الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS

2024

بسم الله الرحمن الرحيم

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Any amendment to this document shall be approved by the Specialty Scientific Council and the Executive Council of the Commission and shall be considered effective from the date of updating the electronic version of this curriculum published on the commission website unless a different implementation date has been mentioned. resources (Please refer to: CanMEDS 2015 physician competency framework; Frank JR, Snell L, Sherbino J, editors. *CanMEDS 2015 Physician Competency Framework*. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).

We would also like to acknowledge that the CanMEDS framework is a copyright of the Royal College of Physicians and Surgeons of Canada, and many of the description's competencies have been acquired from their resources (Please refer to: CanMEDS 2015 physician competency framework; Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).

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FOREWORD

Orthodontics and Dentofacial Orthopedics is a specialty of dentistry that is concerned with the diagnosis, prevention, and treatment of malpositioned teeth and jaws. This specialty is vital for providing comprehensive oral healthcare at dental service centers, including educational and research institutions. Therefore, it is essential to provide a program that is oriented toward introducing qualified clinicians in the healthcare system to treat patients in need. The Saudi Commission for Health Specialties (SCFHS) has adopted the CanMEDS 2015 framework to set up the core curricula of all training programs, including the Saudi Board of Orthodontics and Dentofacial Orthopedics (SBO-DO). CanMEDS 2015 is an educational framework that comprehensively describes the abilities clinicians should possess to effectively meet the healthcare needs of the people they serve. It is a competency-based and outcome-driven framework with a variety of assessment tools. The SBO-DO program was developed by a curriculum development committee with vast expertise in dental education and clinical practice. All the relevant standards, requirements, and competencies have been summarized and tabulated.

The curriculum is intended for use by the SBO-DO program stakeholders, including educators, program directors, teachers, trainees, and researchers as a guide in the process of learning, training, educational strategy, assessment, and certification.

The success of the program is ensured through provision of adequate resources, financial support, collaboration with excellent training canters, and efficient faculty development programs. The support of the SCFHS, program-supervising committees, and the contributing faculty is crucial for the program to attain its goals.

SAUDI BOARD OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS CURRICULUM DEVELOPMENT

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PART I – INTRODUCTION

A. Overview
B. History
C. Vision
D. Mission
E. Rationale and Educational Objectives of the Program
F. General Training Requirements
G. Program Framework
H. Minimum Training Requirement
I. Differences between the Proposed and Existing Curriculum

A. OVERVIEW

Orthodontics and Dentofacial Orthopedics is a discipline of dentistry that is concerned with the diagnosis, supervision, prevention, guidance, and correction of malocclusion and dentofacial problems.

B. HISTORY

The SBO-DO program, a 3-year clinical training program in orthodontics, has been approved by the Saudi Commission for Health Specialties (SCFHS). On completion of the program, a professional clinical degree—"Saudi Board of Orthodontics and Dentofacial Orthopedics"—is attained.

SBO-DO was first established in 2001 as a 5-year residency program under the Saudi Board of Orthodontics. The scientific committee was first chaired by Prof. Sulaiman AlEmran, followed by Prof. Ali Habiballah Hassan and currently by Dr. Eman Al Namankani.

To update its program, in May 2013, the Scientific Committee of the SBO-DO organized a comprehensive review workshop (RW-SBO). Stakeholders from various government and private sectors in the Kingdom of Saudi Arabia were invited. The second version of the SBO-DO curriculum was established based on the recommendations of the RW-SBO and the approval of the Scientific Committee of the SBO and subsequently, by the Scientific Dental Council. Major changes were implemented in the new curriculum to follow a competency-b ased

curriculum with the reduction in duration from 5 to 4 years. The SBO-DO curriculum currently underwent another major revision and was reduced in duration to 3 years, while continuously updating the scientific courses and the methods of assessments.

The program has been uniquely organized such that residents benefit from the rich academic and institutional resources while receiving clinical and research training at leading colleges, universities, hospitals and medical centers in the Kingdom of Saudi Arabia.

C. VISION

To be a national leader with a robust and impactful educational and clinical training program in the field of orthodontics and dentofacial orthopedics and to be internationally sought-after leaders of excellence, integrity, and program quality.

D. MISSION

To produce graduate competent clinicians with a high level of knowledge and clinical expertise in the field of orthodontics and dentofacial orthopedics in order to foster quality in clinical and community services that contribute to oral and dentofacial care in Saudi Arabia.

E. RATIONALE AND EDUCATIONAL OBJECTIVES OF THE PROGRAM

Establishing a national scientific training program in the field of orthodontics with high international standards is a necessity to cater for the increasing number of dental graduates interested in pursuing postgraduate training in the field of orthodontics and dentofacial orthopedics. Moreover, ensuring the graduation of competent orthodontists is crucial to meet the high demand and need for orthodontic treatment in the Kingdom, in both the government andprivate health sectors.

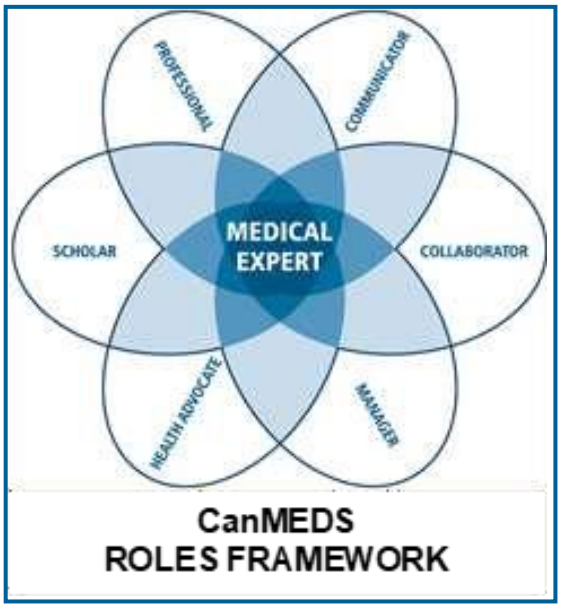
F. GENERAL TRAINING REQUIREMENTS

Please refer to the updated executive policy of SCFHS on admission and registration.
Website: www.scfhs.org.sa

G. PROGRAM FRAMEWORK

- Structure of the Training Program

  The program has been updated to a competency-based curriculum, in which didactic orthodontic knowledge is integrated with clinical training for the entire duration of the program. It has also been designed to meet the standards of the Saudi Commission for Health Specialties and the CanMEDS Framework.



Additionally, the learning outcomes and methods of assessment were updated to be competency-based. This is a 3-year comprehensive program, in which the trainees undergo intensive clinical orthodontic training that prepares them to attain their degree from the Saudi Board of Orthodontics and Dentofacial Orthopedics. The program aims to provide residents with the appropriate knowledge, attitude, and skills required to practice as independent orthodontists, to develop a sense of professionalism, ethics, interest, and enquiry among residents, and to encourage residents to maintain competency throughout their careers through the continuous pursuit of continuing professional development. The SBO-DO program is hosted by many governmental institutions (training centers), all of which have an overall administrative control and certain responsibilities for conducting the program. A government or a private dental center

can be accepted as a training center after evaluation and accreditati on from the SCFHS.

- Program Supervision
- The residency program is supervised by various layers of authority (sectors) as follows:
  - The Scientific Board Committee
  - The Regional Supervisory Committee
  - Program Director at the Training Center

H. MINIMUM TRAINING REQUIREMENT

- The residents enrolled in the SBO-DO have to complete 3 years of training, including all the allocated requirements for eligibility to undergo the SBO-DO examination, as mentioned below:
  - Clinical requirements (comprehensive cases): Refer to Appendix I for guidelines on clinical requirements
  - Research project
  - Community service
  - Participation in teaching activities
  - Submission of the universal topics to obtain a completion certificate.

- The residents are allowed a maximum of 1-month annual vacation according to the rules and regulations of the SCFHS www.scfhs.org.sa.

I DIFFERENCES BETWEEN THE PROPOSED AND EXISTING CURRICULUM

- The current 3-year clinical training program in the field of orthodontics and dentofacial orthopedics has been approved by the Saudi Commission for Health Specialties (SCFHS) and leads to the attainment of a specialty clinical degree called the Saudi Specialty Certificate in Orthodontics and Dentofacial Orthopedics. However, this proposed curriculum is being revised according to the CanMEDS, an internationally recognized educational framework that describes the abilities clinicians require to effectively meet the health care needs of the people they serve.
- The proposed curriculum is primarily based on the CanMEDS framework and the national standards of accreditation. It is designed to continue as a competency-based and outcome-driven curriculum with a variety of assessment tools. Courses and assessments in the current curriculum were devised by first mapping the competencies to their respective outcomes and then aligning the standards to both, in order to create didactic and clinical teaching methods that will ensure improved learning for the residents.

PART II - OUTCOMES AND COMPETENCIES

Competency statements and assessment of competencies for each study level:

Competency Statement	Assessment of Competency / Study Level		
	R1	R2	R3
Dental Expert: Residents practicing orthodontics within their predefined scope and expertise			
1 Dental Knowledge: Residents must be able to demonstrate a knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as have the ability to implement this knowledge in patient care.			
1.1 Integrate and apply the knowledge of clinical, biomedical, ethical, socio-behavioral, epidemiological, and other supportive sciences that are relevant to their discipline.	• Online exam • Written exam • Quizzes/ Assignment	• Online exam • Written exam • SOE • Topic review assessment • Quizzes/ Assignment • Synopsis / proposal project	• Written exam • SOE • Topic review assessment • Quizzes/ Assignment

1.2 Integrate and apply the knowledge and concepts gained in understanding the normal and deviations from normal in growth and development, as well as in occlusion & temporomandibular joint (TMJ), and utilize this knowledge in the diagnosis, treatment planning, management, and referrals of malocclusion and dentofacial problems.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
1.3 Integrate and apply the knowledge and concepts gained in biomaterial & biomechanics for the management of orthodontic and dentofacial problems and for the insertion and adjustment of orthodontic & dentofacial appliances.	• Written exam • SOE • Quizzes/ Assignment • DOPS • MiniCEX • Clinical Portfolio • ITER • CBD • Topic review assessment	• Written exam • SOE • Quizzes/ Assignment • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER • CBD	• Written • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER • CBD
2 Patient Care: Residents must be compassionate and be able to provide appropriate and effective patient care for the treatment of health problems and promotion of health.			
2.1 Data Gathering and Data Analysis: Gather essential and accurate information about patients by thorough history taking, physical examination (extra-oral, intra-oral, and functional), obtain quality records and analyze them using contemporary techniques and by making proper consultations showing an investigatory and analytical thought process in the clinical situations.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER

2.2 Problem list & Diagnosis: Prioritize issues and problems in a detailed problem list and establish a patient-oriented diagnosis based on patient information, preferences, risks and benefits of treatment, up-to-date scientific evidence, and their own clinical judgment.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
2.3 Treatment Objectives and Treatment Plan: Formulate patient-centered treatment objectives and evidence-based treatment plans (with alternatives) in collaboration with patients and their families, explain the risks and benefits of the procedures, and the rationale behind selecting a particular plan, obtain and document informed consent.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER
2.4 Treatment Management: Perform and apply evidence-based patient-centered treatment procedures and therapies			
2.4.1 Treat and manage growing, young patients with various orthodontic and dentofacial orthopedic complications that can be minimized or treated with appropriate timely intervention and coordinate with other dental and medical healthcare providers when needed.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER

2.4.2	Treat and manage non-growing patients with different orthodontic and dentofacial complications, taking into consideration the clinical circumstances, constraints, resources, and contemporary techniques and coordinate with other healthcare providers when needed.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
2.4.3	Treat and manage patients with different orthodontic problems that require multidisciplinary management including medically compromised patients and coordinate with other dental and medical healthcare providers when needed.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
2.4.4	Treat and manage patients in need of orthognathic surgery and coordinate their care with other dental and medical healthcare providers including oral and maxillofacial surgeons.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • I TER

2.4.5 Gain exposure in managing patients with cleft lip and palate problems and coordinate their care with other dental and medical healthcare providers including oral and maxillofacial surgeons.	• Written exam • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
2.4.6 Identify and refer patients with functional and temporomandibular disorders and coordinate with other healthcare providers including prosthodontists and oral and maxillofacial surgeons when needed.	• CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
2.5 Retention and Follow-up: Implement a patient-centered care plan that supports ongoing care, provides a follow-up on investigations, records the response to treatment, and includes further consultation with long-term follow-up and maintenance plan.	• Written exam • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER

Communicator: Residents must demonstrate satisfactory interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and other health professionals.			
1 Demonstrate satisfactory interpersonal as well as verbal and written communication skills that result in the effective exchange of information and collaboration with patients and their families, colleagues, staff, and other health professionals in a timely and accessible manner. Share comprehensive and legibly written or electronic information in a timely manner about the medical encounter to optimize clinical decision-making, ensure patient safety, confidentiality, and privacy.	• Written exam • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER

Collaborator: Residents must demonstrate effective teamwork with other health care professionals to provide safe, high-quality, and patient-centered care.			
1. Collaborate, communicate, understand, and function competently, efficiently, and effectively in the healthcare environment as a member of an inter-professional healthcare team and understand the setting of the organizational system.	• Written exam • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Online written • Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER
Health Advocate: Residents must demonstrate contribution of their expertise and influence as they work with communities or patient populations to improve health. They must prove their merit while working with those they serve in understanding their needs, speaking on behalf of others when required, and supporting the mobilization of resources to affect change.			
1. Respond to individual patients' diagnostic and management needs within and beyond the clinical environment	• CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Online exam • Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER

Scholar: Residents are expected to have a scientific attitude and an inquisitive mind that stimulates professional curiosity.			
1. Lifelong Learner: Engage in continuous enhancement of their professional practice through lifelong learning. Continuously improve patient care based on constant self-evaluation and life-long learning with increased emphasis on their own subset of patient population and the larger set of population from which their patients are drawn.	• CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
2. Evidence-Based Informed Decision Making: Integrate the best available evidence into practice by critically and comprehensively reviewing and evaluating new literature and other information resources that are relevant to the orthodontic field.	• Written exam • SOE • Quizzes/ Assignment • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Synopsis / proposal project • Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER
3. Research: Contribute to the creation and dissemination of knowledge and practices applicable by posing questions amenable to scholarly inquiry and selecting appropriate	• O nline exam	• Synopsis / proposal project	

methods to address them.			
Leader: Residents must demonstrate engagement with others to contribute to a vision of a high-quality health care system and take responsibility for the delivery of excellent patient care through their activities as clinicians, administrators, scholars, or teachers.			
1. Apply quality management principles to improve patient care delivery and demonstrate an expertise in clinical safety initiatives.	• CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER
Professional: Residents must demonstrate a commitment to carry out professional responsibilities, adhere to ethical principles, and show sensitivity to a diverse patient population.			
1. Demonstrate responsibility and commitment to the profession by adhering to regulations and high ethical standards when responding to patients' needs.	• Online exam • CBD • Topic review assessment • DOPS • MiniCEX • Clinical Portfolio • ITER	• Synopsis / proposal project • Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER	• Written exam • SOE • Quizzes/ Assignment • CBD • DOPS • MiniCEX • Clinical Portfolio • ITER

PART III - TEACHING AND ACTIVITIES

A. General Principles
B. Core Educational Program (CEP)
C. Saudi Board of Orthodontics & Dentofacial Orthopedics Curriculum Plan
D. Course Syllabi

A. GENERAL PRINCIPLES

Teaching and learning are based on strategies that encourage self-directed learning, development of a high level of intellectual ability, and integration of knowledge and skills. Multiple and effective instructional methods are offered to help residents achieve their learning objectives in multiple areas.

Every week, at least 4 hours of formal teaching time should be reserved. Formal teaching time is planned in advance with an assigned tutor, time slots, and venue. Formal teaching time excludes clinical training.

The core educational program includes the following formal teaching and learning activities:

The core educational program is also supplemented by other practice-based and work-based methods of learning, such as:

Every 12 weeks at least one hour should be assigned to activities such as meeting with mentors (refer to mentor guidelines), a review of the portfolio, or a mini-clinical evaluation exercise.

B. CORE EDUCATIONAL PROGRAM (CEP)

1. Universal Topics

➢Introduction

➢Universal topics are of high value, and interdisciplinary topics are of utmost importance to resident trainees. The topics are delivered centrally to ensure that every trainee receives high-quality teaching and develops essential core knowledge. These topics are common to all specialties.

➢Topics included here meet one or more of the following criteria:

- Impactful: topics that are common or deal with life-threatening situations

- Interdisciplinary: topics that cannot be taught by a single discipline alone
- Orphan: topics that are poorly represented in the undergraduate curriculum
- Practical: topics that focus on situations that trainees will encounter in a hospital setup

➢Development and Delivery

These topics will be developed and delivered centrally by the Commission through an e-learning platform. They are didactic in nature and focus on practical aspects of care. These topics are more content-heavy than workshops and other planned face-to-face interactive sessions. The suggested duration for teaching each topic is 1.30 hours. They are delivered in a modular fashion. These universaltopics are listed and described in the following modules:

Study Level	Topic	Sub-Topic	Teaching Method
R1	Ethics and Healthcare	Occupational Hazards of HCW	Self-study
		Ethical Issues: Treatment Refusal; Patient Autonomy	Self-study
		Patient Advocacy	Self-study
		Research Methods	Self-study
R2	Introduction	Hospital-acquired Infections	Self-study

2. Basic Science Courses

- The aim of the Basic Science Courses (BSC) is to provide residents with an adequate scientific background in the basic sciences, which is relevant to their specialty in Orthodontics and Dentofacial Orthopedics. The courses consist of intensive didactic lectures or seminars designed as per the residents' study level.
- The Basic Science Courses are:

Study Level	Basic Science Courses	Contact Hours
R1	Advanced Oral and Maxillofacial Radiology	12
	Integrated Basic Science I: Anatomy, Embryology, and Oral Pathology	12
	Integrated Basic Science II: Oral Biology, Genetics, and Molecular Biology	12

3. Research Methodology and Scientific Writing Integrated Course

- It covers the following topics:

Study Level	Research Methodology & Scientific Writing Courses	Contact Hours
R2	Research Methods and Scientific Writing	16
	Biostatistics	16
	Critical Appraisal of Scientific Literature	8

4. Professional Development Courses

- It covers the following topics:

Study Level	Professional Development Courses	Contact Hours
R2	Behavioral Sciences & Psychology	6
R3	Practice Management	16

5. Core Specialty Courses

- The comprehensive orthodontic specialty courses consist of review of books and literature, and case presentations.

Study Level	Core Specialty Courses	Contact Hours
R1	Wire Bending	24
	Typodont I	40
	Orthodontic Appliances	16
	Radiographic Cephalometry	48
	Orthodontic Diagnosis, Treatment Planning & Treatment Management	62
	Orthodontic Biomaterials	6
	Biomechanics in Orthodontics	20
	Craniofacial Growth and Development	20
R2	Cephalometric Superimposition	
	Advanced Wire Bending	
	Orthognathic Surgery	20
	Occlusion & Craniomandibular Dysfunction	14
	Interdisciplinary Treatment & Adult Orthodontics	20
R3	Selected Advanced Topics	20
	Craniofacial Anomalies & Cleft Lip and Palate	18

- A detailed description of the curriculum plan and courses' objectives is provided below.

