FOUNDATION UNIVERSITY
COLLEGE OF DENTISTRY

ORTHODONTICS
Study Guide

FINAL YEAR BDS

Mission:

Equip students with necessary knowledge, skills and attitudes to successfully practice Orthodontics component of the undergraduate dentistry course.

Introduction:

Orthodontics is the specialty of dentistry which is concerned with growth of craniofacial complex, development of occlusion and treatment of the dentofacial abnormalities.

It deals with alignment of teeth and corrects occlusal relationships for optimum function of the oral cavity. It facilitates patients for improvement in oral hygiene. It contributes towards improvement in esthetics through correction of facial asymmetry and creating a balanced profile. It facilitates other specialties in the management of complex facial dentofacial deformities including syndromes such as cleft lip and palate. With the introduction of new specialties such as Sleep Medicine, the specialty of orthodontics provides management support. It assists in rehabilitation of dentition to other dental specialties e.g. missing teeth.

Orthodontics in Pakistan is a rapidly growing dental specialty as general awareness towards improved esthetics is high. It has been found that 40% to 60% of children between the ages of 12-14 years needs orthodontic treatment,[1,2] with a greater percentage of females complaining of forward teeth.[3] The treatment provided, however, ranges to all ages, given to advances in the recent years.

Attributing to the rapidly changing demands, it is intended to generate professionals with sound knowledge of basic orthodontics. The objective is to facilitate students in their future dental careers by providing them a strong foundation which allows them to compete locally and internationally.

1. Fida M. Orthodontic treatment need in a sample Pakistani population. J Coll Physicians Surg Pak. 2000; 10:360-4
2. Bashir U, Hameed W. An index study of orthodontic treatment need in a teaching hospital. J Coll Physicians Surg. 2002; 12:602-5
3. Gul-e-Erum, Fida M. Pattern of malocclusion in orthodontic patients: a hospital based study. J Ayub Med Coll. 2008;20*:* 43-7*.*

Learning Outcomes of Course of Orthodontics:

By the end of this course of Orthodontics, students of Final year BDS will be able to:

- Acquire a professional and ethical approach to patient care
- Exemplify a professional attitude to all members of the dental team
- Impart a scientific attitude, an inquiring mind and the stimulation of professional curiosity
- Recognize common orthodontic problems
- Perform basic clinical examination of an orthodontic patient.
- Identify conditions requiring preventive and interceptive treatment
- Define and classify malocclusion using standardized systems
- Diagnose malocclusions clinically and cephalometrically
- Diagnose anomalies of the dentition.
- Detect deviations in the development of the dentition, of facial growth and the possession of functional abnormalities.
- Evaluate the need for orthodontic treatment
- Demonstrate basic wire bending skills
- Fabricate removable appliances
- Demonstrate diagnostic skills, clinically, radiographically, and, using orthodontic casts
- Formulate a comprehensive treatment plan for patients
- Generate adequate referrals
- Acquire an ability to develop themselves by both reflective practice and self-evaluation

Teaching and learning methodologies:

Teaching and learning methods are primarily focused more on promoting active learning through active participation of the learner. Actively learning students take charge of their own learning, actively seeking guidance and performance feedback from tutors, and routinely conducting self-assessment of their own learning needs.

TEACHING & LEARNING MODALITIES

- Large Group Interactive Sessions (LGIS)
- Small Group Interactive Sessions (SGIS)
- Self-Directed Learning (SDL)

Following teaching modalities may be used for clinical/ small group teaching:

1. Live patient demonstrations by supervisors

2. Video demonstrations
3. Case based learning/clinical scenario based learning
4. Formative supervised learning events in clinical settings such as
    a. Mini-CEX (Mini Clinical Evaluation Exercise)
    b. DOPS (Direct Observation Of Procedural Skills)
    c. OMP (One Minute Preceptor)
5. Role plays
6. Students' presentations
7. Discussions
8. Peer learning
9. Projects/ Assignments

Number of study hours (Lectures+ Practical) for Orthodontics: 295 hours

RECOMMENDED REFERENCE MATERIAL:

1. Contemporary Orthodontics, William R Proffit, 6th Edition
2. An Introduction to Orthodontics, Laura Mitchell 5th Edition
3. Hand Book of Orthodontics, Robert-E-Moyers

