



MDS CURRICULUM

MDS Curriculum is available in VMSCD website and is subject to change from time to time based on council norms.

Orthodontics & Dentofacial orthopaedics

OBJECTIVES:

The training programme in Orthodontics is to structure and achieve the following four objectives

Knowledge:

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

Skills:

1. To obtain proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at a reasonable diagnosis about the Dentofacial deformities.
2. 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.

Attitude:

1. Develop an attitude to adopt ethical principles in all aspects of Orthodontic practice.
2. Professional honesty and integrity are to be fostered
3. Treatment care is to be delivered irrespective of the social status, cast, creed and religion of the patients.
4. Willingness to share the knowledge and clinical experience with professional colleagues
5. 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
6. Respect patients' rights and privileges, including patients right to information and right to seek a second opinion
7. Develop attitude to seek opinion from allied medical and dental specialists as and when require



PART-I: A. Applied Basic Sciences:

Applied Anatomy:

- a. Prenatal growth of head: Stages of embryonic development, origin of head, origin of face, origin of teeth.
- b. Postnatal growth of head: Bones of skull, the oral cavity, development of chin, the hyoid bone, general growth of head, growth of the face.
- c. Bone growth: Origin of bone, composition of bone, units of bone structure, schedule of Ossification, mechanical properties of bone, roentgen graphic appearance of bone
- d. Assessment of growth and development: Growth prediction, growth spurts, the concept of normality and growth increments of growth, differential growth, gradient of growth, methods of gathering growth data. Theories of growth and recent advances, factors affecting physical growth.
- e. Muscles of mastication:
Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion
- f. Development of dentition and occlusion: Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of occlusal development, pattern of occlusion.
- g. Assessment of skeletal age.

Physiology:

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

Dental Materials:

- a. Gypsum products: Dental plaster, dental stone and their properties, setting reaction etc.
- b. Impression materials: Impression materials in general and particularly of alginate impression material.
- c. Acrylics: Chemistry, composition physical properties
- d. Composites: Composition types, properties, setting reaction
- e. Banding and bonding cements:
- f. Wrought metal alloys: Deformation, strain hardening, annealing, recovery, recrystallization, grain growth, properties of metal alloys
- g. Orthodontic arch wires
- h. Elastics: Latex and non-latex elastics.
- i. Applied physics, Bioengineering and metallurgy:
- j. Specification and tests methods used for materials used in Orthodontics:
- k. Survey of all contemporary literature and recent advances in above mentioned materials:

Genetics:

- a. Cell structure, DNA, RNA, protein synthesis, cell division
- b. Chromosomal abnormalities
- c. Principles of orofacial genetics
- d. Genetics in malocclusion
- e. Molecular basis of genetics
- f. Studies related to malocclusion
- g. Recent advances in genetics related to malocclusion
- h. Genetic counseling
- i. Bioethics and relationship to Orthodontic management of patients.

**Physical Anthropology:**

- a. Evolutionary development of dentition
- b. Evolutionary development of jaws.

Pathology:

- a. Inflammation
- b. Necrosis

Biostatistics:

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

Applied Research Methodology In Orthodontics:

- a. Experimental design
- b. Animal experimental protocol
- c. Principles in the development, execution and interpretation of methodologies in Orthodontics
- d. Critical Scientific appraisal of literature. Applied Pharmacology Definitions & terminologies used – Dosage and mode of administration of drugs. Action and fate of drugs in the body, Drug addiction, tolerance and hypersensitive reactions, Drugs acting on the central nervous system, general anesthetics hypnotics, analeptics and tranquilizers. Local anesthetics, Chemotherapeutics and antibiotics. Vitamins: A, D, B – complex group, C & K etc.

PART-II: Paper-I: Basic Orthodontics Orthodontic History:

- a. Historical perspective,
- b. Evolution of orthodontic appliances,
- c. Pencil sketch history of Orthodontic peers
- d. History of Orthodontics in India

Concepts of Occlusion and Esthetics:

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

Etiology and Classification of Malocclusion:

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

Dentofacial Anomalies:

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

Diagnostic Procedures and Treatment Planning in Orthodontics:

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



Cephalometrics

- a. Instrumentation
- b. Image processing
- c. Tracing and analysis of errors and applications
- d. Radiation hazards
- e. Advanced Cephalometrics techniques including digital cephalometrics
- f. Comprehensive review of literature
- g. Video imaging principles and application.

Practice Management in Orthodontics:

- a. Economics and dynamics of solo and group practices
- b. Personal management
 - c. Materials management
- d. Public relations
- e. Professional relationship
- f. Dental ethics and jurisprudence
- g. Office sterilization procedures
- h. Community based Orthodontics.