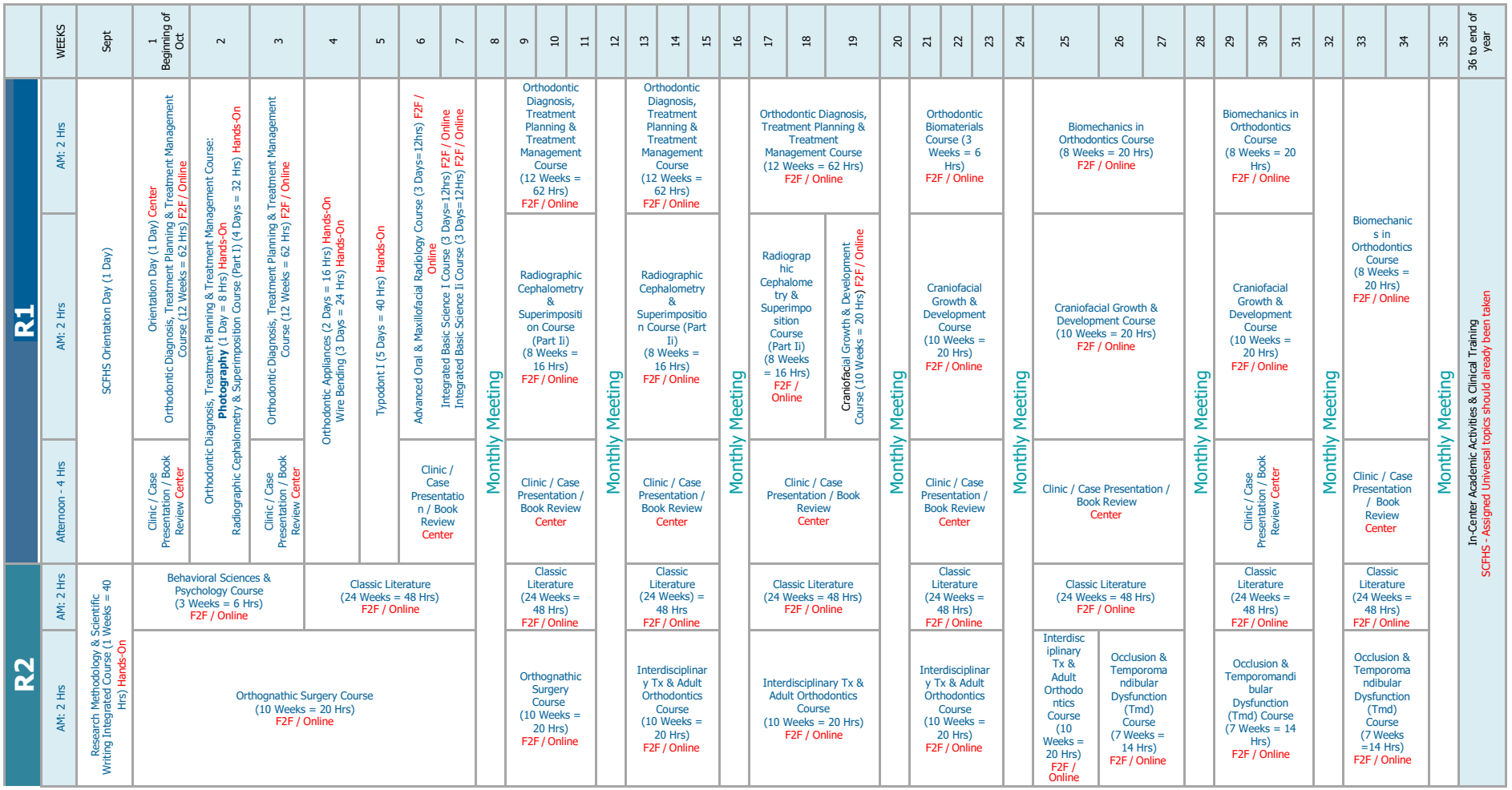
6. Specialty Clinical Training

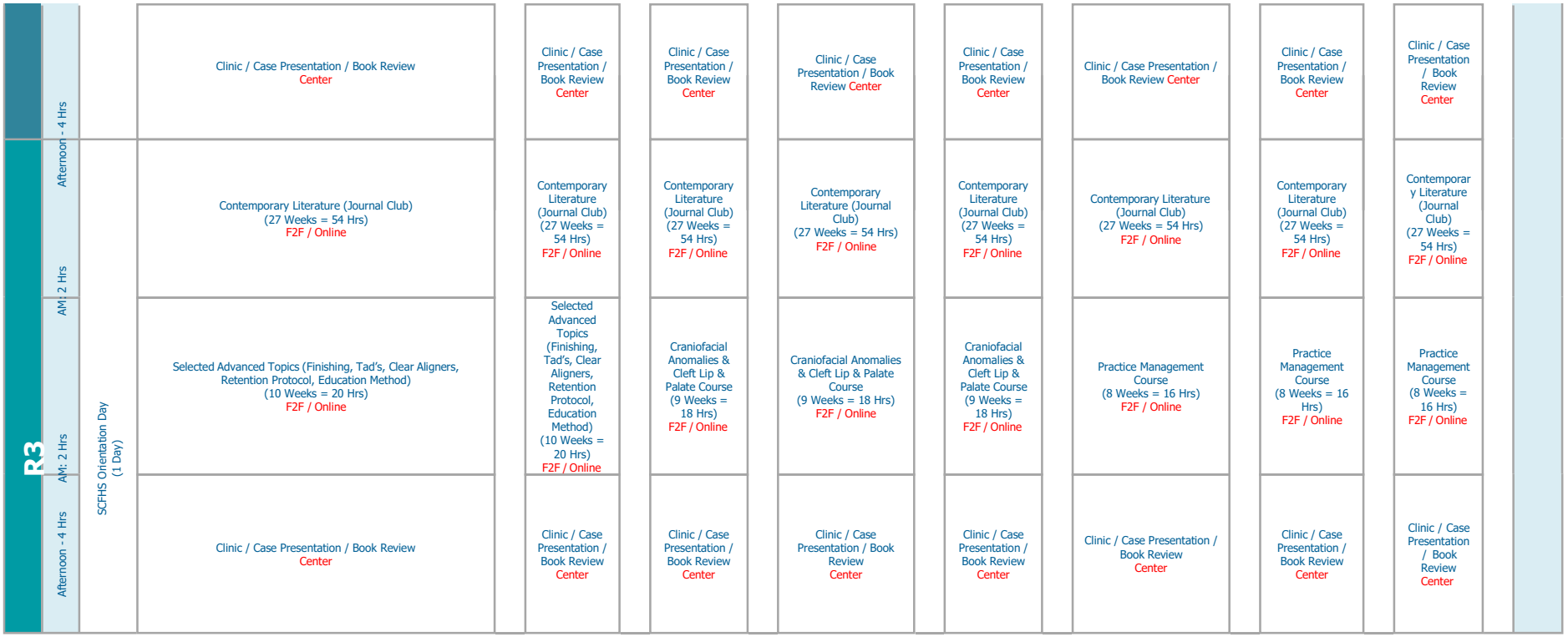
- Orthodontic clinical training is based on a multi-center approach and is spread over a duration of 3 years. The objective of the clinical aspect of the program is to prepare the resident at the end of the training period, with the knowledge, skills, attitudes, and competence to provide various types of orthodontic care and services. The general policies governing clinical training in the specialty of orthodontics and dentofacial orthopedics are as follows:
    1. Full-time residents are anticipated to devote at least six sessions per week for clinical practice.
    2. These sessions are designed to train the residents on evidence-based clinical practice at the highest level of comprehensive orthodontic care under the supervision of clinical instructors.
    3. The residents will be exposed to a minimum of three instructors, which will enhance their learning experience with different clinical modalities and approaches.
    4. Residents are required to treat around 50 to 60 cases of patients under the guidance and supervision of clinical instructors.
    5. These cases should have different malocclusion classifications and dentofacial problems, including growth modification of Class II and III malocclusions, Class I malocclusion, Class II malocclusion, Class III malocclusion, malocclusion with transverse discrepancy, malocclusion with vertical discrepancy, dentofacial deformity treated with combined orthodontic and orthognathic surgery, and cleft lip and palate.
    6. A full documentation for each case must include a detailed history, comprehensive clinical examination, study model assessment, and radiographic assessment. Additionally, a detailed problem list and full diagnostic summary should be prepared for each case.
    7. Case presentation sessions should take place at the training center in the presence of the instructors and residents to discuss the presented clinical case and formulate a suitable treatment plan.
    8. A definitive treatment plan must be appropriately written and approved by the instructor in charge of supervision.
    9. Each patient must sign a consent form prior to initiating treatment, after approval of the treatment plan.

10. Following the commencement of the treatment, the necessary mid-treatment records should be taken and analyzed with the appropriate documentation in order.
11. At the end of the treatment, full post-treatment records must be taken and correctly documented.
12. In addition to the comprehensive cases, residents must be exposed to orthodontic care provided for transferred cases and patients in the retention phase of treatment.

Refer to Appendix I for the clinical training guidelines.

C.SAUDI BOARD OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS CURRICULUM PLAN

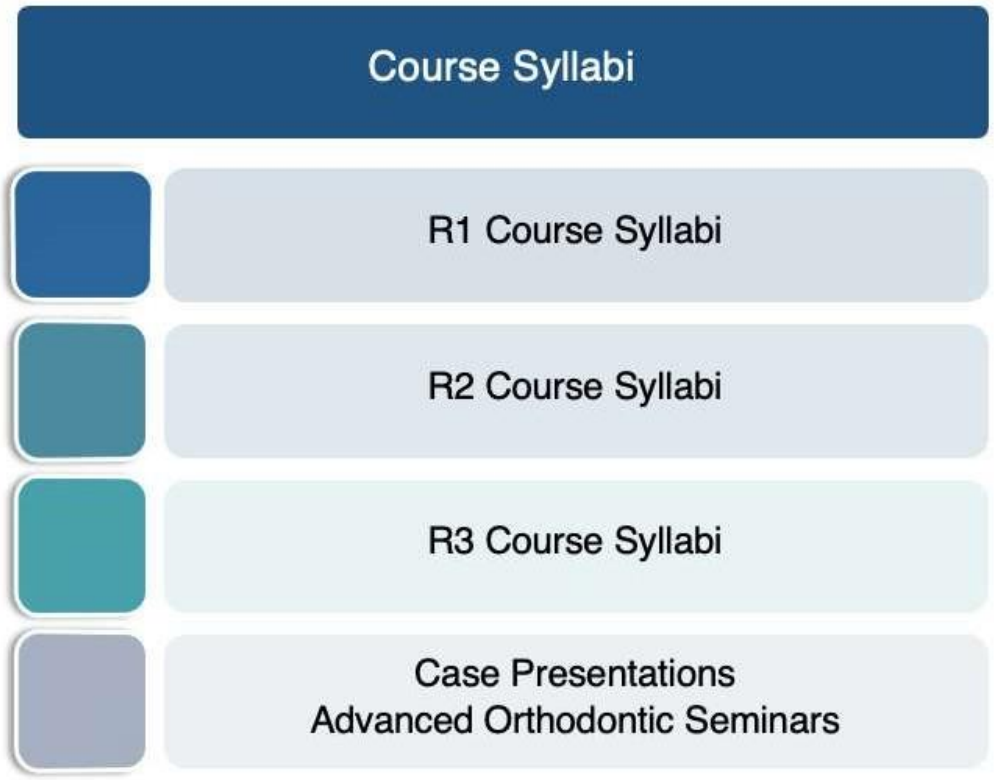




*Trainees and trainers are advised to check the most updated map approved yearly by the Scientific Council of the specialty, as they could be subject to change in the future.

*Note: Case presentation & book review for all levels of residency should be conducted in the center for a minimum of one session per week.

D.COURSE SYLLABI



ADVANCED ORAL & MAXILLOFACIAL RADIOLOGY

OBJECTIVE

This course is intended to provide knowledge of normal and abnormal anatomical radiographic landmarks using advanced imaging principles and techniques.

LEARNING OUTCOMES

KNOWLEDGE

- Identify the different radiographic imaging modalities including contemporaneous techniques such as CBCT
- Describe the radiation protection and ALARA guidelines
- Identify normal and abnormal anatomical features (landmarks), with emphasis on the TMJ as well as the airways
- Discuss the importance of Digital Imaging and Communications in Medicine Standard (DICOM)
- List the common errors that occur in digital imaging

SKILLS

- Apply knowledge of imaging techniques to the diagnosis and management of orthodontic patients
- Request the required radiographic views according to the orthodontic problem
- Interpret the different radiographic views of patients with various orthodontic problems

ATTITUDE

- Recognize the importance and appropriate use of imaging techniques for the benefit of the patient
- Exhibit an awareness of the legal parameters of protecting the patient and staff

TEACHING METHODS

- Lectures/interactive discussions
- Tutorials on normal anatomic landmarks with interactive modules
- Individual cases assigned to each student with different diagnoses
- Group discussions on assigned cases
- Reading assignment

ASSESSMENT METHODS

Written examination

COURSE SCHEDULE

SESSION	CONTENTS / TOPICS
1	• Review of the biological effects of ionizing radiation and radiation protection • Panoramic radiography • Panoramic anatomy • Review of extra-oral views
2	• Diseases of bone that alter the bone pattern • Radiographic assessment of impacted canines • TMJ Imaging and disorders
3	• Introduction to CBCT and its application in orthodontics • Sectional anatomy • Digital radiography in dentistry

COURSE SCHEDULE

TOPICS	CONTENTS
Review of the biological effects of ionizing radiation and radiation protection	
• Differentiation of different radiation sources, measuring units and radiation doses of various imaging techniques • Classification of biological hazards • Understand radio sensitivity and cell types • Describe the protection procedures for the patients before, during and after the exposure • Explain the protection procedures for the operator	
Panoramic radiography	
• Principles of image production • Indication for panoramic radiography • Advantage and disadvantages • Panoramic anatomy • Errors in panoramic radiography	
Review of extra-oral views	
• Indications for different kind of skull views • Anatomical landmarks	
Diseases of bone that alter the bone pattern	
• Radiographic characteristics of bone disease that may affect orthodontic treatment	
Radiographic assessment of impacted canine	
• Various radiographic techniques for localization of impacted canine	
TMJ imaging and disorders	
• Identification of normal anatomy of TMJ in various imaging modalities • Advantages and disadvantages of imaging modalities for TMJ • Most common diseases that affect the TMJ	
Introduction to CBCT and its application in orthodontics	
• Principles of image production • Factors affecting radiation dose • Application of CBCT in orthodontics • Sectional anatomy in various orthogonal planes	

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INTEGRATED BASIC SCIENCE I

OBJECTIVE

- The present course focuses on understanding and correlating the normal and abnormal embryological development and the functional anatomy of the head and orofacial regions as well as the oral pathological lesions. In addition to relating this knowledge to clinical orthodontic practice.

A. ANATOMY

LEARNING OUTCOMES

KNOWLEDGE

- Recognize the conchae, meatuses, and openings of the lateral wall of the nose and the paranasal sinuses.
- Describe the anatomical features of the larynx, muscles, and the nerve and blood supply.
- Define the structural and functional unit of the nervous system.
- Correlate the pathological aspect of the TMJ with its respective anatomy.
- Identify the structure, classification, organization, and function of the various components of the central nervous system.
- Recognize the structure and function of the cranial nerves.
- Recognize the topographic anatomy of the skull regions.
- Know the anatomical basis of disease and injury.

SKILLS

Correlate the basic anatomical knowledge of the head and neck and the orofacial region to the clinically related conditions.

ATTITUDE

- Combine the appropriate supporting knowledge and professional attitudes reliably and competently in diagnosis and treatment plan for the best interest of the patient and community.
- Correlate acquired knowledge to evidence based clinical findings

B. ORAL PATHOLOGY

LEARNING OUTCOMES

KNOWLEDGE

- Explain the sequelae of inflammation
- Recognize the pathology of odontogenic tumors. Recognize the pathological aspects of the developmental abnormalities of teeth
- Recognize the pathological aspects of TMJ disorders
- Recognize the pathology of cleidocranial dysplasia, osteogenesis imperfecta, and osteopetrosis
- Understand the histopathology of ulcerative conditions, including vesiculo-bullous disorders

SKILLS

Correlate the pathological aspects of the TMJ, oral infections, and inflammation with their respective histopathological features and clinical aspects.

ATTITUDE

- Combine the appropriate supporting knowledge and professional attitudes reliably and competently in diagnosis and treatment plan for the best interest of the patient and community.
- Correlate acquired knowledge to evidence based clinical findings

C. EMBRYOLOGY

LEARNING OUTCOMES

KNOWLEDGE

- Understand the formation of the head
- Understand the formation of the face: lip, maxilla, palate, mandible, and tongue
- Explain major events of prenatal development with emphasis on periods of ovum and embryo
- Understand the role of neural crestal cells and the derivatives of

SKILLS

Integrate the knowledge of embryological development and related anomalies to normal anatomy, pathological etiology, and features.

ATTITUDE

- Correlate acquired knowledge to evidence-based clinical findings. Combine the appropriate supporting knowledge and professional attitudes in reliably and competently arriving at a diagnosis and in formulating a treatment plan for the best interest of the patient and community.
- Correlate acquired knowledge to evidence based clinical findings by developing students' cognitive skills through interactive lectures.

TEACHING METHODS

Lectures and web-based e-learning services.

ASSESSMENT METHODS

Written examination

COURSE SCHEDULE

DAY	TOPICS	CONTENTS
1	Embryology	• Fertilization and implantation • First 3 weeks of development • First week- blastocyst formation • Second week- formation of the two-layered embryo “bilaminar germ disk” • Third week- formation of the intraembryonic mesoderm and three-layered embryo “gastrulation”, formation of the neural tube, neural groove, and ectoderm • Folding of the embryo • Head formation • Pharyngeal arches and apparatus • Meckel’s cartilage and mandibular development • Cranial nerve development • Development of the face • Development of the jawbones of the palate • Developmental anomalies associated with birth defects

2	Anatomy	• Anatomical structures and the topographic anatomy of the cranial cavity • Functional anatomy of the skull and its forming bones, cavities, and foramina • Muscles of facial expression—their origin, insertion, nerve supply, actions, lymphatic drainage, and important relations and effects of nerve injury • Boundaries and contents of the temporal and temporal fossa and TMJ • The parotid gland—anatomical features, relations, duct, nerve and blood supply, and muscles of mastication.
	Pathology	• TMJ—normal and disorders
3	Anatomy	• Boundaries and contents of the posterior and anterior triangles of the neck • Submandibular region, and submandibular and sublingual salivary glands • The nasal cavity and paranasal sinuses, the conchae, meatuses, and openings of the lateral wall of the nose; nerve supply and blood supply of the mucosa of the nasal cavity • Anatomy of the palate • Anatomy of the oral cavity and the tongue • Structural and functional unit of the nervous system • Pain, touch, and temperature sensation pathways
	Pathology	• Salivary gland diseases • The pathology of osteodystrophies • Pathological abnormalities of the teeth. • Red and white lesions • Inflammation • Infection • Sleep apnea • Cyst and cyst-like lesions of the jaws • Tumors of the jaws

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INTEGRATED BASIC SCIENCE II

OBJECTIVE

- Know the microanatomy of the dental hard tissues, gingiva, and periodontium.
- Know the oral and dental structures, functions, and their relationships, including the pathophysiology of the stomatognathic system.
- Know the oral and dental manifestations and responses to systemic and environmental influences.
- Know genetics, its relation to orthodontic problems, and the applications of genetic therapy in orthodontic treatment.

LEARNING OUTCOMES

KNOWLEDGE

ORAL BIOLOGY (HISTOLOGY & PHYSIOLOGY):

- Understand the cell structure, function, and its specialization.
- Describe the biological changes in the PDL and bone during orthodontic treatment.
- Discuss the histological structure of the cementum, the biology of root resorption, and the clinical implications, prevention, and management of root resorption during orthodontic treatment.
- Understand the microanatomy and ultrastructure of the healthy and unhealthy gingiva and how they are affected during orthodontic treatment.
- Discuss the systemic factors known to affect bone tissue that influence the velocity of orthodontic tooth movement.
- Understand the effects of different hormonal changes on orthodontic tooth movement and treatment planning.
- Differentiate the influence of different drugs on bone and oral tissue that can have an impact on orthodontic tooth movement.

