CURRICULUM

FOR

ORTHODONTICS

(2023)

National University of Medical Sciences

Pakistan

1. VISION

Our vision is to provide highest quality comprehensive basic knowledge to our undergraduate students making them able to diagnose and treat patients and generate understanding that a beautiful smile is more than just straight teeth. Building on our legacy, we rely on the latest technology and solid educational foundation to provide the highest quality and most comprehensive Orthodontic care available

2. MISSION

To provide the highest quality of orthodontic treatment to all patients, teach innovative new techniques to undergraduate students and encourage the learning capabilities of students also cultivate innovative research to improve the quality of orthodontics.

3. LEARNING STRATEGIES

a. Lectures
b. Practical
c. Case presentations
d. Group discussions

4. **Competencies:** The following generic competencies apply to this course:

a. Critical Thinking
b. Problem Solving
c. Communication Skills
d. Professionalism
e. Procedural Skills

5. Learning Outcomes: Specific Learning outcome of each course is attached as **Anx-A**

6. Implementation of the curriculum:

Implementation of curriculum is at the discretion of institute. Clerkships/ clinical rotations for 08 weeks' may be followed

Clinical Training	
Clinical evaluation of patient total 5	5
Impression taking / Bite registration total 5	5
Cast analysis • Cast in Occlusion • Cast Apart • Boltan Analysis • Mixed Dentition Analysis • Arch Length Discrepancy	Total 5 for each
Wire Bending Exercise • Adam's Clasp • Labial Bow • Springs (finger and Z) • Canine Retractor	Total 5 for each
Construction of Hawley's retainer	01
Cephalometric Analysis	Total 5
Case Presentation	01

- During their clinical rotation, students in small groups learn through practical chair side demonstrations of the techniques of history taking, impression and wax bite registration, cast analysis, wire bending exercises, cephalometric tracing, and other radiographic analysis. They then fabricate removable appliances on patients under supervision. They also observe and assist seniors in fixed appliances treatment procedures.

7. Resources:

To be filled by each Institute

Facilities:

To be filled by each Institute

8. Course Administration:

To be filled by each Institute

A. Examination.

1) Minimum attendance of 75% is a requirement to appear in university professional examination
2) Continuous formative evaluation is conducted during the academic year comprising of 5 theory tests, and 2 clinical assessment tests (ward tests and Pre annual). The results are communicated to students through notice board. Feedback is provided after each evaluation
3) The weighting of internal assessment is 20% in 4th professional BDS Examination
4) There will be two mid-term & term examinations followed by a pre-Annual and annual examinations each year.

5) The structure of the paper of all the term examinations and pre-annual will be the same as that for annual examination though syllabus will be different.
6) The structure of Mid-term exam will be half of the term exam.
7) The syllabus for mid-term & term examinations will be announced by the department at least 02 weeks prior to examination.
8) Pre-annual examination will be from whole syllabus.
9) The date sheet for mid-term, term and pre-annual examinations will be published by Examination branch while the examinations will be conducted by respective department. The result will be submitted to examination branch for incorporation in internal assessment.
10) The University shall take the 4th professional Examination at the end of the academic year. Annual Theory will be of 100 marks & Practical Examination will be of 200 marks. The pass score shall be 50% in theory and practical separately. However, in clinical subjects, student should pass in clinical exams / OSCE (with 50% marks) and unobserved stations (with 50% marks) separately
11) **Log book.** Each student is expected to maintain record of practical work in log book. Safe keeping (make copies) of the log book is the responsibility of each student. The log book must be submitted to the Orthodontic department at the end of the academic year.

Communication of Information to Students: All information communicated to students through Notice boards.

Learning Resources

Recommended Textbooks

Contemporary orthodontics by Profit

Introduction to orthodontics by Laura Mitchel

Hand book of orthodontics by Robert Moyers

Introduction to Cephalometry by Jacobson

LEARNING OUTCOMES					Annex-A
TOPIC/THEME	**COURSE CONTENT**	**LEARNING OUTCOMES** At the end of each module, student will be able to:		**INSTRUCTIONAL STRATEGIES**	**%**
		Knowledge	Skills		
1. INTRODUCTION TO ORTHODONTICS					
Introduction to orthodontics	Definition, Branches of orthodontics and their role, Aim and need of orthodontic treatment (IOTN), Terminologies, Background and Paradigm	Identify the branches of orthodontics and evaluate need and severity of orthodontic problems	Apply pertinent knowledge on patients	Lecture/ CBL	
Epidemiology	Describe the epidemiology of malocclusion including incidence and prevalence	• Describe different research design • Interpret various terms used to describe orthodontic problems		Lecture/ CBL	
2. GROWTH &DEVELOPMENT					
Growth & Development	Definition, Theories, Sites and Centers, Pre & post-natal growth of maxilla, mandible, Naso-maxillary complex, palate, TMJ growth and development. Growth assessment parameters, Cervical maturation stages, Describe changes in face form and profile, Developmental Abnormalities, Psychological and social impact of abnormal growth and malocclusion	• Understand the concept of normal and abnormal pattern of growth and development of craniofacial complex • Understand the malocclusion process as a deviation from normal growth		Lecture/ CBL	
Development of dentition	Definition of primary, mixed and permanent dentition. Development of teeth and eruption. Dimensional changes in the dental arches during different dentition periods,	Understand the concept of normal and abnormal pattern of growth and development of dentition Evaluate the deviation from normal to		Lecture/ CBL/pbl	

