



**THE AMERICAN BOARD OF ORTHODONTICS
SCENARIO-BASED CLINICAL EXAMINATION
STUDY GUIDE
2024**

The American Board of Orthodontics
401 North Lindbergh Blvd., Suite 300
St. Louis, Missouri 63141
314-432-6130
AmericanBoardOrtho.com
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ABOUT THE AMERICAN BOARD OF ORTHODONTICS

Founded in 1929 as the first specialty board in dentistry, The American Board of Orthodontics (ABO) is partnered with the American Association of Orthodontists and is recognized by the National Commission on Recognition of Dental Specialties and Certifying Boards as the national certifying board for Orthodontics and Dentofacial Orthopedics.

The ABO sets the standard for the highest level of patient care and promotes excellence in orthodontics for all of its certified orthodontists. As a specialty board, we serve to protect the orthodontic specialty and encourage orthodontists to achieve certification, demonstrating their commitment to lifelong learning and excellent care.

As advocates for the orthodontic specialty, the ABO is a resource for orthodontists, orthodontic residents, as well as anyone looking for the best in orthodontic care.

MISSION

The mission of The American Board of Orthodontics is to elevate the quality of orthodontic care for the public by promoting excellence through certification, education and professional collaboration.

CERTIFICATION PROCESS OVERVIEW

An orthodontist may become board certified by the American Board of Orthodontics by successfully completing a written examination and a clinical examination. Once this has been completed, the orthodontist will be awarded a time-limited certificate. By the end of the time-limited certification, a Board Certified orthodontist must have taken the appropriate renewal examination to remain board certified.

ELIGIBILITY REQUIREMENTS

Examinees are eligible to take the ABO Written Examination once they have completed at least 18 months of a CODA-accredited orthodontic program. Once successfully completed, the Written Exam does not expire.

All examinees that have graduated from a CODA accredited orthodontic program and have successfully completed the ABO Written Examination are then eligible for the ABO Scenario-based Clinical Examination.

Examinees participating in extended programs will be required to complete their program prior to being eligible to take the Clinical Examination.

All examinations are provided in English.

CONFIDENTIALITY AGREEMENT

All examinees are required to agree to the following Confidentiality Agreement as part of the registration process for both the Written Examination and the Scenario-based Clinical Examination:

I understand that the content of all ABO Examinations, and each of the items contained therein, is proprietary and strictly confidential, and that the unauthorized retention, possession, copying, distribution, disclosure, discussions, or receipt of any examination question, in whole or in part, by written, electronic, oral or other form of communication, including but not limited to texting, e-mailing, social media outlets, copying or printing of electronic files, and reconstruction through memorization and/or dictation, before, during, or after an examination, is strictly prohibited. I further understand that, in addition to constituting irregular behavior subject to disciplinary action such as revocation of certification, revocation of eligibility for future certification, and disciplinary fines, such activities violate the rules and regulations governing ABO certification.

SPECIAL ACCOMMODATIONS

In accordance with Title III of the Americans with Disabilities Act (ADA), the American Board of Orthodontics (ABO) will provide reasonable accommodations to examinees with disabilities, and will ensure that its examinations are administered in facilities that are accessible to individuals with disabilities or that alternative accessible arrangements are made. At least 90 days in advance of the examination date, an examinee must provide ABO with acceptable medical or other documentation of the disability and recommended accommodations (which may include evidence of past modifications, accommodations, or auxiliary aids or services received in similar testing situations). Requests that require fundamental alteration of the purpose and nature of the examination will not be accommodated. See ABO's Policy on Testing Individuals with Disabilities, which is available on the ABO's website (<https://www.americanboardortho.com/about-abo/our-story/policies/>).

NONDISCRIMINATION STATEMENT

ABO certification decisions do not discriminate against applicants on the basis of age, gender, disability, race, ethnicity, national origin, religion, sexual orientation, linguistic background, or other personal characteristics. See ABO's Policy on Fairness in Examining and Exam Use, which is available on the ABO's website (<https://www.americanboardortho.com/about-abo/our-story/policies/>).

REQUEST FOR EXAMINATION PROCESS REVIEW

An examinee may request an Examination Process Review based on an irregularity in administering or conducting the examination within 72 hours from the time the examinee completes the examination. A request for Examination Process Review must be in writing, directed to the ABO's Chief Executive Officer and sent by email (Info@americanboardortho.com) or by facsimile (314-432-8170). See ABO's policy on Examination Process Review, which is available on the ABO's website (<https://www.americanboardortho.com/about-abo/our-story/policies/>).

RE-EXAMINATION

Examinees that do not successfully pass the Clinical Examination will have the opportunity to retake the examination during the next testing window that has availability. If an examinee fails the examination 3 times and wishes to take the examination again, the examinee must petition the Board before registration will be accepted. See ABO's policy on exam retake, which is available on the ABO's website (<https://www.americanboardortho.com/orthodontists/become-certified/clinical-exam/Scenario-based-Clinical-Examination/>).