Paper-II: Clinical Orthodontics

Myofunctional Orthodontics:

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

Dentofacial Orthopedics:

- a. Principles
- b. Biomechanics
- c. Appliance design and manipulation
- d. Review of contemporary literature

Cleft lip and palate rehabilitation:

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

Biology of tooth movement:

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

Orthodontic / Orthognathic surgery:

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

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

- a. Principles of interdisciplinary patient treatment
- b. Common problems and their management

Basic principles of mechanotherapy includes removable appliances and fixed appliances:

- a. Design
- b. Construction
- c. Fabrication
- d. Management
- e. Review of current literature on treatment methods and results

Applied preventive aspects in Orthodontics:

- a. Caries and periodontal disease prevention
- b. Oral hygiene measures
- c. Clinical procedures

Interceptive Orthodontics:

- a. Principles
- b. Growth guidance
- c. Diagnosis and treatment planning
- d. Therapy emphasis on:
 - Dento-facial problems
 - Tooth material discrepancies
 - Minor surgery for Orthodontics

Evidence Based Orthodontics:**Different types of fixed Mechanotherapy:****Orthodontic Management of TMJ problems, sleep-apnoea etc.****Retention and relapse:**

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

Recent Advances :

- a. Use of implants
- b. Lasers
- c. Application of F.E.M.
- d. Distraction Osteogenesis
- e. Invisible Orthodontics
- f. 3D imaging Digital Orthodontics, Virtual Treatment Planning
- g. CAD-CAM bracket Customization
- h. Robotic Wire Bending
- i. Accelerated Orthodontics
 - Surgical
 - Device assisted or mechanical stimulation
 - Biochemical Mediators
- j. Lingual Orthodontics



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

PRE – CLINICAL EXERCISES (Should be completed within 3 months)

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

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

Basic Pre-Clinical Exercise Work for the MDS Students:

1. Clasps:

Sl.No	Exercise	No.
1	¾ Clasps	1
2.	Triangular Clasps	1
3.	Adam's clasp	2
4.	Modification of Adam's – With Helix	2
5.	Southend Clasp	1

2. Labial Bows:

Sl.No.	Exercise	No.
1	Short labial bow (upper & lower)	1
2	Long labial bow (upper & lower)	1
3.	Split high labial bow	1



3.Springs:

Sl.No.	Exercise	No.
1	Double cantilever spring	1
2	Coffin spring	1
3	T spring	1

4.Appliances:

Sl.No.	Exercise	No.
1.	Hawley's retention appliance with anterior bite plane	1
2.	Upper Hawley's appliance with posterior bite plane	1
3.	Upper expansion appliance with expansion screw	1
4.	Habit breaking appliance with tongue crib	1
5.	Oral screen and double oral screen	1
6.	Lip bumper	1
7.	Splint for Bruxism	1
8.	Catalans appliance	1
9.	Activator	1
10.	Bionator	1
11.	Frankel-FR 1 & 2 appliance	2
12.	Twin block	1
13.	Lingual arch	1
14.	TPA	1
15.	Quad helix	1
16.	Utility arches	1
17.	Pendulum appliance	1
18.	Canine Retractor(Marcotte & PG Spring)	1

5. Soldering exercises

Sl.No.	Exercise	No.
1	Star/Comb/Christmas tree	1

6. Study model preparation:

7. Model analysis – Mixed and permanent Dentition

8.Cephalometrics:

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



9. Basics of Clinical Photography including Digital Photography:

10. Typodont exercises: Begg or P.E.A. method/Basic Edgewise:

Sl.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	Different Stages dependent on the applied technique

Scheme of examination:

A. Theory:

Part-I: Basic Sciences Paper

- 100 Marks

Part-II:

Paper-I, Paper-II & Paper-III -

- 300 Marks

(100 Marks for each Paper)

Written examination shall consist of Basic Sciences Paper (Part-I) of three hours duration and should be conducted at the end of First year of MDS course. Part-II Examination will be conducted at the end of Third year of MDS course. Part-II Examination will consist of Paper-I, Paper-II & Paper-III, each of three hours duration. Paper-I & Paper-II shall consist of two long answer questions carrying 25 marks each and five questions carrying 10 marks each. Paper-III will be on Essays. In Paper-III three Questions will be given and student has to answer any two questions. Each question carries 50 marks. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows: *

PART-I:

Applied Basic Sciences: Applied anatomy, Physiology, Dental Materials, Genetics, Pathology, Physical Anthropology, Applied Research methodology, Bio-Statistics and 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 Orthodontics

Paper II : Clinical Orthodontics

Paper III : Essays (descriptive and analyzing type questions) * The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

Practical / Clinical Examination :

200 Marks

Exercise No: 1

50 Marks

Functional Case : Selection of case for functional appliance and recording of construction bite.
Fabrication and delivery of the appliance the next day.