	prenatal development, variation in development including size, form, number and position of teeth and factors effecting development. Nolla's Stages.	abnormal dental development/ malocclusion			
3. DIAGNOSTIC AIDS IN ORTHODONTICS					
Diagnosis of Malocclusion	(Obtain comprehensive history, Extra-oral and Intra-oral examination, Examination of teeth, Appraisal of soft tissue, Functional analysis, Plan the necessary investigation, maintain appropriate diagnostic record, Analyze and interpret the records, Outline the management protocol, Communicate with the patient informing the probable prognosis and financial involvement)	• Formulate a comprehensive diagnosis • Analyze the diagnostic records	Evaluate the patient clinically	Lecture/ CBL/PBL	
Diagnostic Techniques	(Obtain impression and plaster model, Technical procedure for impression and plaster model, Analysis of the study model to assess tooth-jaw discrepancy: Arch perimeter, arch length, arch width, Intra-oral radiograph, Intra-oral and facial photograph, Define cephalometry, Anthropological sources and development of cephalometrics, Objectives of cephalometric tracings. Cephalometric Landmarks- Cranial, Maxillary and			Lectures/CBL/ PBL	

	Mandibular, Cephalometric Analysis- Dental, Skeletal and Skeletal-Dental Analysis, Orthopantomogram X-Ray and importance of it in Orthodontic Treatment)				
Dental radiology	Roentgen anatomy of teeth, jaws and tmj joints, Variations within normal limits, and abnormalities, Different types of X ray mechines, Variation of X ray films (extra oral, intra oral, bite wing and occlusal), indication and use of dental radiography, Interpretation of films and Radiation hazards.	Define and recognize radiographs	Able to interpret simple radiological finding of orthodontic problems	lectures	
4. OCCLUSION					
Occlusion	Define normal and abnormal occlusion, Ideal occlusion (introduction, definition) Andrew's six keys of occlusion, CO-CR and canine guided group function.	Recognize ideal occlusion and differentiate disharmony	• Examine the occlusion • Identify and interpret malocclusion	Lecture/ CBL	
5. METABOLIC BASIS					
Bone Metabolism	Describe different tissue changes, Difference between physiologic movement and orthodontic movement, Describe Patho-physiological change of tissue, Histopathological changes at the pressure and tension area, List the types of tooth movement, explain effect of normal and excessive force, Explain the tissue changes with different types of	Recognize the normal bone metabolism and relate with orthodontic tooth movement	Compare normal and abnormal force levels and identify deleterious orthodontic effects	Lecture/ CBL	

	appliances including the myo-functional appliance, Explain the biological basis of Orthodontics Therapy, Effect of drugs, State favorable and unfavorable incidence of tooth movement, Role of bone in eruption and stabilization Deleterious effects of orthodontic tooth movement on periodontium				
6. MALOCCLUSION					
Etiology Of Malocclusion	Definition, Etiological Factors (local factors eg tooth size, number and shape) (general factors) (specific causes of malocclusion Adenoids, respiration and speech) and various terminologies.	Identify the cause of malocclusion		Lectures/CBL/ PBL	
Malocclusion and Treatment planning	Class I (non skeletal) problem eg crowding, spacing, crossbites, openbite and deepbite), Class II (skeletal problem, div 1 and 2) and Class III (types), planning, diagnosis and management, Diagnosis, planning and treatment of simple and complex malocclusion using a range of: Removable, Functional and Fixed appliance. Describe method of treatment, Types of Orthodontic Appliances, Tooth-jaw discrepancy, Extraction and non-extraction planning, A criterion and	• Identify orthodontic problems and its features • Organize a problem list • Formulate a treatment plan		Lectures/CBL/ PBL	

	choice of teeth for extraction, Contraindication for extraction, Extraction with Orthodontic Treatment.				
7. PROTOCOLS DURING MIXED DENTITION					
Protocols used in relieving dental and skeletal problems during mixed dentition	Protocols of relieving mixed dentition crowding, Diagnosis & management of Habits, serial extractions, crossbites, space regaining, space supervision and Growth modifications, various appliances used. Explain interceptive and preventive orthodontics and methods	• Identify non skeletal and mild skeletal orthodontic problems in mixed dentition stage • Manage mixed dentition problems	Design/ construct simple orthodontic appliances	Lectures/CBL/ PBL	
8. ORTHODONTIC APPLIANCES AND BIOMECHANICS					
Orthodontic Appliances	**<u>Removable Appliance</u>** (Definition, Basic requirement of an Orthodontic appliance, General wire bending exercise, Design and construction of different springs and clasps, Components of removable appliance, Describe general principle of design and fabrication of removable appliance, State the type of appliance for different tooth movements, e.g. labiolingual, expansion and contraction of arches, Construction of Hawley,	Identify and differentiate different orthodontic appliances	Design and construct simple removable orthodontic appliances.	Lectures/CBL/ PBL	

