

## **Paper II: Technical Subject**

### **1. Introduction and History of Orthodontics**

- 1.1 Definition, history, aims and objective of Orthodontics
- 1.2 Branches of Orthodontics
- 1.3 Scope of Orthodontics

### **2. Growth and Development**

- 2.1 Basic concept of Embryology and Genetics
- 2.2 Concept of growth, development, differentiation and maturation
- 2.3 Various theories of Growth :Genetic theory, Sutural growth theory, Cartilagenous growth theory, Functional matrix theory, Van Limborgh's Theory, Enlow's Principle and Cybernetic theory
- 2.4 Factors affecting growth
- 2.5 Bone, Cartilage, Sutures, Synchondrosis
- 2.6 Pre-natal and Post-natal growth of Stomatognathic system
- 2.7 Types of Bone Growth : Intra-membranous and Endochondrial

### **3. Occlusion**

- 3.1 Introduction and phases of occlusion (pre-dentate, primary, mixed, permanent)
- 3.2 Types of occlusion: Normal, Physiologic, Therapeutic, Centric and Eccentric
- 3.3 Angle's keys of normal molar relation
- 3.4 Andrew's keys of normal occlusion
- 3.5 Components of masticatory system

### **4. Malocclusion**

- 4.1 Definition
- 4.2 Classification
  - 4.2.1 Angle classification with Dewey's modification
  - 4.2.2 Ackermann & Profitt classification
  - 4.2.3 Lischer Classification
  - 4.2.4 Simon Classification
- 4.3 Etiology
  - 4.3.1 Graber's etiological classification
  - 4.3.2 Moyer's etiological classification
- 4.4 Epidemiology/ Indices

### **5. Orthodontic Diagnosis**

- 5.1 Introduction/ History taking
- 5.2 Diagnostic aids : essential diagnostic aids and supplemental diagnostic aids
- 5.3 Study model, Radiographs, photographs in Orthodontics

### **6. Cephalometry**

- 6.1 Introduction, History
- 6.2 Application
- 6.3 Cephalometric analyses : Steiner's, Down's, Tweeds, McNamara and Wit's appraisal

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**7. Model analyses**

- 7.1 Introduction and uses
- 7.2 Model analysis : Arch Perimeter/ Carey's, Bolton, Pont and Ashley Howe
- 7.3 Mixed Dentition analysis : Moyer's and Tanaka Johnson

**8. Orthodontic materials**

- 8.1 Introduction, classification and uses
- 8.2 Physical and chemical properties of orthodontic wires: Stainless Steel, Nickel Titanium, TMA/ Beta Titanium and Copper NiTi
- 8.3 Orthodontic impression materials, adhesives, cements, etchant
- 8.4 Orthodontic brackets, bands, auxiliaries/accessories
- 8.5 Elastics and Elastomerics
- 8.6 Welding and Soldering

**9. Preventive Orthodontics**

- 9.1 Definition/ Scope
- 9.2 Types of preventive measures
- 9.3 Significance related to orthodontics

**10. Interceptive Orthodontics**

- 10.1 Definition/ Scope
- 10.2 Types of interceptive measures
- 10.3 Growth guidance
- 10.4 Significance related to orthodontics

**11. Habit**

- 11.1 Introduction/Definition
- 11.2 Etiology
- 11.3 Classification /Types of oral habits : Thumb/digit sucking, Tongue thrusting, Mouth breathing, Lip/nail habits and Bruxism/ grinding habits
- 11.4 Deleterious effects of habits
- 11.5 Management /Treatment of habits

**12. Biology of tooth movement**

- 12.1 Introduction
- 12.2 Types of Orthodontic Force : Continuous, Intermittent and Interrupted
- 12.3 Types of tooth movement
- 12.4 Tissue reaction to different types of orthodontic tooth movement (OTM)
- 12.5 Optimal orthodontic force
- 12.6 Phases of Orthodontic tooth movement : Initial phase, Lag phase and Post-lag phase
- 12.7 Tissue hyalinization
- 12.8 Effects of Drugs on OTM
- 12.9 Deleterious effects of OTM

**13. Biomechanics in Orthodontics**

- 13.1 Introduction/ Definition
- 13.2 Force, Moment, Couple
- 13.3 Center of rotation, Center of Resistance

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- 13.4 Types of tooth movement
- 13.5 Sliding mechanics / Loop mechanics/ 'V' bends
- 13.6 Canine retraction/ En masse retraction

