School of Dental Sciences

Krishna Institute of Medical Sciences,

Deemed to be University, Karad

MDS Syllabus

FACULTY NAME: SCHOOL OF DENTAL SCIENCES,
PROGRAMME NAME: ORTHODONTICS AND DENTOFACIALORTHOPEDICS

PROGRAMME CODE: 2206

OBJECTIVES:

The training programme in Orthodontics is to structure and achieve the following four objectives

Knowledge:

1. The dynamic interaction of biologic processes and mechanical forces acting on the stomatognathic system during orthodontictreatment
2. The etiology, pathophysiology, diagnosis and treatment planning of various common Orthodonticproblems
3. Various treatment modalities in Orthodontics – preventive, interceptive andcorrective.
4. Basic sciences relevant to the practice ofOrthodontics
5. Interaction of social, cultural, economic, genetic and environmental factors and their relevance to management of oro–facialdeformities
6. Factors affecting the long-range stability of orthodontic correction and theirmanagement
7. Personal hygiene and infection control, prevention of cross infection and safe disposal of hospital waste, keeping in view the high prevalence of Hepatitis and HIV and other highly contagious diseases.

Skills:

1. To obtain proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at a reasonable diagnosis about the Dento-facialdeformities.
2. To be competent to fabricate and manage the most appropriate appliance – intra or extra oral, removable or fixed, mechanical or functional, and active or passive – for the treatment of any orthodontic problem to be treated singly or as a part of multidisciplinary treatment of oro-facialdeformities.

Attitude:

1. Develop an attitude to adopt ethical principles in all aspects of Orthodonticpractice.
2. Professional honesty and integrity are to before stered
3. Treatment care is to be delivered irrespective of the social status, cast, creed and religion of thepatients.
4. Willingness to share the knowledge and clinical experience with professionalcolleagues
5. Willingness to adopt, after a critical assessment, new methods and techniques of orthodontic management developed from time to time based on scientific research, which are in the best interest of thepatient
6. Respect patients' rights and privileges, including patients right to information and right to seek a secondopinion
7. Develop attitude to seek opinion from allied medical and dental specialists as and when required

Communication Skills:

1. Develop adequate communication skills particularly with the patients giving them the various options available to manage a particular Dento-facial problem and to obtain a true informed consent from them for the most appropriate treatment available at that point of time.
2. Develop the ability to communicate with professional colleagues, in Orthodontics or other specialties through various media like correspondence, Internet, e-video, conference, etc. to render the best possible treatment.

COURSE OUTCOME

1. **Applied Anatomy**
   Under anatomy they would have learnt about
   Prenatal and post natal growth of head, bone growth, assessment of growth and development, muscles of mastication, Development of dentition and occlusion.
2. **Applied Physiology**
   Under Physiology they would have learnt about Endocrinology and its disorders, Calcium and its metabolism, Nutrition-metabolism and their disorders, Muscle physiology, craniofacial biology, bleeding disorders.
3. **Dental Materials**
   Under Dental Materials they would have learnt about Gypsum products, impression materials, acrylics, composites, banding and bonding cements, wrought metal alloys, orthodontic arch wires, elastics, applied physics, specification and tests methods, survey of all contemporary and recent advances of above.
4. **Genetics**
   Under Genetics they would have learnt about Cell structure, DNA, RNA, protein synthesis, cell division, Chromosomal abnormalities, Principles of orofacial genetics, Genetics in malocclusion, Molecular basis of genetics, Studies related to malocclusion, Recent advances in genetics related to malocclusion, Genetic counseling, Bioethics and relationship to Orthodontic management of patients
5. **Physical Anthropology**
   Under Physical Anthropology they would have learnt about Evolutionary development of dentition, Evolutionary development of jaws
6. **Pathology**
   Under Pathology they would have learnt about inflammation, and necrosis
7. **Biostatistics**

SYLLABUS:

The program outlined, addresses both the knowledge needed in Orthodontics and allied Medical specialties in its scope.

