In the Name of God

Islamic Republic of Iran
Ministry of Health, Treatment and Medical Education
Tehran University of Medical Sciences

Curriculum of Orthodontics Postgraduate (MSc) Program

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Section I:

Title: Orthodontics

Degree: Master of Science in Clinical Dentistry (MSc)

Introduction (not more than 100 words including general comments on the field and its developments, advancements and history)

Orthodontics is one of the dental specialty majors that is made up of prevention, diagnosis and treatment of dento-alveolar disorders and in the case of successful graduation it will lead to the MSc degree.

Definition (the main subject of study and services provided by the graduates)

The main subjects and services provided by the graduates of the program consist of:

- Playing a role in health care as a key factor in sustainable development of the society
- Prevention of complication due to dento-alveolar disorders given to their prevalence, gradation of the quality of life and reduction of health care costs nationwide
- Correct treatment of dento-alveolar disorders with regard to their importance in providing, maintaining and promoting public health
- Being informed of the latest scientific and technical achievements
- Conducting research and extending borders of science

The Aim of the Course (including its vision and mission)

The aim of performing this educational program is training orthodontists who are at global level from the aspects of knowledge and science level and practical skills. In addition they would be able to provide preventive and therapeutic services with standard quality in their field besides being capable of providing education service and playing an active role in advancing sciences and expanding science and research limits.

General Competencies (including communicative, interviewing, educational, writing, reporting, critical thinking, problem solving, managerial ones as well as professionalism)

Effective communication with patients, accurate examinations, proper application of paraclinical tests, familiarity with modern science and technology, accurate diagnosis and appropriate treatment planning, proposing appropriate preventive and therapeutic

strategies, conducting research with the aim of solving existing problems, educating patients, accompaniers and colleagues, and management and executive participation in the health team.

Professionalism and ethical expectations from graduates: It is expected that graduates:

a) **In the area of altruism:** preferring the patient's interests to their own, observance of justice while working with different patients, considering all physical, psychological, social and belief-related aspects of patients while treating them, spending enough time in all phases of patient care, paying attention to patients' demands and discomforts, observance of the patients' bill of rights.
b) **In the area of dutifulness and responsibility:** have enough commitment to do their tasks, answer patients' questions, provide patients and their accompaniers with information regarding the patient's status in the most appropriate way, avoid unnecessary interferences with colleagues' work and interact with the health team members, ask patients' permission for examining and taking any diagnostic-therapeutic measures, and instructing patients properly regarding prevention, appearance of side effects, disease reoccurrence and improvement of life quality.
c) **In the area of honor and honesty:** be truthful, honest and confidant and respect patient's privacy.
d) **In the area of respecting others:** respect patients' conventions, traditions and habits, respect patient as a human being, respect patients' time and observe order and regularity, respect patients' accompaniers, colleagues and therapeutic team members, and have an appearance appropriate to professional prestige.
e) **In the area of professional career:** accept critique, know their scientific limitations, ask for advice and help if needed, improve their knowledge and skills constantly, do diagnostic-therapeutic measures according to available facilities and scientific achievements, and observe the standards of completing medical record and reporting.

Specific Competencies and Skills **(Special Qualifications)**

Orthodontic post graduates ought to achieve these capabilities:

1. Complete identification and diagnosis of dentofacial disorders and evaluation of multi factorial nature of such disorders in relation to dento-alveolar disorders
2. Establishing a deep conception of biologic knowledge and its relation to clinical orthodontics.
3. Necessary knowledge and skill in treatment plan procedure and applying various

therapeutic methods as prevention and correction of dento-alveolar disorders.
4. Necessary knowledge and skill in forming the relation, coordination and presenting service in relation with other specialties.
5. Evaluation capability and using the new research information in clinical treatments.
6. Sufficient knowledge and capability in the field of research methodology and presenting research projects in orthodontics.
7. Capability of annalistic notion in orthodontics

The Terms and Conditions of Admission to the Course (specific conditions including exams, interview, CV, Recommendations, etc.)

Applicant's documents, including his/her DDS/BDS degree, CV, Recommendation, etc will be reviewed by the faculty members of Orthodontics Department. Based on the documents, the applicant will be accepted for either an interview or a three month evaluation period to be an observer in Orthodontics Department. If he/she could successfully pass the interview/evaluation period, he/she will be accepted to continue as a MSc student.

Educational Strategies, Methods and Techniques

The following educational strategies are considered in Orthodontics:

Learner-centered education, learning based on problem solving, integration of basic and clinical sciences, evidence-based learning, lifelong community-oriented education, and systematic education.

The educational system of the Orthodontics MSs program is semestrial. Course types are in theoretical, practical, theoretical-practical forms that are presented in basic, related and special science courses forms.

Student Assessment

A variety of assessment methods including theoretical exam, DOPS, OSCE, Seminar preseantation, portfolio, etc, depending on the course, is implemented.

Number and Type of Credits and Tables of the Courses

(including compulsory and optional [elective] courses)

The Orthodontics MSc program is a 3 year full time program in accordance with the regulations of the Council of Dental and Specialty Educations.

Course structure

Orthodontics post graduate courses` structure includes basic, related and special science courses:

1 . Basic courses are considered to be the infrastructure of related science and specialty science courses and their aim is to remind, update, expand and deepen the topics that are presented in this specialty program.

