

Department of Orthodontics



**Study Guide
Final Year BDS**

College of Dentistry

**Sharif Medical and Dental College,
Lahore**



PREFACE

Study guides are a useful learning aid since they are always available to the students for guidance and reference. Study guides introduce the students, at the beginning of an academic session, to the course outline, the instructional strategy to be followed throughout the year, learning outcomes of each academic activity and the assessment methodology to be followed in an academic session.

At College of Dentistry, Sharif Medical and Dental College, we follow an annual academic schedule in which the subject of Orthodontics is taught in the final year of BDS. Keeping in view the mission of University of Health Sciences and the vision of our institute, we have designed a training program which is intensive and at the same time interesting for the young minds. This guide includes details about various teaching activities which will take place throughout the academic year along with the time allocation of each. A list of lectures to be conducted in this session with names of the instructors is attached. Terminal learning outcomes of every section of the course are also included. A complete list of practical work to be carried out in the laboratory is part of this document. Details of various assessments are included and marks distribution for the subject in the Final Professional examination has been given. Names and email addresses of faculty members have also been mentioned to foster better interaction between the facilitators and the learners. A list of prescribed text and reference books forms part of this study guide. We intend to improve upon this document in light of the student feedback every year.

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VISION & MISSION OF UHS

Qualitative and Quantitative Revolution in Medical Education and Research through Evolution and there by improve Health Care delivery to Populace.

UHS shall be innovative global center of excellence in learning and research, supporting a community of scholars and professionals committed to serving society, promoting the development of students to reach their true potential in becoming competent, ethical, caring, and inquiring health professionals for the benefit of the country and the wider world.

MISSION OF SMDC

Sharif Medical & Dental College is dedicated to best serve the nation through preservation and dissemination of advanced knowledge and educating the students by latest trends in learning and research reaching levels pars excellence.

The Institution is committed to provide standardized quality medical education to its students by inculcating professional knowledge, skills and responsibilities in them with the aim of:

- Preparing them as modern physicians having initiative to act as future leaders in their respective fields and becoming lifelong learners.
- Encouraging the spirit of critical thinking through research and publication.
- Building up an understanding of the ethical values compatible with our religion, culture and social norms.
- Developing a sense of being responsible citizens of the society possessing professional competence and instilling in them the values of hard work and dedication thus preparing them to be accountable to the stakeholders and the state.

The Institution is devoted to keep abreast its faculty with the latest trends in Medical Education encompassing teaching/learning methodologies, assessment tools, research opportunities and professionalism to facilitate their professional development, competencies and commitment towards continues learning.

Our patient-centered mission is achieved by outstanding medical care & services in professional practice with due emphasis and focus on our local health needs.

Our mission further elaborate upon establishing academic and research facilities in areas of local demand under global gold standards and leading advancement in research, education & patient care.

VISION OF SMDC

To be recognized for the provision of a safe and functional environment conducive to collaborative teaching & learning, comfortable working atmosphere, and conducting world class research through professionalism and excellence.



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PLANNED TEACHING ACTIVITIES FOR 4TH YEAR BDS DEPARTMENT OF ORTHODONTICS

PMC has allocated 295 hours of teaching in the subject of Orthodontics for the BDS course. In order to meet this requirement, following learning strategies have been planned to impart core knowledge of Orthodontics in a manner that an undergraduate dental student can grasp the subject fully and is adequately prepared for university examinations.

Interactive lectures

One-third of the curriculum will be delivered in a traditional didactic format including PowerPoint presentations and case discussions. Didactic education is considered to be a one-way transmission of material from teacher to learner. We cannot overlook the possibility of meaningful interaction between experts and learners during live lectures. This type of interaction, which allows for immediate clarification of concepts and extension of knowledge, may be particularly important for novice learners who have relatively little exposure to the subject matter, such as our study population.

Small Group Discussion

Small group discussion provides a unique environment to achieve high standards in medical education. Activation of prior knowledge, construction of new concepts, exchange of ideas, and engagement at a higher cognitive level are assumed to result in deeper learning and better academic achievements by students.