FACULTY OF DEPARTMENT

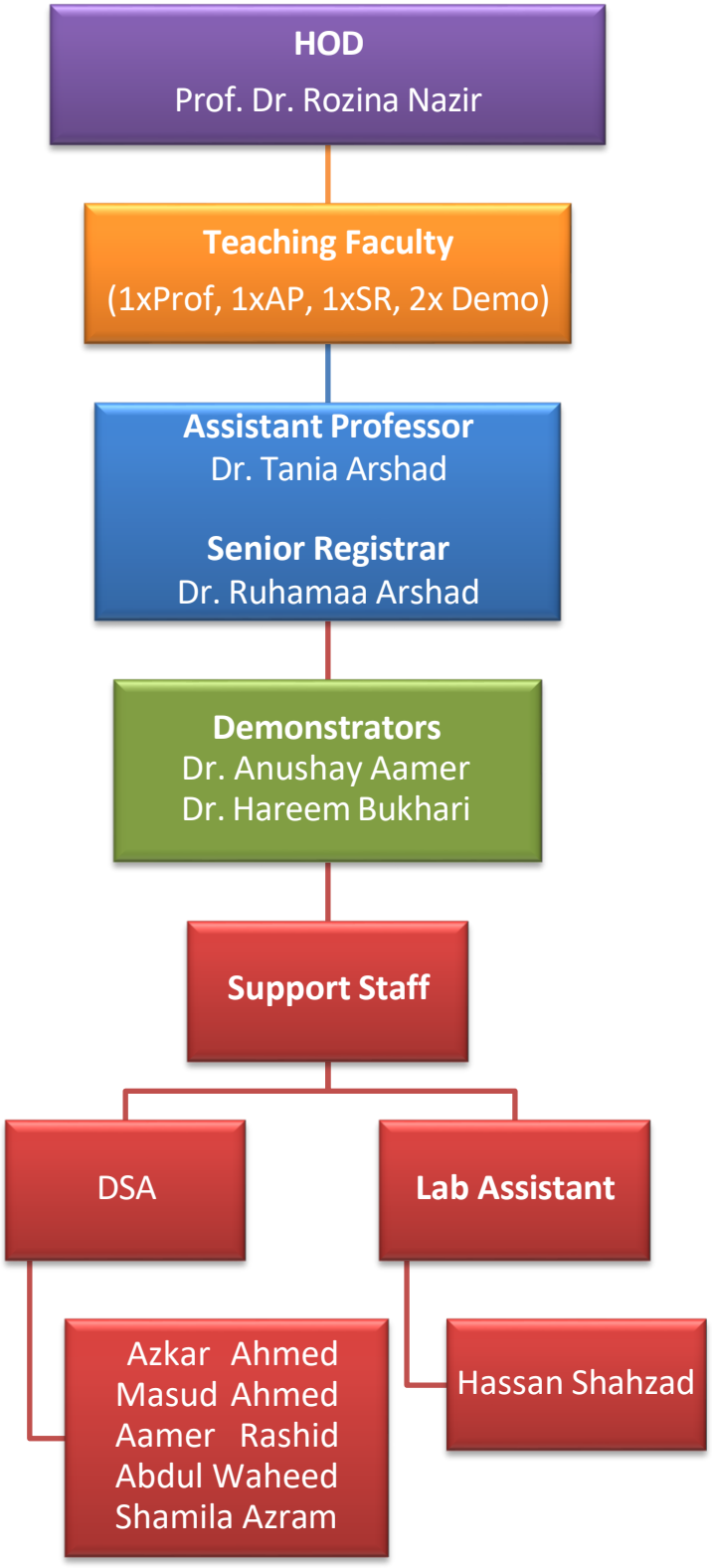
Head of department:

Professor Dr. Rozina Nazir (BDS, FCPS, MHPE)

Faculty members:

Assistant Professor. Dr. Tania Arshad Siddiqui (BDS, FCPS, AcMed)
Senior Registrar. Dr. Ruhamaa Arshad (BDS, FCPS, CHPE)
Demonstrator. Dr. Anushay Amir (BDS)
Demonstrator. Dr. Syeda Hareem Bukhari (BDS)

Department of Orthodontics – Organogram



Marks Distribution

Theory paper 100 marks				Practical/OSCE Viva 200 marks	
Type of Assessment	**MCQ's**	**SEQ's**	**Internal Assessment 10%**	**OSCE/OSPE Viva**	**Internal Assessment 10%**
Description	40 MCQs One mark each	10 SEQs 5 Marks each	10 marks	14 stations in total (180 Marks) 8 static stations of 10 marks each (80 Marks) 4 interactive stations of 10 marks each (40 Marks) 2 Viva stations of 30 marks each (60 Marks)	20 marks
Marks	**40**	**50**	**10**	**180**	**20**