Basic science courses which are 374 h of post graduate program are taught in two forms:

A. Common basic science courses are taught 255 h by basic science specialists to all residents.

B. Special basic science courses are taught 119 by orthodontics department and related attendings` supervision.

2. Related science courses: These courses discuss the scientific relationship with other specialty fields of dentistry and teach knowledge, creativity and making correct decisions to residents so that they can participate in team work attempts to provide comprehensive care for patients by recognizing abilities, priorities, limitations and new developments in science. Related science courses are 102 h of post graduate program which are presented in common with related education departments.

3. Special science courses: These courses which are the main post graduate program content are taught with the goal of knowledge and science promotion and skill acquisition in orthodontics.

Specialty science courses are 2269 h of the post graduate program which will be taught by the related education department faculty members.

Total education hours of post graduate orthodontics is 2745.

1: Common Basic science schedule

Course Code	Course	Credit hours			
		Workshop	Theoretical	Practical	Total
1	Research Methodology1	2			102
2	Research Methodology2	2			102
3	Scientific writing	1			51
Total		5			**255**

2. Special Basic science schedule

Course Code	Course	Credit hours			
		Workshop	Theoretical	Practical	Total
4	Oral physiology and biology		1		17
5	Craniofacial genetics		1		17
6	Clinical Photography	1			51
7	Practice Management		2		34
Total		1	4		**119**

Orthodontics

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3. Related courses

Course Code	Course	Credit Hours			Prerequisite Courses
		Theoretical	Practical	Total	
8	Prosthodontics	1		17	
9	Periodontology	1		17	
10	Oral and Maxillofacial surgery	1		17	
11	Oral and Maxillofacial surgery		1	34	
12	Oral and Maxillofacial Radiology	1		17	
Total				**102**	

4. Special science courses

Course Code	Course	Credit Hours			Prerequisite Courses
		Theoretical	Practical	Total	
13	Literature review 1	1		17	
14	Literature review 2	1		17	13
15	Biomechanics	2		34	
16	Biology of tooth movement and tissue response	1		17	15
17	Diagnosis (imaging)	2		34	
18	Principles of diagnosis and treatment plan	2		34	
19	Removable preclinic		1	34	
20	Fixed preclinic		1	34	
21	TypoDont		4	136	
22	Fixed technique 1	1		68	
23	Fixed technique 2	2		25	22
24	Principles of removable appliances	2		34	
25	Treatment theoretical 1	2		34	
26	Treatment theoretical 2	2		34	17, 18, 25
27	Treatment theoretical 3	1		17	25, 26
28	Orthosurgery	2		34	25, 26
29	Occlusion development	1		17	
30	Growth and development	1		17	
31	Retention and Relapse	1		17	
32	Syndromes and lip and palate clefts	2		34	
33	Biomaterials	1		34	

34	Occlusion and TMJ disorders	1		17	
35	Patient presentation (Treatment planning) 1		1	34	
36	Patient presentation (Treatment planning) 2		1	34	35
37	Patient presentation (Result assessment) 1		1	34	36
38	Patient presentation (Result assessment)2		1	34	37
39	Clinical treatment 1		4	136	
40	Clinical treatment 2		5	170	
41	Clinical treatment 3		8	272	
42	Clinical treatment 4		7	238	
43	Clinical treatment 5		8	272	
44	Thesis 1		2	34	
45	Thesis 2		2	34	
46	Thesis 3		2	34	
47	Thesis 4		6	204	
Total		**28**	**56**	**2269**	

Ethical issues

The graduates should,

- Observe the Patient's Bill of Rights[1] when working with the patients.
- Strictly observe Biosafety and Patient Safety Rules* concerning the patients, personnel and workplace.
- Observe the Rulebook for Dress Code[2].
- Strictly observe the Regulations of Working with the Laboratory Animals[3].
- Carefully preserve resources and equipment.
- Truly respect faculty members, the staff, classmates and other students and work for creating an intimate and respectful atmosphere.
- Observe social and professional ethical considerations in criticism.

1, 2 and 3 are contained in the Enclosures.

* Biosafety and Patient Safety Rules will be set out by the Educational Departments and will be available to the students.

Section II

Unit title: research methodology 1

Unit code: 1

Unit number: 2 unit workshop

Unit type: common basic science

Aims: familiarity with principles of various research methods , familiarity and acquiring skills about types of epidemiologic studies and proper codification of a research project with subsequent questionnaire and sample volume

Evaluation: presenting a proposal according to taught subtitles as a project or portfolio

Subtitles:

1. Acquiring skill in searching scientific references and Iranian national digital library
2. Familiarity with research basics and epidemiologic studies cycle
3. Health and disease measuring scales
4. Subject selection and statement of problem
5. Goals, hypothesis and research variables
6. Types of epidemiologic studies
7. Preparation of research questionnaire
8. Sampling and sample volume
9. Ethics in research
10. Study management

Unit title: research methodology 2

Unit code: 2

Unit number: 2 unit workshop

Unit type: common basic science

Aims: familiarity with kinds of descriptive studies, observational experimental analysis based on evidence and systematic review studies

Evaluation: presenting a proposal according to taught subtitles as a project or portfolio

