.
1.	U loop canine retractor	2
2.	Helical canine retractor	2
3.	Palatal canine retractor	2
4.	Self supporting canine retractor	

9.1.1.6. APPLIANCES

Sr. No.	Exercise
1.	Hawley's retention appliance with anterior bite plane
2.	Upper Hawley's appliance with posterior bite plane
3.	Upper expansion appliance with coffin spring
4.	Upper expansion appliance with expansion screw
5.	Habit breaking appliance with tongue crib
6.	Oral screen
7.	Double Oral Screen
8.	Lip bumper
9.	Splint for Bruxism
10.	Catalans appliance
11.	Activator
12.	Bionator
13.	Frankel-FR2appliance
14.	Twin block
15.	Lingual arch
16.	TPA
17.	Quad helix
18.	Bihelix
19.	Utility arches
20.	Pendulum appliance

9.1.1.7. Soldering exercise

Sr. No.	Exercise	No
1.	Star	1
2.	Comb	1
3.	Christmas tree	1
4.	Soldering buccal tube on molar bands	1

9.1.1.8. Welding exercises

Sr. No.	Exercise
1.	Pinching and welding of molar, premolar, canine and Incisor bands
2.	Welding of buccal tubes and brackets on molar bands and incisor Bands

9.1.2 FIRST YEAR - SECONDTERM**9.1.2.1 Impression of upper and lower arches in alginate****9.1.2.2 Study model preparation****9.1.2.3 Model analysis**

Sr. No.	Exercise
1.	Impression of upper and lower dental arches
2.	PREPARATION OF STUDY MODEL–permanent dentition analysis to be done.
3.	PREPARATION OF STUDY MODEL–permanent dentition analyses to be done.
4.	PREPARATION OF STUDY MODEL-mixed dentition analyses to be done

9.1.2.4 Cephalometrics

Sr. No.	Exercise
1.	Lateral cephalogram to be traced in five different colors and super imposed to see the accuracy of tracing
2.	Steiner's analysis
3.	Down's analysis
4.	Tweed analysis
5.	Rickett's analysis
6.	Burstone Analysis
7.	Rakosi's Analysis
8.	Witt's Appraisal
9.	Mc namara analysis
10.	Bjork analysis
11.	Coben's Analysis
12.	Harvold's Analysis
13.	Cephalometrics for Orthognathic surgical cases
14.	Soft tissue analysis
15.	Soft tissue analysis-Holdaway and Burstone

9.1.2.5 Basic of Clinical Photography including Digital Photography

9.1.2.6 Light wire bending exercise for the Begg technique.

Sr. No.	Exercise
1.	Wire bending techniques on 0.016' wire
2.	Bonwill-Hawley ideal arch
3.	Making standard arch wire
4.	Inter maxillary hooks –Boot leg and Inter maxillary type
5.	Upper and Lower arch wire Stage-I
6.	Bending a double back arch wire
7.	Bayonet bends(vertical and horizontal offsets)
8.	Stage –III arch wires

9.	Torquing auxillary(upper)
10.	Reverse Torquing(lower)
11.	Up righting and rotating Spring

9.1.2.7 Typhodont exercises: (Begg's Tech.)

Sr. No	Exercise
1.	Teeth setting in Class II division I malocclusion with maxillary anterior Proclination and mandibular anterior crowding.
2.	Band pinching, welding brackets and buccal tubes to the bands
3.	Stage –I
4.	Stage –II
5.	Pre Stage–III
6.	Stage –III

Typhodont exercises: (Edgewise Tech.) Optional

Sr. No	Exercise
1.	Teeth setting in Class II division I malocclusion with maxillary Anterior Proclination and mandibular anterior crowding.
2.	Band pinching, welding brackets and buccal tubes to the bands
3.	Leveling
4.	Anchorage Preparation
5.	Canine Retraction
6.	Consolidation
7.	Detailing and finishing

9.1.3 Other work to be done during FIRST YEAR:

9.1.3.1 Seminars: Five seminars should be presented by each student each year.

9.1.3.2 Journal club: Four to Five journal club presentations should be done by each student each year.

9.1.3.3 Synopsis of dissertation: To be submitted on or before the end of six months from the date of admission. Pilot study should be completed by the end of one year. The dissertation should not be just a repetition of a previously undertaken study but it should try to explore some new aspect.

9.1.3.4 Pre-Clinical Exercises: To be completed within the six months. On completion of these exercises, student can start taking patients.

