

SAUDI BOARD RESIDENCY TRAINING PROGRAM

ORTHODONTICS

Final Written Examination

Examination Format:

1. A Saudi board final specialty written examination shall consist of two papers each with 100-125 SBA MCQs. Ten unscored items can be added for pretesting purposes.
2. If any other assessment format is used, the CAC must agree to its implementation (for example Short Answer Question (SAQ) or Modified Essay Question (MEQ) formats).

Passing Score:

The passing score is 70%. However, if the percentage of candidates passing the examination before final approval is less than 70%, the passing score must be lowered by one mark at a time aiming at achieving 70% passing rate or 65% passing score whichever comes first. Under no circumstances can the passing score be reduced below 65%.

Suggested Reading List for Final Written Examination:

This reading list is generated to provide the fifth-year residents in the Saudi Board of Orthodontics and craniofacial Orthopedic with a source of knowledge in preparation for the didactic component of the Final Examination. It is intended to remind the residents with several key-articles in orthodontics and to give them a broad perspective on selected orthodontic topics. The Examination Committee of the SBO would like to emphasize that this list should not serve as a single preparatory source for the Final Examination and other literature and textbooks are recommended in addition to the suggested references. Questions of the Final Examination may or may not be based on the suggested reading list and no single reference in the suggested reading list contains the indisputable answer to any of the questions.

TEXT BOOKS:

1. Proffit WR. CONTEMPORARY ORTHODONTICS. 6th edition, St. Louis, MO, USA, Mosby, Inc., 2018.
2. Radiographic cephalometry from basics to 3-D imaging, Alexander Jacobson, Richard Jacobson , 2nd Edition.
3. Orthodontics Current principals and techniques, Graber, Vanarsdall, and Vig, 5th Edition.
4. Several articles as illustrated in the blueprint “attached examples”.

LITERATURE:
Growth and development:

1. Thilander B. Basic mechanisms in craniofacial growth. Acta Odontol Scand 53(3):144-151, 1995.
2. Bjork, A. Prediction of Mandibular Rotation. Am. J. Orthod. 55: 585-599, 1969.
3. Dager MM, McNamara JA, Baccetti T, Franchi L. Aging in the craniofacial complex. Angle Orthod 78(3):440-444, 2008.
4. Pecora NG, Baccetti T, McNamara JA Jr. The aging craniofacial complex: a longitudinal cephalometric study from late adolescence to late adulthood. Am J Orthod Dentofacial Orthop 134(4):496-505, 2008.
5. Ranly DM. Craniofacial growth. Dent Clin North Am 44(3):457-470, 2010.
6. Mossey PA. The heritability of malocclusion: part 2. The influence of genetics in malocclusion. Br J Orthod 26(3):195-203, 1999.
7. Derya Germec Cakan, Feyza Ulkur, and Tulin (Uğur) Taner The genetic basis of facial skeletal characteristics and its relation with orthodontics Eur J Dent. 2012 July; 6(3): 340–345.
8. Wishney, M., Darendeliler, M., & Dalci, O. (2018). Craniofacial growth studies in orthodontic research-lessons, considerations and controversies. Australasian Orthodontic Journal, 34(1), 61
9. Thilander, B. (2017). Craniofacial growth and development. Essential Orthodontics, 30, 25. “BOOK”
10. Wishney, M., Darendeliler, M., & Dalci, O. (2018). Craniofacial growth studies in orthodontic research-lessons, considerations and controversies. Australasian Orthodontic Journal, 34(1), 61.

Orthodontic Diagnosis and Treatment Planning:

1. Doppel DM, Damon WM, Joondeph DR, Little RM. An investigation of maxillary superimposition techniques using metallic implants. Am J Orthod Dentofacial Orthop. 1994 Feb;105(2):161-8.
2. Nielsen IL. Maxillary superimposition: a comparison of three methods for cephalometric evaluation of growth and treatment change. Am J Orthod Dentofacial Orthop. 1989 May;95(5):422-31.
3. Naini FB, Gill DS. Facial aesthetics: 2. Clinical assessment. Dent Update 35(3):159-162, 164-166, 169-170, 2008.