Spread of the Curriculum:

PART-I :- 2206-1

I. Applied Anatomy:

a. Prenatal growth ofhead:

Stages of embryonic development, origin of head, origin of face, origin of teeth.

b. Postnatal growth ofhead:

Bones of skull, the oral cavity, development of chin, the hyoid bone, general growth of head, growth of the face.

c. Bonegrowth:

Origin of bone, composition of bone, units of bone structure, schedule of Ossification, mechanical properties of bone, roentgen graphic appearance of bone

d. Assessment of growth anddevelopment:

Growth prediction, growth spurts, the concept of normality and growth increments of growth, differential growth, gradient of growth, methods of gathering growth data. Theories of growth and recent advances, factors affecting physical growth.

e. Muscles ofmastication:

Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion

f. Development of dentition and occlusion.

Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of occlusal development, pattern of occlusion.

g. Assessment of skeletalage.

II. Physiology:

a. Endocrinology and its disorders.
   Growth hormone, thyroid hormone, parathyroid hormone, ACTH.
b. Calcium and itsmetabolism:
c. Nutrition-metabolism and theirdisorders:
   Proteins, carbohydrates, fats, vitamins and minerals
d. Musclephysiology:
e. CraniofacialBiology:
   Adhesion molecules and mechanism of adhesion
f. Bleeding disorders in orthodontics:Hemophilia

III. Dental Materials:

a. Gypsum products:
   Dental plaster, dental stone and their properties, setting reaction etc.
b. Impressionmaterials:
   Impression materials in general and particularly of alginate impression material.
c. Acrylics:
   Chemistry, composition physical properties

IV Genetics:

a. Cell structure, DNA, RNA, protein synthesis, celldivision
b. Chromosomal abormalities
c. Principles of orofacial genetics
d. Genetics inmalocclusion
e. Molecular basis ofgenetics
f. Studies related tomalocclusion
g. Recent advances in genetics related tomalocclusion
h. Geneticcounseling
i. Bioethics and relationship to Orthodontic management ofpatients.

V. Physical Anthropology:

a. Evolutionary development ofdentition
b. Evolutionary development of jaws.

VI. Pathology:

a. Inflammation
b. Necrosis

VII. Biostatistics:

a. Statisticalprinciples
   - Data Collection
   - Method ofpresentation
   - Method ofSummarizing
   - Methods of analysis – differenttests/errors
b. Sampling and Samplingtechnique
c. Experimental models, design andinterpretation
d. Development of skills for preparing clear concise and cognent scientific abstracts and publication

VIII. Applied Research Methodology In Orthodontics:

a. Experimentaldesign
b. Animal experimentalprotocol
c. Principles in the development, execution and interpretation of methodologies inOrthodontics
d. Critical Scientific appraisal ofliterature.

IX. Applied Pharmacology

Definitions & terminologies used – Dosage and mode of administration of drugs. Action and fate of drugs in the body, Drug addiction, tolerance and hypersensitive reactions, Drugs acting on the central nervous system, general anesthetics hypnotics, analeptics and tranquilizers. Local anesthetics, Chemotherapeutics and antibiotics. Vitamins: A, D,B– complex group, C & K etc.

PART-II :

Paper-I: 2206-11

BasicOrthodontics

X. OrthodonticHistory:

a. Historical perspective
b. Evolution of orthodonticappliances,
c. Pencil sketch history of Orthodonticpeers
d. History of Orthodontics in India

XI. Concepts of Occlusion and Esthetics:

a. Structure and function of all anatomic components ofocclusion,
b. Mechanics ofarticulation,
c. Recording of masticatoryfunction,
d. Diagnosis of Occlusaldysfunction,
e. Relationship of TMJ anatomy and pathology and related neuromuscular physiology.

XII. Etiology and Classification of Malocclusion:

a. A comprehensive review of the local and systemic factors in the causation of malocclusion
b. Various classifications ofmalocclusion

XIII. Dentofacial Anomalies:

a. Anatomical, physiological and pathological characteristics of major groups of developmental defects of the orofacial structures.

XIV. Diagnostic Procedures and Treatment Planning in Orthodontics:

a. Emphasis on the process of data gathering, synthesis and translating it into a treatmentplan
b. Problem cases – analysis of cases and itsmanagement
c. Adult cases, handicapped and mentally retarded cases and their specialproblems
d. Critique of treatedcases.