9.1.3.5 Inter-departmental meetings: Should be held once in a month.

9.1.3.6 Case discussions: Ten to twelve clinical case presentations should be done by each student each year.

9.1.3.7 Field visits: To attend dental camps and to educate the masses.

9.1.3.8 Library Thesis: To be submitted by the completion of 1st year.

9.1.3.9 Part-I Examination: Theory paper I (Applied Basic Sciences) is conducted at the end of 1st year. \

9. 2 SECOND YEAR- CLINICAL WORK:

Once the basic pre-clinical work is completed, the students can take up clinical cases and the clinical training is for the two and half years. **Each postgraduate student should start with a minimum of 50 cases of his / her own Additional he / she should handle a minimum of 20 transferred cases.**

9.2.1 Removable active appliances

9.2.2 Class-I malocclusion with Crowding

9.2.3 Class-I malocclusion with bi-maxillary protrusion

9.2.4 Class-II division - 1 9.2.5 Class – II division – 2.

9.2.6 Class-III (Orthopedic, Surgical Orthodontic cases).

9.2.7 Inter disciplinary cases

9.2.8 Removable functional appliances cases like activator, Bionator, functional regulator, twin block and new developments.

9.2.9 Fixed functional appliances –

9.2.10 Dento-facial orthopedic appliances like head gears, rapid maxillary expansion.

9.2.11 Appliance for arch development such as molar distalization.

9.2.12 Fixed mechano therapy cases (Begg, PEA)

9.2.13 Retention procedures of above treated cases.

9.2.14 OTHER WORK TO BE DONE DURING SECOND YEAR

9.2.14.1 Seminars: Five seminars should be presented by each student each year.

9.2.14.2 Journal club: Four to Five journal club presentations should be done by each student each year.

9.2.14.3 Dissertation work: On getting the approval from the university work for the dissertation to be started.

9.2.14.4 Inter-departmental meetings: Should be held once in a month.

9.2.14.5 Case discussions: Ten to twelve clinical case presentations should be done by each student each year.

9.2.14.6 Field visits: To attend dental camps and to educate the masses.

9.2.14.7 Undergraduate classes: Each post-graduate student should handle around 4-5 classes.

9.2.14.8 The clinical cases taken up should be followed under the guidance. More case discussions and cases to be taken up.

9.3 THIRD YEAR

CONTINUATION OF CLINICAL WORK AND ADDITIONAL WORK AS FOLLOWS:

9.3.1. **Seminars:** Five seminars should be presented by each student each year.

9.3.2. **Journal club:** Four to Five journal club presentations should be done by each student each year.

9.3.3. **Dissertation work:** The completed dissertation should be submitted six months before the final examination. Approval of dissertation is essential before a candidate appears for the University examination.

9.3.4. **Inter-departmental meetings:** Should be held once in a month.

9.3.5. **Case discussions:** Ten to twelve clinical case presentations should be done by each student each year.

9.3.6. **Field visits:** To attend dental camps and to educate the masses.

9.3.7. **Undergraduate classes:** Each post-graduate student should handle around 5 Classes.

9.3.8. The **clinical cases** taken up should be followed under the guidance. More case discussions and cases to be taken up.

9.3.9. Finishing and presenting the cases taken up.

9.3.10. Preparation of finished cases and presenting the cases (to be presented for the examination).

9.3.11. **Monitoring Learning Progress** a. It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists.

BOOKSRECOMMENDED:

No.	Title	Author	Publisher
1	An introductiontoorthodontics	Laura Mitchel	OxfordUni.Pre
2	Begg orthodontic theoryand technique	Begg, Kesling	Saunders
3	Biomechanical&Esthetic Stratgiesincli.ortho	Ravindra Nanda	Saunders
4	BiomechanicsinclinicalOrthodontics	Nanda	Saunders
5	ContemporaryOrthodontics	WilliamProffit	Mosby
6	Contemporarytreat. Of dentofacialdeformity	Profit,white,sarver	Mosby
7	CraniofacialDistractionOsteogenesis	Mikhail,Jason	Mosby
8	DentalInstrumentspocketguide	Linda Boyd	Elsevier
9	Dentofacialdeformity	Epker,Wolford	Mosby
10	Estheticorthodontia & orthodontic surgery	Sarver	Mosby
11	Facial & Dental planning for ortho. &oralsurg.	Arnett,McLaugh.	Mosby
12	Invisible Orthodontics	ScuzzoTakemoto	Quintessence
13	Managementof TMJdisorder &Occlusion	Okeson	Mosby
14	Microimplantinorthodontics	Jae-Hyunsung	Dentos
15	Ortho.mngt.ofdentitionwith preadjustedappli.	Bennet,Mclaugh.	Mosby
16	Ortho.mngt.of uncrowded Cl-II Div.1in children	JohnC.bennett	Mosby
17	Orthodontic conceptsandstratragies	Van der Luiden	Quintessence
18	Orthodonticprinciplesandpractice	T.M.Grabner	A.I.T.B.S