4. Bishara SE, Burkey PS, Kharouf JG. Dental and facial asymmetries: a review. *Angle Orthod* 64(2):89-98, 1994.
5. Charles J. Burstone. Diagnosis and treatment planning of patients with asymmetries. *Semin Orthod* 4(3):153-164, 1998.
6. Janson, G., de Lima, K. J. R. S., Woodside, D. G., Metaxas, A., de Freitas, M. R., & Henriques, J. F. C. (2007). Class II subdivision malocclusion types and evaluation of their asymmetries. *American journal of orthodontics and dentofacial orthopedics*, 131(1), 57-66.
7. Nguyen, T., Cevidanes, L., Franchi, L., Ruellas, A., & Jackson, T. (2018). Three-dimensional mandibular regional superimposition in growing patients. *American Journal of Orthodontics and Dentofacial Orthopedics*, 153(5), 747-754.
8. 19- Beit, P., Konstantonis, D., Papagiannis, A., & Eliades, T. (2017). Vertical skeletal changes after extraction and non-extraction treatment in matched class I patients identified by a discriminant analysis: cephalometric appraisal and Procrustes superimposition. *Progress in orthodontics*, 18(1), 44.

Growth Modification:

1. Cozza P, Baccetti T, Franchi L, De Toffol L, McNamara JA. Mandibular changes produced by functional appliances in Class II malocclusion: a systematic review. *Am J Orthod Dentofacial Orthop* 129(5):599, e1-12, 2006.
2. Brosh T, Portal S, Sarne O, Vardimon AD. Unequal outer and inner bow configurations: comparing 2 asymmetric headgear systems. *Am J Orthod Dentofacial Orthop* 128(1):68-75, 2005.
3. Mandall, N., Cousley, R., DiBiase, A., Dyer, F., Littlewood, S., Mattick, R., & Shargill, I. (2016). Early class III protraction facemask treatment reduces the need for orthognathic surgery: a multi-centre, two-arm parallel randomized, controlled trial. *Journal of orthodontics*, 43(3), 164-175.

Treatment Modalities:

1. Marshall SD, Southard KA, Southard TE. Early Transverse Treatment. *Semin Orthod* 11(3):130-139, 2005.
2. Eustáquio A. Araújo. Diagnostic Protocol In Cases Of Congenitally Missing Maxillary Lateral Incisors. *World J Orthod* 2006;7:376–388.
3. Bills DA, Handelman CS, BeGole EA. Bimaxillary dentoalveolar protrusion: traits and orthodontic correction. *Angle Orthod* 75(3):333-339, 2005.
4. Kokich VG. Surgical and orthodontic management of impacted maxillary canines. *Am J Orthod Dentofacial Orthop* 126:278-283, 2004.
5. Andrew Schmidt, Vincent Kokich, Peridontal response to early uncovering autonomous eruption, and orthodontic alignment of palatally impacted maxillary canines. *Am J Orthod Dentofacial Orthop* 2007; 131:449-55.



6. Elliott M. Moskowitz, Ronniette C. Garcia, The management of palatally displaced maxillary canines: Considerations and challenges. *Semin Orthod* 2014;20:46-58.
7. Vaden JL, Pearson LE. Diagnosis of the vertical dimension. *Semin Orthod* 8(3):120-129, 2002.
8. Turley PK. Orthodontic management of the short face patient. *Semin Orthod* 2(2):138-153, 1996.
9. Budi Kusnoto and BernardJ. Schneider. Control of the Vertical Dimension. *Semin Orthod* 2000;6:33-42
10. Thomas J Cangialosi, Skeletal Morphologic features of anterior open bite. *Am J Orthod Dentofacial Orthop* 1984; 85:28-36.
11. Lagravere MO, Major PW, Flores-Mir C. Long-term dental arch changes after rapid maxillary expansion treatment: a systematic review. *Angle Orthod* 75(2):155-161, 2005.
12. Lione R, Franchi L, Cozza P. Does rapid maxillary expansion induce adverse effects in growing subjects? *Angle Orthod.* 2013 Jan;83(1):172-82.
13. Suri L, Taneja P. Surgically assisted rapid palatal expansion: a literature review. *Am J Orthod Dentofacial Orthop.* 2008 Feb;133(2):290-302.
14. Andrews LF. The six keys to normal occlusion. *Am J Orthod Dentofacial Orthop* 62(3):296-309, 1972.
15. Rinchuse DJ, Kandasamy S, Sciote J. A contemporary and evidence-based view of canine protected occlusion. *Am J Orthod Dentofacial Orthop.* 2007 Jul;132(1):90-102.
16. Donald J. Rinchuse, and Jeffrey T. McMinn, Summary of evidence-based systematic reviews of temporomandibular disorders. *Am J Orthod Dentofacial Orthop* 2006;130:715-20
17. Jeffrey P. Okeson. Evolution of occlusion and temporomandibular disorder in orthodontics: Past, present, and future. *Am J Orthod Dentofacial Orthop* 2015;147:S216-23)
18. Litsas, G., & Acar, A. (2011). A review of early displaced maxillary canines: etiology, diagnosis and interceptive treatment. *The open dentistry journal*, 5, 39.
19. Sadowsky, C., & Polson, A. M. (1984). Temporomandibular disorders and functional occlusion after orthodontic treatment: results of two long-term studies. *American journal of orthodontics*, 86(5), 386-390.