XV. Cephalometrics

a. Instrumentation
b. Imageprocessing
c. Tracing and analysis of errors andapplications
d. Radiation hazards
e. Advanced Cephalometrics techniques including digitalcephalometrics
f. Comprehensive review ofliterature
g. Video imaging principles andapplication.

XVII. Practice Management in Orthodontics:

a. Economics and dynamics of solo and grouppractices
b. Personalmanagement
c. Materialsmanagement
d. Public relations
e. Professionalrelationship
f. Dental ethics andjurisprudence
g. Office sterilizationprocedures
h. Community basedOrthodontics.

COURSE OUTCOME

1. **Orthodontic history**
   Under Orthodontic History they would have learnt about
   Historical perspective, Evolution of orthodontic appliances, Pencil sketch history of Orthodontic peers, History of Orthodontics in India.
2. **Concepts of occlusion and esthetics** Under this, the students would learn about Structure and function of all anatomic components of occlusion, Mechanics of articulation, Recording of masticatory function, Diagnosis of Occlusal dysfunction, Relationship of TMJ anatomy and pathology and related neuromuscularphysiology.
3. **Etiology and Classification of malocclusion**
   Under this, the students would learn about, a comprehensive review of the local and systemic factors in the causation of Malocclusion and Various classifications of malocclusion.
4. **DentofacialAnomalies**
   Under this, the students would learn about, anatomical, physiological and pathological characteristics of major groups of developmental defects of the orofacial structures.
5. **Child and AdultPsychology**
   Under this, the students would learn about Stages of childdevelopment,
   Theories of psychological development Management of child in orthodontic treatment, Management of handicapped child, Motivation and Psychological problems related to malocclusion / orthodontics, Adolescent psychology, Behavioral psychology and communication.
6. **Diagnostic procedures and treatment planning in orthodontics** Under this, the students would learn about Stages of child development, Theories of psychological development, Management of child in orthodontic treatment, Management of handicapped child, Motivation and Psychological problems related to malocclusion / orthodontics, Adolescent psychology, Behavioral psychology and communication.
7. **Cephalometrics**
   Under this the student would learn about, Instrumentation, Image processing, Tracing and analysis of errors and applications, Radiation hygiene, Advanced Cephalometrics techniques, Comprehensive review of literature, Video imaging principles and application.
8. **PracticemanagementinOrthodontics**

Under this the student would learn about, Economics and dynamics of solo and group practices, Personal management, Materials management, Public relations, Professional relationship, Dental

ethics and jurisprudence, Office sterilization procedures, Community based Orthodontics

Paper-II: 2206-12

XVIII. Clinical Orthodontics

COURSE OUTCOME

1. **MyofunctionalAppliances**
   The students will be capable of diagnosing and interpreting the knowledge obtained to treat developing malocclusion at a younger age.
2. **DentofacialOrthopaedics**
   The students will develop acumen to identify and deliver treatment regimes Usingorthopaedic appliances to the appropriate cases.
3. **Cleft Lip & PalateRehabilitation**
   The students will be trained to treat the CLCP cases with empathy starting with Naso alveolar moulding at the infant stage and then systematically treat the malocclusion using removable / fixed orthodontics during the mixed & permanent dentition by harmonizing the treatment plan with the other members og the multidisciplinary cleft team.
4. **Biology of toothmovement**
   Basic understanding of the applied anatomy & physiology regarding to tooth & its surrounding structures will be inculcated into the student, so that the results of application of orthodontic forces can be understood and clinically used.
5. **Orthodontics/OrthognathicSurgery**
   Students will be thoroughly trained in conjoint diagnosis & treatment planning of cases requiring surgical intervention.
6. **Ortho/ Perio/ Prostho inter relationship**
   Students will be trained in treating complicated cases requiring a multi- disciplinary approach in patient management.
7. **Basic Principles of mechanotherapy**Students will be trained in designing , construction , fabrication &management of cases using both removable & fixed orthodontics.
8. **Applied preventive aspects in Orthodontics**
   A comprehensive view of diagnosing & preventing caries, periodontal diseases to maintain proper inter arch relationship.
9. **Interceptiveorthodontics**
   Students will be trained in growth guidance, diagnosing & treatment planning of early malocclusion both at mixed/ permanent dentition.