- **Tutorials:** A tutorial, in education, is a method of transferring knowledge and may be used as a part of a learning process. More interactive and specific than a book or a lecture, a tutorial seeks to teach by example and supply the information to complete a certain task.
- **CBL & PBL:** Using case-based and problem-based approaches engage students in discussion of specific scenarios that resemble or typically are real-world examples. These methods are learner-centered with intense interaction between participants as they build their knowledge and work together as a group to examine the case.

Clinical Demonstration

The clinical quota encompasses certain skills which are demonstrated in four small groups in the department of orthodontics. The students are given ample time and targets to practice these skills before attaining a reasonable competency.

Chairside learning

The students are directed to spend one hour daily, as per their clinical time-table, in the orthodontics clinic. Though not part of the UHS curriculum, this activity exposes them to the opportunity to correlate theory with practice by observing, assisting and performing simple clinical procedures under direct supervision.

Self-directed learning

Students' take responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Center, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours or afterwards for self-study.

Assignments & PowerPoint Presentations

Students are given written formative assignments on designated topics. Revision of the topics already covered by basic dental science departments are given to students as oral presentations.

PowerPoint Presentations on various topics are assigned to the students which enhance their knowledge, presentation skills and research aptitude.

Distance Learning

Softwares like Zoom, Google Classroom and Socrative have been used for live online interactive sessions and assessments. Resource material like handouts, links to books and articles, as well as YouTube videos, are shared via these media.



**TRAINING PROGRAM FOR LECTURES
DEPARTMENT OF ORTHODONTICS
FINAL YEAR BDS**

INTRODUCTION TO ORTHODONTICS		
<i>Sr.No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Definition of Orthodontics, Occlusion, Malocclusion	Dr.Faiza Malik
2.	Branches of Orthodontics	
3.	Malocclusion and dentofacial deformity in contemporary society	
4.	Paradigm shift in Orthodontics	
5.	Prevalence of malocclusion	
6.	Demand of treatment versus need	
7.	Index of Orthodontic Treatment Need	
RADIOLOGY IN ORTHODONTICS		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	History of radiology	Dr. Sundas Ali
2.	Safe dosage and ALARA principle	
3.	Measures to minimize radiation exposure including PPE	
4.	Classification of radiographs	
5.	Hard tissue radiology: classification, indications, contraindications and limitations	
6.	Soft tissue imaging: classification, indications, contraindications and limitations	
7.	2D radiology: indications, contraindications and limitations	
8.	3 D imaging: indications, contraindications and limitations	
9.	Digital imaging techniques and their advantages	
10.	TMJ imaging and limitations	
11.	Approaches to measure lateral cephalogram	
12.	Standardization and errors in lateral cephalogram	
GROWTH AND DEVELOPMENT IN ORTHODONTICS		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	The concepts of growth and development	Dr. M. Noman
2.	Growth: pattern, variability and timing	
3.	Methods for studying physical growth	
4.	The nature of skeletal growth	
5.	Sites and types of growth in craniofacial complex	
6.	Theories of growth in the craniofacial control	
7.	Social and behavioral development	
8.	EARLY STAGES OF DEVELOPMENT	
9.	Late fetal development and birth	
10.	Infancy and early childhood: The primary dentition years	
11.	Late childhood: The Mixed Dentition Years	
12.	LATER STAGES OF DEVELOPMENT	
13.	Adolescence – the early permanent dentition	



14.	Growth patterns in dentofacial concept	
15.	Maturational and aging changes	
ETIOLOGY OF MALOCCLUSION		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Specific causes	Dr. Faiza Malik
2.	Genetic influences	
3.	Environmental influences	
4.	Etiology in contemporary perspective	
5.	Craniofacial Syndromes and their clinical presentation	
DIAGNOSIS AND TREATMENT PLANNING		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Orthodontic diagnosis: the problem-oriented approach	Dr. Faiza Malik
2.	Questionnaire and Interview	
3.	Clinical evaluation	
4.	Diagnostic records	
5.	Orthodontic Classification	
6.	Development of a problem list	
7.	Orthodontic treatment planning: from problem list to specific plan	
8.	Treatment planning concepts and goals	
9.	Major issues in treatment planning	
10.	Treatment possibilities	
11.	Planning comprehensive orthodontic treatment	
12.	Treatment planning in special circumstances	
BIOLOGICAL BASIS OF ORTHODONTIC THERAPY		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Periodontal and bone response to normal function	Dr. Faiza Malik
2.	Periodontal ligament and bone response to normal function	
3.	Periodontal ligament and bone response to sustained force	
4.	Anchorage and its control	
5.	Deleterious effect of orthodontic forces	
CONTEMPORARY ORTHODONTIC APPLIANCES		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Removable appliances	Dr. Faiza Malik
2.	Fixed appliances	
3.	Functional appliances	
4.	Orthopedic appliances	
MECHANICAL PRINCIPLES IN ORTHODONTIC FORCE CONTROL		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Elastic materials and production of orthodontic force	Dr. Sundas Ali
2.	Design factors in orthodontic appliance	
3.	Mechanical aspect of anchorage control	