Retention and Stability:

1. Janson, G., Araki, J., Estelita, S., & Camardella, L. T. (2014). Stability of class II subdivision malocclusion treatment with 3 and 4 premolar extractions. *Progress in orthodontics*, 15(1), 67.
2. Zachrisson BU. Important aspects of long-term stability. *J Clin Orthod* 31(9):562-583, 1997.
3. Melrose C, Millett DT. Toward a perspective on orthodontic retention? *Am J Orthod Dentofacial Orthop.* 1998 May;113(5):507-14.
4. Little RM. Stability and relapse of dental arch alignment. *Br J Orthod* 17(3):235-241, 1990.

5. Bishara SE. Third molars: a dilemma! Or is it? *Am J Orthod Dentofacial Orthop* 115(6):628-633, 1999.

Comprehensive Treatment in Adolescents and Preadolescent:

1. Marshall SD, Southard KA, Southard TE. Early Transverse Treatment. *Semin Orthod* 11(3):130-139, 2005.
2. Pinto, A. S., Buschang, P. H., Throckmorton, G. S., & Chen, P. (2001). Morphological and positional asymmetries of young children with functional unilateral posterior crossbite. *American Journal of Orthodontics and Dentofacial Orthopedics*, 120(5), 513-520.
3. McNamara Jr, J. A. (1981). Components of Class II malocclusion in children 8–10 years of age. *The Angle Orthodontist*, 51(3), 177-202.
4. Mucedero, M., Fusaroli, D., Franchi, L., Pavoni, C., Cozza, P., & Lione, R. (2018). Long-term evaluation of rapid maxillary expansion and bite-block therapy in open bite growing subjects: A controlled clinical study. *The Angle Orthodontis*
5. Ferro, F., Funicello, G., Perillo, L., & Chiodini, P. (2011). Mandibular lip bumper treatment and second molar eruption disturbances. *American Journal of Orthodontics and Dentofacial Orthopedics*, 139(5), 622-627.

Adult Orthodontics:

1. Sabri R. Orthodontic objectives in orthognathic surgery: state of the art today. *World J Orthod* 7(2):177-191, 2006.
2. Bailey LJ, Cevidanes LH, Proffit WR. Stability and predictability of orthognathic surgery. *Am J Orthod Dentofacial Orthop* 126(3):273-277, 2004.
3. Larry M. Wolford, Spiro C. Karras, and Pushkar Mehra, Considerations for orthognathic surgery during growth, Part 1: Mandibular deformities. *Am J Orthod Dentofacial Orthop* 2001;119:95-101.
4. Hamilton RS, Gutmann JL. Endodontic-orthodontic relationships: a review of integrated treatment planning challenges. *Int Endod J* 32(5):343-360, 1999.
5. Kokich VG, Spear FM. Guidelines for managing the orthodontic-restorative patients. *Semin Orthod* 3(1):3-20, 1997.
6. Mathews DP, Kokich VG. Managing treatment for the orthodontic patient with periodontal problems. *Semin Orthod* 3(1):21-38, 1997.

Clinical Orthodontics:

1. Theodosia Bartzela, Jens C. Türp, Edith Motschall, and Jaap C. Maltha. Medication effects on the rate of orthodontic tooth movement: A systematic literature review. *Am J Orthod Dentofacial Orthop* 2009;135:16-26.
2. Kolokitha OE, Chatzistavrou E. Allergic reactions to nickel-containing orthodontic appliances: clinical signs and treatment alternatives. *World J Orthod*. 2008 Winter;9(4):399-406.



3. Kindelan SA, Day PF, Kindelan JD, Spencer JR, Duggal MS. Dental trauma: an overview of its influence on the management of orthodontic treatment. Part 1. J Orthod. 2008 Jun;35(2):68-78.
4. Monty Singh Duggal, Jay Kindelan, Hani Nazzal. Upper incisor trauma and the orthodontic patient—Principles of management. Semin Orthod 2015; 21:59–7
5. Patel A, Burden DJ, Sandler J. Medical disorders and orthodontics. J Orthod. 2009 Dec;36 Suppl:1-21. Review
6. Kerosuo, H., Kullaa, A., Kerosuo, E., Kanerva, L., & Hensten-Pettersen, A. (1996). Nickel allergy in adolescents in relation to orthodontic treatment and piercing of ears. American journal of orthodontics and dentofacial orthopedics, 109(2), 148-154.