**14. Anchorage**

- 14.1 Introduction/ Definition
- 14.2 Source/ Types/ Classification
- 14.3 Anchorage preparation/ planning
- 14.4 Anchorage loss
- 14.5 TPA/ LHA/ Nance palatal button
- 14.6 Use of Mini-implant anchorage (TAD)

**15. Methods of gaining space**

- 15.1 Introduction/ Indication
- 15.2 Proximal stripping
- 15.3 Extraction
- 15.4 Arch expansion
- 15.5 Distalization
- 15.6 Derotation of posterior tooth
- 15.7 Anterior proclination
- 15.8 Uprighting of posterior tooth

**16. Functional/ Myofunctional appliances**

- 16.1 Introduction/ Definition/ Scope
- 16.2 Basic principles
- 16.3 Classification/ Types of appliance : Monoblock, Twinblock, Activator, Bionator, Frankel's regulators and Fixed functional appliances
- 16.4 Contemporary appliances/ Mode of action

**17. Orthopedic Appliances**

- 17.1 Introduction/ Definition/ Scope
- 17.2 Basic principles
- 17.3 Classification/ Types of appliance : Headgear, Chin cup and Facemask
- 17.4 Contemporary appliances/ Mode of action

**18. Removable Appliances**

- 18.1 Introduction/ Definition/ Scope
- 18.2 Basic principles/ Mode of action
- 18.3 Classification/ Types of appliance
- 18.4 Parts/ Components

**19. Fixed Appliances**

- 19.1 Introduction/ Definition/ Scope
- 19.2 Basic principles
- 19.3 Classification/ Types of appliance
- 19.4 Phases of fixed orthodontic treatment
- 19.5 Contemporary appliances/ Mode of action
  - 19.5.1 Standard Edgewise appliance

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- 19.5.2 Andrew's Straight Wire Appliance/ Pre-adjusted edgewise appliance
- 19.5.3 Self-ligating bracket system
- 19.5.4 Lingual orthodontics

**20. Corrective Orthodontics**

- 20.1 Correction of Antero-posterior discrepancies : Treatment of Class I, Class II and Class III malocclusion
- 20.2 Correction of Vertical discrepancies : Treatment of open bite and deep bite
- 20.3 Correction of transverse discrepancies : Treatment of cross bite and scissor bite

**21. Surgical Orthodontics**

- 21.1 Introduction, Scope, Indication, Contraindication, Hazard, Limitations
- 21.2 Types/ Procedures of surgical orthodontics
  - 21.2.1 Minor surgical procedures - Extraction, Frenectomy, Pericision, Surgical exposure of impacted tooth, Osteotomies
  - 21.2.2 Major surgical procedures - Orthognathic surgery, Distraction osteogenesis
- 21.3 Extraction in Orthodontics
  - 21.3.1 Indication/ Contraindication
  - 21.3.2 Types of orthodontic extraction : Serial extraction, Balancing extraction, Compensatory extraction, Therapeutic extraction and Enforced extraction

**22. Craniofacial Anomalies**

- 22.1 Introduction
- 22.2 Classification/ Types
- 22.3 Clinical significance in relation to orthodontics
- 22.4 Etiology / Pathology of Cleft lip and palate
- 22.5 Management/ Treatment / Rehabilitation of Cleft lip and palate

**23. Adult Orthodontics**

- 23.1 Introduction/ Scope
- 23.2 Adult patient Vs adolescent patient
- 23.3 Modalities for adult orthodontics
- 23.4 Adjunctive Orthodontics
- 23.5 Treatment considerations/ Limitations

**24. Interdisciplinary Orthodontics**

- 24.1 Introduction/ Scope
- 24.2 Ortho-Perio relationship
- 24.3 Ortho-Prosthodontics relationship
- 24.4 Ortho- Resto/Endo relationship
- 24.5 Ortho-Surgery relationship
- 24.6 Community-based Orthodontics

**25. Retention and Relapse**

- 25.1 Introduction/ Definition
- 25.2 Causes of relapse

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- 25.3 Schools of retention
- 25.4 Theorems of retention
- 25.5 Post-retention stability
- 25.6 Classification/Types of retainers : Hawley's retainer, Wrap-around, Clip-on retainer, Begg's retainer, Fixed lingual retainer and Clear retainer

**26. Recent advances in orthodontics**

- 26.1 Clear aligner
  - 26.2 Temporary anchorage device (TAD)
  - 26.3 Advanced imaging- CBCT, CAD-CAM
  - 26.4 Laser in orthodontics
  - 26.5 Management of Obstructive Sleep Apnea
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