



NIHS Residency TRAINING PROGRAM

Program: Orthodontics Specialty

Comprehensive Clinical Examination (CCE)

I. Definition of Comprehensive Clinical Examination (CCE)

CCE is a form of performance-based testing of higher levels of cognition to ensure that the candidate has clinical competence to practice independently as a specialist or consultant. During a CCE, candidates are observed and evaluated through a series of stations in which the stations reflect real-life situations and allow the candidate to explain the rationale behind their thinking. Each station tests one or more clinical competency domains.

II. Clinical/Practical Skill Domains

Proposed Domains for NIHS	DEFINITIONS
Data gathering / History taking	Asks key relevant questions. Sensitively gathers appropriate information. Explores main problems/concerns of patient/parent/career in structured manner.
Physical Examination and practical skills	Demonstrate correct, thorough, systematic, appropriate, fluent, and professional technique of physical examination. Demonstrate proficiency in performing practical and procedural skills at the level of a specialist.
Data interpretation	Correctly interpret the History findings, Physical examination and Investigation results.
Clinical reasoning and analytical skills (Differential Diagnosis & Provisional Diagnosis)	Formulate & propose likely appropriate differential diagnosis Understand implications of findings. Able to suggest appropriate steps if physical examination inconclusive.
Decision making & Management	Select or negotiate a sensible and appropriate management plan for a patient, relative or clinical situation. Select appropriate investigations or treatments for a patient. Apply clinical knowledge, including knowledge of law and ethics, to the case.





Proposed Domains for NIHS	DEFINITIONS
Communication & Professionalism	<p>Appropriate level of confidence; greeting and introduction; appropriate body language Develops appropriate rapport with patient/parent/carer or colleague. Appropriate tone & pace of speech</p> <p>Behave towards the patient or relative, respectfully and sensitively and in a manner that ensures their comfort (eg. avoid causing pain), safety (eg. washing hands) and dignity (eg. covering patient). Seek, detect, acknowledge and address patients' or relatives' concerns. Demonstrate empathy.</p>

III. Blueprint Outline

- This will be published on the NIHS website for the candidates.
 - This will act as a guideline for Examination Sub-committee for exam design.
 - This will be fixed for the next 4 academic years
- Growth and Development
 - Orthodontic Diagnosis and Treatment Planning
 - Growth Modification
 - Treatment Modalities
 - Retention and Stability
 - Comprehensive Treatment in Adolescents and Preadolescent
 - Adult Orthodontics
 - Clinical Orthodontics
 - Dentofacial Deformity
 - Biomechanics and Contemporary Orthodontic Appliance

IV. Passing Score

- Each station shall be assigned a minimum performance level (MPL) based on the expected performance of a minimally competent candidate using a sound scientific standard-setting method such as regression analysis.
- To pass the examination, a candidate must attain a score equal to or more than the MPL in at least 70% of the number of stations.

V. Time Management





- The examiner is aware of how much material needs to be covered per station, and it is their responsibility to manage the time accordingly.
- The examiner will want to give you every opportunity to address all the questions within the station.
- They may indicate that "in the interests of time, you will need to move to the next question." This type of comment has no bearing on your performance. It is simply an effort to ensure that you complete the station.
- If you are unclear about something during the station, ask the examiner to clarify.
- Some stations may finish early – if this occurs, the examiner will end the encounter.

VI. Examiner Professionalism

- The examiners have been instructed to interact with you professionally – don't be put off if they are not as warm and friendly towards you as usual.
- We recognize this is a stressful situation, and the examiner is aware that you are nervous. If you need a moment to collect your thoughts before responding, indicate this to the examiner.
- The nomination of examiners is based on the principle that candidates are assessed by qualified examiners selected and appointed by NIHS. The examiner is not obligated by any means to share their personal information or professional details with the candidate.

VII. Conflict of Interest

- The examiners come from across the country. You will likely recognize some of them and may have worked with some of them in your center's clinical/academic capacity. This is completely acceptable to the NIHS and is not a conflict unless if the examiner had a substantial contribution to your training or evaluation, or if you have another personal relationship with the examiner.
- Identify the conflict at the moment of introduction; examiners have been instructed to do the same. Examiners will alert the NIHS staff – every attempt will be made to find a suitable replacement for the station.

VIII. Confidentiality

- Electronic devices are NOT permitted.
- Communication with other candidates during the evaluation is prohibited.

IX. Link to FAQs on NIHS Website

X. Textbooks

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,





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th Edition.

4. Several articles as illustrated in the blueprint “attached examples”

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). Threedimensional mandibular regional superimposition in growing patients. *American Journal of Orthodontics and Dentofacial Orthopedics*, 153(5), 747-





754.

8. Kouvelis G, Dritsas K, Doulis I, Kloukos D, Gkantidis N. Effect of orthodontic treatment with 4 premolar extractions compared with nonextraction treatment on the vertical dimension of the face: A systematic review. *Am J Orthod Dentofacial Orthop*. 2018 Aug;154(2):175-187.

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, Peridental 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. Ghoneima A, Abdel-Fattah E, Hartsfield J, et al: Effects of rapid maxillary expansion on the cranial and circummaxillary sutures. *American Journal of Orthodontics and Dentofacial Orthopedics* 140(4):510-519, October 2011.
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. Tsolakis AI, Kalavritinos M, Bitsanis E, et al: Reliability of different radiographic methods for the localization of displaced maxillary canines. *American Journal of Orthodontics and Dentofacial Orthopedics* 153(2):308-314, February 2018

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. Tulloch JFC, Proffit WR, Phillips C: Influences on the outcome of early treatment for Class II malocclusion. *American Journal of Orthodontics and Dentofacial Orthopedics* 111(5):533-542, May 1997.

4. Tulloch JFC, Proffit WR, Phillips C: Outcomes in a 2-phase randomized clinical trial of early class II treatment. *American Journal of Orthodontics and Dentofacial Orthopedics* 125(6):657- 667, June 2004.

5. 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*

6. 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, Cevidan 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. Anthony J Diangelis, Jens O Andreasen, Kurt A Ebeleseder: International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dental Traumatology* 28(1):2-12. Feb 2012
5. Monty Singh Duggal, Jay Kindelan, Hani Nazzal. Upper incisor trauma and the orthodontic patient—Principles of management. *Semin Orthod* 2015; 21:59–7
6. Patel A, Burden DJ, Sandler J. Medical disorders and orthodontics. *J Orthod.* 2009 Dec;36 Suppl:1-21. Review
7. Fleming PS, Strydom H, Katsaros C, MacDonald L, Curatolo M, Fudalej P, Pandis N. Non-pharmacological interventions for alleviating pain during orthodontic treatment. *Cochrane Database Syst Rev.* 2016 Dec 23;12(12).
8. 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.

XI. Journals

XII. Others