Dentofacial Deformity:

1. Thornton J, Nimer S, Howard P. The incidence, classification, etiology, and embryology of oral clefts. Semin Orthod 2(3):162-168, 1996.
2. Evans CA. Orthodontic treatment for patients with clefts. Clin Plast Surg 31(2):271-290, 2004.
3. Katherine W. L. Vig and Ana M. Mercado. Overview of orthodontic care for children with cleft lip and palate, 1915-2015, Am J Orthod Dentofacial Orthop 2015;148:543-56).
4. Bergland, O., Semb, G., & Abyholm, F. E. (1986). Elimination of the residual alveolar cleft by secondary bone grafting and subsequent orthodontic treatment. The Cleft palate journal, 23(3), 175-205.

Biomechanics and Contemporary Orthodontic Appliance:

1. Isaacson RJ, Lindauer SJ, Davidovitch M. The ground rules for arch wire design. Semin Orthod 1(1):3-11, 1995.
2. Charles J. Burstone. Biomechanics of deep overbite correction. Semin Orthod 7(1):26-33, 2001.
3. Edsard van Steenberg, and Ravindra Nanda, Biomechanics of Orthodontic correction of dental asymmetries, Am J Orthod Dentoface Orthop, 1995;107:618- 24
4. Park HS, Jeong SH, Kwon OW. Factors affecting the clinical success of screw implants used as orthodontic anchorage. Am J Orthod Dentofacial Orthop. 2006 Jul;130(1):18-25.
5. Yan Chen, Hee Moon Kyung, Wen Ting Zhao, and Won Jae Yu, Critical factors for the success of orthodontic mini-implants: A systematic review. Am J Orthod Dentofacial Orthop 2009;135:284-91

Professionalism and Ethics:

1. Professionalism and Ethics, Handbook for Residents, Practical guide, Prof. James Ware, Dr. Abdulaziz Fahad Alkaabba, Dr. Ghaiath MA Hussein, Prof. Omar Hasan Kasule, SCFHS, Latest Edition.
2. Essentials of Patient Safety, SCHS, Latest Edition.



Note:

This list is intended for use as a study aid only. SCFHS does not intend the list to imply endorsement of these specific references, nor are the exam questions necessarily taken solely from these sources.

Blueprint Outlines:

No.	Sections	Percentage (%)
1	Growth and Development	7%
2	Orthodontic Diagnosis and Treatment Planning	10%
3	Growth Modification	10%
4	Treatment Modalities	15%
5	Retention and Stability	5%
6	Comprehensive Treatment in Adolescents and Preadolescent	12%
7	Adult Orthodontics	10%
8	Clinical Orthodontics	7%
9	Dentofacial Deformity	3%
10	Biomechanics and Contemporary Orthodontic Appliance	13%
Research, Ethics and Professionalism and Patient Safety		8%
Total		100%

Note:

- Blueprint distributions of the examination may differ up to +/-3% in each category.
- Percentages and content are subject to change at any time. See the SCFHS website for the most up-to-date information..

1- Growth and Development:

1. Growth pattern, theories of growth, methods for studying physical growth.
2. The nature of skeletal growth, sites and types of growth in the craniofacial complex, social and behavioral development
3. Specific causes of malocclusion, genetic influences, environmental influences, etiology in contemporary perspective

4. Late fetal development and birth, infancy and early childhood: the primary dentition years, late childhood: the mixed dentition years
 5. Later stages of development adolescence: the early permanent dentition years, growth patterns in the dentofacial complex, maturational and aging changes
- 2- Orthodontic Diagnosis and treatment Planning:**
1. Examination and data collection, record analysis, interpretation and diagnosis of orthodontic problems
 2. Treatment planning concepts and goals, and planning comprehensive orthodontic treatment,
 3. Treatment planning in special circumstances.
- 3- Growth Modification:**
1. Treatment of Skeletal Transverse and Class III Problems
 2. Growth Modification in the Transverse Plane of Space
 3. Growth Modification in Class II, Class III, Open Bite/Deep Bite, and Multidimensional Problems
 4. Combined Vertical and Anteroposterior Problems, Facial Asymmetry in Children,
- 4- Treatment Modalities:**
- 1- Transverse, vertical problems, and Bimaxillary Protrusion
 - 2- Ectopic maxillary Canines
 - 3- Inter-disciplinary Approach
 - 4- Temporomandibular Disorder
 - 5- Principles of occlusion
 - 6- Root resorption
- 5- Retention and Stability:**
1. Finishing
 2. Adjustment of Individual Tooth Positions, Correction of Vertical Incisor Relationships,
 3. Final “Settling” of Teeth, Positioners for Finishing
 4. Special Finishing Procedures to Avoid Relapse, Micro-Esthetic Procedures
 5. Types of retainers:
 - Removable Retainers
 - Fixed Retainers
 - Active Retainers

