

# JODHPUR DENTAL COLLEGE GENERAL HOSPITAL

## Department of Orthodontics & Dentofacial Orthopedics

### POST GRADUATE COURSE CURRICULUM:

Six months teaching of basic subjects including completion of pre – clinical exercises and 2 ½ years of coverage of all the relevant topics in Orthodontics. Clinical training involving treatment of patients and submission of dissertation. These may be divided into blocks of 6 to 8 months duration each, depending on the training policies.

### FIRST YEAR:

#### **I. APPLIED ANATOMY:**

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

- Bone growth:

Origin of bone, composition of bone, units of bone structure, schedule of Ossification, mechanical properties of bone, roentgen graphic appearance of bone

- Assessment of growth and development:

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

- Muscles of mastication:

Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion

- Development of dentition and occlusion:

Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of occlusal development, pattern of occlusion.

- Assessment of skeletal age

The carpal bones, carpal x – rays, cervical vertebrae

#### **II PHYSIOLOGY:**

- **Endocrinology and its disorders**

(Growth hormone, thyroid hormone, parathyroid hormone, ACTH) pituitary gland hormones, thyroid gland hormones, parathyroid gland hormones

- **Calcium and its metabolism**

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

- **Muscle physiology**

- **Craniofacial Biology:** cell adhesion molecules and mechanism of adhesion

- **Bleeding disorders in orthodontics: Hemophilia**

#### **III DENTAL MATERIALS:**

- **Gypsum products:** dental plaster, dental stone and their properties, setting reaction etc.

- **Impression materials:** impression materials in general and particularly of alginate impression material.

- **Acrylics:** chemistry, composition physical properties

- **Composites:** composition types, properties setting reaction

- **Banding and bonding cements:** Zn (PO<sub>4</sub>)<sub>2</sub>, zinc silicophosphate, Zinc polycarboxylate, resin cements and glass ionomer cements

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- **Wrought metal alloys:** deformation, strain hardening, annealing, recovery, recrystallization, grain growth, properties of metal alloys
- **Orthodontic arch wires:** stainless steel gold, wrought cobalt chromium nickel alloys, alpha&beta titanium alloys
- **Elastics:** Latex and non-latex elastics.
- **Applied physics,** Bioengineering and metallurgy.
- **Specification and tests methods** used for materials used in Orthodontics
- **Survey of all contemporary literature and Recent advances** in above – mentioned materials.

### **IV. GENETICS:**

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

### **V. PHYSICAL ANTHROPOLOGY:**

- Evolutionary development of dentition
- Evolutionary development of jaws.

### **VI. PATHOLOGY:**

- Inflammation
- Necrosis

### **VII. BIostatISTICS:**

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

### **VIII. APPLIED RESEARCH METHODOLOGY IN ORTHODONTICS:**

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

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### **IX. APPLIED PHARMACOLOGY**

#### **X. ORTHODONTIC HISTORY:**

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

#### **XI. CONCEPTS OF OCCLUSION AND ESTHETICS:**

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

#### **XII. ETIOLOGY AND CLASSIFICATION OF MALOCCLUSION:**

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

#### **XIII. DENTOFACIAL ANOMALIES:**

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

#### **XIV. CHILD AND ADULT PSYCHOLOGY:**

- Stages of child development.
- Theories of psychological development.
- Management of child in orthodontic treatment.
- Management of handicapped child.
- Motivation and Psychological problems related to malocclusion / orthodontics
- Adolescent psychology
- Behavioral psychology and communication

#### **XV. DIAGNOSTIC PROCEDURES AND TREATMENT PLANNING IN ORTHODONTICS**

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

#### **Cephalometrics**

- Instrumentation
- Image processing
- Tracing and analysis of errors and applications
- Radiation hygiene
- Advanced Cephalometrics techniques
- Comprehensive review of literature
- Video imaging principles and application.

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**Basic Pre-Clinical Exercise Work for the MDS Students: First 6 Months:**

**1. NON-APPLIANCE EXERCISES**

All the following exercises should be done with 0.7 or 0.8mm wire

- 1 Straightening of 6" & 8" long wire 1 each
- 2 Square 1
- 3 Rectangle 1
- 4 Triangle of 2" side 1
- 5 Circle of 2" side 1
- 6 Bending of 5U's 1
- 7 Bending of 5V's 1

**2. CLASPS**

- 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 Duryzing Clasps on Molars 2
- 12 Southend Clasp 1

**3. LABIAL BOWS**

- 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 Mill's labial bow 1
- 6 Reverse loop labial bow 1
- 7 Retention labial bow soldered to Adam's clasp 1
- 8 Retention labial bow extending distal to second molar 1
- 9 Fitted labial bow 1
- 10 Split high labial bow 1

**4. SPRINGS**

- 1 Finger spring-mesial movement 2
- 2 Finger spring-distal movement 2
- 3 Double cantilever spring 2
- 4 Flapper spring 2
- 5 Coffin spring 2