Exercise No: 2 :

50 Marks

1. III stage with auxiliary springs/Wire bending of any stage of fixed orthodontics (OR)
2. Bonding of SWA brackets and construction of suitable arch wire.

**Exercise No. 3****75 Marks**

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

Exercise No: 4**25 Marks**

Long case discussions

Time allotted for each exercise:

No	Exercise	Marks allotted	Approximate Time
1	Functional appliance	50	1 hour (each day)
2	III stage mechanics / Bonding and arch wire fabrication	50	1 hr 30 min
3	Display of case records (a minimum of 5 cases to be presented along with all the patients and records)	75	1 hour
4	Long cases	25	2 hours

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

C. Viva Voce :**100 Marks****i. Viva-Voce examination:****80 marks**

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

ii. Pedagogy Exercise:**20 marks**

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



First year work schedule

Day	8:30-10:00	10:00-12:30	12:30-1:30	1:30-2:30	2:30-3:30
Monday	JC/Seminar/Case discussion	OP/ Clinical Case Discussion	Lunch	Pre clinical excersice/OP cases	Basic Science / Pre clinical excersice
Tuesday	JC/Seminar/Case discussion	OP/ Clinical Case Discussion	Lunch	Theory topic Discussion	Basic Science / Pre clinical excersice
Wednesday	JC/Seminar/Case discussion	OP/ Clinical Case Discussion	Lunch	Pre clinical excersice	Basic Science / Pre clinical excersice
Thursday	JC/Seminar/Case discussion	OP/ Clinical Case Discussion	Lunch	LD/Thesis work approval	Basic Science / Pre clinical excersice
Friday	JC/Seminar/Case discussion	OP/ Clinical Case Discussion	Lunch	Theory topic Discussion	Basic Science / Pre clinical excersice
Saturday	JC/Seminar/Case discussion	OP/ Clinical Case Discussion	Lunch	Pre clinical excersice/OP cases	Basic Science / Pre clinical excersice

Second year work schedule

Day	8:30-10:00	10:00-12:30	12:30-1:30	1:30-2:30	2:30-3:30
Monday	JC/Seminar/Case discussion	ClinicalCase Review	Lunch	ClinicalCase Review	ClinicalCase Review
Tuesday	JC/Seminar/Case discussion	ClinicalCase Review	Lunch	ClinicalCase Review	ClinicalCase Review
Wednesday	JC/Seminar/Case discussion	ClinicalCase Review	Lunch	Clinical Case Review	
Thursday	JC/Seminar/Case discussion	ClinicalCase Review	Lunch	LD/Thesis/Short study work progress approval	
Friday	JC/Seminar/Case discussion	ClinicalCase Review	Lunch	Theory topic Discussion	ClinicalCase Review
Saturday	JC/Seminar/Case discussion	ClinicalCase Review	Lunch	ClinicalCase Review	ClinicalCase Review



Third year work schedule

Day	8:30-10:00	10:00-12:30	12:30-1:30	1:30-2:30	2:30-3:30
Monday	JC/Seminar/Case discussion	Clinical Case Review	Lunch	ClinicalCase Review	ClinicalCase Review
Tuesday	JC/Seminar/Case discussion	Clinical Case Review	Lunch	ClinicalCase Review	ClinicalCase Review
Wednesday	JC/Seminar/Case discussion	Clinical Case Review	Lunch	ClinicalCase Review	
Thursday	JC/Seminar/Case discussion	Clinical Case Review	Lunch	Thesis/Short study work progress approval	
Friday	JC/Seminar/Case discussion	Clinical Case Review	Lunch	Theory topic Discussion	ClinicalCase Review
Saturday	JC/Seminar/Case discussion	Clinical Case Review	Lunch	Clinical Case Review	

LIST OF INSTRUMENTS

1.	Adam's Universal plier	2 Nos
2.	Young's Universal plier	2 Nos
3.	Heavy wire cutter	2 Nos
4.	Glass plate with graph	2 Nos
5.	Glass marking pencil	2 Nos
6.	Geometry box	2 Nos
7.	Begg template	2 Nos
8.	Straight wire template	2 Nos
9.	Light archwire plier	2 Nos
10.	De la rosa pliers	2 Nos
11.	Tweed's loop forming plier	2 Nos
12.	Nance loop forming plier	2 Nos
13.	Ribbon arch plier	2 Nos
14.	Turret	1 Nos
15.	Mouth mirrors	10 Nos
16.	Probe	10 Nos