6- Comprehensive Treatment in Adolescents and Preadolescent:

- 1- Moderate Non-skeletal Problems in Preadolescent Children: Preventive and Interceptive Treatment in Family Practice, Orthodontic Triage: Distinguishing Moderate from Complex Treatment
- 2- Management of Occlusal Relationship Problems, Management of Eruption Problems
- 3- Space Analysis: Quantification of Space Problems, Treatment of Space Problems
- 4- Complex Non-skeletal Problems in Preadolescent Children: Preventive and Interceptive Treatment, Eruption Problems, Traumatic Displacement of Teeth, Space-Related Problems,
- 5- Alignment and Vertical Problems Class I Crowding/Protrusion, Leveling, Space Closure and Class II/Class III Correction
- 6- Space Closure in Incisor Protrusion Problems, Class II Correction in Adolescents, Class III Camouflage

7- Adult Orthodontics:

- 1- Adjunctive Versus Comprehensive Treatment
- 2- Adjunctive Treatment principles and Procedures
- 3- Comprehensive Treatment in Adults
- 4- Development of Orthognathic Surgery, Contemporary Surgical Techniques
- 5- Special Considerations in Planning Surgical Treatment, Putting Surgical and Orthodontic Treatment together
- 6- The Borderline Patient: Camouflage Versus Surgery

8- Clinical orthodontics:

- 1- Medically Compromised Patients management
- 2- Trauma management
- 3- Medical disorders and orthodontics, Drugs effect on orthodontic treatment.



9- Dentofacial Deformity:

- 1- Syndromes with oral manifestation etiology, risk factors.
- 2- Classification and management of dentofacial deformity

10- Biomechanics and Contemporary Orthodontic Appliance:

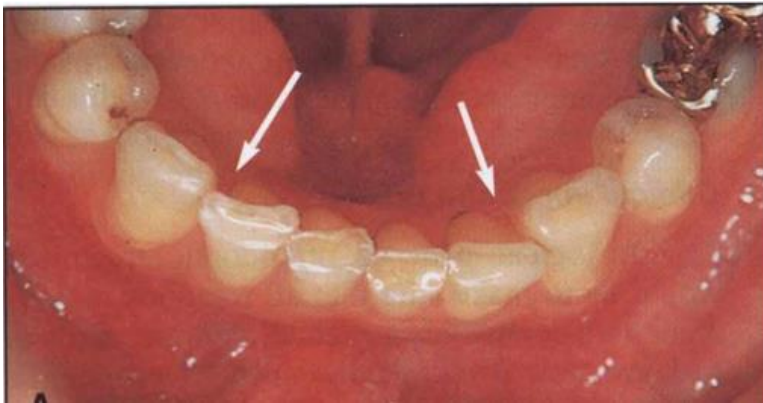
- 1- The Biologic Basis of Orthodontic Therapy, Periodontal and Bone Response to Normal Function, and to Sustained Forces
- 2- Anchorage and Anchorage Control, Determinate Versus Indeterminate Force Systems
- 3- Deleterious Effects of Orthodontic Force.
- 4- Mechanical Principles in Orthodontic Force Control
- 5- Elastic Materials and the Production of Orthodontic Force
- 6- Design Factors in Orthodontic Appliances (Removable and Fixed appliances), Mechanical Aspects of Anchorage Control, Determinate Versus Indeterminate Force Systems

11- Ethics, Professionalism and Patient safety, Research

Example Questions

EXAMPLE OF K2 QUESTIONS

Question 1



A Case presented in the Dental Clinic post orthodontic treatment complaining from relapse in anterior incisors region (see image).

Which of the following is the most common contributing factor?

- A. Mandibular plane angle increases during treatment
- B. Over expanded inter canine width during treatment
- C. Increase in lower facial height (LAFH) during treatment
- D. No correlation between any variables studied and mandibular irregularity

EXAMPLE OF K1

Question 2

Which of the following is the role of the steroid in obstructive sleep apnea treatment?

- A. It has no significant role
- B. It has high significant role
- C. Less than surgical approach
- D. Equal role to ventilator mask