EXAMINATION SCHEDULE

Online registration and the current fee schedule for all future examinations may be found on the ABO website:

<https://www.americanboardortho.com/orthodontists/become-certified/exam-dates-fees-and-registration/>

The Scenario-based Clinical Examinations are held in Pearson VUE testing centers worldwide. For more information on the most up-to-date listing of testing center locations please see the following link: <http://pearsonvue.com/abo/>

Approximately 6 weeks prior to the exam, Pearson Vue will pre-schedule all candidate exam appointments based on the testing center location preferences that were provided during registration. Individual appointment information will be e-mailed to examinees by Pearson Vue. If the appointment that Pearson Vue schedules is not in a location or time that is preferred, examinees will have the opportunity to change the appointment, subject to availability. Detailed information and instructions for rescheduling exams will be e-mailed to candidates by the ABO the week before Pearson Vue starts the pre-scheduling process.

Examinees must ensure that they are available for both dates the exam is administered, as Pearson Vue testing appointments are based on availability and a preferred date cannot be guaranteed.

For more information regarding exam scheduling with Pearson VUE please see Appendix A.

All exam correspondence is sent via email; therefore, examinees are responsible for ensuring that their email address in their ABO profile is current and allows for correspondence from The American Board of Orthodontics and Pearson VUE. The ABO and Pearson VUE will not be held responsible for misdirected (sent to spam or trash) communications regarding the Clinical Examination.

SCENARIO-BASED CLINICAL EXAMINATION

Purpose of Examination

The Scenario-based Clinical Examination is designed to evaluate an orthodontist's knowledge, abilities, and critical thinking skills so that certification decisions can be made for examinees based on proficiency and clinical expertise. This format allows for testing a large amount of material in a relatively short period of time and allows for questions to be graded based on pre-determined desired responses.

The purpose of the clinical examination is to assess candidates' knowledge, critical thinking, and clinical competence relative to the ABO-approved practice domains and content outline as validated in the practice analysis study conducted by the ABO in 2017. Specifically, the case-based problems provided by the ABO in the examination address skills that newly certified orthodontists must possess in order to perform the 13 tasks that characterize the practice of orthodontics. The tasks are organized in four domains:

1. Data Gathering and Diagnosis
2. Treatment Objectives and Planning
3. Treatment Implementation and Management
4. Critical Analysis and Outcomes Assessment

The practice analysis study provides evidence of validity for the domains and tasks, and the ABO employs appropriate criterion-referenced standard setting procedures and equating methodology.

Exam Development Process

Scenarios, questions, and model responses are developed in collaboration with program directors/chairs, examiners, leaders in the industry, and the ABO Board of Directors (i.e., subject matter experts). During the item writing process, the ABO works closely with a third-party psychometric company that has expertise in certification examinations.

Scenario cases, questions, and model responses are sent through a comprehensive process to be reviewed, edited, refined, and validated prior to being used in an examination.

Examination Administration

The Scenario-based Clinical Examination is presented on a testing center computer and examinee responses to exam questions will be entered using the keyboard. Responses should be in numbered list format. Examinees must enter a new number for each item in the list. Whiteboards or pencil and paper will be available for note taking during the exam. Candidates will have 4 hours (240 minutes) to complete the question sets for at least 6 different scenario cases (but no more than 10) in the Pearson VUE system. Each scenario case is comprised of 1 – 6 questions. Each question will have case records that will be available as exhibits. Exhibits will be presented as a vertical-split display that can be manipulated (zoom in, zoom out, click on tab for new image, etc.), and individual case records are separated by named tabs. Examinees will be able to view case records and type their responses in the same window in the Pearson VUE system. Before the examination begins, all candidates will be informed of how many total questions they will be required to answer during the exam. The examinee is responsible for managing their own time during the exam. A countdown clock will be visible at all times on the computer monitor but the examinee has the option to hide/unhide this tool at any time. Examinees will not be able to preview exam questions before beginning the exam. If a candidate clicks to see the next question(s) without answering, they will not be able to return and they will lose points. Examinees must review their answers prior to clicking the next button as they will not be permitted to return to any previous question in the exam to edit or review answers once submitted. If an examinee chooses to excuse themselves in the middle of their exam, the exam time will continue. If the examinee exits the main testing area, they may be asked to show their photo ID and go through the security protocol by the Pearson Vue proctor upon reentry.

Each case scenario set will have a different pair of examiners who score responses independently. Exam questions will measure proficiency related to the tasks and skills required in each of the four domains that the scenario is intended to evaluate. Responses will be typed out, and the examiners will assess the responses virtually at a later date. Examinees should provide evidence-based answers and cite references when necessary to support answers. Once an exam question has been answered and submitted in the system, the examinee will not be permitted to go back.

Please see the Examinee Orientation presentation (under [downloads and resources](#)) on the ABO website for further information.