GENETICS:

- Understand the principles of genetics.
- Understand the structure of a DNA.
- Understand the structure of a gene.

- Recognize the effects of gene mutations and mutation suppressors.
- Recognize the different types of modes of inheritance
- Identify the effects of the following genes on craniofacial structure and malocclusion: Msh Homeobox, Bar Homebox, DLX, Fibroblast Growth Factors, Bone Morphogenic Proteins, Sonic Hedgehog.

SKILLS

Apply the knowledge of oral biology and genetics to orthodontic treatment planning and its clinical implications.

ATTITUDE

Recognize the significance of oral biology in understanding the normal and abnormal dental hard and soft tissues.

TEACHING METHODS

Lectures and web-based e-learning services.

ASSESSMENT METHODS

Written examination.

COURSE SCHEDULE

DAY	CONTENTS / TOPICS
1	1. Biological changes in PDL and bone during orthodontic treatment 2. Histology of the cementum and root resorption in orthodontics
2	1. Microanatomy & ultrastructure of the gingiva and how it is affected during orthodontic treatment 2. Response of the oral tissues to systemic conditions and drugs
3	1. Genetics Part I 2. Genetics Part II 3. Stem cells

DAY	TOPICS	CONTENTS
1	Biological changes in PDL and bone during orthodontic treatment	1. Name all cells of the periodontal ligament 2. Identify the extracellular substance fibers of the periodontal ligament 3. Describe periodontal ligament function 4. Describe the periodontal ligament response to normal function 5. Understand the main theories of tooth movement 6. Explain orthodontic tooth movement as related to bone deformation 7. Explain orthodontic tooth movement as related to biochemical reactions 8. Differentiate the biological mechanisms involved in the transformation of external stimuli to specific tissue reactions 9. Compare the response of periodontal ligament on the pressure side & tension side 10. List the types of tooth movement 11. Define the optimum forces for orthodontic movement 12. Describe the sequence of events that occur in the PDL after the application of force on the pressure side 13. Identify the main differences between the effects of heavy and light forces on the remodeling process of the PDL 14. The effect of force magnitude and drugs on orthodontic tooth movement 15. Explain the rationale behind monthly appointments in orthodontics 16. List & explain the cause for some of the side effects in orthodontics 17. Use the knowledge gained in educating patients undergoing orthodontic therapy

DAY	TOPICS	CONTENTS
1	Histology of the cementum and root resorption in orthodontics	1. Understand the histological structure of the cementum 2. Classify root resorption 3. Discuss the biology of root resorption 4. List the etiological factors of root resorption 5. Have a fair knowledge of the clinical implications, and prevention and management of root resorption during orthodontic treatment.
2	Microanatomy and ultrastructure of the gingiva and how it is affected during orthodontic treatment	1. Define the gingiva 2. List the parts of gingiva. 3. Understand the microscopic features of the gingiva 4. Discuss the ultrastructure of the sulcular and junctional epithelium of the dentogingival junction 5. Identify the gingival fibers and its relation to orthodontic treatment. 6. Describe the clinical features of healthy and diseased gingiva.
2	Response of the oral tissues to systemic conditions and drugs	1. Discuss systemic factors known to affect bone tissue and to influence the velocity of orthodontic tooth movement. 2. Understand the effect of different hormonal changes and their effect on orthodontic tooth movement and treatment planning 3. Differentiate the influence of different drugs on bone and oral tissue that can impact orthodontic tooth movement.

3	Genetics Part 1	1. Define genetics and its relation to Orthodontic problems 2. Name all the genetic terms related to Orthodontic problems 3. Define human chromosome 4. Differentiate modes of inheritance in orthodontics 5. Explain twin studies 6. Explain mutations in orthodontics 7. Understand chromosomal abnormalities in orthodontic problems 8. Describe the role of genes in malocclusion
	Genetics Part 2	1. Define the role of neural crest cells 2. Explain the vertebrate hox genes and the vertebrate hox code 3. Identify the patterning the branchial region of the head 4. Identify the patterning of face and jaws 5. Identify the patterning of the midline 6. Identify the patterning of the dentition 7. Explain the genetic influence on tooth number, size, morphology, position and eruption 8. Understand the heritability of malocclusion family and twin studies for heritability of dentofacial phenotypes 9. Explain the genetic factors and heritability of vertical dimension malocclusion 10. Discuss the heriability of local occlusal variables 11. Describe the genomics and orofacial clefts 12. Differentiate the craniofacial syndromes
	Genetics Part 3	1. Understand the recent advances in genetics and molecular biology related to 2. Orthodontics 3. Describe the genetic therapy applications for orthodontic treatment purposes 4. Discuss the gene therapy to enhance condylar growth 5. Explain the use of recombinant adeno-associated virus for skeletal gene therapy

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Part 1

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ORTHODONTIC TECHNIQUES INTEGRATED COURSE

A. WIRE BENDING

OBJECTIVE

This course is intended to provide knowledge about the fundamental concepts and basic skills required to fabricate and adjust orthodontic wires.

LEARNING OUTCOMES

KNOWLEDGE

- Identify the position and design of wire bends that are needed to compensate for deficiencies in bracket positioning.
- Recognize the principles of wire bending.
- Identify the types and uses of orthodontic instruments, including:
  - Pliers
  - Wires

SKILLS

- Properly handle the orthodontic pliers and wires.
- Adapt and coordinate the archwire to different arch forms.
- Perform different types of wire bending for different clinical purposes such as:
  - First-, second-, and third-order bends
  - Closing loops on round and rectangular wires
  - Uprighting springs
  - Utility arches

ATTITUDE

- Recognize the importance of archwire sizes and sequences.
- Recognize the uses of closing loops and order bends.

TEACHING METHODS

- Lectures
- Hands-on training
- Reading assignment
- Demonstration

ASSESSMENT METHODS

- Quizzes / Assignments
- DOPS

COURSE SCHEDULE

TOPIC	CONTENTS
1	Introduction to orthodontics Lecture: • Class introduction / orientation
2	Introduction to wire bending Lecture: • Identification of different pliers and wires • Principles of wire bending • Application and implication of different bends and loops
3	Wire bending exercises Practical session: • Posture and proper handling/bending techniques • Performing simple straight wires bends
4	Wire bending exercises Practical session: • Straight angle bend, step bend, utility arches on round and rectangular wires. • Omega stops, protraction wires, and differential intrusion-extrusion arch wires
5	Wire bending exercises: Application and implication of different loops Practical session: • Making different closing loops. • Vertical, horizontal, and T loops on straight rectangular wires
6	Wire bending exercises Practical session: • Making loops with a helix on straight rectangular wires

7	Wire bending exercises Practical session: • Making different arch forms with a straight wire and coordinating arch forms
8	Wire bending exercises Practical session: • First-order bends on coordinated arch wires • Understanding the concept
9	Wire bending exercises Practical session: • Second-order bends on coordinated arch wires • Understanding the concept
10	Wire bending exercises Practical session: • Third-order bends V bends, incorporating anterior torque with loops
11	Wire bending exercises Practical session: Heat treatment, wire annealing, tip back bends, toe-in bends, wire bends needed to compensate for deficiencies in bracket positioning
12	Wire bending exercises Practical session: • Special loops for specific indications: Box loop, midline correction loops, uprighting springs, segmental retraction loops
13	TADS and specific wire bending requirements Lecture: Anchorage concept and clinical application
14	Wire bending exercises Practical examination: Competency-based practical examination
10	Wire bending exercises Practical session: • Third-order bends V bends, incorporating anterior torque with loops

11	Wire bending exercises Practical session: Heat treatment, wire annealing, tip back bends, toe-in bends, wire bends needed to compensate for deficiencies in bracket positioning
12	Wire bending exercises Practical session: • Special loops for specific indications: Box loop, midline correction loops, uprighting springs, segmental retraction loops
13	TADS and specific wire bending requirements Lecture: Anchorage concept and clinical application
14	Wire bending exercises Practical examination: Competency-based practical examination

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5. Brandt S, Servoss JM, Wolfson J. Practical methods of bonding direct and indirect. Journal of clinical orthodontics. 1975;9(10):610.

B. TYPODONT I

OBJECTIVE

This course is intended to provide knowledge of the basic mechanics of fixed orthodontic treatment required for patients with a variety of orthodontic needs in a simulated setting.

LEARNING OUTCOMES

KNOWLEDGE

- Define the principles and use of pre-adjusted fixed appliances, including bracket prescriptions.
- Explain the concept of bracket positioning to patients.
- Explain the principles of anchorage and their application.
- Explain the basic biomechanics of orthodontic tooth movement.
- Identify the different bonding methods in orthodontics.
- Identify and choose appropriate appliances for treatment of different malocclusions.
- Identify the difference between extraction and non-extraction mechanics.
- Understand the different concepts of anchorage and the causes of unwanted side effects from orthodontic forces.

SKILLS

- Apply the basic principles of force control to orthodontic treatment planning.
- Complete a case with a missing lower first molar using an uprighting spring for closing and opening the spaces.
- Perform proper bracket bonding on a typodont
- Complete the treatment of a non-extraction case on the typodont.
- Complete the treatment of an extraction case on the typodont by performing all stages of treatment, including:
- Leveling and alignment
- Canine retraction using different methods, such as power chains and coil springs
- Anterior teeth retraction using a
- T- loop arch wire
- Torque and case completion

ATTITUDE

- Recognize the importance of archwire sizes and sequences.
- Recognize the appropriate stages for treatment progress.

TEACHING METHODS

- Lectures
- Hands-on training
- Reading assignment
- Demonstration

ASSESSMENT METHODS

- Quizzes / Assignments
- DOPS

COURSE SCHEDULE

TOPIC	CONTENTS
1	Introduction to clinical orthodontics Lecture: • Edgewise/pre-adjusted fixed appliances • Concept of band and bracket positioning • Direct and indirect bonding • Identifying appliances for different malocclusions
2	Basic biomechanics of orthodontic movement Lecture: • Treatment protocol for Class I, II and III malocclusions. • Extraction /non-extraction treatment mechanics
3	Typodont exercises Practical session: • Typodont banding and direct bonding
4	Typodont exercises Practical session: • Arch wire placement, utility arches, and partial versus complete wire insertion • Tip back bend
5	Different concepts of anchorage Lecture: • Principle of anchorage and its application • Concept of anchorage and unwanted side effects from orthodontic forces

6	Treatment planning: non-extraction treatment protocol Practical session: Complete treatment of a non-extraction Class I malocclusion: • Expansion/protraction/stripping • Levelling and alignment
7	Typodont exercises Practical session: • Torque and case completion
8	Typodont exercises Practical session: Finishing and retention: • Removable and fixed retainers • Spring retainers
9	Extraction treatment protocol Practical session: • Typodont banding and indirect bonding
10	Basic biomechanics of an extraction case Lecture: • Treatment protocol of Class II and/or Class III malocclusions extraction case • Leveling and alignment
11	Canine retraction/ different anchorage Practical session: • Canine retraction using different methods • Segmental retraction vs continuous wire retraction
12	Anterior retraction Practical session: • Anterior teeth retraction using different retraction loops • Finalizing the occlusion
13	Case completion Practical session: • Torque and detailing
14	Treatment protocol with a missing lower first molar Practical session: • Typodont banding and direct bonding
15	Basic biomechanics of a molar extraction case Practical session: • Levelling and alignment, • Up righting spring and TADS

16	Molar protraction/ different anterior anchorage Practical session: • Distal protraction mechanics
17	Esthetic positioning Practical session: • Finalizing the occlusion
18	Case completion Practical session: • Torque and detailing
19	Examination Practical examination: Competency-based practical examination

REFERENCES

TYPODONT I:

1. Manual
2. Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics, latest Edition. Elsevier Health Sciences; 2006 Dec 8.
3. Bishara, S.E., 2001. Textbook of orthodontics. WB Saunders.
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C. ORTHODONTIC APPLIANCES

OBJECTIVE

This course is intended to introduce the fundamental concepts of orthodontic appliances and provide the basic skills required to insert and adjust orthodontic appliances.

LEARNING OUTCOMES

KNOWLEDGE

- Identify orthodontic wires used for laboratory appliances
- Understand the different methods of appliance fabrication (Prefabricated Appliances & Laboratory-Fabricated Appliances) as well as appliance activation
- Identify and describe the different kinds of orthodontic appliances, including;
  - Space maintainers
  - Expanders
  - Fixed and removable functional appliances & headgear
  - Distalization appliances
  - Anchorage appliances, including TADs
  - Retainers

SKILLS

- Understand how to fabricate orthodontic appliances such as rapid and slow expanders, quad helix, TPA, lingual arches, Hawley retainer, and Essix retainer
- Adopt the necessary skills to activate different orthodontic appliances
- Adopt the necessary skills to identify appliance-fitting problems.
- Communicate appropriately with dental laboratory technicians, assistants, and other members of the dental team regarding the fabrication and repair of different orthodontic appliances.

ATTITUDE

- Recognize the advantages, contraindications, uses and limitations of different appliances for the treatment of specific malocclusion.

TEACHING METHODS

- Lectures
- Hands-on training
- Reading assignment
- Demonstration

ASSESSMENT METHODS

- Quizzes / Assignments
- DOPS

COURSE SCHEDULE

TOPIC	CONTENTS
1	Orthodontic Anchorage Lecture & Laboratory Session
2	Transverse Problems Lecture & Laboratory Session
3	Headgear & Functional Appliances Lecture & Exercises
4	Class II Antero-Posterior Problems Lecture & Exercises
5	Class II Antero-Posterior Problems Lecture & Exercises
6	Vertical Problems Lecture & Exercises
7	Retention & Stability Video Demonstrations

REFERENCES

ORTHODONTIC APPLIANCES:

1. Manual
2. Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics, latest Edition. Elsevier Health Sciences; 2006 Dec 8.
3. Graber, Thomas M, Brainerd F Swain. Current orthodontic concepts and techniques. WB Saunders Company, 1975.
4. McNamara JA, Brudon WL, Kokich VG, 2001. Orthodontics and dentofacial orthopedics. Needham Press.

RADIOGRAPHIC CEPHALOMETRY & SUPERIMPOSITION

OBJECTIVE

This course is intended to give information about and provide experience in:

- Basic & 3D cephalometric analysis
- Basic and 3D superimposition techniques for lateral skull radiographs
- Growth analysis based on serial lateral skull radiographs
- Use of cephalometric templates
- Evaluation of treatment changes
- Estimation of growth status

LEARNING OUTCOMES

KNOWLEDGE

CEPHALOMETRIC ANALYSIS:

- Identify the different types of cephalometric imaging systems.
- List and describe the normal anatomical landmarks of craniofacial structures seen on cephalometric radiographs.
- Identify the different cephalometric analyses.
- Identify the application and limitations of the different cephalometric analyses.

CEPHALOMETRIC SUPERIMPOSITION:

- Understand the history of cephalometric superimposition.

CEPHALOMETRIC SUPERIMPOSITION:

- Identify the rationale of using cephalometric superimpositions
- Define & identify the cephalometric landmarks used for superimposition.
- Describe the various cranial base superimposition techniques.
- Describe the various maxillary and mandibular superimposition techniques.

- Identify the uses and limitations of various cephalometric superimposition techniques.
- Determine the indications, advantages, and disadvantages for using 3-D superimpositions.
- Identify the different prediction methods.

SKILLS

CEPHALOMETRIC ANALYSIS:

- Demonstrate the ability to manually and digitally trace and analyze cephalometric radiographs.
- Diagnose types of malocclusions using the appropriate analysis.
- Criticize the different analyses (list and describe the limitations).

CEPHALOMETRIC SUPERIMPOSITION:

- Evaluate the accuracy of superimposition techniques.
- Interpret superimposition of growth measurements with time.
- Explain growth and the influence of treatment on growth.

CEPHALOMETRIC SUPERIMPOSITION:

- Differentiate between the effects of cephalometric treatment using various orthodontic techniques.
- Perform voxel-based 3D superimpositions.
- Interpret regional and overall cephalometric changes.
- Differentiate between skeletal, dental, and soft tissue changes as seen on cephalometric superimpositions.
- Perform all the steps in constructing manual and digital superimpositions.
- Perform superimpositions for orthognathic surgery cases.

ATTITUDE

CEPHALOMETRIC ANALYSIS:

Using the appropriate radiographs and cephalometric analysis based on individual case problems.

TEACHING METHODS

- Lectures
- Class presentations
- Reading assignment
- Hands-on training

ASSESSMENT METHODS

- Written examination
- Structured oral examination (SOE)

- DOPS
- Quizzes/Assignment

COURSE SCHEDULE

WEEK	TOPIC	EXERCISES
1	• Radiographic Cephalometry: Introduction • Tracing Technique & Identification of Landmarks	Tracing Technique & Identification of Landmarks (Demo, Hands on, Exercises)
2	• Downs Analysis • Steiner Analysis • Wits Appraisal	Cephalometric Analysis Exercises (Downs, Steiner, Wits)
3	• McNamara Analysis • Ricketts Analysis • Tweed Analysis	Cephalometric Analysis Exercises (McNamara, Ricketts, Tweed)
4	• Soft Tissue Analysis • PA Cephalometric Analysis • Digital Cephalometric Analysis • SBO-MO CEPH Template	Cephalometric Analysis Exercises (Digital Cephalometric Analysis Demo, Exercises)

REFERENCES

Textbooks

1. Jacobson A, Jacobson RL and Rushton VE, 2007. Radiographic Cephalometry: From Basics to 3-D Imaging, (Book/CD-ROM set) (Vol. 2006).

Articles Related to Cephalometric Analysis & Superimposition

2. McNamara JA and Franchi L: The cervical vertebral maturation method: a user's guide. The Angle Orthodontist 88(2): 133-143, 2018.
3. Nielsen lL. Maxillary superimposition: A comparison of three methods for cephalometric evaluation of growth and treatment change. Am J Orthod Dentofacial Orthop. 1989;95:422-431.
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ORTHODONTIC DIAGNOSIS, TREATMENT PLANNING & TREATMENT MANAGEMENT

OBJECTIVE

This course is intended to provide knowledge that would enable the residents to determine, select, obtain, analyze, and interpret the records needed to generate an appropriate evidence-based patient-centered diagnosis, treatment plan, and treatment management for patients with different malocclusions and dentofacial problems.

LEARNING OUTCOMES

KNOWLEDGE

INTRODUCTION TO ORTHODONTICS:

- Understand the scope and field of orthodontics.
- Define normal occlusion and malocclusion
- Explain the etiology of malocclusion

RECORD ANALYSIS:

- The different study model analyses techniques
- The different soft and hard (extra/intra oral) tissue analyses required to diagnose an orthodontic problem
- The different radiographic analysis (periapical, bitewing, orthopantomograph, lateral cephalometric, postero-anterior and cone beam)

PRIORITIZED PROBLEM LISTS & DIAGNOSIS:

- Adult multidisciplinary problems
- Determine the importance of a prioritized problem list in relation to patient management

PRIORITIZED PROBLEM LISTS & DIAGNOSIS:

- Diagnose malocclusions in three dimensions.
- Pre-adolescent skeletal problems (early treatment)
    - Antero-posterior

- Vertical
- Transverse

➢ Pre-adolescent non-skeletal problems (early treatment)
- Space problems
- Impactions
- Congenitally missing teeth

➢ Adult skeletal problems
- Antero-posterior
- Vertical
- Transverse

➢ Adult non-skeletal problems
- Space problems
- Impactions
- Congenitally missing teeth

TREATMENT PLANNING & TREATMENT MANAGEMENT:

➢ Determine the importance of a clearly defined treatment plan and treatment objectives.