Subtitles:

1. Descriptive and ecologic studies and subsequent statistical analysis
2. Types and principles of analytical-observational studies and subsequent statistical analysis
3. Experimental studies and subsequent statistical analysis
4. Errors and reasons
5. Diagnostic methods` evaluation studies
6. Principles and methods of evidence based dentistry
7. Familiarity with systematic review studies

Unit title: Scientific writing

Unit code: 3

Unit number: 1 unit workshop

Unit type: common basic science

Aims: familiarity with kinds of articles and their writing method and subsequent software, article submission and persuasion

Evaluation: presenting an article and its modification with software according to taught subtitles as a project or portfolio

Subtitles:

1. Kinds of scientific articles
2. Familiarity with structure of original research articles
3. scientific writing instructions
4. Familiarity with Endnote software
5. Critical appraisal
6. Article submission and their persuasion
7. Plagiarism

Unit title: Oral physiology and Biology
Unit code: 4
Unit number: 1 unit theoretical
Unit type: specialized basic science
Aims: familiarity with pain physiology and oral cavity`s functions
Evaluation: Written exam
Subtitles:

1. Respiratory physiology and mechanisms
   -Effect of respiratory disorders on jaw, face and dental system
   2.chewing and swallowing physiology and mechanisms
   - Effect of swallowing disorders on jaw, face and dental system
   3.speech physiology and mechanisms
   - Effect of speech disorders on jaw, face and dental system
   4.Pain physiology and control
   5.Nouromascular system physiology
   - Effect of neuromuscular disorders on jaw, face and dental system

Unit title: Crania-facial genetics

Unit code: 5

Unit number: 1 unit theoretical

Unit type: specialized basic science

Aims: familiarity with general principles of Genetics inheritance and hereditary diseases and modern genetic disorders` diagnosis

Evaluation: Written exam

Subtitles:

1. Definition of Genetics` principles
2. Types of genetic disorders and their inheritance
3. Role of Genetics in dental development
4. Effect of Genetics and environment on facial symmetry
5. Genetics and external root resorption
6. Genetic research on skeletodental disorders
7. Genetic assessments in different responses to treatment
8. Familiarity with modern pre-birth diagnostic techniques of genetic disorders
9. Principles of genetic engineering techniques and recombinant DNA

Unit title: Clinical photography

Unit code: 6

Unit number: 1 unit workshop

Unit type: specialized basic science

Aims: familiarity with types of cameras and making photographs of orthodontic patients and 2and 3 dimensional analysis

Evaluation: presenting a photograph according to the taught subtitles as a project

Subtitles:

1. Familiarity with conventional and digital cameras
2. Familiarity with application of camera and using and appropriate rest
3. Familiarity with kinds of retractors, mirrors, and their application
4. Acquiring knowledge about standard orthodontic photographs and their process
5. Familiarity with 3D photographs
6. Photograph analysis
7. 3D photographs analysis
8. Superimposition of photographs and radiographs
9. Familiarity with restoration of 2and 3 dimensional photographs

Unit title: treatment management

Unit code: 7

Unit number: 2 units theoretical

Unit type: specialized basic science

Aims: familiarity with infection control principles and orthodontic patients` hygiene, patients` documentation and document filing management, rules, medical ethics and treatment economy

Evaluation: written exam for field of cognition and portfolio for field of attitude

Subtitles:

1. Principles of infection control in orthodontic clinic
2. Regarding hygiene for patients during orthodontic treatment
3. Principles of admission system management and documentation in office
   -Admission
   -Documentation
   -Dental casts and photographs and Para clinical records
   -Restoration and achieving
   -Recording the treatment progress
4. Familiarity with office management software
5. Patient management in orthodontics
6. Familiarity with required rules in professional performance and patient contact
7. Medical ethics
   -Definitions
   -Physician and patient contact
   -Treatment type and patient satisfaction
8. Familiarity
9. Familiarity with
10. Familiarity with scientific associations` regulations
11. Familiarity with principles of treatment economics in orthodontics

Unit title: Dental prosthesis

Unit code: 8

Unit number: 1 unit theoretical

Unit type: Specialized related science

Aims: Familiarity with treatment method in additional orthodontic and prosthetic treatments

Evaluation: Seminar presentation or essay

Subtitles:

1. Simultaneous orthodontic and prosthetic treatments in congenital missed and extracted teeth
2. Simultaneous orthodontic and prosthetic treatments in tooth axis correction and molar up righting
3. Simultaneous orthodontic and prosthetic treatments in forced eruption
4. Familiarity with malocclusion camouflage limitations from prosthodontic aspect in 3 dimensions
5. Orthodontic and prosthodontic considerations in implants
6. Pre prosthetic orthosurgery treatments sequence
7. Orthodontic and prosthodontic considerations in cleft patients

Unit title: Periodontics

Unit code: 9

Unit number: 1 unit theoretical

Unit type: Specialized related science

Aims: Familiarity of orthodontic residents with cooperation with periodontists about periodontal considerations in orthodontic treatment

Evaluation: Seminar presentation or essay

Subtitles:

1. Normal periodontium characteristics and periodontal diseases` new classification
2. Familiarity with periodontal hygiene care before and during orthodontic treatments
3. Priorities of orthodontic and periodontal treatments
4. Periodontium management in patients undergoing orthodontic treatment :