17.	Pair of Tweezers	10 Nos
18.	Patient apron	2 Nos
19.	Rubber bowl	2 Nos
20.	Spatula – Curved & Straight	2 Nos
21.	Impression trays	2 sets
22.	Base formers	2 Nos
23.	Separator inserting pliers	2 Nos
24.	Band trimming scissors with TC tip	2 Nos
25.	Boone's gauge with interchangeable leds	2 Nos
26.	Band contouring plier	2 Nos
27.	Band pusher	2 Nos
28.	Howe plier straight	2 Nos
29.	Howe plier curved	2 Nos
30.	Band seater	2 Nos
31.	Anterior band removing plier	2 Nos
32.	Posterior band removing plier	2 Nos
33.	Cheek Retractor	2 Nos
34.	Bracket Positioning Tweezer	2 Nos
35.	Weingart Plier	2 Nos
36.	Pin & Ligature Cutter	2 Nos
37.	Distal End Cutter With Safety Hold	2 Nos
38.	Mathieu Needle Holder	2 Nos
39.	Tie & Tucker	2 Nos
40.	Debonding pliers	2 Nos
41.	Kidney trays	5 Nos
42.	Intra oral mirrors	2 Nos



43.	MBT Positioning Gauge	2 Nos
44.	Three prong plier	2 Nos
45.	DSLR camera with ring flash	1 Nos
46.	Mackintosh Sheet	2 Nos

Miscellaneous:

Microsoft Tablet Pc

SUGGESTED TEXT BOOKS

1. Contemporary Orthodontics - William R. Proffit , Henry W. Fields , David M. Sarver .6th edition
2. Orthodontics principles and practice - T. M. Graber.1st edition
3. Orthodontics Current Principles and Techniques – Thomas Graber , Robert Vanarsdall , Katherine Vig.6th edition
4. Orthodontic Diagnosis -Thomas Rakosi, I. Jonas , Thomas M. Graber. 1st edition
5. An atlas and manual of cephalometric radiography - Thomas Rakosi 2nd edition
6. Orthodontic Cephalometry - Athanasios E. Athanasiou 1st edition
7. Radiographic cephalometry - Alexander Jacobson , Richard L. Jacobson 2nd edition
8. Facial growth - Donald H. Enlow 2nd edition
9. A synopsis of craniofacial growth - Don M. Ranly 2nd edition
10. Text book of craniofacial growth – Sridhar Premkumar 1st edition
11. Dentofacial orthopedics with functional appliances – Alexander G. Petrovic, Thomas M. Graber , Thomas Rakosi 3rd edition
12. Twin Block Functional Therapy: Applications in Dentofacial Orthopedics - William J. Clark 3rd edition
13. Orthodontics and Dentofacial Orthopedics – James A. McNamara , William L. Brudon 2nd edition
14. Biomechanics in Clinical Orthodontics - Ravindra Nanda 1st edition
15. Biomechanics and Esthetic Strategies in Clinical Orthodontics - Ravindra Nanda 1st edition
16. Biomechanics in Orthodontics - Michael R. Marcotte .1st edition



17. Contemporary treatment of dentofacial deformity – William R. Proffit, Raymond P. White, David. M.Sarver 4th edition
18. Orthodontic Theory and Technique - P.R. Begg, Peter Kesling 3rd edition
19. Straight Wire Appliance - Lawrence F. Andrews 1st edition
20. Orthodontic Treatment Mechanics and the Preadjusted Appliance - McLaughlin, Bennett 1st edition
21. Orthodontic Management of the Dentition with the Preadjusted Appliance – McLaughlin, Bennett 1st edition
22. Systemized Orthodontic Treatment Mechanics - McLaughlin, Bennett and Trevisi 2nd edition
23. Orthodontic materials -William A. Brantley, Theodore Eliades 3rd edition
24. Hand book of orthodontics -Robert E. Moyers 1st edition
25. Orthodontic and orthopedic treatment in the mixed dentition - James A. McNamara , William L. Brudon 3rd edition
26. The 20 Principles of the Alexander Discipline - R. G. Alexander 1st edition
27. Bioprogressive therapy - Robert M. Ricketts 1st edition
28. Tip-Edge Orthodontics - Richard Parkhouse 2nd edition
29. Human Embryology – T.W. Sadler 12th edition
30. Fundamental concepts of biomechanics –Gustavo H Gamaro 1st edition
31. Handbook of Orthodontics- Martyn T Cobourne 1st edition
32. Straight wire orthodontics - Shadi S Samawi 1st edition
33. Orthodontic treatment of Class II Non compliant patient –Moschos A Papadopoulos 1st edition
34. Orthodontically driven corticotomy –Wiley Blackwell 1st edition
35. A Short guide to clinical digital photography in Orthodontics- Shadi S Samawi 2nd edition