4.	Determinate versus indeterminate force systems	
TREATMENT IN PREADOLESCENT CHILDREN		
<i>Sr. No.</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Moderate Non-Skeletal Problems In Pre-Adolescent Children: Preventive And Interceptive Treatment In Family Practice	Dr. Sundas Ali
2.	Orthodontic triage: Distinguishing moderate from complex treatment problems	
3.	Management of occlusal relationship problems	
4.	Management of eruption problems	
5.	Space analysis – quantification of space problems	
6.	Treatment of space problems	
7.	Complex Non skeletal problems in preadolescent Children: Preventive and interceptive treatment.	
8.	Eruption problems	
9.	Traumatic displacement of teeth	
10.	Space related problems	
GROWTH MODIFICATION		
<i>Sr.No</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Treatment of transverse and Class III problems	Dr. Faiza Malik
2.	Growth modification in Class II	
3.	Growth modification in Open bites /Deep bite and multidimensional Problems	
4.	Combined AP and vertical problems	
5.	Facial asymmetry in children	
COMPREHENSIVE TREATMENT IN ADOLESCENT: TREATMENT IN EARLY PERMANENT DENTITION		
<i>Sr.No</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Comprehensive treatment in adolescent: Alignment and vertical problems	Dr. Faiza Malik
2.	Class I crowding / protrusion	
3.	Leveling	
4.	Space closure in Class II and Class III	
5.	Class II correction in adolescents	
6.	Class III camouflage	
COMPREHENSIVE TREATMENT: FINISHING		
<i>Sr.No</i>	<i>Title of Lecture</i>	<i>Instructor</i>
1.	Adjustment of individual tooth positions	Dr. Faiza Malik
2.	Correction of vertical incisor relationship	
3.	Final settling of teeth	
4.	Positioners for finishing	
5.	Special finishing procedure to avoid relapse	
6.	Micro esthetic procedures in finishing	
RETENTION AND RELAPSE		
<i>Sr.No</i>	<i>Title of Lecture</i>	<i>Instructor</i>



1.	Definitions of Retention and Relapse	Dr. M. Noman
2.	Removable retainers	
3.	Fixed retainers	
4.	Active retainers	

COMBINED SURGICAL AND ORTHODONTIC TREATMENT

<i>Sr.No</i>	<i>TitleofLecture</i>	<i>Instructor</i>
1.	The borderline cases – surgical versus camouflage?	Dr. Sundas Ali
2.	Special considerations in planning surgical treatment	
3.	Distraction osteogenesis	
4.	Putting surgical and orthodontic treatment together	
5.	Steps in orthodontic orthognathic surgical cases	



TERMINAL LEARNING OUTCOMES ORTHODONTICS

This course deals with the general principles of Orthodontics and provides a foundation for clinical orthodontics and rational use of appliances and mechanics in clinical practice. For this purpose, emphasis should be laid on the clinical indications of appliances, both removable and fixed, diagnostic parameters and the timing/growth status for the treatment, that will lead to a successful clinical outcome.

At the conclusion of this course, a student must be able to diagnose and manage common developmental or acquired dentofacial, growth-related and functional problems of the primary, mixed and permanent dentition.