COURSE OUTLINE

Course content	Learning Objectives	No of lectures	Practical hours	Teaching Strategy	Assessment Method
1. Introduction **i. Definitions and Terminologies** **ii. Types** **1. Preventive** **2. Interceptive** **3. Corrective** **iii. Aims and needs for Orthodontic Treatment**	By the end of the session, students will be able to: • Define various terminologies and types of orthodontic treatment modalities • Describe aims and need for orthodontic treatment	4	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
2. Growth and Development **i. Basic concepts and definitions** **ii. Variables affecting growth** **iii. Prenatal and postnatal craniofacial growth** **iv. Methods of studying growth** **v. Theories of growth** **vi. Clinical application of growth and development in orthodontics** **vii. TMJ Development**	• Discuss basic concept of growth and development of craniofacial region related to orthodontics	7	0	LGIS SGIS SDL Videos	Written test MCQs SAQs Viva voce OSCE
3. Occlusion **i. Normal Occlusion** **ii. Andrews Six Keys of Occlusion**	• Identify Normal occlusion • Define Andrews Six Keys of Occlusion	2	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
4. Diagnostic Aids in Orthodontics i. **History** ii. **Clinical Evaluation** 1. **Extraoral examination** 2. **Intraoral examination'** iii. **Radiographs** 1. **Periapical X rays**	• Acquire proper history of a patient • Evaluate effects of local and systemic conditions and medications on orthodontic treatment • Demonstrate intra and extra oral examination.	8	25 25	LGIS SGIS SDL Practical	Written test Practical exam Viva voce clinical observation of

2. **Orthopantomogram** 3. **Occlusal X rays** 4. **Hand and Wrist Radiograph** 5. **Cephalometric X ray** **(1)Identifying relevant anatomical structures and landmarks** **(2)Tracing** **(3)Analyses** iv. **Tooth mass and size analyses** **(Cast analysis, Bolton Analysis, Mixed Dentition Analysis, Arch Length Discrepancy)** v. **Formulation of problem list**	• Identify and diagnose different intra and extra-oral x-rays, along with their indications • Identify and interpret cephalometric radiograph • Measure tooth mass and size analyses • Formulate a problem list		50 65		skill
5. Dental Radiology **i. Roentgen Anatomy of teeth, jaws and T M Joint** **ii. Variations within normal limits, and abnormalities** **iii. Different types of X-Rays machines** **iv. Varieties of X-Ray Films: Extra Oral, Intra oral, Bite wing and Occlusal films** **v. Film taking and exposure procedures** **vi. Film development techniques** **vii. Indications and uses of dental radiology** **viii. Interpretation of films** **ix. Radiation Hazards**	• Recognize radiographic anatomy of teeth and allied structures • Identify different types of x-ray machines, views and apply indication of different exposure techniques • Interpret radiographs • Identify methods to control radiation exposure	3	0 0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
6. Development of dentition and occlusion **i. Prenatal development of dentition**	• Describe development of dentition and occlusion. • Describe Prenatal,	4	0	LGIS SGIS SDL	Written test MCQs SAQs

ii. Features of Primary dentition **iii. Mixed dentition period** **iv. Permanent dentition period** **v. Dimensional changes in dental arch** **vi. Variations in development including size, form, number and position of teeth** **vii. Factors affecting development**	primary, mixed and permanent dentition periods • Describe factors affecting development of dentition and occlusion			Viva voce OSCE
7. Malocclusion **i. Definitions** **ii. Classification** **iii. Etiology of Malocclusion** **1. Local factors** **2. Heredity** **3. Environmental Factors**	• Repeat Classification of Malocclusion • Describe etiology of malocclusion	1 0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
8. Preventive and Interceptive Orthodontics **i. Diagnosis and Management of Habits** **ii. Space supervision** **iii. Space maintenance** **iv. Space regaining** **v. Serial Extractions**	• Differentiate Preventive and Interceptive Orthodontics. • Classify, describe and determine various space management protocols • Define serial extractions • Cite the indications for serial extractions • Select appropriate patients for procedure • Distinguish between different methods	2	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
9. Bone metabolism **i. Normal Structure of Periodontal Ligament and Bone** **ii. Effects of Orthodontic force** **iii. Factors affecting tooth movement**	• Describe bone metabolism. • Describe effects of orthodontic forces on periodontium • Describe factors	2 0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE

	affecting orthodontic tooth movement.				
10. Biomechanics **i. Concepts, Types and Control of Anchorage** **ii. Types of Wires and Alloys used in orthodontics** **iii. Ideal properties of Orthodontic wires and comparison of different alloys**	• Tabulate principles of biomechanics • Identify types of wires and alloys used in orthodontics • Compare properties of materials used in orthodontics	3	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
11. Retention and relapse i. **Concepts of retention and relapse** ii. **Occlusal Stability and factors related to retention** iii. **Strategies of management**	• Differentiate between retention and relapse • Identify and differentiate factors related to stability and retention • Identify methods to prevent relapse	2	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
12. Removable appliances i. **Types** ii. **Indications** iii. **Construction** iv. **Wire work for removable appliances** v. **Fabrication of removable appliances**	• Construct removable appliances. • Demonstrate wire work for removable appliance • Demonstrate fabrication of removable appliance	2	67	LGIS SGIS SDL	Written test/Practical exam /Viva voce/ clinical observation of skill
13. Functional appliances i. **Types** ii. **Indications** iii. **Construction**	• Identify different types of appliances • Compare and differentiate between skeletal, dental and soft tissue effects of the appliances • Select appropriate appliances dependent on patient need • Choose appropriate patients for treatment	2	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
14. Various extraoral appliances i. **Head Gear** ii. **Face Mask**	• Identify different types of appliances • Compare and	3	0	LGIS SGIS SDL	Written test MCQs SAQs

iii. **Chin Cup**	differentiate between skeletal, dental and soft tissue effects of the appliances • Select appropriate appliances dependent on patient need • Choose appropriate patients for treatment				Viva voce OSCE
15. Deep Bite i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
16. Open Bite i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
17. Cross Bite i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE

	methods of treatment • Identify and select appropriate treatment strategy at different stages of development				
18. Impacted Canine i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	2	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
19. Fixed appliances i. **Introduction and background of different systems** ii. **Indications and drawbacks** iii. **Components and its accessories** iv. **Edgewise and Straight Wire systems** v. **Bonding and Banding materials**	• Repeat indications of fixed appliances • Distinguish different types of fixed appliances • Differentiate between materials used for banding and bonding • Describe the steps for banding and bonding procedures	3	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
20. Class I Malocclusion i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE

21. Class II Div 1 Malocclusion i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
22. Class II Div 2 Malocclusion i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
23. Class III Malocclusion i. **Definition** ii. **Etiology** iii. **Clinical Features** iv. **Treatment**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE
24. Surgical Orthodontics i. **Indications** ii. **Various Surgical Procedures**	• Tabulate indications of surgical orthodontic and various surgical procedures	1	0	LGIS SGIS SDL Videos	Written test MCQs SAQs

	• Select appropriate surgical procedure depending on need				Viva voce OSCE
25. Cleft Lip and Palate **i. Etiology** **ii. Clinical Features** **iii. Different clinical procedure involved during management of cleft lip and palate patient**	• Define the condition • Distinguish and state types and classification • Identify etiological factors and describe the pathophysiology • Compare and differentiate between methods of treatment • Identify and select appropriate treatment strategy at different stages of development • Formulate different treatment steps involved in cleft lip and palate patient management	1	0	LGIS SGIS SDL Videos	Written test MCQs SAQs Viva voce OSCE
26. Common Syndromes affecting craniofacial region	• State clinical features of common syndromes affecting craniofacial region	1	0	LGIS SGIS SDL	Written test MCQs SAQs Viva voce OSCE

CLINICAL ROTATION

The following procedures will be performed by students under supervision

NO	LEARNING OBJECTIVES	LEARNING MODALITY
1.	Acquire and write patient history	Live Patient Demo Mini CEX
2.	Record orthodontic impressions and clinical photographs	Live Patient Demo DOPS
3.	Demonstrate skills for intra and extra oral clinical examination	Live Patient Demo Mini CEX
4.	Formally present orthodontic cases for treatment planning	SGIS
5.	Identify instruments and appliances along with specific uses	Demonstrate in SGIS SDL
6.	Observe fixed orthodontic cases	Chair side learning
7.	Demonstrate wire bending skills	Demonstration in SGIS SDL
8.	Fabricate removable appliances	Lab based learning
9.	Trace, measure and diagnose cephalograms for radiographic analysis of jaw bones orientation, tooth inclinations and soft tissue profiles	Demonstration in SGIS SDL
10.	Measure, calculate and diagnose space analysis for permanent and mixed dentition cases; and Bolton analysis	Demonstration in SGIS SDL
11.	Diagnose and differentiate occlusal anomalies in orthodontic casts	Demonstration in SGIS SDL
12.	Differentiate between stages of skeletal and dental maturation using cervical stage method, hand wrist radiograph and OPG	Demonstration in SGIS SDL