-Decrease in attached gingiva

-Bone resorption, bone regeneration and socket preservation

-Impacted and misplaced teeth

-High frenulum

-Implant candidates

-Extrusion and crown lengthening candidates

Unit title: Oral and Maxillofacial Surgery

Unit code: 10

Unit number: 1 unit theoretical

Unit type: Specialized related science

Aims: Familiarity with types of lower and upper jaw surgeries and methods of jaws` fixation and different surgeries in syndromic patients

Evaluation: Seminar presentation or essay

Subtitles

1. Principles of surgical treatments in patients suffering from dentofacial deformities
   -Anesthetic considerations
   -Blood supply and its control
   -Patient management in surgery
   - The immediate postsurgical period
   -Familiarity with fixation methods and their application
   -Postsurgical patient management
2. Familiarity with upper jaw`s surgeries
3. Familiarity with lower jaw`s surgeries
4. Familiarity with bi maxillary surgeries
5. Familiarity with segmental surgeries
6. Familiarity with TMJ surgeries
7. Familiarity with chin surgeries
8. Familiarity with adjunctive (nose, cheeks, lips etc.) surgeries
9. Familiarity with surgical methods in lip and palate cleft patients and common craniofacial syndromes
10. Orthognathic surgery side effects prevention and control
11. Familiarity with new orthognathic surgery methods
12. Familiarity with distraction osteogenesis method

Unit title: Oral and Maxillofacial Surgery

Unit code: 11

Unit number: 1 unit practical

Unit type: Specialized related science

Aims: Practical familiarity with observation, diagnosis and treatment plan and therapeutic methods in common orthodontic and surgical patients

Evaluation: Seminar presentation or essay

Subtitle:

1. Cooperation with surgeon in pre-operation, preparation of orthosurgery patients including: diagnosis, surgical model and splint preparation, cephalometric prediction, familiarity with systemic considerations and complications
2. Presence in operation room and familiarity with surgical techniques in at least 3 orthosurgery patients
3. Postsurgical patient management(post-op contribution in patient management)

Unit title: Oral and Maxillofacial Radiology

Unit code: 12

Unit number: 1 unit theoretical-practical

Unit type: Specialized related science

Aims: Familiarity with common and modern intra and extra oral radiologic techniques and subsequent differential diagnosis of oral and dental lesions

Evaluation: Seminar presentation or essay

Subtitle:

1. Acquiring knowledge about cephalometric and panoramic radiographs with digital and analogue techniques
2. Familiarity with radiologic techniques for TMJ assessment and their interpretation
   -MRI
   -Arthrography
   -CT Scan
   -Tomography
3. Familiarity with CBCT`s principles, applications and interpretation
4. 3D radiographs methods, applications and interpretations
5. Familiarity with new radiographs and their application in orthodontics
6. Acquiring knowledge about irritation safety`s modern standards in new radiologic techniques

Unit title: literature review 1, 2

Unit code: 13, 14

Unit number: 2 units theoretical

Unit type: Specialized science

Aims: Assessing and criticizing reliable national and international articles in order to acquire new knowledge and research techniques related to orthodontics for the purpose of practical application of articles

Evaluation: presenting and criticizing articles in Essay or Viva form

Subtitle:

1. Familiarity with important journals in the field of orthodontics
2. Familiarity with level of evidence and evidence based orthodontics
3. Practical assessing of important articles in journal clubs(new and old)

Unit title: Biomechanics

Unit code: 15

Unit number: 2 units theoretical

Unit type: Specialized science

Aims: Familiarity with the mechanical and biomechanical principles of tooth movement

Evaluation: Written exam or Essay

Subtitle:

1. Familiarity with principles and implications of biomechanics and analyzing the forces
2. Familiarity with bio mechanic of tooth movement in various tooth movements and forces
3. Familiarity with mechanical characteristics of orthodontic equipment
4. Familiarity with bio mechanic principles of segmented and continuous techniques
5. Anchorage and its bio mechanics
6. Bio mechanic of inter and intra maxillary elastics
7. Bio mechanic of orthopedic tools
8. Analyzing the forces in peripheral techniques such as V-bend, Tip back, reverse curve ,utility arch, T-loop, L-loop, Box loop, extrusion and other springs
9. Biomechanics of mini-screws and implant

Unit title: Biology of tooth movement and tissue response

Unit code: 16

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with physiology of bone and adjacent tissues, types of tooth movement and tissue response

Evaluation: Written exam or Essay

Subtitle:

1. Bone physiology against forces
2. methods of bone and periodontium modification assessment subsequent to forces
3. Tooth adjacent tissues
4. Tooth movements in orthodontics and adjacent tissues` response against it
5. Types of forces and movements in orthodontics and its effect on tooth adjacent tissues
6. Tissue response in sutures following orthodontic and orthopedic forces
7. TMJ, tissue response sutures following orthodontic and orthopedic forces
8. Tooth`s and adjacent tissues iatrogenic response in orthodontics

Unit title: Diagnosis (imaging)

Unit code: 17

Unit number: 2 units theoretical

Unit type: Specialized science

Aims: Familiarity with cephalometry and its various analyses in orthodontics

Evaluation: Written exam or Essay

Subtitles:

1. Familiarity with application of cephalometry software
2. 3D cephalometry
3. History of cephalometry
4. Radiographic principles of cephalometry
5. Cephalometric landmarks and their tracing
6. Hard tissue analysis such as : Down`s, Steiner, McNamara, template, Mesh Diagram, Wits, Ricketts, cervical vertebral analysis(Baccetti)
7. Posterior-anterior cephalogram analysis
8. Soft tissue analysis

Unit title: Principles of diagnosis and treatment plan

Unit code: 18

Unit number: 2 units theoretical

Unit type: Specialized science

Aims: Familiarity with development and health assessment method from different aspects and diagnosis and evaluation of records in orthodontics, classification and triage of orthodontic disorders

Evaluation: Written exam or Essay

Subtitles:

1. Medical and dental history
2. Physical development assessment
3. Socio mental development assessment
4. Oral health assessment
5. Occlusion and jaw function assessment
6. Smile, face and teeth appearance assessment
7. Diagnostic casts` assessment
   -Mixed dentition
   -Permanent dentition
   -Total space analysis
8. Classification and characteristics of malocclusions
9. Treatment needs and demands
10. Soft tissue paradigm
11. Orthodontic triage

Unit title: Removable preclinic

Unit code: 19

Unit number: 1unit practical

Unit type: Specialized science

Aims: Practical familiarity with various removable and functional appliances in orthodontics

Evaluation: Practical final exam at “shows how” level

Subtitles:

1. Practical familiarity with impression making and impression modification
2. Wire bending
3. Fabrication of various springs
4. Fabrication of labial arch
5. Fabrication of various clasps
6. Fabrication of various removable expansion appliances
7. Fabrication of various functional appliances
   -Bionator
   -Franckel
   -Farmand
   -Twin Black
8. Fabrication of occlusal split appliance for TMD patients
9. Application method of Chin cap, Facemask and Oral screen appliances
10. Fabrication of clear plastic retainer
11. Familiarity with “diagnostic set up” method and its conducting

Unit title: Fixed preclinic

Unit code: 20

Unit number: 1unit practical

Unit type: Specialized science

Aims: Practical familiarity with components of various fixed orthodontic and orthopedic appliances and fabrication of appliances, springs and arches and indirect bonding and orthodontic implants

Evaluation: Practical final exam at “shows how” level

Subtitles:

1. Welding and soldering of:
   -A cube with sides of 3cm with 1mm diameter wire
   -Welding and soldering on them
2. Fabrication of loop and multi loop
   -Fabrication of arch wire with 016ss wire in upper and lower jaw in multi loop shape with these loops
      *Vertical loop
      *Box loop
      *Boot loop
      *T loop
      *Stoner Drag loop
3. Fabrication and formation of band and welding attachment
   -Fabrication of band on molars and premolars of both sides
   -Implementation of lingual sheet on maxillary molars
4. Fabrication of ideal arch wire with round and rectangular wires
5. Fabrication of these appliances
   -Maxillary palatal bar and its soldering
   -Mandibular lingual arch and its soldering
   -Maxillary Quad Helix
   -Sliding Jig
   -Pendolum
   -Hyrax on cast
   -Nance on cast
   -Fix habit breaker on cast
6. Fabrication of these springs and arches:
   -Canine Retraction spring with vertical and T loops
   -Burstone tourqing spring
   -Closing loop spring with vertical, Delta, T, Opus, Mushroom loops
   -Burstone intrusion arch
   -Utility arch

-Auxillary Ar spring
-Begg uprighting spring

7. Familiarity with indirect bonding and its conducing
8. Familiarity with implementation of mini screw on model

Unit title: TypoDont

Unit code: 21

Unit number: 4units practical

Unit type: Specialized science

Aims: Practical familiarity with fixed orthodontic workflow in treatment of different orthodontic disorders on TypoDent

Evaluation: Practical final exam at “shows how” level

Subtitles:

1. Implementation of prefabricated bands on upper and lower molars in TypoDent
2. Implementation of brackets on upper and lower plaster casts with glue wax
   -With edge wise standard technique
   -With straight wire technique
3. Familiarity with self- ligating brackets
4. Conducting of treatment on models with malocclusion I, moderate crowding with 4mm over bite by moderate anchorage and extraction of 4 first premolars

   A. alignment:
   -lower arch: 1- 0175 Twist
   2- 016 ss
   -upper arch: 1- 014 Multi loop
   2- 016 ss
   -Other choice: 016 A-NiTi

   B. Leveling by extrusion:
   - 1- 016 ss Reverse curve of spee
   - 1- 018 ss (if needed)
   - Other choices: 016 or 018 M-NiTi

   C. Space closing:
   -Lower arch: Delta closing loop 16*22 ss
   -Upper arch: Tear Drop closing loop 16*22 ss
   - Other choice: *Opus closing loop