S.No.	TITLE OF LECTURES WITH LEARNING OUTCOMES
1.	Introduction to Orthodontics By the end of the lecture the student will be able to <ol style="list-style-type: none">1. Define Orthodontics as a branch of dentistry2. Diagnose and differentiate between different types of malocclusion3. Differentiate the sub-branches of Orthodontics in which management of a given malocclusion falls4. Differentiate between the need and demand of orthodontic treatment for a given patient5. Classify the need for orthodontic treatment using IOTN
2.	Growth & Development By the end of the lecture the student will be able to <ol style="list-style-type: none">1. Understand and describe concepts of craniofacial growth.2. Differentiate between different variants of craniofacial growth e.g. dolico facial & brachy facial growth patterns.3. Understand and describe the role of craniofacial growth in development of malocclusion.
3.	Development of dentition and occlusion By the end of the lecture the student will be able to <ol style="list-style-type: none">1. Differentiate between primary, mixed & permanent dentition.2. Determine the developmental stage & dental age of a given patient.

4.	<p>Occlusion and Malocclusion</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Define and describe normal occlusion. 2. Differentiate between normal occlusion & malocclusion 3. Explain various incisor, canine, and molar relationships 4. Differentiate between centric occlusion and centric relation
5.	<p>Diagnostic Aids in Orthodontics</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Take diagnostic history of the patient & pick positive findings 2. Perform relevant clinical examination & pick positive findings 3. Evaluate that which radiographic investigations are needed for a given patient 4. Trace & analyze lateral cephalogram 5. Make a provisional diagnosis of a given patient. 6. Differentiate between macro, mini and micro esthetics.
6.	<p>Dental Radiology</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Describe dental radiographic equipment and their uses 2. Precautions to be followed during radiography 3. Enumerate the indications, advantages and disadvantages of various radiographs used in orthodontics
7.	<p>Etiology of Malocclusion</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Differentiate between etiologies of different types of malocclusion (which in turn will help them to better understand the management of these malocclusions) 2. Correlate etiology with signs and symptoms of a malocclusion 3. Enumerate the clinical features of various craniofacial syndromes
8.	<p>Preventive and Interceptive Orthodontics</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Make appropriate treatment plan for parafunctional habits. 2. Plan and design space-maintainers. 3. Describe the prerequisites and protocol for serial extractions. 4. Describe treatment options for growing patients
9.	<p>Biology of tooth movement</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Describe normal structure of periodontium 2. Describe the biochemical processes involved in orthodontic tooth movement 3. Classify the types of orthodontic forces and tooth movements 4. Enumerate the methods for accelerating orthodontic tooth movement 5. Enumerate the deleterious effects of orthodontic tooth movement

10.	<p>Retention and relapse</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Define retention & relapse 2. Describe the indications of common types of retainers
11.	<p>Removable appliances</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Describe the components of removable appliances 2. Define & describe functional appliances, their indications and contraindications 3. Identify orthopedic appliances & have an understanding of their use & wear time. 4. Differentiate between slow and rapid palatal expansion
12.	<p>Fixed appliances</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Enlist the advantages and disadvantages of fixed appliances 2. Differentiate among different systems of fixed appliances 3. Differentiate between 1st, 2nd and 3rd order bends
13.	<p>Treatment Planning</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Differentiate between skeletal and non-skeletal problems and their management. 2. Differentiate between extraction and non-extraction cases 3. Select different modalities like functional jaw orthopedics, camouflage and orthognathic surgeryfor planning treatment of orthodontic patients
14.	<p>Surgical Orthodontics</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Enlist the indications of orthognathic surgery 2. Describe the surgical procedure and extraction pattern for correcting various dentofacial deformities 3. Define the term pre-surgical decompensation
15.	<p>Cleft Lip and Palate</p> <p>By the end of the lecture the student will be able to</p> <ol style="list-style-type: none"> 1. Describe the etiology and type of cleft lip and palate 2. Tabulate the protocol for managing cleft patients.