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6 T spring 2

### **5. CANINE RETRACTORS**

- 1 U loop canine retractor 2PAIRS
- 2 Helical canine retractor 2PAIRS
- 3 Palatal canine retractor 2PAIRS
- 4 Self –supporting canine retractor 2PAIRS
- 5 Self –supporting canine retractor 2PAIRS

### **6. APPLIANCES**

- 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 coffin spring
- 5 Upper expansion appliance with expansion screw
- 6 Habit breaking appliance with tongue crib
- 7 Oral screen and double oral screen
- 8 Lip bumper
- 9 Splint for Bruxism
- 10 Catalans appliance
- 11 Activator
- 12 Bionator
- 13 Frankel-FR 2 appliance
- 14 Twin block
- 15 Lingual arch
- 16 TPA
- 17 Quad helix
- 18 Bihelix
- 19 Utility arches
- 20 Pendulum appliance

### **7. Soldering exercises:**

- 1 Star 1
- 2 Comb 1
- 3 Christmas tree 1
- 4 Soldering buccal tube on molar bands 1

### **8. Welding exercises:**

- 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. Impression of upper and lower arches in alginate**

### **10. Study model preparation**

### **11. Model analysis**

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- 1 Impression of upper and lower dental arches
- 2 PREPARATION OF STUDY MODEL – 1  
And all the permanent dentition analyses to be done.
- 3 PREPARATION OF STUDY MODEL – 2  
And all the permanent dentition analyses to be done.
- 4 PREPARATION OF STUDY MODEL – 3  
And all the mixed dentition analyses to be done.

### **12. Cephalometrics**

- 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 Burrstone analysis
- 7 Rakosi's analysis
- 8 Mc Namara analysis
- 9 Bjork analysis
- 10 Coben's analysis
- 11 Harvold's analysis
- 12 Soft tissue analysis – Holdaway and Burstone

### **13. Basics of Clinical Photography including Digital Photography**

#### **14. Light wire bending exercises for the Begg technique**

- 1 Wire bending technique on 0.016' wire circle "Z" Omega
- 2 Bonwill-Hawley diagram
- 3 Making a standard arch wire
- 4 Inter maxillary hooks- Boot leg and Inter Maxillary type
- 5 Upper and Lower arch wire
- 6 Bending a double back arch wire
- 7 Bayonet bends (vertical and horizontal offsets)
- 8 Stage-III arch wire
- 9 Torquing auxiliary (upper)
- 10 Reverse Torquing (lower)
- 11 Up righting spring

#### **15. Typhodont exercises: (Begg or P.E.A. method)**

- 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

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**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. Additionally he/she should handle a minimum of 20 transferred cases.**

The type of cases can be as follows:

- i. Removable active appliances- 5 cases
- ii. Class-I malocclusion with Crowding
- iii. Class-I malocclusion with bi-maxillary protrusion
- iv. Class-II division-1
- v. Class-II division-2
- vi. Class-III (Orthopedic, Surgical, Orthodontic cases)
- vii. Inter disciplinary cases
- viii. Removable functional appliance cases like activator, Bionator, functional regulator, twin block and new developments
- ix. Fixed functional appliances – Herbst appliance, jasper jumper etc – 5 cases
- x. Dento-facial orthopedic appliances like head gears, rapid maxillary expansion niti expander etc., - 5 cases
- xi. Appliance for arch development such as molar distalization– 5 cases
- xii. Fixed mechano therapy cases (Begg, PEA, Tip edge, Edgewise)

Retention procedures of above treated cases.

**Other work to be done during First year:**

1. Seminars: One Seminar per week to be conducted in the department. A minimum of five seminars should be presented by each student each year
2. Journal club: One Journal club per week to be conducted in the department. A minimum of five seminars should be presented by each student each year
3. Protocol for dissertation to be submitted on or before the end of six months from the date of admission.
4. Under graduate classes: Around 4 – 5 classes should be handled by each post-graduate student
5. Field survey: To be conducted and submit the report
6. Inter-departmental meetings: should be held once in a month.
7. Case discussions
8. Field visits: To attend dental camps and to educate the masses
9. Basic subjects classes
10. Topic for Library Dissertation to be allotted after submission of dissertation synopsis
11. Departmental tests to be conducted once every month

**SECOND YEAR:**

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### **XVII. PRACTICE MANAGEMENT IN ORTHODONTICS:**

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

### **XVIII. CLINICAL ORTHODONTICS:**

#### **Myofunctional Orthodontics:**

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

#### **Dentofacial Orthopedics**

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

#### **Cleft lip and palate rehabilitation:**

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

#### **Biology of tooth movement:**

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

#### **Orthodontic / Orthognathic surgery:**

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

#### **Ortho / Perio / Prostho inter relationship**

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



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### **Basic principles of Mechanotherapy** ( Includes Removable appliances and fixed appliances)

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

### **Applied preventive aspects in Orthodontics**

- Caries and periodontal disease prevention
- Oral hygiene measures
- Clinical procedures

### **Interceptive Orthodontics**

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

### **Retention and relapse**

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

### **XIX.RECENT ADVANCES LIKE:**

- Use of implants
- Lasers
- Application of F.E.M.
- Distraction Osteogenesis

### **Second Year:**

The clinical cases taken up should be followed under the guidance. More case discussions and cases to be taken up. Other routine work as follows.