   * T closing loop 16*22 ss or TMA

   D. Finishing: 1-016 ss ideal arch wire
   2-16*22 ss ideal arch wire

5. Conducting treatment on model with class I malocclusion and severe crowding with first left upper molar rotation by :
   -Maximum anchorage
   -Extraction of four first premolars
   -Segmental upper canine retraction
   -Sliding of lower canines
   -Banding of upper second molars
   -With palatal arch:
   A. alignment:
      -lower arch: 1- 0175 Twist
                   2- 016 ss
      -upper arch: 1- 014 Multi loop
                   2- 016 ss
      -Other choice: 016 A-NiTi
   B. Leveling by extrusion:
      - 1- 016 ss Reverse curve of spee
      - 1- 018 ss (if needed)
      - Other choices: 016 or 018 M-NiTi
   C. Space closing:
      -Lower arch: Delta closing loop 16*22 ss
      -Upper arch: Tear Drop closing loop 16*22 ss
      - Other choice: *Opus closing loop
   * T closing loop 16*22 ss or TMA
   D. Finishing: 1-016 ss ideal arch wire
                 2-16*22 ss ideal arch wire
6. Conducting treatment on model with group 1 class II malocclusion, moderate crowding, normal bite, class II molar and canine relation and maxillary arch tightness by :
   -Upper molars bonding
   -Upper first premolars extraction
   -Palatal arch:
   A.Alignment
      1- 0175 Twist
      2- 0.9 mm Max overlay for Expansion
      3- 016ss

4- Removable Overlay→ Trans palatal Arch
5- Extraction 1st Premolar
Other choices: 016 A-NiTi→ 016ss

B. Leveling: 1- 016→ 018 (if needed)

C. En mass Retraction
1- Opus 70 Closing loop

D. Finishing

7. Conducting treatment on group 2 class II malocclusions with lingualised lower second premolars, sever spee curve and sever deep bite by:

- Extraction of upper first premolar
- Second molars banding
- Upper jaw maximum anchorage
- non ext lower jaw

A. Alignment

lower arch: 1. 0175 Twist
2. 016 ss
3. 16*22 Segmental

Upper arch :1. 0175 Twist
2. 014 ss→ 016 ss→ 16*22
3. Palatal Bar 09
4. Intrusion of central incisor by BIA
5. Aligning incisor 0175, 016

B. Leveling

lower arch: 1 Utility intrusion arch 18*25
Lingual arch 09mm
Post segment: 16*22
Ant segment: 16*22
2- 0175 Twist
3- 016ss→ 018ss

upper arch: Burstone Intrusion Arch 18*25
Intrude Canine

C. Space closing
1- T Loop Closing Loop 16*22
Other Choice: Delta, Opus 70, teardrop Closing Loop

D. Finishing

Upper:

1. Auxillary Ant Root Torque Spring 17*25ss
2. Base Arch 16*22ss
3. Ideal Arch Wire 16*22ss

Lower:

Ideal Arch Wire 16*22ss

8. Conducting treatment group 1 class II malocclusion with moderate crowding and moderate deep bite by straight wire and extraction of first premolars:

A. Alignment & leveling

1. Lower arch: 014 NiTi or Hant with lace back
2. Upper arch: 016 NiTi of Hant with lace back

B. Space closing

1.Lower arch: Active tie back with oring

2. Upper arch: Active tie back with NiTi spring & cl II E

Other choices: H. G+ATB in lower arch with cl III E & ATB in upper

arch with cl II E

C.Finishing

Lower arch: 014 Hant

Upper arch: 014 sectional with elastic for setting

Unit title: Fixed technique 1

Unit code: 22

Unit number: 1unit theoretical

Unit type: Specialized science

Aims: Familiarity with various fixed therapeutic orthodontic techniques

Evaluation: written exam or essay

Subtitles:

1. Familiarity with fixed orthodontic appliances
2. Familiarity with standard edgewise technique
3. Familiarity with Modern Begg technique
4. Familiarity with Burstone segmented technique

Unit title: Fixed technique 2

Unit code: 23

Unit number: 2units theoretical

Unit type: Specialized science

Aims: Familiarity with new various fixed therapeutic orthodontic techniques

Evaluation: written exam or essay

Subtitles:

1. Familiarity with lingual orthodontics technique
2. Familiarity with Tweed Merrifield technique
3. Familiarity with self-ligation technique
   -Speed
   -in-ovation
   -Damon
4. Familiarity with straight wire appliance technique
   -Andrews
   -Roth
   -MBT

Unit title: Principles of removable appliances

Unit code: 24

Unit number: 2units theoretical

Unit type: Specialized science

Aims: Familiarity with principles and techniques of removable appliances in orthodontics

Evaluation: written exam or essay

Subtitles:

1. Familiarity with removable orthodontic appliances (principles, mechanisms, types)
2. Familiarity with functional appliances (principles, mechanisms, functions, types)
   -Bionator and Activator
   -Franckel
   -Twin Black
   -Farmand
3. Familiarity with headgear appliances (principles, mechanisms, types)
   -High pull
   -Low pull
   -Occipital
   -Reverse pull
4. Familiarity with integrated functional and headgear appliances
5. Familiarity with FaceMask and Chincap appliances
6. Familiarity with fix functional appliances

Unit title: Treatment theoretical 1

Unit code: 25

Unit number: 2units theoretical

Unit type: Specialized science

Aims: Familiarity with principles of preventive, interstitial and growth modification treatment planning

Evaluation: written exam

Subtitles:

1. Preventive orthodontic
   -Oral habits
   -Occlusal equilibration
   -Space maintenance
2. Interceptive Orthodontics
   -Guidance of occlusion (serial extraction)
   -Space regaining
   -Correction of developing cross bite
3. Growth modification
   A. Class II malocclusion:
   -Headgears
   -Functional appliances
   B. Class III malocclusion
   -Facemask
   -Functional appliances
   -Orthopedic chincap
4. Class I malocclusion treatment
   A. Non extraction
   -Various maxillary expansion
   -Mandible expansion appliances
   B. Extraction

Unit title: Treatment theoretical 2

Unit code: 26

Unit number: 2units theoretical

Unit type: Specialized science

Aims: Familiarity with various orthodontic disorders in sagittal transverse and vertical dimensions

Evaluation: written exam or essay

Subtitles:

1. Sagittal disorders treatment
   A. Class II malocclusion
      -Dental
      -Skeletal
      -Treatment by fixed appliances with or without extraction (camouflage treatment)
      -Surgical treatment
   B. Class III malocclusion
      -Dental
      -Skeletal
      -mendacious
      -Surgical treatment
2. Transverse disorders treatment
      -Dental
      -Skeletal
      -Lingual cross bite
      -Buccal cross bite
3. Vertical disorders treatment
   A. Deep over bite
      -Dental
      -Skeletal
      -Collapsed bite
   B. Open bite
      - Dental
      -skeletal

Unit title: Treatment theoretical 3

Unit code: 27

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with various adjunctive orthodontic treatments of adult patients and skeletal anchorage techniques

Evaluation: written exam or essay

Subtitles:

1. Adjunctive treatments
   -Up righting posterior teeth
   -Cross bite correction
   -Forced eruption
   -Alignment of anterior teeth
2. Adult inter disciplinary therapy
   -Goals
   -Diagnosis
   -Treatment process
      -Skeletal assessment
      -Periodontal preparation
      -Restorative considerations
      -Results` retention
   -Treatment clinical management
   -Behavioral management
   -Establishing contact with other members of treatment team
3. Modern treatment techniques by Temporary Anchorage Devices (TAD)
   -Biological considerations
   -Diagnosis and treatment plan
   -Principles and biomechanical considerations
   -clinical indications
   -skeletal anchorage

Unit title: Orthosurgery

Unit code: 28

Unit number: 2 units theoretical

Unit type: Specialized science

Aims: Familiarity with various orthodontic treatments in patients requiring common orthodontic and surgical treatment

Evaluation: written exam or essay

Subtitles:

1. Psychosocial consideration in orthosurgery patients
2. Treatment planning
3. Special considerations in orthosurgery treatment from beginning to end
4. Pre surgical cephalometric prediction
5. Orthosurgery treatment in skeletodental disorders
   -Anterior posterior
   -Vertical
   -Transverse
   -Asymmetries
6. Distraction osteogenesis
7. Adjunctive (aesthetic facial procedure)
8. Postsurgical orthodontic management of orthognathic patients

Unit title: Occlusion development

Unit code: 29

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with development of dental arch occlusion formation in human

Evaluation: written exam or essay

Subtitles:

1. Occlusion form and function development in human
2. Postnatal development
3. Modifications in deciduous, mix and permanent teeth
4. Correlation between craniofacial growth and occlusion development
5. Tooth eruption sequence and mechanisms and natural modifications in this process
6. Teeth, dental arch, growth and development and its pattern and effecting factors
7. Ideal occlusion and factors effecting this development

Unit title: Growth and development

Unit code: 30

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with embryological principles of head and face bone and soft tissue growth steps and types of growth assessment

Evaluation: written exam or essay

Subtitles

1. Familiarity with organogenesis
   -Cephalic region modifications
   -visceral region modifications (primary mouth, oronsal cavity process modifications)
   -Growth and development of neuromuscular system
   -fetogenesis
   -Bone and cartilage
2. Familiarity with growth theories
3. A review to craniofacial grow and development
4. Familiarity with basic principles of growth
5. Cognition of developmental sequence
6. Familiarity with growth of lower jaw
7. Familiarity with nasomaxillary complex
8. Familiarity with neurocranium
9. Familiarity with form and pattern of the face
10. Familiarity with human face pattern and its natural modifications and basis of malocclusions
11. Familiarity with racial differences of face form
12. Familiarity with face growth control techniques

Unit title: Retention and Relapse

Unit code: 31

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with types of retainers and its indications and relapse reasons in orthodontics

Evaluation: written exam or essay

Subtitles:

1. History and etiology
-Occlusion theory
-Apical based theory
-Mandibular incisor theory
-Masculature theory
2. Basic theories related to retention and relapse
-Intention to relapse
-Habits elimination
-Over correction
-Tissue reorganization
-Soft tissue
-PDL
-Arch form preservation
-Apical based theory
-Growth pattern and treatment time
3. Influencing factors on retention and relapse
-Tooth size discrepancy
-Relation of third molars
-Growth factors
-Sexual differences
4. Various required retention for special malocclusions
5. Retention appliances
6. Retention with clear plastic appliances

Unit title: Syndromes and lip and palate clefts

Unit code: 32

Unit number: 2 units theoretical

Unit type: Specialized science

Aims: Familiarity with common syndromes and lip and palate cleft and their orthodontic treatments