LIST OF PRACTICAL AND CLINICAL ACTIVITIES DEPARTMENT OF ORTHODONTICS

- Identification and uses of fixed, removable, functional appliances
- Fabricate the wire-work and removable appliances
- Trace and analyze lateral cephalogram to develop a provisional diagnosis
- Identify positive findings on cast analysis
- Find out ALD in mixed dentition cases
- Analyze lateral cephalometric tracings for cervical maturation index for growth status
- Hand and wrist radiograph analysis for growth status
- Bolton analysis for inter-arch relationship
- Mixed dentition analysis for prediction of future crowding
- Case preparation
- Chair side clinical learning

Wire work

Sr. No.	Contents
1	Fabrication of wire work
2	Description of wire-work
	Adam's clasp Labial Bow Z spring Finger spring Buccal canine retractor

Cast Analysis

Sr. No	Components
1	Cast analysis of individual arch
2	Cast analysis in occlusion
3	Arch length discrepancy

Cephalometrics

Sr. No	Components
1	Tracing of lateral cephalogram
2	Skeletal , dental & soft-tissue analysis
3	Provisional diagnosis
4	CVMI
5	Interpretation and clinical intervention

Hand and wrist radiograph stages and CVMI

Sr. No	Components
1	Observing HWR and Lateral Cephalogram
2	Identification of developmental stage
3	Provisional diagnosis
4	Peak pubertal growth spurt
5	Interpretation and clinical intervention

Bolton analysis

Sr. No	Components
1	Individual measurements of teeth
2	Using Bolton formula
3	Provisional diagnosis
4	Significance of value
5	Interpretation and clinical intervention

Mixed Dentition analysis

Sr. No	Components
1	Individual measurements of anterior teeth
2	Analysis done using Tanaka Johnston method, Moyers probability method, Huckaba radiographic method
3	Provisional diagnosis
4	Significance of value
5	Interpretation and clinical intervention

Case preparation

Sr. No	Components
1	History, Photographs, Radiographs, Intraoral cast
2	Cast analysis done, individual, in occlusion and Bolton, ALD Mixed dentition if required
3	Cephalometric analysis done for hard tissue, dental and soft tissue
4	Provisional diagnosis
5	Problem list
6	Interpretation and clinical intervention/treatment plan



Chair side clinical learning

Assisting and learning via ongoing clinical procedure on patients

Sr. No	Components
1	History taking
2	Examination: Intraoral and Extra oral
3	Photographs: Intraoral and Extraoral
4	Impression taking and cast pouring
5	Activation of fixed orthodontic appliance
6	Insertion/Activation of removable/functional/orthopedic appliance
7	Retractions in extraction cases by different mechanics
8	Wire insertion and change of ligatures
9	Banding and bonding
10	Fixed/Removable retainers



ASSESSMENT PLAN DEPARTMENT OF ORTHODONTICS 4TH YEAR BDS

Following modes of assessment are planned for 4th year BDS class in the subject of Orthodontics. This plan has been designed keeping in view the university curriculum and hopefully will facilitate the students in preparing for 4th professional examinations in the subject.

Chapter Tests:

These will be conducted at the completion of every chapter. The test will comprise of MCQs and SEQs on the pattern of university examinations. A preparatory time of at least 7 days shall be given prior to these tests. **OSPE:**

In order to prepare the students for practical examinations, OSPE tests will be conducted on the pattern of university examinations at the end of clinical rotation.

Rotation exam:

In order to prepare the students for practical examinations, rotation exam along with viva will be conducted on the pattern of university examinations at the end of clinical rotation. Completion of clinical quota and submission of logbooks is mandatory for being eligible to sit in this exam.

Term Tests:

Two term tests shall be conducted in coordination with other subjects. This will comprise of theory, practical and viva segments and a sizeable portion of the total course will be included in each of them.

Send-up Exam:

This will be undertaken in coordination with other departments, exactly following the format of university professional examinations. It will comprise of MCQs, SAQs, OSPE and Viva voce.

Internal assessment:

Internal assessment will be calculated out of 20 on the basis of all these tests that will be conducted throughout the year.



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04	Dr.Faiza Rana	dr.faizarana03@gmail.com



RECOMMENDED READING

1. Contemporary Orthodontics, 6th Edition, William R. Profit (Main textbook)
2. Introduction to Orthodontics, Laura Mitchel
3. Hand-Book of Orthodontics, Robert E. Moyers
4. Textbook of Orthodontics, Thomas M. Graber
5. Contemporary Treatment of Dentofacial Deformities, William R. Profit

All books, journals and online sources available in SMDC e-Library are accessible to students.