TREATMENT PLANNING & TREATMENT MANAGEMENT:

➢ Understand the treatment plan and treatment objective for the management of malocclusions in three dimensions:

➢ Pre-adolescent skeletal problems (early treatment)
- Antero-posterior
- Vertical
- Transverse

➢ Pre-adolescent non-skeletal problems (early treatment)
- Space problems
- Impactions
- Congenitally missing teeth

➢ Adult skeletal problems
- Antero-posterior
- Vertical
- Transverse

➢ Adult non-skeletal problems
- Space problems
- Impactions
- Congenitally missing teeth

➢ Adult multidisciplinary problems

SKILLS

PATIENT ASSESSMENT & RECORD TAKING:

➢ Review the medical and dental history of the patient.

- Conduct the necessary dental and orthodontic clinical examination.
- Assess the need and prescribe the proper radiographs to diagnose the case.
- Assess the need for consultation by other specialty (medical and dental), refer the patient accordingly, and communicate with other departments effectively.
- Be able to assess the need, prescribe (design), communicate with the laboratory effectively and evaluate the delivered orthodontic laboratory appliances that are required to treat the case.

PATIENT ASSESSMENT & RECORD TAKING:

- Be able to assess the growth status of the patients.
- Be able to take the required impressions, occlusal records, photographs and any supplemental records.

RECORD ANALYSIS:

- Analyze the necessary orthodontic diagnostic tools including photographs, radiographs, and orthodontic models.
- Conduct the necessary model analysis, cephalometric analysis, and interpretation of models.
- Conduct the necessary soft tissue analysis.

PRIORITIZED PROBLEM LISTS & DIAGNOSIS:

- Formulate an appropriate diagnosis, including a prioritized problem list.

TREATMENT PLANNING & TREATMENT MANAGEMENT:

- Formulate an appropriate treatment plan and treatment objective.

ATTITUDE

PATIENT ASSESSMENT & RECORD TAKING:

- Recognize the importance of systematic and thorough diagnosis.

PRIORITIZED PROBLEM LISTS & DIAGNOSIS:

- Recognize the need for the explanation of the cause of patient's malocclusion.

TREATMENT PLANNING & TREATMENT MANAGEMENT:

- Recognize the importance of whether malocclusion can be corrected successfully.
- Recognize the need for considering the patient factors that may modify treatment.

TREATMENT PLANNING & TREATMENT MANAGEMENT:

- Interact with members of the dental team dealing with children and adolescents undergoing early treatment.
- Recognize the role of the orthodontist and other specialties in the management of malocclusion.

- Apply evidence-based practice when treating different types of malocclusions.

TEACHING METHODS

- Seminars
- Discussion groups
- Reading assignment
- Projects
- Case-based discussion

ASSESSMENT METHODS

- Written examination
- Structured oral examination (SOE)
- Quizzes / Assignments

COURSE SCHEDULE

MODULE	CONTENTS
Module 1	Introduction to Orthodontics
Module 2	The etiology of malocclusion
Module 3	Patient Assessment and Record Taking
Module 4	Record Analysis
Module 5	Diagnosis and Treatment Planning / Orthodontic indices
Module 6	Early Treatment: Moderate Non-skeletal Problems in Preadolescent Children
Module 7	Early Treatment: Complex Non-skeletal Problems in Preadolescent Children
Module 8	Early Treatment of Skeletal Problems Part I
Module 9	Early Treatment of Skeletal Problems Part II
Module 10	Comprehensive Treatment in Adolescents: Part I: Alignment & Vertical Problems
Module 11	Comprehensive Treatment in Adolescents Part II: Space Closure & Class II/III Correction

Module 12	Comprehensive Treatment in Adolescents Part III: Finishing
Module 13	Retention
Module 14	Adult Treatment
Module 15	Combined Surgical and Orthodontic Treatment

REFERENCES

1. Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics, latest Edition. Elsevier Health Sciences.
2. Graber, Thomas M, and Brainerd F. Swain. Current orthodontic concepts and techniques. WB Saunders Company, 1975.

Articles Related to Etiology of Malocclusion

3. Xue F, Wong RW, Rabie AB. Genes, genetics, and Class III malocclusion. Orthod Craniofac Res. 2010;13:69-74.
4. Cassidy SE1, Jackson SR2, Turpin DL3, Ramsay DS4, Spiekerman C5, Huang GJ6.Classification and treatment of Class II subdivision malocclusions. Am J Orthod Dentofacial Orthop. 2014;145(4):443-51. doi:10.1016/j.ajodo.2013.12.017.
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7. David Normando, Marco A O Almeida, Cátia C A Quintão. Dental crowding. Angle Orthod. 2013;83(1):10.
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9. Andrews LF. The six keys to normal occlusion. Am J Orthod Dentofacial Orthop. 1972;62(3):296-309.
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12. Arat ZM, Akcam MO, Esenlik E, Arat FE. Inconsistencies in the differential diagnosis of open bite. Angle Orthod. 2008;78:415-420.

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16. Naini FB, Gill DS. Facial aesthetics: 2. Clinical assessment. Dent Update. 2008;35(3):159-162, 164-166, 169-170.
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19. McNamara L, McNamara JA Jr, Ackerman MB, Baccetti T. Hard- and soft-tissue contributions to the esthetics of the posed smile in growing patients seeking orthodontic treatment. Am J Orthod Dentofacial Orthop. 2008;133(4):491-499.
20. Işiksal E, Hazar S, Akyalçin S. Smile esthetics: perception and comparison of treated and untreated smiles. Am J Orthod Dentofacial Orthop. 2006;129(1):8-16.
21. Gul-e-Erum, Fida M. Changes in smile parameters as perceived by orthodontists, dentists, artists, and laypeople. World J Orthod. 2008;9(2):132-140.
22. Yang IH, Nahm DS, Baek SH. Which hard and soft tissue factors relate with the amount of buccal corridor space during smiling? Angle Orthod. 2008;78(1):5-11.
23. Early orthodontic treatment for Class II malocclusion reduces the chance of incisal trauma: 1 Results of a Cochrane systematic review. American Journal of Orthodontics and Dentofacial Orthopedics. 2015;148(1):47–59.

Articles as stated below (more details about articles can be obtained from the ABO reading list):

24. Early orthodontic treatment for Class II malocclusion reduces the chance of incisal trauma: 1 Results of a Cochrane systematic review. American Journal of Orthodontics and Dentofacial Orthopedics. 2015;148(1):47–59.
25. Past, present, and future. American Journal of Orthodontics and Dentofacial Orthopedics. 2015;47(5):S216–S223.
26. Effects of lingual arch used as space maintainer on mandibular arch dimension: A systematic review. American Journal of Orthodontics & Dentofacial Orthopedics. 2010;138(4):382.e1-382.e4.
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28. Surgical and orthodontic management of impacted maxillary canines. American Journal of Orthodontics & Dentofacial Orthopedics. 2004;126(3):278-283.
29. The six keys to normal occlusion. American Journal of Orthodontics. 1972;62(3):296-309.
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31. Treatment options for congenitally missing lateral incisors. European Journal of Oral Implantology. 2016;1:S5-S24.
32. Guidelines for managing the orthodontic-restorative patient. Seminars in Orthodontics. 1997;3(1):3-20. /kokichorthodontics.com
33. Managing treatment for the orthodontic patient with periodontal problems. Seminars in Orthodontics. 1997;3(1):21-38.
34. Orthodontic-endodontic treatment planning of traumatized teeth. Seminars in Orthodontics. 1997;3(1):39-44.

ORTHODONTIC BIOMATERIALS

OBJECTIVE

This course is intended to provide basic knowledge about the different types and properties of materials available for orthodontic treatment.

LEARNING OUTCOMES

KNOWLEDGE

Identify the properties of the materials used in orthodontics, including:

- Wires
- Adhesives, cements, along with bonding materials to both conventional & non-conventional surfaces
- Brackets, including metal, ceramic, and polymeric brackets
- Intermaxillary elastics, power chains, ligatures, O-rings, coils & miscellaneous
- Acrylic/ clear aligners appliance material
- Impression materials
- Explain the biocompatibility of materials in the oral cavity.
- TADs

SKILLS

- Apply the appropriate bonding materials and techniques to conventional and non-conventional surfaces.
- Select and manipulate the various dental and orthodontic materials.

ATTITUDE

- Critically evaluate the evidence behind the selection of different dental and orthodontic materials.
- Explain to patients/ parents the advantages, disadvantages, and use/limitations of different materials.

TEACHING METHODS

- Lectures
- Class presentations
- Reading assignment

ASSESSMENT METHODS

- Written examination
- Structured oral examination (SOE)
- Quizzes / Assignment

COURSE SCH EDULE

DAY	TOPICS	CONTENTS
1	Orthodontic Wires	1. Learn about the history of archwire development 2. Describe the various shapes of modern archwires 3. Describe the basic properties of orthodontic wires 4. Understand the following concepts: a. stress-strain curve b. shape memory c. super elasticity d. phase transformation e. heat-activation 5. Describe the types of materials used in orthodontic wires 6. Understand the characteristics of each type of material used in archwires 7. Describe the effect of changing wire dimensions on stress, strain, and range 8. Differentiate between shapes and sizes of archwires. 9. Describe the stages of orthodontic treatment and the reason for using each wire.

2	Orthodontic Brackets	1. List the major differences between fixed and removable appliances and consequently the indications for fixed therapy 2. Have a general understanding of the components used in fixed therapy and their uses 3. Be able to logically deduct the indications, advantages and disadvantages of the components used in fixed therapy. 4. Understand the history of fixed orthodontic appliances 5. Be able to identify parts of a brackets and to list and differentiate different types of brackets available 6. Be able to differentiate the different materials of brackets used. 7. Have a general understanding of the different bracket prescriptions
3	Adhesives in Orthodontics	1. Realize the variables affecting bond strength of orthodontic brackets. 2. Realize the management techniques needed to preserve the orthodontic brackets attached to the tooth structure during the whole orthodontic treatment period. 3. Compare the different orthodontic brackets regarding their design that facilitate debonding after finishing orthodontic treatment. 4. Understand the various types and properties of adhesive systems used to bond orthodontic brackets.
4	Orthodontic Elastomeric Ligatures and Chains	1. Describe the composition of the different materials used in orthodontic elastics 2. Understand the advantages and disadvantages of the different elastics 3. Describe the uses and different clinical applications of: a. Elastic chains b. Rubber bands c. Elastic ligature d. Elastic thread e. Separators 4. Describe the factors affecting the properties of elastics

		5. Differentiate between elastomeric modules and stainless steel ligatures
5	Demineralization and Remineralization in Orthodontics	1. Describe the demineralization/ remineralization cycles. 2. Be able to differentiate subsurface versus erosive lesions of enamel. 3. Understand the dental biofilm formation in orthodontic patients. 4. Describe the use of orthodontic sealers, mode of application, advantages, and disadvantages. 5. Have a general understanding of the factors enhancing remineralization
6	Miniscrews in Orthodontics	1. Identify and describe the different kinds of anchorage control for tooth movement 2. Identify and describe the different types of skeletal anchorage and their clinical implications 3. Determine what type of anchorage control is required for different case scenarios 4. Translate miniscrew insertion techniques and site selection to the clinical setting 5. Plan biomechanical tooth movement in accordance with miniscrew placement 6. Recognize and manage complications associated with miniscrew insertion and maintenance

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Articles Related to Orthodontic Materials:

5. Eliades T. Orthodontic materials research and applications: part 1. Current status and projected future developments in bonding and adhesives. Am J Orthod Dentofacial Orthop. 2006;130:445-451.
6. Eliades T. Orthodontic materials research and applications: part 2. Current status and projected future developments in materials and biocompatibility. Am J Orthod Dentofacial Orthop. 2007;131:253-262.
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11. Kusy RP: A review of contemporary archwires: their properties and characteristics. The Angle Orthodontist 67(3): 197-208, June 1997.
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BIOMECHANICS IN ORTHODONTICS

OBJECTIVE

This course is intended to provide a deep knowledge of the tissue responses to force systems and the biomechanical principles of orthodontic appliances

LEARNING OUTCOMES

KNOWLEDGE

- Explain the biomechanics of the common appliances used in orthodontics, including extraoral appliances.
- Differentiate between friction and frictionless mechanics.
- Explain the clinical applications and selection criteria of different wire alloys.
- Determine the importance of normal arch wire sequences and their justification, and the appropriate pace of treatment progression.
- Explain the prescriptions of a fixed orthodontic appliance.
- Understand the indications, advantages, and disadvantages of using clear aligner therapy as an alternative to conventional orthodontic appliances.
- Explain the different stages of a fixed orthodontic appliance, including leveling and aligning, canine retraction and space closure, finishing and detailing, and retention and stability.
- Explain the different concepts of anchorage, including absolute anchorage
- Explain the biomechanical principles entailed in the treatment of different malocclusions including Class I, II, III, transverse, vertical, asymmetric, and interceptive problems
- Recognize the biomechanical principles of using Temporary Anchorage Devices (TAD's).
- Explain the concepts & applications of accelerated tooth movement.

SKILLS

- Apply appropriate mechanics to achieve specific tooth movements
- Manage complications using the appropriate appliances and biomechanical principles.

ATTITUDE

- Recognize how to create desired and predictable tooth movement
- Select and modify the treatment mechanics according to the patients' needs
- Choose the best evidence-based biomechanical therapy for different orthodontic treatments

TEACHING METHODS

- Lectures
- Class presentations
- Reading assignment

ASSESSMENT METHODS

- Written examination
- Structured oral examination (SOE)
- Quizzes / Assignments

COURSE SCHEDULE

WEEK	CONTENTS
1	Course Introduction: Treatment Mechanics Understanding Forces and Moments, Principles of Statics
2	Force Application and Tooth Movement
3	Two-Couple Mechanics
4	Anchorage Considerations, Molar Control, Extraoral Forces
5	The Role of Friction in Orthodontic Appliances
6	Stage 1 Treatment Mechanics: Alignment, Leveling, Correction of Vertical and Transverse Discrepancies
7	Stage 2 Treatment Mechanics: Correcting Molar Relationship Stage 3 Treatment Mechanics: Space Closure

8	Advanced Appliance Therapy; Temporary Anchorage Devices

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CRANIOFACIAL GROWTH & DEVELOPMENT

OBJECTIVE

The course is designed to provide detailed information on human craniofacial growth and development.

LEARNING OUTCOMES

KNOWLEDGE

- Determine the concepts of craniofacial growth.
- Understand the role of genetics in craniofacial growth.
- Recognize, in depth, the pre-natal period of craniofacial growth.
- Recognize, in depth, the post-natal period of craniofacial growth.
- Understand the concepts of growth of certain craniofacial structures.
- Understand the concepts of soft tissue growth of craniofacial structures.
- Understand the concepts of growth rotation of the craniofacial structures.
- Describe growth of craniofacial structures from childhood to adulthood.

SKILLS

- Integrate the knowledge of growth rotation of craniofacial structures to classic literature
- Translate the craniofacial development concepts to correlate with the dentition and occlusion.
- Perform and analyze cephalometric superimpositions in relation to growth.
- Distinguish between normal and abnormal growth of different craniofacial components and their relationships, including genetic components
- Determine the basic growth events that may represent opportunities for growth modification through dentofacial orthopedics.

- Correlate craniofacial growth and development to clinical orthodontics

ATTITUDE

- Express a critical perspective by evaluating the evidence behind the existing theories on facial growth
- Select and modify the treatment plan according to the patients' needs

TEACHING METHODS

- Reading assignment, lectures, critique articles, and web-based e-learning services.

ASSESSMENT METHODS

- Written examination
- Quizzes / Assignments

COURSE SCHEDULE

WEEK	CONTENTS
1	Principles and Control Mechanisms of Craniofacial Growth Intended Learning Outcomes: 1. Describe & analyze patterns of growth 2. Understand growth centers & sites 3. Understand theories of growth 4. Understand the different bony growth mechanisms 5. Describe the different growth movements Describe factors controlling craniofacial growth
2	Biology of Bone and Cartilage Intended Learning Outcomes: 1. Describe the types of bone tissues 2. Understand the different parts of bone 3. Know the molecular structures of bone 4. Describe the bone formation 5. Know the mechanism of bone growth 6. Know the cartilage cells 7. Describe the nasal cartilage Describe the condylar cartilage

3	Prenatal Growth of the Craniofacial Skeleton Intended Learning Outcomes: 1. Know the different periods of the prenatal growth 2. Describe the period of ovum 3. Describe the period of embryo 4. Describe the bone formation 5. Understand the prenatal growth of the cranial vault 6. Understand the prenatal growth of the cranial base 7. Understand the prenatal growth of the mandible Understand the prenatal growth of the TMJ
4	Postnatal Growth of the Craniofacial Skeleton Intended Learning Outcomes: 1. Discuss the postnatal growth of the cranial vault 2. Discuss the postnatal growth of the cranial base 3. Discuss the postnatal growth of the nasomaxillary complex 4. Discuss the postnatal growth of the mandible Discuss the postnatal growth of the temporomandibular joint
5	Growth of Soft Tissue Intended Learning Outcomes: 1. Discuss the soft tissue profile 2. Describe the growth of the soft tissue of the nose 3. Describe the growth of the soft tissue of the lips 4. Discuss the postnatal growth of the mandible 5. Describe the growth of the soft tissue of the chin Discuss the height, width, & depth of the face

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RESEARCH METHODOLOGY & SCIENTIFIC WRITING

INTEGRATED COURSE

OBJECTIVE

- Provide knowledge regarding different research methods.
- Enhance the capability of writing good scientific papers.
- Teach the ethical aspects of research on animals and humans.
- Teach the basic principles of biostatistics and introduce applied computed biostatistics as related to research in orthodontics.
- Develop the ability to critically analyze a scientific study.

LEARNING OUTCOMES

KNOWLEDGE

BIOSTATISTICS:

- Describe the importance of biostatistics in the field of orthodontics.
- Understand how to choose a statistical test to analyze data and be able to interpret the results of any study.

RESEARCH METHODS:

- Identify key characteristics and important concepts of epidemiological, experimental, cohort, case-control, and cross-sectional studies as well as systematic review.
- Identify a level of evidence for the research.

CRITICAL APPRAISAL OF SCIENTIFIC LITERATURE:

- Understand the meaning of evidence-based dentistry and the importance of critical appraisal skills.
- Describe how to interpret data.
- Understand how to read the literature and synthesize the information provided
- Describe how to apply data interpretation to clinical practice.

SCIENTIFIC WRITING:

- Understand the IMRAD structure of scientific writing.
- Understand the concept of plagiarism and ways to avoid it.
- Understand the value and application of research ethics.

SKILLS

BIOSTATISTICS:

- Apply descriptive techniques commonly used to summarize orthodontic data.
- Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.
- Interpret results of statistical analyses of orthodontic studies.

RESEARCH METHODS:

- Distinguish between different research methods: descriptive, analytical, observational, and experimental.

CRITICAL APPRAISAL OF SCIENTIFIC LITERATURE:

- Design systematic approaches to search the literature.
- Critically appraise different types of research evidence

SCIENTIFIC WRITING:

- Read, understand, and be able to write a scientific synopsis in the English language.
- Use “Mendeley” software for electronic citation
- Use different search engines with appropriate keywords.
- Summarize an article or literature.
- Undertake a research project leading to publication.

ATTITUDE

BIOSTATISTICS:

- Apply the acquired knowledge to read and critique journal articles that use biostatistical methods.

SCIENTIFIC WRITING:

- Apply research ethics in writing scientific papers.