Evaluation: written exam or essay

Subtitles:

1. Familiarity with facial and cranial common syndromes such as : Craniofacial synostosis, Craniomandibular synostosis, craniofacial microstomia, Pierre Robin anomaly and sequence
2. Craniofacial syndromes` orthodontic management
3. Diagnosis
   -pre-birth diagnosis of lip and palate cleft
   -Diagnosis of orofacial cleft
4. Team approach
5. Orthodontist`s role in :
   -Neonatal and infant period (birth to 2 years)
   -Primary dentition period (2-6 years)
   -Mixed dentition period(7-12 years)
   -Permanent dentition period
6. Orthognathic surgeries and orthodontists` role
7. Nasoalveolar Molding
8. Ear disorders in children with cleft palate
9. Speech in children with cleft palate
10. Facial growth in children with cleft palate
11. Types of clefts

Unit title: Biomaterials

Unit code: 33

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with structure of consumed materials and alloys in orthodontics

Evaluation: written exam or essay

Subtitles:

1. Physical and chemical characteristics of materials
   -Atoms
   -Molecules
   -Cristal
   -Grains
   -Lattices
   -Lattice deformation
   -Polymorphism
   -Twining
   -Transitions
   -phases
   -Affinity
   -Chemical bonding
2. Metals
   -Stainless steels
   -Titanium and its alloys (NiTi)
   -Brazing alloys
   -Orthodontic implants
3. Organic polymers
   -Acryl
   -Poly urethane
4. Non organic polymers (ceramics)
   -Oxides
   -Glasses
5. Composites and Blends
   -Resin composites
   -Glass ionomers

-Compomers
-composite brackets

6. Familiarity with elastomeric materials in orthodontics
7. Familiarity with Nano materials in orthodontics

Unit title: Occlusion and TMJ disorders

Unit code: 34

Unit number: 1 unit theoretical

Unit type: Specialized science

Aims: Familiarity with occlusion theories and its goal in orthodontics and diagnosis and management of TMJ disorders related to orthodontic treatments

Subtitles:

1. A review to occlusion theories in human and its types (group function, cuspid rise etc.)
2. Familiarity with static and functional occlusion theories
3. Occlusion goals in contemporary orthodontics
4. Orthopedic stability principles
5. Finding a masculoskeletally stable position
6. Evaluation of the patient from aspect of TMD
   -Screen history
   -Clinical examination
7. Orthodontic and TMJ disorders treatment planning and management
8. Facial pain differential diagnosis
9. Management of temporomandibular symptoms occurring during orthodontic treatment
10. Familiarity with TMJ disorders related to malocclusions

Unit title: Patient presentation (Treatment planning and result assessment)

Unit code: 35, 36, 37, 38

Unit number: 4 units practical

Unit type: Specialized science

Aims: Presentation of patient in case presentation sessions in presence of all attendings and residents with the purpose of treatment planning and result assessment

Evaluation: Direct observation of case presentation and assessment with check list

Subtitles:

Presentation of at least 4 patients in every semester at case presentation sessions regarding evidence based dentistry methods (Performance method is up to universities` departments)

Unit title: Clinical treatment

Unit code: 39, 40, 41, 42, 43

Unit number: 43 units practical

Unit type: Specialized science

Aims: Acquiring skill in admission, diagnosis and treatment of patients with various orthodontic disorders in residents

Evaluation: Students` performance assessment at “Shows how” level with subsequent means such as OSCE or at “Does” level with suitable tools (such as DOPS, MiniCEx)

Subtitles:

1. Starting at least 30 cases of fixed, 5 cases of removable orthodontic treatment and 5 cases of orthosurgery
2. Treating at least 20 transferred and 10 recall patients
3. Every resident should terminate at least 50% equal with 20 of new patients and at least 70% transferred patients
4. Classification of malocclusion for residents:
   -Class I malocclusion: 10 cases (including extraction and non - extraction)
   -Class II malocclusion: 10 cases (including cl II div 1, cl II div 2, long face, short face, ext and non-ext)
   -Class III malocclusion: 5 cases (surgical and nonsurgical)
   -Vertical problems: 5 cases
   -Transverse problems: 5 cases
   - Other specialized cases: 5 cases (including dental impactions, cleft patients etc.)
   -Distribution of each cases is determined by facilities of each department

Unit title: Thesis

Unit code: 44, 45, 46, 47

Unit number: 12 units practical

Unit type: Specialized science

Aims: Registration of post graduate thesis subject at the end of first year, conducting the approved research project under the mentor`s supervision, termination of approved research project and preparing the thesis under mentor`s supervision and defending it

Evaluation: Dissertation

Subtitles:

1. Subject selection under mentor`s supervision
2. Proposal writing under the mentor`s supervision
3. Getting the subject and proposal approved by the department and faculty research council
4. Registration the approved subject in the office of education affairs
5. Conducting the research according to the approved methods and materials under mentor`s supervision
6. Presenting the progress report to the mentor and post graduate officer of the department and the faculty
7. Terminating the research according to the approved methods and materials under mentor`s supervision
8. Writing the thesis under mentor`s supervision
9. Writing at least 1 article based on the conducted research under mentor`s supervision
10. Publication or submission of the article in reliable scientific journals
11. Defending the thesis