	Begg retainer and Bite planes, Trimming and Polishing, Insertion and advice for the patients, Follow up and adjustments, Care during treatment) Selective case presentation. **<u>Functional jaw orthopedics</u>** (Describe Orthopedic force and its principles, Narrate Myo-functional appliance and describe its indication and contraindication, Technique and training for the construction of Myo-functional appliance, Clinical and laboratory steps in the construction of Class II and Class III Activator (Anderson/Mono block type) and Twin Block, Adjustment of activator after insertion in the oral cavity, Care during treatment) Selective case presentation. **<u>Fixed Appliances</u>** (Describe Principles, identify parts and appliance system currently used, list the advantages and disadvantages, technique and training of Fixed appliance, general wire bending exercise, use of multiple loop used in Fixed appliance, upper and lower ideal arch formation, Offset and Inset bend, 1st, 2nd and 3rd order bend, Toe				

	in and Tip back bend, Molar band formation and welding of molar tube in the band with ideal position, Cementing of the band, Weldable bracket positioning, Direct bonding technique of mesh bracket, Adjustment of arch wire and follow up, Stages of treatment progression by Fixed appliance, Anchorage (Types of anchorage, Preparation and assessment of anchorage planning, Anchorage planning according to the needs: Mild, Moderate and Maximum, Increase anchorage value- Use of head gear, Chin cup and other Extra-oral/Intra-oral anchorage) planning, Leveling, Canine retraction, Arch/Anterior contraction, both arch coordination and retention, Care during treatment) Selective case presentation.				
Material instruments and techniques used in orthodontics	Different materials, instruments and techniques used in Orthodontics, Properties of SS wire and NiTi alloy. Principle and method of wire bending exercise, Soldering- Introduction and definition, Composition and properties of Silver Solder and Fluxes, Soldering	• Identify and relate different orthodontic materials • Explain wire modification procedures	Practice different wire bending exercise	lectures	

	Flame, soldering method and procedure, Welding- Definition, principle and mechanism of spot welding, Heat treatment procedure.				
Biomechanics	Concept, Advantages & disadvantages, limitations, Anchorage, types of movements, types of forces, wires and Alloys used in orthodontics, ideal properties, comparison of different alloys,	• List the biomechanical requirements of different orthodontic appliances and their anchorage requirements • Recall the clinical implementation of biomechanical requirements of orthodontic appliances	Aware of clinical implementation of biomechanical requirements of orthodontic appliances and CBLs	Lectures/CBL	
9. MULTIDISCIPLINARY ORTHODONTICS					
Cleft lip & plate & orthognathic surgery	Etiological factors role of orthodontist, treatment procedures at different age groups, indication of OGS, stages of OGS, Various adjunctive and types of surgical procedures	Define and explain problems and pathophysiology	Be able to formulate problem list plan discrepancies according to age groups and PBLs.	Lectures/CBL/ PBL	
Adjunctive and Multi-disciplinary orthodontic Approaches	Adjunctive treatment goals and principles, Describe Adult Orthodontics, Appliance and technique for Adult Orthodontics, Multi-disciplinary treatment procedures. Pre-surgical Oral-Orthopedic and Orthodontic procedure and Post-surgical Orthodontic Procedure, Pre-restorative Orthodontic Procedure,	Be aware of multidisciplinary approaches pertinent to orthodontic problems	Be able to predict appropriate team for orthodontic referrals and PBLs and CBLs.	Lectures/CBL/ PBL	

	Describe preventive Periodontics. TMJ Dysfunction. Selective case presentation.				
10. RETENTION PROTOCOLS					
Retention And Relapse	Define retention and relapse, Causes, factors, various types of retainer's role of periodontal tissues and allied causes of relapse, concept of retention and relapse, occlusal stability and management, evaluate relapse after orthodontic treatment, retention after correction of different malocclusion, theorems.	Choose appropriate retention regime and post treatment review of treated cases	Design simple retention appliances	lecturs/CBLs /PBLs.	

List of Clinical Demonstrations
Orthodontics
Final Year Clinical Rotation Orthodontics

Sr.#	Demonstration / Tutorial
1	Orientation to Orthodontic department and clinical area
2	History taking and Clinical examination
3	Impression taking and bite registration
4	Radiology techniques and interpretations
5	Case preparation (radiographic tracing, cast analysis, photographic evaluation)
6	Basic wire bending exercises
7	Appliance fabrication and insertion
8	Group discussion
9	Orientation with instruments and appliances