CRITICAL APPRAISAL OF SCIENTIFIC LITERATURE:

- Recognize the importance of evidence-based clinical care treatment.
- Apply approaches to discussing healthcare research evidence with patients and the public.

TEACHING METHODS

- Lectures
- Discussion
- In-class exercises

- Hands-on exercises
- Reading assignment

CRITICAL APPRAISAL OF SCIENTIFIC LITERATURE:

- Attend trainee seminars within the specialty
- Independent study
- Attend suitable courses
- Attend journal clubs
- Complete reading assignment

ASSESSMENT METHODS

- Project based assessments.
- Writing a research synopsis/proposal

COURSE SCHEDULE

SESSION	CONTENTS / TOPICS
1	• Elements of a research proposal & manuscript • Medical web search engines and searching medical literature + exercise
2	• Obtaining ethical approval for research + exercise • Writing a grant research proposal + exercise
3	• Writing research manuscripts 1 and 2 + exercise
4	• Selection of a research area & formulation of a research question + exercise • Statistical considerations in a research proposal + exercise
5	• Article submission and journal selection
6	• Research misconduct • Hands-on writing of a research proposal and manuscript

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BEHAVIORAL SCIENCES & PSYCHOLOGY

OBJECTIVE

- Provide information about dental ethics and experience the main aspects of dental ethics, child psychology, and geriatric dentistry.
- Introduce the variety of principles that influence human behavior.
- Teach the different approaches to understanding human behavior.

LEARNING OUTCOMES

KNOWLEDGE

- Describe an individual's normal psychological development from childhood to adulthood.
- Describe normal and abnormal psychological development including the disorders of the personality.
- Understand the psychological processes involved in an individual's adaptation to death and dying.
- Understand basic knowledge on quality of life in oral health.
- The role of oral and craniofacial appearance in interpersonal attraction, self-image, and well-being.
- Gain advanced knowledge on oral habits and disorders and their management from a psychological perspective (e.g., ethology and development of thumb sucking, bruxism, self-mutilation behaviors, and temporomandibular disorders).
- Describe the main aspects of dental ethics.
- Gain advanced knowledge on oral habits and disorders and their management from a psychological perspective (e.g., ethology and development of thumb sucking, bruxism, self-mutilation behaviors, and temporomandibular disorders).
- Gain advanced knowledge on pain and anxiety (environmental and emotional determinants) and strategies to manage them.
- Understand that positive psychology, health promotion, and salutogenesis are present on an individual and community level.
- Gain knowledge on compliance with health care recommendations & motivational interventions.
- Understand the processes of aging of the population and the specificity of geriatric dentistry.

- Identify the basics of family violence and abuse.
- Describe the main aspects of dental ethics.

SKILLS

- Apply knowledge of psychological development to the assessment and orthodontic treatment of patients
- Apply advanced knowledge on oral habits and disorders and their management from a psychological perspective.
- Show an ability to react to the signs of risky and destructive behaviors.
- Show an ability to conduct a motivational interview.
- Show an ability to deal with stress at the academic level and in their respective future careers.

ATTITUDE

- Recognize the importance and apply the knowledge of psychology to understand normal and abnormal patient profiles
- Recognize when and how to make psychological referrals.
- Demonstrate effective interpersonal skills for effective communication with patients who require behavioral and psychological management, including those with cleft lip and palate and those undergoing orthognathic surgery.

TEACHING METHODS

- Lectures
- Group discussion

ASSESSMENT METHODS

- Quizzes / Assignments

COURSE SCHEDULE

TOPICS	CONTENTS
1	• Know the theories of child psychology • Dynamic of growth and change from birth to adolescence (cognitive, emotional, and social) • Temperament
2	• Communication skills: types, benefits, and complications • Compliance and informed consent • Patient motivation and stage of changes • Parent style
3	• Recognize the different personality traits in children and adults • Discuss the impact of malocclusion on the psychological well-being • Psychological assessment of patients with appearance concerns • Behavioral response to mechanical teeth movement • Psychological behavioral management
4	• The consequences of orthodontic-surgical treatment on the psychological well-being and behavior • Psychological factors associated with orthognathic treatment.
5	• Psychological approach of some dental habits
6	• Work stress and burnout

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ORTHOGNATHIC SURGERY

OBJECTIVE

- The course is designed to provide knowledge and skills in identifying dento-skeletal deformities that require orthognathic surgery, conducting proper extra-oral and intra-oral clinical examinations, evaluating the psychological background, developing a comprehensive treatment plan, and orthodontically preparing the patient for orthognathic surgery.

LEARNING OUTCOMES

KNOWLEDGE

- Understand the historical background, necessity, and the stability of orthognathic surgery
- Determine the general concepts and applications of orthognathic surgery
- Determine the general orthognathic treatment protocol
- Define the factors affecting the diagnosis of surgical problems
- Determine the complications encountered in orthognathic surgical approach

SKILLS

- Diagnosing the various dento-skeletal deformities and the corresponding surgical treatment.
- Establishing an ideal surgical treatment plan with other non-surgical treatment alternatives.
- Preparing the patient orthodontically for surgery with the necessary mechanotherapy
- Managing the patient. orthodontically post-surgery.

ATTITUDE

- Communicate effectively with the patient and explain the diagnosis, best treatment modalities, surgical procedures, and complications of each technique.
- Interact with the oral and maxillofacial surgery (OMFS) team .

TEACHING METHODS

- Lectures, critique articles, and web-based e-learning services

ASSESSMENT METHODS

- Written examination
- Structured oral examination (SOE)
- Quizzes / Assignment

COURSE SCHEDULE

WEEK	CONTENTS
1	Dento-Skeletal Deformities and Facial Esthetics History of Orthognathic Surgery Indications of Orthognathic Surgery Intended Learning Outcomes: 1. Recognize the concept of facial esthetics 2. Recognize the history and development of orthognathic surgery Identify the indications of orthognathic surgery
2	Diagnosis of Dento-Skeletal Deformities Intended Learning Outcomes: 1. Analyze dento-skeletal deformities 2. Perform comprehensive clinical assessment 3. Radiographically analyze the dento-skeletal deformities Provide correct diagnosis
3	Techniques for Mandibular Surgeries Intended Learning Outcomes: 1. Describe the techniques for mandibular surgeries 2. Understand the indications for mandibular surgical techniques Identify drawback of mandibular surgical techniques
4	Techniques for Maxillary Surgeries Intended Learning Outcomes: 1. Describe the techniques for maxillary surgeries 2. Understand the indications for maxillary surgical techniques 3. Identify drawback of maxillary surgical techniques Recognize the management of skeletal transverse discrepancies

5	Class II Dento-Skeletal Deformity Intended Learning Outcomes: 1. Recognize the indications of Class II dento-skeletal deformity surgical correction 2. Recognize the correct timing for orthognathic surgery in Class II malocclusion 3. Establish an ideal surgical treatment plan 4. Perform orthodontic preparation for Class II dento-skeletal deformity surgical correction 5. Describe model surgery planning Perform post-surgical orthodontic maintenance and finishing
6	Class III Dento-Skeletal Deformity Intended Learning Outcomes: 1. Recognize the indications of Class II dento-skeletal deformity surgical correction 2. Recognize the correct timing for orthognathic surgery in Class II malocclusion 3. Establish an ideal surgical treatment plan 4. Perform orthodontic preparation for Class III dento-skeletal deformity surgical correction 5. Describe model surgery planning Perform post-surgical orthodontic maintenance and finishing
7	Skeletal Vertical Discrepancies Intended Learning Outcomes: 1. Describe the etiology and manifestations of facial asymmetry 2. Recognize the management of facial asymmetry Describe the available temporomandibular joint treatment protocols

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Articles Related to Cephalometric Analysis & Superimposition

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OCCLUSION AND TEMPOROMANDIBULAR DYSFUNCTION

OBJECTIVE

This course is intended to provide information to orthodontists about the importance of occlusion and temporomandibular dysfunction (TMD), anatomy and physiology of the TMJ, and the diagnosis and management of TMD problems.

LEARNING OUTCOMES

KNOWLEDGE

FUNDAMENTALS OF OCCLUSIONS:

- Describe the six keys of occlusion.
- Define centric relation and centric occlusion
- Recognize the categories of occlusion: canine guidance, bilateral balancing, unilateral balancing, and mutually protected articulation
- Diagnose occlusal interferences.
- Define the occlusal plane, curve of Spee, and curve of Wilson
- Discuss the causes and management of bruxism and clenching
- Explain the types of occlusal interference
- Differentiate between a night guard and a therapeutic splint

TEMPOROMANDIBULAR JOINT DYSFUNCTION (TMD)

- Identify normal TMJ function, anatomy, and physiology
- Identify disorders of the TMJ.
- Identify signs and symptoms of TMJ dysfunction
- Describe the etiology and management of TMJ dysfunction
- Identify disorders of the TMJ.
- Explain the referral patterns for TMJ dysfunction
- Evaluate the impact of psychosocial issues on a patient with persistent TMJ dysfunction.

SKILLS

FUNDAMENTALS OF OCCLUSIONS:

- Demonstrate the ability to perform occlusal analysis.

TEMPOROMANDIBULAR JOINT DYSFUNCTION:

- Construct appropriate occlusal appliances for the diagnosis and treatment of TMJ dysfunction.
- Communicate and work with colleagues on the multidisciplinary management of TMJ dysfunction.
- Monitor and evaluate the effectiveness of treatment regimes.
- Assess the position of the TMJ in orthodontic patients.
- Record, interpret, and analyze the clinical findings and perform image analysis of TMD in orthodontic patients
- Diagnose and monitor the presence of TMD and its progress, if present.

ATTITUDE

TEMPOROMANDIBULAR JOINT DYSFUNCTION:

- Recognize the importance of diagnosing and identifying patients with TMD.
- Advise patients who are at risk or have been diagnosed with TMD.

TEACHING METHODS

- Lectures
- Class presentations
- Reading assignment

ASSESSMENT METHODS

- Written examination
- Quizzes / Assignment

COURSE SCHEDULE

WEEK	CONTENTS
1	Chapter 1 - Page 2-19 Functional Anatomy and Biomechanics of the Masticatory System Chapter 2 - Page 21-34 Functional Neuroanatomy and Physiology of the Masticatory System
2	Chapter 3 - Page 46-61 Alignment and Occlusion of the Dentition Chapter 4 - Page 62-71 Mechanics of Mandibular Movements

3	Chapter 5 - Page 73-83 Criteria for Optimum Functional Occlusion Chapter 6 - Page 86-99 Determinants of Occlusal Morphology
4	Chapter 7 - Page 102-122 Etiology of Functional Disturbances in the Masticatory System Chapter 8 - Page 129-160 Signs and Symptoms of Temporomandibular Disorders
5	Chapter 9 - Page 170-217 History and Examination of Temporomandibular Disorders Chapter 10 - Page 222-253 Diagnosis of Temporomandibular Disorders
6	Chapter 11 - Page 258-280 General Considerations in the Treatment of Temporomandibular Disorders Chapter 12 - Page 291-311 Treatment of Masticatory Muscle Disorder
7	Chapter 13 - Page 317-354 Treatment of Temporomandibular Joint Disorders Chapter 14 - Page 362-373 Treatment of Chronic Mandibular Hypomobility & Growth Disorder
8	Chapter 15 - Page 375-396 Occlusal Appliance Therapy Chapter 17 - Page 422-429 General Considerations in Occlusal Therapy Chapter 19 - Page 443-456 Selective Grinding

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INTERDISCIPLINARY TREATMENT & ADULT ORTHODONTICS

OBJECTIVE

This course is intended to provide information about and experience in:

- Periodontal considerations.
- Restorative / prosthodontic considerations.
- Comprehensive vs compromised treatments.

LEARNING OUTCOMES

KNOWLEDGE

- Recognize dental health considerations in adult patients
- Determine the appropriate approach (adjunctive vs. comprehensive) to adult orthodontic patient treatment
- Identify the special anchorage problems unique to adult patients
- Explain how certain medical conditions and drugs affect the orthodontic treatment
- Recognize the capabilities and the limitations of “Invisalign®” treatment
- Compare the approaches to accelerated orthodontic treatment

SKILLS

- Write the proper sequence of treatment procedures in the interdisciplinary management of adult orthodontic patients.
- Select the best orthodontic management of patients with multidisciplinary problems.
- Analyze the esthetic periodontal challenges in adult patients and propose interdisciplinary solutions to produce ideal esthetic results.
- Propose orthodontic management plans for elderly and medically compromised patients.

TEACHING METHODS

- Lectures
- Class presentations
- Reading assignment

ASSESSMENT METHODS

- Written Examination
- Structured oral examination (SOE)
- Quizzes / Assignment

COURSE SCHEDULE

WEEK	CONTENTS
1	Introduction: Adult Orthodontic Patients – Who Are They? Chapter 1 Adult Orthodontics, Chapter 19 Contemporary Orthodontics
2	Diagnosis and Treatment Planning Considerations in Treatment for Adults Chapters 2,4, Adult Orthodontics, Chapter 19 Contemporary Orthodontics
3	Diagnosis and Treatment Planning Considerations Recorded Lecture: Dr. Vincent G. Kokich, AAO 2006: Contemporary Adult Orthodontics: Are Your Treatment Objectives Realistic?
4	A. Orthodontic-Restorative Connection B. Problem-Based Learning Case: Braces Later in Life
5	A. Problem-Based Learning Case: Braces Later in Life B. Interdisciplinary Treatment
6	Perceive it to Treat it: A Guide to Comprehensive Esthetic Dentistry
7	Management of Patients with Missing/Abnormally Proportioned Teeth Recorded Lecture: Dr. Ward M. Smalley, AAO 2014: Enhancing Anchorage during Adult Orthodontics: Restorative/Prosthodontic Implants
8	A. Anchorage Problems in Melsen B. Adult Orthodontics. Blackwell Publishing Ltd. 2012. Chapter 8, 132-162. B. Recorded Lecture: Dr. Birte Melsen, AAO 2007: Treatment of the Degenerated Dentition: Where is the Limit?
9	The Orthodontic-Periodontic Connection – Part I • Pre-Orthodontic Periodontal Therapy

	• Pre-Orthodontic Perio Surgery A. Gingival Recession and Root Coverage (Mucogingival Problems, Inadequate Attached Gingiva, Gingiva Grafting) B. Osseous Surgery – Bone Defects/Bone Grafting • Impacted Maxillary Canines • Corticotomy
10	The Orthodontic-Periodontic Connection – Part II • Missing Interdental Papilla • Gummy Smile • Maxillary Midline Diastema (Frenectomy) Circumferential Supracrestal Fibrotomy
11	Orthodontic-Periodontic Relationship
12	A. Psychosocial Issues and Adult Orthodontics B. Problem Based Learning Case: “I always wanted to have my teeth fixed”
13	A. Problem Based Learning Case: “I always wanted to have my teeth fixed” B. Accelerated Orthodontic Treatment
14	Lingual Orthodontics
15	Clear Aligner Therapy
16	Clear Aligner Treatment (Invisalign®)

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2. Chapter 18: Special Considerations in Treatment for Adults in: Contemporary Orthodontics. William R. Proffit, Henry W. Fields Jr., David M. Sarver. 2012, 5th Edition, Mosby Inc., Saint Louis. ISBN: 978-0323083171

Additional Reading:

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4. Buttke TM, Proffit WR. Referring adult patients for orthodontic treatment. J Am Dent Assoc. 1999;130(1):73–9.
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systematic review of systematic reviews. J Oral Rehabil. 2017;44(8):636–654.
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TYPODONT II FINISHING & DETAILING

(Selected Advanced Topics)

OBJECTIVE

This course is intended to:

- Provide students with theoretical and clinically related knowledge and skills applied in the final stage of orthodontic treatment.
- Describe a comprehensive system of evaluation of the individual patient to be used during the finishing stage of treatment.
- Present a written system of notation that can guide the orthodontist in producing an excellent finished result for each patient.

LEARNING OUTCOMES

KNOWLEDGE

- Understand the basic concept of finishing and detailing.
- Identify facial and dental goals during orthodontic finishing.
- Apply the six features that should be considered when placing a fixed orthodontic appliance.
- Demonstrate how bracket positioning can affect finishing.
- Identifying errors in bracket positioning, causes, and solutions
- Appreciate the esthetic significance of incisor position and inclination
- Recognize and resolve challenges that may preclude an excellent finish.
- Describe procedures that can be performed to achieve excellence in orthodontic treatment finishing.
- Identify important factors that play a role in orthodontic stability.

SKILLS

- Apply the American Board of Orthodontic (ABO) grading system to the student's own case assessment.
- Use a comprehensive system of evaluation to assess an orthodontic case.
- Apply correct wire bending sequences for orthodontic case finishing.

ATTITUDE

- Apply systemized method of assessment during orthodontic finishing.
- Recognize procedures that can be performed during orthodontic treatment to achieve excellence in orthodontic results.

TEACHING METHODS

- Lectures
- Hands-on training
- Reading assignment

ASSESSMENT METHODS

- DOPs

COURSE SCHEDULE

TOPICS	CONTENTS
1	Lecture / Case-based discussion • Goals of orthodontic treatment • Andrews' six keys of occlusion • Finishing to gnathological principles ABO grading system
2	Lecture / Case-based discussion • The importance of bracket positioning The concept of variable torque prescription
3	Lecture / Case-based discussion • A comprehensive system of evaluation (detailing form) Wire bending consideration
4	Lecture / Case-based discussion • Stability and retention consideration Procedure after removal of appliance
5	Case-based discussion
6	Practical session / Video demonstrations Self-assessment using ABO grading system
7	Practical session Case No. 1: Filling the detailing form

8	Typodont hands-on session • Typodont course-straight wire appliance: Finishing and Detailing 0.019' X 0.025' TMA (Beta-Titanium) Ideal Arch Form with Detailing Bends
9	Lecture / Case-based discussion • Stability and retention consideration Procedure after removal of appliance
10	Practical session Case No. 2
11	Typodont hands-on session • Typodont course-straight wire appliance: Finishing and Detailing 0.019' X 0.025' TMA (Beta-Titanium) Ideal Arch Form with Detailing Bends

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PRACTICE MANAGEMENT

OBJECTIVE

- Personnel management
- Financial management
- Responsibilities and professionalism of a specialist practitioner

LEARNING OUTCOMES

KNOWLEDGE

- Identify the basic concepts of orthodontic practice management.
- Recognize the basics of accounting and finance.
- Define the marketing concepts.
- Develop awareness to the importance of team building.
- Identify the basics of human resources management.
- Recognize the importance of health information management.
- Identify the basics of quality measures and their management.
- Recognize their professional options in the Saudi Health Care Market.
- Identify the concept of organizational structure.
- Define the concept of dental insurance in orthodontic practice.
- Develop an awareness of the importance of social media in orthodontic practice.
- Outline employment law (including equality and diversity).
- Explain staff development procedures.
- Assess the need for risk management in a successful practice.
- Identify the rules and regulations of opening a private clinic in Saudi Arabia.

SKILLS

- Apply the knowledge of clinical management within a specialist environment.
- Demonstrate the interpersonal skills required to support a team for the delivery of care.
- Demonstrate optimal patient record keeping.

ATTITUDE

- Recognize the legal framework within which staff are employed.
- Recognize the importance of good record keeping.
- Recognize the importance of staff engagement and support.