19	Orthodontic:Currentprinciplesandtech.	Graber, Vanarsdal	Mosby
20	Orthodontics, The art and science	S.I.Bhalaji	Arya
21	Problemsolvinginorthodontia	Burstone, Marcote	Quintessence
22	Radiographic Cephalometry	Alexander, Jacob	Quintessence
23	Removable Orthodontic appliances	Isaacson, muir	Elsevier
24	RiskManagementinOrthodontics	Graber, Athana.	Quintessence
25	Systemisedortho. Treatmentmechanics	M.B.T.	Mosby
26	Textbook of Orthodontics	Bishara	Saunders
27	Textbook of Orthodontics	GurkeeratSingh	Jaypee Bro.
28	TwinBlockfunctionaltherapy	Clark, Graber	Mosby
29	The design, construction and use of removable ortho.appl.(6ThEdition)	PhilipAdams	varghese
30	Textbook of Orthodontics- AIPD	M.S.Rani	AIPD
31	Oral healthfororthodontic patients	Heintze, Brinkmann	quintessence
32	ClinicalOrthodontics	Fisher	Saunders
33	Removable Orthodontic appliances	Graber, Neumann	Saunders
34	The Alexander discipline	WickAlexander	Ormco
35	Atlas of advanceorthodontics	AnthonyD Viazia	Saunders
36	The Tippededge orthodontics	RichardParkhouse	elsevier mosby
37	The orthodontic treatment of impacted teeth	AdrianBecker	informa health
38	Orthodontic materials	BrantleyElides	Thieme
39	RefinedBeggsfor modern times	V.P jayde	
40	Textbook of anatomy with colour atlas	I.B.singh	Jaypee Bro.
41	Human anatomy vol3	B Dchaurasia	CBS
42	Essentials of preventive and community dentistry	Sobenpeter	Arya(medi)
43	essential pathology for dental students	Harshmohan	jaypee Bro.
44	Human embryology	I.B.singh	Macmillan
45	Biochemistry	U.Sathya narayan	Books & Allied
46	Anatomy for dental students	Zargar	CBSPD
47	Textbook of human physiology for dental students	Indukhurana	Elsevier
48	Dental materials	PhilipAdams	Anusavice
49	Orthodontic prep. Manual	Premkumar	Elsevier

JOURNALS RECOMMENDED:

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| <ol style="list-style-type: none"> 1. Journal of Indian Orthodontic Society 2. American Journal of Orthodontics & Dentofacial Orthopedics 3. British Journal of Orthodontics (Journal of Orthodontics) 4. Journal of Clinical Orthodontics 5. Angle Orthodontist 6. Seminars in Orthodontics | } | Mandatory |
| <ol style="list-style-type: none"> 7. Australian Orthodontic Journal 8. The Cleft Palate Craniofacial Journal 9. International Journal of Adult Orthodontics And Orthognathic Surgery 10. European Journal of Orthodontics 11. Journal of World Orthodontics 12. Korean Journal of Orthodontics | } | Recommended |

University practical exam

PRACTICAL / CLINICAL EXAMINATION: 200 Marks

1. Exercise No: 1 Functional Case: 50 Marks recording of construction bite for functional appliance and Fabrication and delivery of the appliance

2. Exercise No.: 2 Multiband exercises: 50 Marks

- 1. Stage 3 with auxillary springs OR 2. Bonding of SWA brackets and construction of suitable arch wire.

3. Exercise No. 3 Display of records of the treated cases (minimum of 5 cases) 5 cases * 15 marks = 75 Marks

4. Exercise No: 4 Long case discussions: 25 Marks

No	Exercise	Marks allotted	Approximate time
1.	Functional appliance	50	1hour (Bite) 1hour (Delivery)
2.	III stage mechanics/Bonding And arch wire fabrication	50	1 hr30min
3.	Display of case records (assessment of minimum of 5 cases treated by the candidate during the course)	75	1hour
4.	Long case (Clinical case for diagnosis and treatment planning)	25	2hour

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 is 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