1. **Seminars:** One Seminar per week to be conducted in the department. Each student should present a minimum of five seminars each year.

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2. **Journal club:** One Journal club per week to be conducted in the department. Each student should present a minimum of five seminars each year.
3. **Library assignment to be submitted on or before the end of six months of second year.**
4. **Undergraduate classes:** each post-graduate student should handle around 4-5 classes.
5. **Inter-departmental meetings:** Should be held once in a month
6. **Case discussions**
7. **Field visits: To attend dental camps and to educate the masses.**
8. **Internal assessment or term paper.**
9. **Dissertation work:** On getting the approval from the university work for the dissertation to be started.
10. Departmental tests to be conducted once every month

#### **Third Year:**

The clinical cases taken up should be followed under the guidance. More cases discussions and cases to be taken up. Other routine work as follows:

1. **Seminars:** One Seminar per week to be conducted in the department. Each student should present a minimum of five seminars each year.
2. **Journal Club:** One Journal club per week to be conducted in the department. A minimum of five seminars should be presented by each student each year
3. **Under graduate classes:** each post – graduate student, should handle Around 4-5 classes.
4. **Inter-departmental meetings:** Should be held once in a month.
5. **The completed dissertation should be submitted six months before the final examination**
6. **Case discussions**
7. **Field visits:** To attend dental camps and to educate the masses.
8. Finishing and presenting the cases taken up.
9. **Preparation of finished cases and presenting the cases** (to be presented for the examination)
10. **Mock examination**

#### WEEKLY DISTRIBUTION OF TEACHING / CLINICAL / SEMINAR / LECTURE SESSIONS:

##### **TIME TABLE FOR I st M.D.S**

Day	08.00 – 09.00	09.00- 10.00	10.00 – 02.00
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Mon	Basic sciences	Seminar	Clinics
Tues	Basic sciences	Case Discussion	Clinics
Wed	Basic sciences	Journal Club	Clinics
Thu	Basic sciences	Case Discussion	Clinics
Fri	Basic sciences	Dissertation work	Clinics
Sat	Basic sciences	Case Discussion	Clinics

Pre clinical Exercises to be done in Clinical Hours.

**TIME TABLE FOR II M.D.S**

Day	08.00 – 09.00	09.00- 02.00
Mon	Seminar	Clinics
Tues	Case Discussion	Clinics
Wed	Journal Club	Clinics
Thu	Seminar	Clinics
Fri	Dissertation work	Clinics
Sat	Case Discussion	Clinics

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**TIME TABLE FOR III M.D.S**

Day	08.00 – 10.00	10.00- 02.00
Mon	Seminar	Clinics
Tues	Case Discussion	Clinics
Wed	Journal Club	Clinics
Thu	Seminar	Clinics
Fri	Journal Club	Clinics
Sat	Case Discussion	Clinics

Tentative periods for submission of post graduate work:

Sr. No.	Work	Period
1.	Allotment of Dissertation	6 weeks from start of PG Course
2.	Submission of synopsis	6 months after starting of PG Course
3.	Allotment of library Dissertation	6 months after starting of PG Course
4.	Submission of Library Dissertation	1 year after allotment
5.	Submission of Dissertation	6 months before Final examination in Third year
6.	Pre-clinical work submission	6 months from start of PG Course

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7.	Clinical work allotment	6 months after starting of PG Course / Immediately after submission of pre-clinical work
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- One Poster and two Papers to be presented in any Specialty or National conference by each post-graduate student by the end of second year.

- One Publication in a National or Specialty Journal by each post-graduate student by 6 months before the end of the course

**SCHEME OF EXAMINATION**

**A. Theory : 300 Marks**

Written examination shall consist of four question papers each of three hours duration. Total marks for each paper will be 75. Paper I, II and III shall consist of two long questions carrying 20 marks each and 5 short essay questions each carrying 7 marks. Paper IV will be on Essay. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows:

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PAPER-I: Applied Basic Sciences: Applied Anatomy and Histology, Applied Physiology and Biochemistry, Applied Pathology, Microbiology, Oral Pathology, Physical and Social Anthropology, Applied Pharmacology and Research Methodology and Biostatistics.

Paper II: Orthodontic history, concept 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 III: Clinical Orthodontics.

Paper IV: Essay.

**B. Practical / Clinical Examination: 200 Marks**

**Exercise no: 1 Functional Case** 50 Marks.

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

Fabrication and delivery of the appliance the next day.

**Exercise no: 2 Multiband exercises** 50 marks.

1. III stage with auxiliary spring

Or

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

**Exercise No: 3 Display of records of treated cases** (minimum of 5 cases)

5 Cases x 20 marks = 100 marks.

**C. Viva Voce: 100 Marks**

A) 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

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components of course contents. It includes presentation and discussion of the dissertation also.

B) Pedagogy Exercise: 20 Marks.

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