TEACHING METHODS

- Participation in auditing procedures
- Attending trainee seminars
- Independent study
- Attending small group discussions

ASSESSMENT METHODS

Assignments

COURSE SCHEDULE

TOPICS	CONTENTS
1	Health Care Economics / Health Care Management
2	Business Planning / Feasibility Study
3	Business Modeling / Value Based Business model
4	Marketing your Orthodontic Private Practice (Marketing Plan)
5	Human Resources Management in Private Dental Practice
6	Case Study 1
7	Accounting and Financial management of Private Dental Practice
8	Quality management in a Specialized Private Dental Practice
9	Health Information Management in Dental Practice
10	Operation management in Private Dental Practice
11	Social Media and Dental Practice
12	Case Study 2

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CRANIOFACIAL ANOMALIES & CLEFT LIP & PALATE

OBJECTIVE

- The course is designed to provide detailed information on craniofacial anomalies with emphasis on cleft lip and palate anomaly. Residents will be provided with knowledge beyond the routine dental and orthodontic diagnosis; hence, basic knowledge about the embryology, etiology, pathogenesis, classification, and functional problems associated with craniofacial anomalies is imparted in this interactive course.
- The course is intended to provide a broad overview and experience in the inter-disciplinary approach of cleft lip and palate (CLP), and craniofacial anomalies including dental and surgical interventions.

LEARNING OUTCOMES

KNOWLEDGE

- Understand the role of genetics in craniofacial anomalies with CLP.
- Recognize the clinical presentation of craniofacial anomalies with CLP.
- Understand the clinical implications of craniofacial anomalies with CLP.
- Understand the surgical interventions required at each stage of CLP anomalies.
- Recognize the interdisciplinary approach in the management of CLP anomalies.
- Know the dental and surgical treatments required at each stage of CLP anomalies.
- Plan the orthodontic interventions required at each stage of CLP anomalies.

SKILLS

- Recognize the clinical presentations of craniofacial anomalies with CLP. Plan the interdisciplinary care for CLP anomalies and craniofacial syndrome.
- Formulate a center for CLP anomalies and craniofacial syndromes.

ATTITUDE

- Communicate effectively with the patient and explain the diagnosis, best treatment modalities, surgical procedures, and complications of each technique.
- Interact with an inter-disciplinary team for cleft lip and palate.

TEACHING METHODS

Lectures, critique articles, and web-based e-learning services.

ASSESSMENT METHODS

- Written examination
- Structured oral examination (SOE)
- Quizzes / Assignment

COURSE SCHEDULE

WEEK	CONTENTS
1	Facial Embryology and Genetics in Oro-facial Cleft Intended Learning Outcomes: 1. Describe the gene expression and causes of CLP anomaly 2. Understand the role of neural crestal cells in CLP anomaly 3. Describe the formation of the face 4. Describe the formation of the lip and development of cleft lip 5. Describe the formation of the palate and development of cleft palate

2	Facial and Palatal Growth Complete Unilateral & Bilateral Cleft of the Lip and Palate Intended Learning Outcomes: 1. Understand the etiology of cleft lip and palate 2. Understand the growth in cleft lip and palate patients 3. Understand the different classifications of cleft lip and palate 4. Describe the profile, skeletal features, occlusal features of patients with unilateral CLP anomaly 5. Describe the profile, skeletal features, and occlusal features of patients with bilateral CLP anomaly
3	Pre-surgical Orthopedics Intended Learning Outcomes: 1. Learn the stages of treatment for CLP anomaly 2. Understand the nature and background of pre-surgical orthopedics 3. Understand lip strapping: indications, timing, and procedures 4. Understand palatal orthopedic appliances: indications, timing, and procedures 5. Know the Dutchcleft study
4	Lip & Palatal Surgeries Intended Learning Outcomes: 1. Learn the timing of different surgical interventions for cleft patients 2. Recognize the different surgical techniques for lip repair Recognize the different surgical techniques for palatal repair
5	Midfacial Orthopedic Changes and Secondary Alveolar Bone Graft Intended Learning Outcomes: 1. Know pre-surgical midfacial orthopedics: indications, timing, and procedures 2. Know pre-secondary alveolar bone graft orthodontics: indications, timing, and procedures Learn the surgical interventions and materials used in secondary alveolar bone graft
6	Craniofacial Microsomia, Treacher Collin's Syndrome Craniosynostosis, Down's Syndrome Intended Learning Outcomes: 1. Describe the etiology of selected craniofacial syndromes 2. Understand the clinical presentation of selected craniofacial syndromes Plan the management of selected craniofacial syndromes

7	Orthognathic Surgery in CLP and Craniofacial Syndromes Intended Learning Outcomes: 1. Describe the orthodontic preparation for orthognathic surgery 2. Understand the indicated orthognathic surgeries among cleft patients 3. Discuss the indications and methods of distraction osteogenesis 4. Discuss the complications encountered in cleft patients Describe an oro-nasal fistula and its indicated management

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ADDITIONAL READING:

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CASE PRESENTATION

OBJECTIVE

- This course is intended to provide the residents with the opportunity to present, assess, and critique their clinical cases and their treatment plans and perform an evidence-based management.

LEARNING OUTCOMES

KNOWLEDGE

- In-depth knowledge about the diagnosis, treatment planning, and treatment management of orthodontic cases.

SKILLS

- Present clinical cases with clear and well-analyzed records and data.
- Critique treatment plans and treatment management.
- Formulate a correct diagnosis based on history, clinical examination, investigations, and consultation.
- Choose treatments based on evidence.

ATTITUDE

- Expose the residents to different orthodontic problems and treatment strategies.

TEACHING METHODS

- Class presentations
- Clinical cases
- Critique assignments

ASSESSMENT METHODS

- Topic review assessment
- CBD

ADVANCED ORTHODONTIC SEMINARS

CLASSIC AND CONTEMPORARY LITERATURE REVIEW

OBJECTIVE

- This course is intended to provide the residents with an experience of an evidence-based practice and educate them regarding the current and up-to-date literature in the orthodontic field.

LEARNING OUTCOMES

KNOWLEDGE

- Acquire knowledge about the different types of studies and methodologies.
- Understand the literature behind the basic concepts of orthodontics, including:
- Management of orthodontic problems in growing patients.
- Management of adults and interdisciplinary/adjunctive orthodontic problems.
- Pharmacological modulation during orthodontic tooth movement
- Updates in orthodontics

SKILLS

- Carefully choose, read, and critique the evidence.
- Assess and present selected articles from the most recent orthodontic literature.
- Keep up to date with the literature.
- Recognize classical and current published articles and case reports impacting the practice of orthodontics.
- Identify areas of controversy in areas of the orthodontic disciplines.

ATTITUDE

- Be up to date in evidence-based orthodontics.
- Choose the best evidence in any practice-related decisions.

- Apply evidence-based practice when treating different types of malocclusions.
- Change practice decisions based on evidence-based results

TEACHING METHODS

- Class presentations
- Seminar

ASSESSMENT METHODS

- Written
- Topic review assessment

DOMAINS & CATEGORIES

Domain	Categories	Sub-categories
Management of orthodontic problems in the permanent dentition	Assessment / Diagnosis / Treatment rationale & management of intra-arch & anterior-posterior problems	Extraction versus non-extraction therapy
		Mandibular incisor extraction
		Distalization
		IPR
		Molar uprighting
		Bimaxillary protrusion
		Adult Class II & Class III malocclusion
	Assessment / Diagnosis / Treatment rationale & management of vertical problems	Treatment consideration for open bite, deep bite, long face and short face problems
	Assessment / Diagnosis / Treatment rationale & management of transverse problems	Treatment consideration for dental & facial transverse problems and asymmetries
	Anchorage	Anchorage from dental and bone anchorage devices

	Soft tissue	Soft tissue changes with different malocclusion and treatment modalities
	Finishing	Treatment consideration for the finishing stage
	Retention – relapse & stability	- Retention methods for different orthodontic problems (malocclusions – habits and others) including frenectomy and fibrotomy - Aetiology of relapse including late mandibular crowding and third molars - Stability of different treatment modalities
	Tissue reactions to orthodontic tooth movement / Risks associated with orthodontic treatment	Root resorption TMD/Orthodontics Maxillary sinus Traumatized teeth Other risks associated with orthodontic treatment

Domain	Categories	Sub-categories
Management of orthodontic problems in the developing dentition	Assessment / Diagnosis / Treatment rationale & management of dental problems	Preventive and interceptive orthodontics: Eruption guidance Space maintenance Early management of arch length and width problems
		Ectopic canines
		Ectopic eruption of maxillary first molar
		Ankylosed & Infra-occluded teeth
		Dental anomalies & congenitally missing teeth Interdisciplinary management of moderate and severe hypodontia
	Assessment / Diagnosis / Treatment rationale & management of skeletal problems	Dento-facial orthopedics / early treatment of anterior-posterior problems
		Early management of vertical problems
		Early management of transverse problems
	Assessment / Diagnosis / Treatment rationale & management of functional problems	Respiratory Function and Orthodontics Speech, Swallowing and Habits

Domain	Categories	Sub-categories
Advances in Orthodontics	Advances in orthodontic prescriptions & materials	Updates in orthodontic materials including elastomeric materials, remineralizing agents and sealants
	Advances in orthodontic treatments	Accelerated orthodontic tooth movement Surgery first Clear aligners
	Technology in orthodontics	CBCT 3D imaging and analysis software 3D scanning & printing
	Provisions in orthodontic treatment needs, complexities, and outcomes	Epidemiology in Orthodontics Orthodontic indices

PART IV - ASSESSMENT OF TRAINEES AND SUPPORT

A. Purpose of Assessment

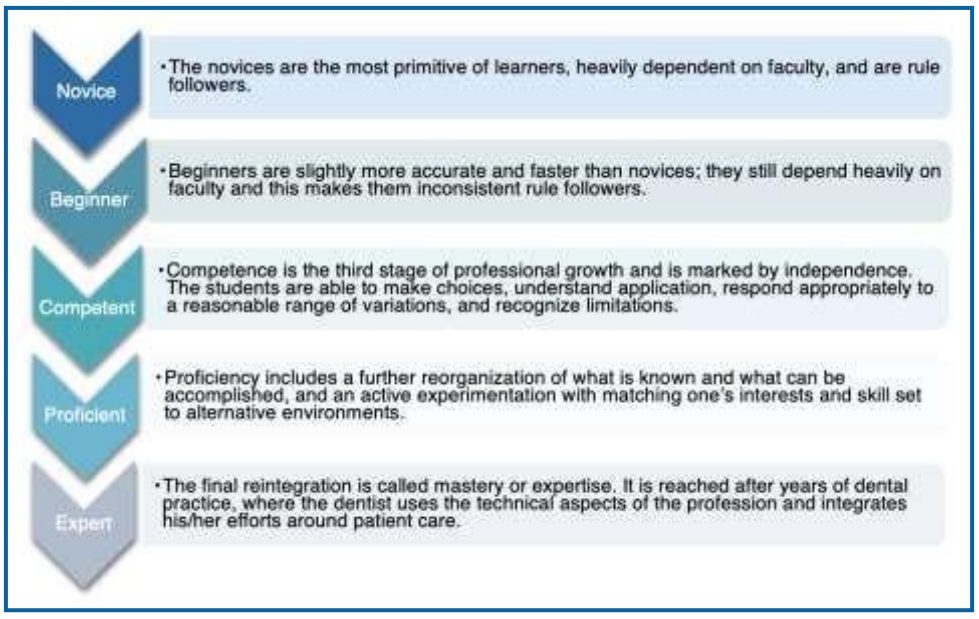
B. Tools and Methods of Assessment

C. Residents' and Trainers' Responsibilities in the Assessment Process

D. Trainee Support

A. PURPOSE OF ASSESSMENT

Assessment is a crucial part of developing competent practitioners. The concept of competence recognizes that the student will have to pass several defined stages. These stages have been named Novice, Beginner, Competent, Proficient, and Expert by Dreyfus and Dreyfus (1980). The following table summarizes the definition of each stage.



In general, the purposes of the assessment are as follows:

1. Formative Assessment

- Formative assessment, with its constructive feedback teaching approach, is a component of assessment that primarily aims to guide residents towards the development of their own self-assessment and learning skills. Formative assessment in the SBO-DO training program is designed to be a major component in the comprehensive orthodontic specialty courses—review of

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books and literature, and case presentations. It also constitutes a major component of the clinical training performance evaluation.

2. Summative Assessment

- Summative assessment is a component of assessment that primarily aims to make informed decisions on the trainees' competency. In comparison to the formative assessment, summative assessment does not aim to provide constructive feedback. For further details on this section, please refer to the general bylaws and executive policy of assessment (available online: www.scfhs.org). In order to be eligible to take the final exams, a trainee should be granted a "Certificate of Training-Completion".
- Trainees should play an active role in seeking feedback during their training. On the other hand, trainers are expected to provide timely and formative assessment to the trainees. SCFHS will provide an e-portfolio system to enhance communication and analysis of data arising from the formative assessment.

B. TOOLS AND METHODS OFASSESSMENT

The Saudi Board of Orthodontics and Dentofacial Orthopedics (SBO-DO) certification has incorporated an assessment system that captures all or most of the aspects of required competencies. For assessing knowledge concepts and application of knowledge, written exams with multiple formats including context-based multiple-choice questions (MCQ's) and structured oral examinations (SOE) have been implemented, in addition to multiple different academic activities such as quizzes, assignments and topic reviews. For assessing skills, case-based discussions, DOPS, clinical portfolios as well as research activities were implemented in the program. For assessing attitude, Mini-CEX, ITER and FITER are used to assess the roles of multiple competencies related to the specialty of orthodontics. Residents are required to submit a collection of evidence of their respective clinical and professional work in their portfolio at the end of the program. Self-reflection, assessment of clinical reasoning, judgment, and decision-making skills are essential components of the assessment plan. Assessment tools and their relevant competencies are mentioned below in Tables A-D. Trainees and trainers are advised to check the most recently updated assessment tools approved by the Scientific Council of the specialty, as they could be subject to change in the future.

The detailed information about assessment methods has been provided in the assessment methods document uploaded on the website of www.scfhs.org.sa.

Table A: Description of the SBO-DO Assessment Toolbox

KNOWLEDGE

ASSESSMENT TITLE	DETAILS
➢ Online written exam	The online written examination is a Pass/Fail exam designed for the universal topics. Residents are required to repeat the exam until they obtain the Pass grade.
➢ End of year progress test (written exam)	Knowledge is assessed using context based MCQs, Extended Matching Items, and Written Assignments. This is exam will be replaced by Part I exam for R1 and by Part II exam for R3. Examination details such as the dates of the exam and the blueprint have been published on the commission website: www.scfhs.org.sa.

➢ Structured Oral Examination (SOE)	The number of exam items, eligibility, and the passing scores are in accordance with the commission's training and examination rules and regulations and the blueprint of the program. Examination details, such as the dates of the exam and the blueprint have been published on the commission website, www.scfhs.org.sa. SOE includes an assessment of the candidate's clinical reasoning, judgment, and decision-making skills, and assessment blueprints are structured accordingly.
➢ Academic activity ➢ a. Quizzes / Assignments	A short test of knowledge conducted at the end of the core specialty courses.
➢ Academic activity ➢ b. Topic / book review assessment	An academic activity to assess the scholar and evidence-based skills of the resident in reading, interpreting evidence and critiquing published research on a topic.

SKILLS

ASSESSMENT TITLE	DETAILS
➢ Case-based Discussion (CBL)	The resident is expected to present comprehensive treatment plans for patients at different stages of treatment, supported with implemented evidence, discussion on the diagnoses, treatment plan and treatment mechanics, case progress, finishing, and prognosis. The resident is also expected to review at least five cases that were completed by previous graduates of the program, with the objective of assessing treatment outcomes using validated indices such as the ABO grading system or the Peer Assessment Rating. Reflection on the provided treatment and its outcomes are also required to be completed.
➢ Direct Observation of Procedural Skills (DOPs)	DOPS is a method used to assess the trainee's technical, operative, and professional skills in a range of basic diagnostic and interventional procedures, or parts of procedures during routine orthodontic practice, to facilitate developmental feedback. Self-assessment is also implemented. Different orthodontic procedures can be assessed, such as banding, bonding, wire bending, loop formation, lingual arch placement, delivery and activation of TPA, lip bumper, finger spring, headgear, reverse headgear, insertion of mini-screws, handling of functional appliances, clear aligners, occlusal splints, night guard, TMD appliances, and retainers. For more details about DOPS, please refer to the competency-based assessment document of the SBO-DO.

➢ Clinical Portfolio	The clinical portfolio includes the assessment of the clinical knowledge and skills. • First level residents should submit 10 documented new cases started by the resident. • Second level residents are expected to submit 35 new c*ases* (minimum 25 new cases started by the residents and may include up to 5 transferred cases) with IOTN 3 and above. • Final level residents are required to submit the completed records and documentation of *25 cases* (may include up to 5 transferred cases) treated and finished by the resident. Out of the 25 cases, residents should include and submit completed records and documentation of 5 advanced cases categorized by IOTN as at least grade 4 with no more than one case from each of the following categories: 1. Growth modification followed by comprehensive orthodontic treatment 2. Class I malocclusion 3. Class II malocclusion 4. Class III malocclusion 5. Malocclusion with transverse discrepancy 6. Malocclusion with vertical discrepancy 7. Dentofacial deformity case treated with combined orthodontic and orthognathic surgery. 8. Cleft lip and palate (single treatment phase or more) The detailed information about assessment methods has been provided in the assessment methods document uploaded on the website of www.scfhs.org.sa.
➢ Research Activity	The resident will be evaluated for a research proposal that he/she will formulate and submit to the supervisor. A poster or oral presentation at a distinguished orthodontic conference, approved workshops, or a publication in a peer-reviewed journal is required before graduation.

ATTITUDE

ASSESSMENT TITLE	DETAILS
➢ The Clinical Evaluation Exercise (Mini-CEX)	Mini-CEX assesses clinical skills, attitudes, and behaviors in a secondary care setting. The mini-CEX provides a 15-minute snapshot of how the trainee may interact with patients in a secondary care setting. Each mini-CEX should represent a different clinical problem and should provide samples from a wide range of problem groups. The following skills will be assessed using Mini-CEX: orthodontic assessment & diagnosis encounter, treatment management & progress encounter, case finishing encounter, and case retention encounter. For more details about mini-CEX, please refer to the competency-based assessment document of the SBO-DO.
➢ ITER	In-training evaluation report (ITER) aims to highlight the strengths, identify the weaknesses, and aid in developing a plan of action for improvement. The trainers (at least two supervisors) should give feedback to the residents at the end of each quarter. This assessment is conducted throughout the academic year (every 3 months) and at the end of each academic year.
➢ FITER	Final in-training evaluation report (FITER) represents the training competency portfolio that includes evidence of achievements of all required competencies. This includes all evidence of clinical knowledge and skills as well as other competencies. Multiple projects might be required as evidence of being competent as health advocate, scholar, leader and professional orthodontists. Example of these projects include: a. Quality Improvement Project ➢ The resident is expected to participate in a quality improvement developmental activity related to the home hospital environment. Senior residents are expected to apply the knowledge gained from their practice management course, to identify an "issue" or a "problem" in their clinical environment, select a model to follow, design a solution, implement it, and evaluate the outcome of their intervention. b. Educational Projects

	➢ Residents are expected to participate in teaching activities. Senior residents, on the other hand, are expected to mentor their junior colleagues. Residents are expected to complete the “teaching log” form for any educational encounter they participated in. c. Community Project ➢ Resident is expected to participate in community service or submit a community project. For further details regarding this implementation, please check the statement on this regard from Scientific Council of the specialty.

PROMOTION

The program is divided into two parts: junior residency (the first year “R1” level), and senior residency (the 2nd “R2” & 3rd years “R3” levels).

The Junior Level – R1

The junior level in the SBO-DO program typically refers to the initial stage of education and training in the field of orthodontics. At this level, residents are usually involved in:

1. Foundational Learning: Acquiring basic knowledge of dental and orthodontic principles, including basic general sciences, basic specialty sciences including diagnosis and treatment planning, cephalometric analysis, growth and development, biomaterials and biomechanics of tooth movement.

