

SYLLABUS FOR Ph.D. ENTRANCE EXAMINATION

ORTHODONTICS

APPLIED ANATOMY

- Prenatal growth of head - Stages of embryonic development, origin of head, origin of face, origin of teeth.
- Post-natal growth of head - Bones of skull, the oral cavity, development of chin, the hyoid bone, general growth of head, face growth.
- Bone growth -Origin of bone, composition of bone, units of bone structure, schedule of ossification, mechanical properties of bone, Roentgenographic appearance of bone.
- Assessment of growth and development - Growth prediction, growth spurts, the concept of normality and growth increments of growth, differential growth, and gradient of growth, methods of gathering growth data.Theories of growth and recent advances, factors affecting physical growth.
- Muscles of mastication - Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion.
- Development of dentition and occlusion - Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of Occlusal development, pattern of occlusion.
- Assessment of skeletal age- The carpal bones, carpal X – rays, cervical vertebrae.

APPLIED PHYSIOLOGY

- Endocrinology and its disorders pituitary gland hormones, thyroid gland hormones, parathyroid gland hormones
- Calcium and its metabolism
- Nutrition-metabolism and their disorders : proteins, carbohydrates, fats, vitamins and minerals
- Muscle physiology
- Craniofacial Biology : cell adhesion molecules and mechanism of adhesion
- Bleeding disorders in orthodontics; Hemophilia

DENTAL MATERIALS

- Gypsum products: Dental plaster, dental stone and their properties, setting reaction etc.
- Impression materials in general and particularly alginate impression material.
- Acrylics: chemistry, composition physical properties.
- Composites: composition, types, properties, setting reaction
- Banding and bonding cements : Zn (PO₄)₂, zinc silicophosphate, Zinc polycarboxylate, resin cements and glass ionomer cements
- Wrought metal alloys: deformation, strain hardening, annealing recovery, recrystallization, grain growth properties of metal alloys.
- Elastics: Latex and non-latex elastics.
- Applied physics, Bioengineering and metallurgy.

- Specification and tests methods used for materials used in Orthodontics
- Survey of all contemporary literature and recent advances in above – mentioned materials.

GENETICS:

- Cell structure, DNA, RNA, protein synthesis, cell division □ Chromosomal abnormalities.
- Principles of oro-facial 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.

PHYSICAL ANTHROPOLOGY:

- Evolutionary development of dentition 8.1.5.2 Evolutionary development of jaws.

PATHOLOGY

- Inflammation
- Necrosis

BIOSTATISTICS

- Statistical principles
- Data Collection
- Method of Summarizing
- Methods of analysis – different tests – errors
- Sampling and Sampling technique
- Experimental models, design and interpretation.
- Development of skills for preparing clear concise and cogent scientific abstracts and publication.

APPLIED RESEARCH METHODOLOGY IN ORTHODONTICS

- Experimental design
- Animal experimental protocol
- Principles in the development, execution and interpretation of methodologies in Orthodontics
- Critical Scientific appraisal of literature.

DIAGNOSIS AND TREATMENT PLANNING

Orthodontic History

- Historical perspective,
- Evolution of orthodontic appliances, □ Pencil sketch history of Orthodontic peers.
- History of Orthodontics in India.

Concepts of Occlusion and Esthetics

- 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 neuromuscular physiology.

Etiology and Classification of malocclusion:

- A comprehensive review of the local and systemic factors in the causation of malocclusion
- Various classifications of malocclusion

Dentofacial Anomalies:

- Anatomical, physiological and pathological and characteristics of major groups of development defects of the orofacial structures.

Child and Adult Psychology:

- 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

Diagnostic procedures, Prognosis and treatment planning in orthodontics

- Emphasis on the process of data gathering, synthesis and translating it into a treatment plan.
- Problem cases – analysis of cases and its management.
- Adult cases, handicapped and mentally retarded cases and their special problems
- Critique of treated cases.

Cephalometrics

- Instrumentation
- Image processing
- Tracing and analysis of errors and applications
- Radiation hazards
- Advanced Cephalometrics techniques.
- Comprehensive review of literature.
- Video imaging principles and application.

Practice management in Orthodontics

- 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

CLINICAL ORTHODONTICS

Myofunctional Orthodontics:

- Basic principles
- Contemporary appliances – their design and manipulation □ Case selection and evaluation of the treatment results.
- Review of the current literature

Dentofacial Orthopedics

- Principles
- Biomechanics
- Appliance design and manipulation
- Case selection and evaluation of the treatment results.
- Review of the current literature.

Cleft lip and palate rehabilitation

- Diagnosis and treatment planning
- Mechanotherapy
- Special growth problems of cleft cases
- Speech physiology, pathology and elements of therapy as applied to orthodontics
- Team rehabilitative procedures.

Biology of tooth movement:

- Principles of tooth movement-review
- Review of contemporary literature
- Applied histophysiology of bone, periodontal ligament
- Molecular and ultra cellular consideration in tooth movement

Orthodontic / Orthognathic surgery:

- Orthodontist' role in conjoint diagnosis and treatment planning
- Pre and post-surgical Orthodontics
- Participation in actual clinical cases, progress evaluation and post retention study
- Review of current literature

Ortho / Perio / Prostho inter relationship □

Principles of interdisciplinary patient treatment.

- Common problems and their management

Basic principles of Mechanotherapy includes Removable appliances and fixed appliances

- Design
- Construction
- Fabrication
- Management
- Review of current literature on treatment methods and results.

Applied preventive aspects in Orthodontics

- Caries and periodontal disease prevention
- Oral hygiene measures
- Clinical procedures

Interceptive preventive aspects in Orthodontics

- Principles
- Growth guidance
- Diagnosis and treatment planning
- Therapy emphasis on
 - a. Dento-facial problems
 - b. Tooth material discrepancies
 - c. Minor surgery for Orthodontics

Retention and relapse

- Mechanotherapy – special reference to stability of results with various procedures
- Post retention analysis
- Review of contemporary literature

Recent advances like:

- Use of implants
- Lasers
- Application of F.E.M.
- Distratcion Osteogenesis