<u>Myofunctional Orthodontics:</u>

a. Basic principles
b. Contemporary appliances –design, manipulation andmanagement
c. Case selection and evaluation of the treatmentresults
d. Review of the currentliterature.

Dentofacial Orthopedics:

a. Principles
b. Biomechanics
c. Appliance design andmanipulation
d. Review of contemporaryliterature

Cleft lip and palate rehabilitation:

a. Diagnosis and treatmentplanning
b. Mechanotherapy
c. Special growth problems of cleftcases
d. Speech physiology, pathology and elements of therapy as applied toothodontics
e. Team rehabilitativeprocedures.

Biology of tooth movement:

a. Principles of toothmovement-review
b. Review of contemporaryliterature
c. Applied histophysiology of bone, periodontalligament
d. Molecular and ultra-cellular consideration in toothmovement

Orthodontic / Orthognathic surgery:

a. Orthodontist's role in conjoint diagnosis and treatmentplanning
b. Pre and post-surgicalOrthodontics
c. Participation in actual clinical cases, progress evaluation and post retentionstudy
d. Review of currentliterature

Ortho / Perio / Prostho/Endo inter relationship:

a. Principles of interdisciplinary patient treatment
b. Common problems and theirmanagement

Basic principles of mechanotherapy includes removable appliances and fixed appliances:

a. Design
b. Construction
c. Fabrication
d. Management
e. Review of current literature on treatment methods andresults

Applied preventive aspects in Orthodontics:

a. Caries and periodontal diseaseprevention
b. Oral hygienemeasures

c. Clinicalprocedures

Interceptive Orthodontics:

a. Principles
b. Growthguidance
c. Diagnosis and treatmentplanning
d. Therapy emphasis on:
    - Dento-facialproblems
    - Tooth materialdiscrepancies
    - Minor surgery forOrthodontics

Evidence Based Orthodontics:

Different types of fixed Mechanotherapy:

Accelerated Orthodontics

Orthodontic Management of TMJ problems, sleep-apnea etc.:

Retention and relapse:

a. Mechanotherapy – special reference to stability of results with variousprocedures
b. Post retentionanalysis
c. Review of contemporaryliterature

XIX. Recent Advances :

a. Use ofimplants
b. Lasers
c. Application ofF.E.M.
d. DistractionOsteogenesis
e. InvisibleOrthodontics
f. 3D imaging Digital Orthodontics, Virtual TreatmentPlanning
g. CAD-CAM bracketCustomization
h. Robotic WireBending
i. AcceleratedOrthodontics
   - Surgical
   - Device assisted or mechanicalstimulation
   - BiochemicalMediators
j. LingualOrthodontics

Paper-III: 2206-13

Essays (descriptive and analyzing type questions)

PRE – CLINICAL EXERCISES
(Should be completed within 3 months)

A general outline of the type of exercises is given here:

1. General Wire bending exercises to develop the manualdexterity.
2. Clasps, Bows and springs used in the removableappliances.
3. Soldering and weldingexercises.
4. Fabrication of removable, habit breaking, mechanical and functional appliances, also all types of space maintainers and spaceregainers.
5. Bonwill Hawley Ideal archpreparation.
6. Construction of orthodontic models trimmed andpolished.
7. Cephalometric tracing and various Analyses, also superimposition methods–
8. Fixed appliance typodontexercises.

a) Training shall be imparted in one basic technique i.e. Standard Edgewise / Begg technique or its derivative / Straight wire etc., with adequate exposure to other techniques.
b) Typodontexercise

- Band making
- Bracket positioning andplacement
- Different stages in treatment appropriate to techniquetaught

9. Clinicalphotography
10. Computerizedimaging
11. Preparation of surgical splints, and splints for TMJproblems.
12. Handling of equipment like vacuum forming appliances and hydro solderetc.
13. Accelerated orthodontics

PAPER IV: ESSAY

COURSE OUTCOME

. Recent Advances

The Students would be trained in above mentioned topics in detail, so that the student would know the recent updates along with the previousliterature available.

MDS EXAM SCHEME

4 Theory Papers

Theory Max 75 marks

Theory Total Max 300 Min 150

Practical & Viva. Voce Max 300 Min 15