2. Clinical Skills Development: Gaining hands-on experience through supervised clinical practice. This includes learning to perform detailed and systematic clinical and laboratory assessments, and diagnosing different malocclusions and dentofacial problems, and applying basic orthodontic appliances.

3. Case Management: Managing less complex cases under the guidance of experienced orthodontists. This stage emphasizes developing treatment planning skills and understanding the progression of orthodontic treatment.

The Senior Levels – R2 & R3

The senior levels in the SBO-DO program represents an advanced stage of training and professional practice. By the end of R3, residents are expected to:

1. Advanced Clinical Competence: Demonstrate proficiency in diagnosing and treating complex orthodontic cases, including interdisciplinary treatment planning that may involve surgical orthodontics.

2. Leadership and Supervision: Take on leadership roles within clinical settings, supervising junior residents, and contributing to the training and development of new residents.

3. Specialized Techniques: Utilize advanced orthodontic techniques and appliances, such as clear aligners and temporary anchorage devices (TADs).
4. Patient Management: Handle a wide range of patient scenarios, and provide comprehensive care that includes pre-treatment planning, execution, and post-treatment follow-up.
5. Professional Development: Engage in continuous professional development through attending conferences, earning certifications, and being active members of professional organizations.

To be promoted from the junior level (R1) to the senior level (R2), the trainee must complete the promotion requirements as stated in Table D in addition to passing the Part I examination.

The assessment plan of the SBO-DO program is formulated in accordance with the Saudi Commission's training and examination rules and regulations, which have been described in detail in the SBO-DO Assessment rules and regulations page (www.scfhs.org.sa). Postgraduate examinations aim to assess the trainees at different levels of the training program and ensure that trainees are adequately competent to be awarded the "Saudi Specialty Certificate in Orthodontics and Dentofacial Orthopedics" at the end oftheir training period.

CERTIFICATION

Each resident is required to pass Part I and Part II examination in order to be eligible for the Saudi Board of Orthodontics and Dentofacial Orthopedics certification. Those examinations include written and Objective Structured Clinical Examination (OSCE) assessment types. The examination regulations and details, such as the requirements and the dates of the examination have been published on the commission website, www.scfhs.org.sa.

Upon successful completion of all requirements of the program and after passing the Part II Examination, the candidate will receive a "Certificate of Completion of the Saudi Board Program in Orthodontics", issued by the Saudi Commission for Health Specialties.

***Trainees and trainers are advised to check the most updated assessment tools approved by the Scientific Council of the specialty, as they could be subject to change in the future.**

Table B: Assessment of Desired Competencies

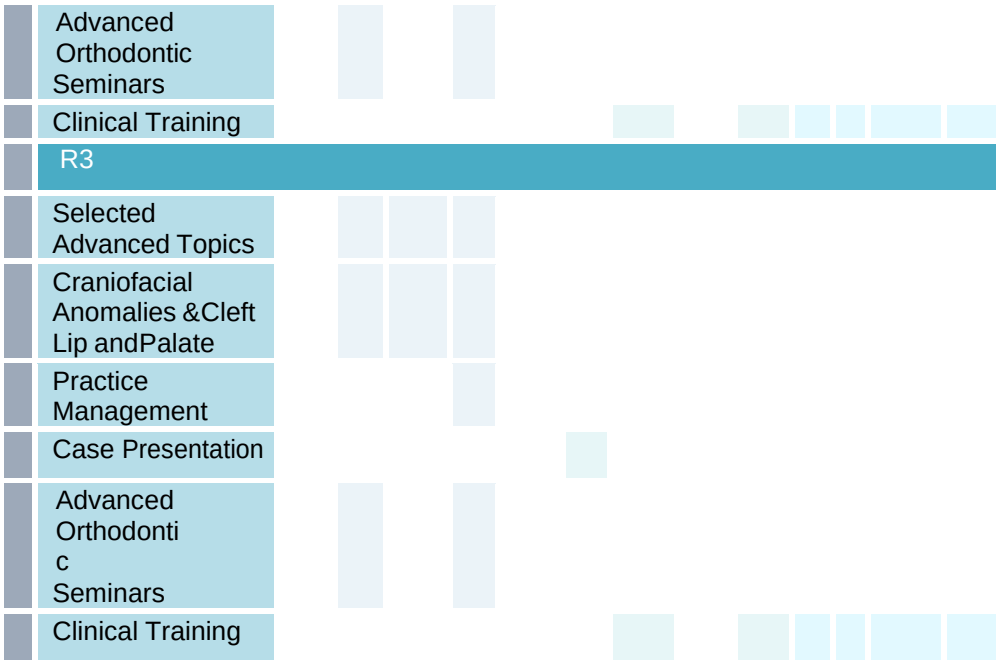
	Domains	Knowledge					Skills				Attitude	
	Assessment Methods	Online WE (Pass / Fail)	End of Year Progress Test (WE)	Structured Oral Examination (SOE)	Academic Activity		Case-based Discussion (CBD)	Direct Observation of Procedural Skills (DOPs)	Research Activity	Clinical Portfolio	Mini-CEX	ITER / FITER
				Quizzes / Assignment	Topic /Book Review							
Desired competencies according to CanMed	1. Dental Expert a. Dental Knowledge											
	1. Dental Expert b. Patient Care											
	2. Communicator											
	3. Collaborator											
	4. Health Advocate											
	5. Scholar											
	6. Leader											
	7. Professional											
	Residency level	R1 R2	R1 R2 R3	R1 R2 R3	R1 R2 R3	R2 R3	R1 R2 R3	R1 R2 R3	R2	R1 R2 R3	R1 R2 R3	R1 R2 R3

*Trainees and trainers are advised to check the most updated assessment tools approved by the Scientific Council of the specialty, as they could be subject to change in the future

Table C: Assessment of Courses by Study Level

Domains	Knowledge					Skills				Attitude			
Assessment Methods	Online WE (Pass / Fail)	End of Year Progress Test (WE)	Structured Oral Examination (SOE)	Academic Activity		Case-based Discussion (CBD)	Direct Observation of Procedural Skills (DOPs)	Research Activity	Clinical Portfolio	Mini-CEX	ITER / FITER		
Courses				Quizzes / Assignment	Topic / Book Review Assessment						Quarterly Evaluation	Quality Improvement / Education projects	Community Projects
R1													
Universal Topic:Ethics and Healthcare Occupational hazards of HCW													
Universal Topic:Ethics and Healthcare Ethical issues: treatment refusal; patient autonomy													
Universal Topic:Ethics and Healthcare Patient advocacy													
Universal Topic:Research Methods													
Advanced Oral and Maxillofacial Radiology													
Integrated Basic Science Course I													
Integrated Basic Science Course II													

	Wire Bending
	Typodont I
	Orthodontic Appliances
	Photograp hy
	Model analysis
	Radiographic Cephalometry
	Diagnosis, Treatment Planning & Treatment Management
	Orthodontic Biomaterials
	Biomechanics in Orthodontics
	Craniofacial Growth and Development
	Case Presentation
	Clinical Training
	R2
	Universal Topic: Introduction - Hospital-acquired infections
	Behavioral Sciences & Psychology
	Research Methods, Biostatistics & Critical Appraisal
	Radiographic Cephalometric Superimposition
	Typodont II: Finishing & Detailing
	Orthognathic Surgery
	Occlusion & Craniomandibular Dysfunction
	Interdisciplinary TX & Adult Orthodontics
	Case Presentation



*Trainees and trainers are advised to check the most updated assessment tools approved by the Scientific Council of the specialty, as they could be subject to change in the future.

Table D: Assessment by Study Level* (Summative Assessment)

Formative Assessment (2024-2025)

Gen./Sub.	Level	Knowledge					Skills								Attitude	Competence
		SOE	EYPT-n't	Academic Activities	CBD	EYPT-Local	OSCE/OSPE	Research	DOPS	Logbook	Volunteering	Other	Other	Mini -CEX	ITERS	Part I Exam
Orthodontics & Dentofacial Orthopedics	R1	✓	*	✓	*	*	*	*	✓	*	*	✓ (CCP)	✓ (CBL)	✓	✓	✓
	R2	✓	*	✓	*	✓	*	✓	✓	*	*	✓ (CCP)	✓ (CBL)	✓	✓	*
	R3	✓	*	✓	*	*	*	*	✓	*	*	✓ (CCP)	✓ (CBL)	✓	✓	*

SOE: Structured Oral Exam skills
Mini-CEX: Mini-Clinical Evaluation exercise
OSCE: Objective Structured Clinical Examination

CBD: Case-based Discussion
EYPT-Local: promotion exam or progress test
CBL: Case based Learning

DOPS: Direct observation of procedural
EYPT-n't: International Exams
(CCP): Clinical Case Portfolio

Description Table of Formative Assessment Tools R1 (Junior Level)

Learning Domains	Assessment Tool	Requirements
Knowledge	SOE	**1 SOE (At least 2 stations)** • 1 Unseen case station • 1 Skills assessment station
	Academic Activities	• 90% Attendance • Pass the final year progress test (as specified in the SBO-DO curriculum & clinical guidelines).
Skill	DOPs	**2 DOPS** • Banding & bonding: should be submitted by the end of the 3rd quarter. • Appliance insertion and activation: should be submitted by the end of the 3rd quarter.
	Mini-CEX	**1 Mini-CEX** • Diagnosis and Treatment plan: should be submitted by the end of the 1st quarter.
	Other (CBL)	• 90% Attendance Present at least one case supported by evidence in front of a panel of consultant /academic year
	Other (CCP)	As specified in the SBO-DO curriculum & clinical guidelines. • Evidence of **5 documented detailed written cases** + the **progress of 25 active cases** approved by the program director.
Attitude	ITER	Quarterly: at least **3** ITER evaluations
Competence	Part I Exam	Passing the Part 1 exam of the Saudi Board of Orthodontics and Dentofacial Orthopedics is a mandatory promotion requirement from the junior level (R1) to the senior levels (R2 and R3).

Description Table of Formative Assessment Tools R2 (Senior Level)

Learning Domains	Assessment Tool	Requirements
Knowledge	SOE	**1 SOE (At least 2 stations)** • 1 Unseen case station • 1 Skills assessment station
	Academic Activities	• 90% Attendance • Present at least one article /academic year
	EYPT- Local	**End of Year Promotion Exam:** Passing the End of Year Promotion Exam is a mandatory promotion requirement.
Skill	Research	**2 Research Projects** • Research e-modules • Research Proposal
	DOPs	**1 DOPS** • TADs insertion: should be submitted by the end of the 3rd quarter.
	Mini-CEX	**1 Mini-CEX** • Treatment plan & management: should be submitted by the end of the 1st quarter.
	Other (CBL)	• 90% Attendance • Present at least one case supported by evidence in front of a panel of consultant /academic year
	Other (CCP)	As specified in the SBO-DO curriculum & clinical guidelines • Evidence of **45 documented detailed written cases** approved by the program director.
Attitude	ITER	Quarterly: at least **3** ITER evaluations

Description Table of Formative Assessment Tools R3 (Senior Level)

Learning Domains	Assessment Tool	Requirements
Knowledge	SOE	**1 SOE (2 stations):** once/ year with a minimum of two stations of the residents' submitted cases.
	Academic Activities	• 90% Attendance • Present at least one article /academic year. • Review journals
Skill	DOPs	**1 DOPs** • Debonding and retention: should be submitted by the end of the 3rd quarter.
	Mini-CEX	**1 Mini-CEX** • Finishing and retention: should be submitted by the end of the 1st quarter.
	Other (CBL)	• 90% Attendance • Present at least one case supported by evidence in front of a panel of consultant /academic year
	Other (CCP)	As specified in the SBO-DO curriculum & clinical guidelines Evidence of **5 documented detailed written cases + 25 documented finished cases** approved by the program director.
Attitude	ITER	Quarterly: at least **3** ITER evaluations

C. RESIDENTS' AND TRAINERS' RESPONSIBILITIES

Assessment is the joint responsibility of trainers and residents. Both play an equally important role in the assessment process.

Residents are expected to:

- Be familiar with the rotation objectives prior to the start of the program
- Attend their clinical duties and academic activities regularly
- Ensure that the evaluations are completed and that he/she has received feedback in a timely manner
- Accept constructive feedback as part of the training process
- Have open channels of communication with the Rotation Supervisor and other trainers

Trainers are expected to:

- Be familiar with the objectives of supervising
- Orient the resident at the beginning of the program regarding the objectives of rotation and their responsibilities during rotation
- Supervise and teach the residents daily based on the graded responsibility that is entrusted according to the level of training
- Provide continuous feedback to the residents during rotation for corrective measures to be taken in a timely manner

Trainers and other supervisors should appraise the resident midblock and at the end of each quarter using the In-Training Evaluation Report form. Sufficient time should be allocated to discuss the evaluation with the resident and provide feedback and advice.

D. TRAINEE SUPPORT

Guidelines for the Mentor

The mentor is an assigned faculty supervisor responsible for the professional development of residents under his/her responsibility. Mentoring is the process by which a mentor provides support to the residents. A mentee is a resident under the supervision of the mentor.

Need for a mentor

Post-graduate residency training is a formal academic program for residents to develop their full potential as future specialists. This is potentially the last substantial training program before becoming an

independent specialist. However, unlike the undergraduate program, which has a well-defined structure, residency training is inherently less organized. Residents are expected to perform in clinical settings and deliver patient care. They are rotated through multiple sites and subspecialties.

The design of the residency program, while necessary for good clinical exposure, does not provide the opportunity to develop a long-term professional relationship with a faculty member. Residents may feel lost without proper guidance. Moreover, without a long-term longitudinal relationship, it is extremely difficult to identify a struggling resident. Residents also struggle to develop a professional identity with the home program, especially when they are rotating in other disciplines for long durations.

Finally, the new curriculum creates a more substantial, work-based, and continuous assessment of clinical skills and professional attributes. Residents are expected to maintain a logbook, complete mini-CEX and DOPS, and meticulously chart their clinical experience. This requires a robust and structured monitoring system with clear accountability and defined responsibility for trainees and trainers.

Nature of the Relationship

Mentorship is a formal yet friendly relationship. This is a partnership between the mentor and the resident (i.e., the mentee). Residents are expected to take mentoring opportunities seriously and help their respective mentors to achieve their outcomes. The mentor should receive a copy of any adversarial report about the resident under his/her mentorship, which may have been made by other faculty members.

Goals:

- Guiding residents towards personal and professional development through continuous monitoring of progress
- Early identification of struggling residents and high achievers
- Early detection of residents who are at risk of emotional and psychological disturbance
- Providing career guidance

Roles of the Mentor

The primary role of the mentor is to nurture a long-term professional relationship with the assigned residents. The mentor is expected to provide an ‘academic home’ for the residents, so that they can feel comfortable sharing their experiences, expressing their concerns, and clarifying issues in a non-threatening environment. The mentor is

expected to keep sensitive information about the residents in his/her confidence.

SCFHS Guidelines for Mentoring

The mentor is also expected to make appropriate and early referral to the Program Director or Head of the Department if he/she determines a problem that may require expertise or resources that are beyond his/her capacity. Regulations are provided on the SCFHS website regarding the guidelines for mentoring (www.scfhs.org.sa).

Examples of such referrals might include:

- Serious academic problems
- Progressive deterioration of academic performance
- Potential mental or psychological issues
- Personal problems that may be interfering with academic duties
- Professional misconduct

However, the following are NOT the expected roles of a mentor:

- Providing extra tutorials, lectures, or clinical sessions
- Providing counseling for serious mental and psychological problems
- Being involved in the residents' personal matters
- Providing financial or other material support

Roles of the Resident

- Submit his/her resume to the mentor at the start of the relationship
- Provide the mentor with medium (1-3 years) and long-term (3-7 years) goals.
- Take primary responsibility in maintaining the relationship.
- Schedule a monthly meeting with the mentor in a timely manner and not request ad hoc meetings, except in case of an emergency.
- Recognize self-learning as an essential element of residency training.
- Report any major events to the mentor in a timely manner.

Who can be a mentor?

Any faculty member, consultant grade, or above within the residency program can be a mentor. No special training is required.

Number of Residents per Mentor

As a guideline, each mentor should not be training more than 4–6 residents at any given time. As much as possible, the residents from

all training years should be included. This will create an opportunity for the senior residents to work as guides for the junior residents.

Frequency and Duration of Engagement

The recommended minimum frequency is once every 4 weeks. Each meeting might take 30 minutes to 1 hour. It is also expected that once assigned, the mentor should continue with the same resident preferably for the entire duration of the training program, or at least for 2 years.

Tasks during the Meeting

The following are suggested tasks to be completed during the meeting:

- Discuss the overall clinical experience of the residents with particular attention to any concerns raised
- Review the residents' logbook or portfolio to determine whether they are on target to meet their training goals
- Revisit earlier concerns or unresolved issues, if any
- Explore any non-academic factors that may be seriously interfering with the training
- Document excerpts of the interaction in the logbook

Mandatory Reporting to the Program Director or Head of the Department

- Consecutive absence from three scheduled meetings without any valid reasons.
- Unprofessional behavior
- Consistent underperformance in spite of counseling
- Serious psychological, emotional, or health problems that may potentially cause unsafe patient care.
- Any other serious concerns deemed relevant by the mentor

PART V - IMPLEMENTATION PLAN: WHAT NEEDS TO BE DONE?

A. Implementation Plan

- Obtain expertly written matter and inputs from key decision-makers
- Obtain administrative approval
- Finalize and stage the implementation plan
- Align training and assessment strategies and correlate forms with their desired competency
- Begin staff training and calibration
- Reinforce a competency-based approach to assessment
- Review related rules and regulations
- Introduce resident's portfolio to document teaching, learning, and assessment activities for each CanMEDS role
- Review the SOE and the blueprints for written exams according to the proposed competencies

PART VI - APPENDICES

A Appendix I. Clinical Training Guidelines

B Appendix II. Radiograph Guidelines

C Appendix III. Curriculum Map

APPENDIX I. CLINICAL TRAINING GUIDELINES

SAUDI BOARD OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS
SBO-DO

Clinical Case Portfolio for the 3-Year Training Program
2024

A clinical case portfolio is considered one of the assessment methods in the Saudi Board of Orthodontic and Dentofacial Orthopedics for residents in the first, second, and third levels of training.

Clinical cases in orthodontics apply both theory and practice to real life orthodontic cases in a clinically relevant format. This unique approach supports the new trend in case-based and problem-based learning, thoroughly covering topics ranging from Class I malocclusions to orthognathic surgery. The clinical case portfolio fosters independent learning and prepares the trainer for case-based examinations.

Goals and Objectives

- Make the residents aware early on that there is a specific template for working up cases.
- Make sure the residents fully understand the template.
- Ensure the residents are filling the template properly.
- Check the quality of X-rays early on and ensure that the standard is maintained throughout the program.
- Check the quality of photos early on and ensure that the standard is maintained throughout the program.
- Check the quality of casts (traditional plaster or digital) early on and ensure that the standard is maintained throughout the program. (Check the appendix at the end of the portfolio

regarding digital models)

- Check the variety of cases and compliance to guidelines early on and throughout the program.
- Check the number of cases and compliance to the guidelines early on and throughout the program.
- Check the difficulty (IOTN) of cases and compliance to the guidelines early on, and throughout the program.
- Ensure the residents have adequate knowledge to analyze cases properly.
- Ensure the residents have adequate knowledge to reach a proper diagnosis.
- Ensure the residents have adequate knowledge to write a proper treatment plan.
- Provide feedback to residents as needed.
- Approve the submitted cases to ensure that residents are ready to take the promotional didactic and/or oral exams.
- Provide support and guidance to residents as needed.
- Submit reports to the scientific committee.
- Make recommendations to the scientific committee as needed.

Guidelines

The following is a guideline for the Saudi Board of Orthodontic and Dentofacial Orthopedic residents' clinical case portfolio.

Clinical Cases Requirement Submission:

The first level of residency:

- Residents are required to submit evidence of **a minimum of 25 cases with treatment started by the residents** using the approved templates (template No.2), signed by their instructors and program director on predetermined date which will be announced by the clinical case review committee.
- The criteria of the cases must include the following categories:
  - Growth modification
  - Class I malocclusion
  - Class II malocclusion
  - Class III malocclusion
  - Malocclusion with transverse discrepancy
  - Malocclusion with vertical discrepancy
  - Dentofacial deformity treated with combined orthodontic and orthognathic surgery treatment

- Cleft lip and palate

- Out of the 25 cases, the resident also should submit **5 detailed documented** cases started by the resident using the approved templates (template No.1), signed by their instructors and program director on predetermined date which will be announced by the clinical case review committee.
- Out of the 25 cases, the resident also should submit **15 documented cases started by the resident** using the approved templates (template No.5), signed by their instructors and program director on predetermined date which will be announced by the clinical case review committee.
- Evaluation criteria:
  - Compliance with guidelines.
  - Appropriateness of findings and diagnosis.
  - Quality of the records.
  - Cover a variety of the above-mentioned categories.

The second level of residency:

- Residents are required to submit evidence of **40 cases** which may include up to **10 transferred cases** using the approved templates (template No.2) and 30 cases be documented with progress (in template No.5), signed by their instructors and program director on predetermined date which will be announced by the clinical case review committee.
- Evaluation criteria:
  - Compliance with the guidelines.
  - Quality of the records.
  - Quality of the documentation.
  - Variety and Distribution of the cases.

The final level of residency:

To fulfill the **Clinical Training Certification** requirements and be eligible to sit for **Part II written examination**, the residents should submit the followings:

- Submission of **25 finished** cases, which include **5 advanced complete cases** (the details of these 5 cases are explained at the end of this article) which he/she will be examined with.
- Passing the oral examination which will be conducted as part of the clinical training evaluation.

Criteria of the Finished Cases:

- Residents are required to submit evidence of **25 finished cases** (may include up to **5 transferred cases**) with IOTN 3 and above using the approved template (template No.5) signed by their instructors and program directors of each center.

- The submitted cases must have started treatment during the program (**start to finish by the resident during SBO program**); transferred cases are cases which was started by other SBO residents during the SBO program
- Evaluation criteria:
  - Compliance with guidelines
  - Quality of the records
  - Quality of the documentations
  - Variety and distribution of the cases
  - Quality of the treatment outcomes

- **Clear Aligner Treatment** are accepted with no more than two cases.
- **Adjunctive orthodontic treatment** which refers to supplementary orthodontic interventions to achieve specific goals within a short time frame, (typically up to 6 months) is accepted with no more than one case with evidence of treatment objectives achieved and maintained.
- **Interceptive Treatment** is accepted with evidence of full of treatment objectives achieved no more than one case.
- **Growth Modification Phase I** is accepted with evidence of full of treatment objectives achieved.

Final oral exam for the final level residents:

Out of the 25 submitted cases, the residents are required to submit the complete records and documentation of **5 finished cases** (template No.6).

These finished cases should be advanced cases **with IOTN grade 4 and above** and treated by the resident during his/her training period **from start to finish except for the dentofacial deformity cases. The cases should include a variety of cases with no more than one case from each category** of the followings:

1. Growth modification followed by comprehensive orthodontic treatment
2. Bimaxillary dentoalveolar protrusion with interincisal angle less than 110º
3. Class I malocclusion
4. Class II malocclusion
5. Class III malocclusion
6. Malocclusion with transverse discrepancy
7. Malocclusion with vertical discrepancy
8. Dentofacial deformity treated with combined orthodontic and orthognathic surgery treatment.
   A. From pre-treatment until end of full decompensation phase with evidence of final surgical plane and surgical movement

simulation through 3D cast or surgical cast determination of optimal surgical approaches, and visualization of potential postoperative outcomes.

Or:

B. postsurgical until debonding with evidence of full of treatment objectives achieved.

9. Cleft lip and palate (single treatment phase or more) with evidence of treatment objectives achieved.
    A. Mixed dentition: Correcting anterior and posterior crossbites, bone grafting (ABG) with evidence of guidance the eruption of permanent teeth, align anterior teeth and improve occlusal relationships, space maintainers utilized as case needed.
    B. Permanent Dentition: Case Consider as comprehensive orthodontic treatment.

Eligible residents will be examined on the various aspects of orthodontic diagnosis and treatment planning. Each resident will be challenged through oral exam on selected cases of his/her submitted **5 final cases.**

Appendix:

- Upon submission of a digital study model, the following conditions should be met:

1. Digital model should be designed virtually just like the trimmed classical orthodontic model and to be in a white color.
2. Views of the model should be:
    a. Frontal in occlusion
    b. Right in occlusion
    c. Left in occlusion
    d. Back of the cast view in occlusion
    e. Upper occlusal
    f. Lower occlusal
    g. Right of the lower arch alone to indicate the curve of Spee
    h. Left of the lower arch alone to indicate the curve of Spee
    i. Right of the Upper arch alone to indicate the curve of Spee
    j. Left of the Upper arch alone to indicate the curve of Spee

- If the case to be submitted as one of the 5 exam cases, the digital model should be 3D printed in the actual 1:1 dimension and as well should be designed to mimic the classical trimming of the orthodontic study model.

Grade	Characteristics
5 (Very great)	5.i Impeded eruption of teeth (with the exception of third molars) owing to crowding, displacement, the presence of supernumerary teeth, retained primary teeth and any pathological cause 5.h Extensive hypodontia with restorative implications (more than one tooth missing in any quadrant) requiring prerestorative orthodontics 5.a Increased overjet >9 mm 5.m Reverse overjet >3.5 mm with reported masticatory and speech difficulties 5.p Defects of cleft lip and palate 5.s Submerged primary teeth
4 (Great)	4.h Less extensive hypodontia, requiring prerestorative orthodontics or orthodontic space closure to obviate the need for a prosthesis 4.a Increased overjet >6 mm but ≤9 mm 4.b Reverse overjet >3.5 mm with no masticatory or speech difficulties 4.m Reverse overjet >1 mm but <3.5 mm, with recorded masticatory and speech difficulties 4.c Anterior or posterior crossbites with >2 mm discrepancy between retruded contact position and intercuspal position 4.l Posterior lingual crossbite with no functional occlusal contact in one or both buccal segments 4.d Severe displacements of teeth >4 mm 4.e Extreme lateral or anterior open bites >4 mm 4.f Increased and complete overbite with gingival or palatal trauma 4.t Partially erupted teeth, tipped and impacted against adjacent teeth 4.x Supplemental teeth
3 (Moderate)	3.a Increased overjet >3.5 mm but ≤6 mm with incompetent lips 3.b Reverse overjet >1 mm but ≤3.5 mm 3.c Anterior or posterior crossbites with >1 mm but ≤2 mm discrepancy between retruded contact position and intercuspal position 3.d Displacement of teeth >2 mm but ≤4 mm 3.e Lateral or anterior open bite >2 mm but ≤4 mm 3.f Increased and complete overbite without gingival or palatal trauma
2 (Little)	2.a Increased overjet >3.5 mm but ≤6 mm with competent lips 2.b Reverse overjet >0 mm but ≤1 mm 2.c Anterior or posterior crossbite with ≤1 mm discrepancy between retruded contact position and intercuspal position 2.d Displacement of teeth >1 mm but ≤2 mm 2.e Anterior or posterior open bite >1 mm but ≤2 mm 2.f Increased overbite ≥3.5 mm without gingival contact 2.g Prenormal or postnormal occlusions with no other anomalies; includes up to half a unit discrepancy
1 (None)	Extremely minor malocclusions including displacements <1 mm

APPENDIX II. RADIOGRAPH GUIDELINES

SAUDI BOARD OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS
SBO-DO
Guidelines for the Use of Radiographs In
Clinical Orthodontics in SBO-DO Program
2021-2022

OVERVIEW

The purpose of these guidelines is to improve the effectiveness and efficiency of clinical care. To fulfill their utility, they must be reviewed regularly. Despite the availability of these guidelines, the practice of taking routine orthodontic radiographs for children, as a matter of course, often before a clinical examination, persists. This puts these children at unnecessary risk.

These guidelines are designed to assist the residents of the Saudi Board of Orthodontics and Dentofacial Orthopedics regarding the choice and timing of radiographs in clinical orthodontic practice.

Orthodontists, like all clinicians, have the responsibility of deciding what a justifiable level of radiographic exposure is for their patients. Keeping in mind this statement “No person shall carry out a medical exposure unless it has been justified …”, it must be remembered that—prescription of a radiograph—is a procedure with a low, but nevertheless inferred risk, and therefore each radiograph *must* be clinically justified as required.

Additional information may be required from radiographs when a clinical examination suggests the presence of an abnormality, or when interceptive and active orthodontic treatment is being considered.

Such as:

- The presence or absence of permanent teeth
- The presence and position of misplaced or supernumerary teeth

- The stage of development of permanent teeth
- The morphology of unerupted, and sometimes erupted teeth
- The presence and extent of dental disease
- The presence, extent, and type of developmental anomalies, if present

For treatment planning, it is frequently necessary to assess accurately the relationship of the teeth to the jaws and the jaws to the rest of the facial skeleton. In addition, radiographs may be used in the presence of clinical indicators to assess treatment progress and growth changes. Where appropriate, they may be used for teaching and research.

• INTRA-ORAL RADIOGRAPHS

1. Periapical radiograph

This type of radiograph is taken to determine the presence andposition of unerupted teeth, the presence of apical disease or unusualroot form. It maybe indicated in evaluating root parallelism in orthodontic-implant cases. Full mouth periapical views are rarely indicated as dental panoramic radiographs offer an adequate amountof information with a much-reduced exposure.

2. Upper standard occlusal radiograph

This radiograph shows the maxillary incisor region and is taken when there is a clinical indication of potential underlying disease, presence of supernumerary tooth in the premaxilla region, or a developmental anomaly in this area, provided that CBCT was not taken.

3. Bitewings

Bitewings are indicated to check the caries status of a high-risk patient who is to undergo fixed appliance treatment or in a patient with periodontitis, to evaluate the alveolar bone status.

• EXTRA-ORAL RADIOGRAPHS

1. Dental panoramic radiographs

A panoramic radiograph is commonly used to provide information on the state of the dentition and is often the preferred choice of radiograph when orthodontic treatment is being considered. Moreover, it is indicated to provide information about the dental pathosis and third molar status. Another indication is prior to the end of the active orthodontic treatment to assess the state of the overall dentition. One limitation of panoramic radiographs is that the focal trough is relatively

narrow particularly in the incisors' region. If a tooth is inclined or malpositioned, the crown, root, and apex may not all lie within the focal trough, and therefore, additional periapical radiographs are indicated for upper and lower anterior teeth in such a situation.

2. Lateral cephalometric radiograph

Cephalometric images may be used to aid in diagnosis and treatment planning. It helps in assessing the skeletal and dental relationships and serves as a baseline recording or aids in monitoring progress.

3. Cone beam computed tomography (CBCT)

CBCT may be appropriate for the examination of impacted or supernumerary teeth in selected cases where conventional radiographs fail to provide adequate information. Surgical planning may also benefit from three-dimensional information. The use of CBCT for the assessment of cleft palate can be justified where CT scans are utilized to allow quantification of the bone defect volume in the context of grafting, as well as localization of ectopic teeth, which may be associated with clefts.

Cephalometric and panoramic radiographs appear to be sufficient in most circumstances and should not be replaced with CBCT imaging.'

3. Postero-anterior cephalometric radiograph

Postero-anterior (PA) views of the skull may be useful in patients who present with facial asymmetry and may occasionally be helpful in the assessment of certain jaw or dental anomalies. PA cephalograms should be used only when a proper 3-D imaging device with a suitable program for analysis is unavailable.

4. Hand and wrist radiograph

Hand and wrist radiographs were the standard method used to predict growth spurts; however, several studies have shown that the skeletal maturation of a patient can be assessed from the stages of calcification of the cervical vertebrae on lateral cephalometric radiographs instead of hand and wrist radiographs. Since cephalometric radiographs are obtained routinely for orthodontic patients, this method has an advantage over hand and wrist radiographs as additional radiation exposure is not needed to judge the probable timing of the adolescent growth spurt.

CLINICAL NOTES

Clinicians should make note of the following:

- A radiograph should only be taken after a clinical examination, when it is deemed to provide sufficient benefit to the exposed individual and influence clinical management.
- All radiographs should be evaluated (reported) and this evaluation should be recorded.
- There is no known safe level of radiation exposure.
- The benefits of diagnostic radiology generally outweigh the risks.
- The level of risk is only justified when the patient receives a commensurate health benefit from a minimum dose.

There is no indication for the following practices of taking or requesting radiographs:

- Radiographs before a clinical examination.
- Radiographs when only minimal tooth movement is planned.
- Full mouth periapical views before treatment.
- Prospective radiographs only for medico-legal reasons i.e., the practice of ‘defensive dentistry’.
- Routine cone beam computed tomography for all orthodontic patients.

Radiographs required for submission of SBO-DO cases

- For new cases, any previous radiographs (panoramic or intra-oral radiographs) taken up to 6 months prior to orthodontic treatment will be accepted.
- The minimum requirements for radiographs are panoramic and lateral cephalometric views, unless there is a need for periapical, bitewing, or occlusal view radiographs for special considerations, as mentioned before.
- CBCT may be used in cases requiring surgical extraction of teeth or in cases of impacted teeth; in all other instances, recommending a CBCT needs to be justified.
- Some CBCT software machines have a feature of construction of lateral cephalometric and panoramic radiographs. Consequently, all residents should utilize this resource rather than taking additional radiographs (panoramic, cephalogram, periapical radiograph, etc.).

- Interceptive and adjunctive cases do not require lateral cephalometric radiographs, unless they are required to establish a diagnosis.

For growth modification followed by fixed appliances the following radiographs are required:

1. Pre-treatment: OPG and cephalometric
2. Post-growth modification: cephalometric only
3. Post-treatment: OPG and cephalometric

For Clinical case portfolio:

- Pre-treatment: panoramic and lateral cephalometric radiograph. Any additional radiograph should be justified.
- Post treatment: panoramic and lateral cephalometric radiograph only. If there is a sign of root resorption, periapical radiographs are indicated for affected teeth.

For the final clinical portfolio of the 5 cases for structured oral exam, in addition to the previous points, progress panoramic radiograph is required.

- Progress cephalometric radiograph is required in two scenarios:
  1. For surgical cases as a pre- surgical record
  2. In extraction cases prior to closing all the spaces
- Post-treatment radiographs (i.e. panoramic and lateral cephalometric) should be taken before debonding the fixed orthodontic appliance.
- In cases of severe centric relation-centric occlusion discrepancy, cephalometric radiographs should be taken in centric occlusion since getting the patient into true centric relation position in the cephalometric head holder can be difficult.

For clinical portfolio of 5 cases for structured oral exam, superimposition of lateral cephalometric radiographs should be done for evaluating both overall and regional areas in different stages of treatment as follows:

- Growth modification treatment followed by phase II treatment need two sets of superimpositions:
  1. Initial of phase I with post treatment phase I treatment.
  2. Initial of phase I with post treatment phase II treatment.
- Orthognathic surgical cases require two sets of superimpositions:
  1. Initial treatment with pre- surgical lateral cephalometric.
  2. Initial treatment with post treatment (only overall superimposition)

- Comprehensive orthodontic treatment (extraction and non-extraction) cases and cleft lip and palate case need one set of superimpositions.
    1. Initial with post treatment lateral cephalometric radiograph**.**

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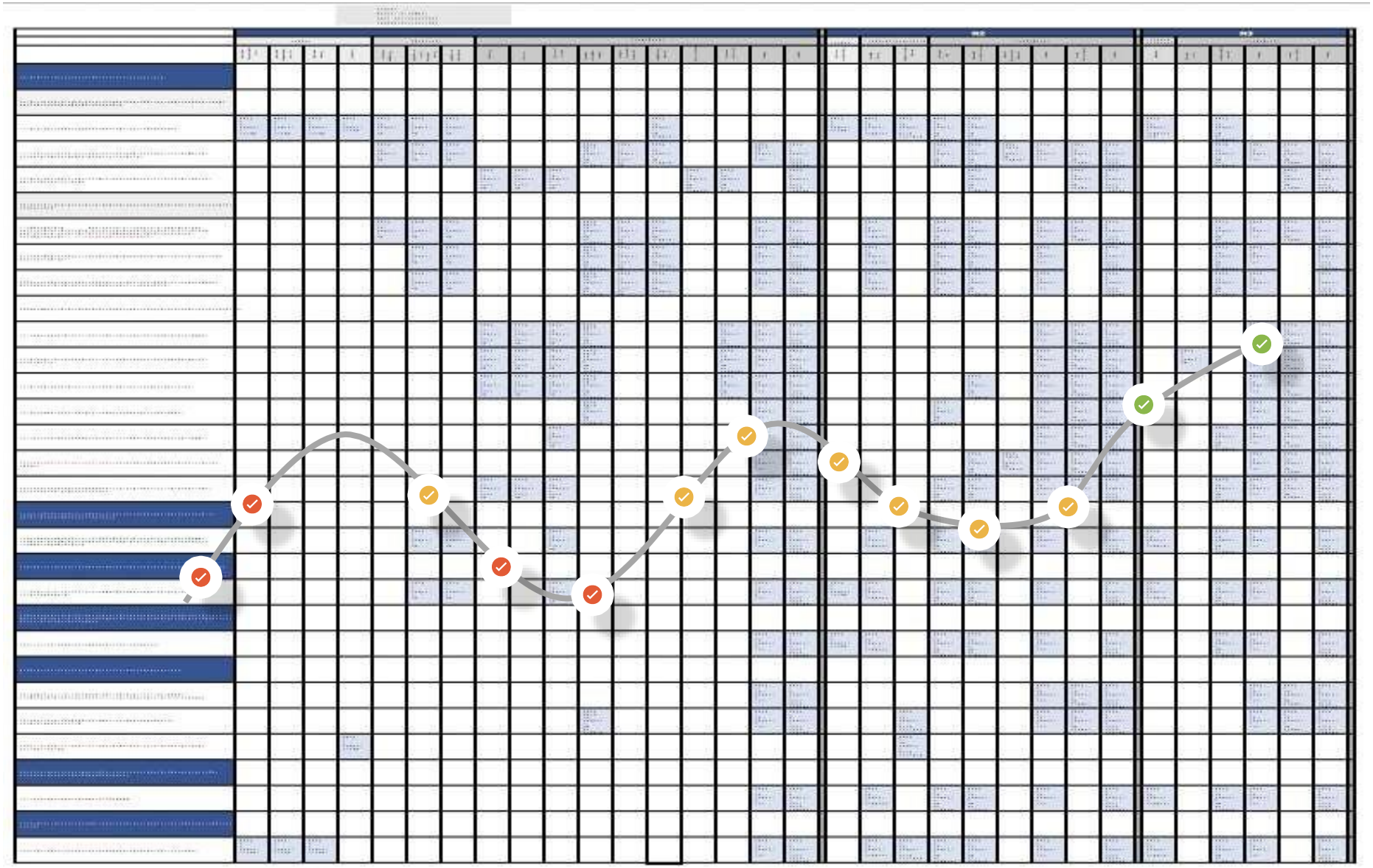
APPENDIX III. CURRICULUM MAP