Clinical Examination Rules

Personal items and electronic devices must be stored in the provided lockers at the testing center and will not be permitted in the examination area (this includes all bags, books, notes, phones, pagers, watches, and wallets). The ABO and Pearson VUE will not be held liable for any examinee's personal items that are stored at the test site.

Examinees will be monitored at all times during their exam by a trained Pearson VUE proctor. Pearson VUE testing center staff may respond to examinee questions about the test administration process and the equipment provided by Pearson VUE, but they will not respond to questions related to content of the test. If you arrive more than 30 minutes after your appointment time and are refused admission, the exam delivery fees are non-refundable.

Please see Appendix B for Pearson check-in procedures and rules.

To sit for the clinical exam, candidates are required to provide **two** valid, unexpired forms of identification, both with signature and at least one form must be a government issued photo ID.

The ID with a photo is referred to as the **primary** ID. Military IDs, state IDs, passports, alien registration cards (green cards, permanent resident visas), and credit cards qualify as primary IDs, **as long as they contain both a photo and a signature and are not expired.**

Candidates must provide **both** a primary and a secondary form of ID.

The candidate's name on the two forms of ID must match the name shown in his or her ABO profile. When registering with the Board, the name that appears on the identification that a candidate plans to provide for admittance into the testing center should be used. If the names differ only slightly due to a spelling or typographical error or due to a difference in the first name (for example, if "Sue" is printed on an ID but "Susan" is used on the schedule), a candidate will be allowed to test. If the names are obviously not the same, the candidate will not be seated for the exam.

If the candidate's name in the ABO system does not match the legal name as shown on their government issued ID, the candidate **MUST** provide documentation of the name change to the **ABO at least 6 weeks prior to the exam.** If not received by that date, the ABO cannot guarantee that Pearson Vue will be able to incorporate the change in their system in time for the exam, which may result in Pearson Vue denying the candidate entry to the exam center. If this should happen, the candidate will not be able to transfer their exam to another date and they will forfeit their exam seat and registration fees.

If your first and/or last name(s) have changed, please contact Info@americanboardortho.com at least six (6) weeks in advance of the examination date. You will be required to provide legal documentation (i.e., marriage license, legal name change) for this information to be updated in the ABO system. If you have more than one last name listed on your government-issued ID, the same last names must be reflected in your ABO profile.

ALL candidates are required to have two forms of ID as previously noted, regardless of whether they have an admission letter.

Acceptable forms of ID

Primary (picture and signature, not expired) Secondary (signature, not expired)

- Driver's license or passport
- School ID or alien registration card (green card, military ID permanent resident visa)
- Other government-issued ID
- Credit card
- Employee ID
- Social Security card
- Bank ATM card

Preparation Resources

The objective of this list of resources is to offer the practicing orthodontist an index of references, which may serve as a guide in preparing for Board certification. It should be clearly understood that a catalog, such as this, is not all encompassing and does not remain static. It will be continuously subject to additions and deletions. Whenever possible, links to the resource, full text or article abstracts are provided. *If you or your school are not subscribers to the journals included on list, it may be possible to purchase single article access through the publisher. The ABO and/or AAO library cannot provide the full text if the article or journal is not open access.*

The American Board of Orthodontics does not consider any of the articles and/or texts to contain the indisputable answer to any questions within the field of orthodontics. Examinees are responsible for the contents listed, even though some references may not be represented by an exam question. Current literature and textbooks on orthodontics may be studied in addition to the suggested references.

- Keep current through contemporary textbooks, journals including [AJODO](#), and CE courses
- Utilize ABO [Downloads and Resources](#) for the Scenario-based Clinical Exam
- Employ [CMF, CRE](#) scoring methodologies with patient cases
 - [ABO videos](#)
- [ABO superimposition videos and tracing guidelines](#)
- Buschang PH, Roldan SI, Tadlock LP: Guidelines for assessing the growth and development of orthodontic patients. *Seminars in Orthodontics* 23(4): 321-335, December 2017.
<https://www.sciencedirect.com/science/article/abs/pii/S107387461730035X>
- Buschang, PH. (2023, November 11). [Growth Related Questions that Future ABO Certified Orthodontists Should be able to Answer](#) [Live lecture]. 2023 ABO Educators Symposium, Saint Louis, MO, United States.

- Chen Y, Kyung HM, Zhao WT, et al: Critical factors for the success of orthodontic mini-implants: a systematic review. American Journal of Orthodontics and Dentofacial Orthopedics 135(3): 284-291, March 2009.
[https://www.ajodo.org/article/S0889-5406\(08\)00860-3/abstract](https://www.ajodo.org/article/S0889-5406(08)00860-3/abstract)
- Fishman L. S. Radiographic evaluation of skeletal maturation. A clinically oriented method based on hand-wrist films. The Angle Orthodontist. Vol. 52, No. 2, April 1982.
https://bbo.org.br/bbo/files/bibliografia/artigos/73_Radiographic_Evaluation_of_Skeletal_Maturation.pdf
- Han S, Bayome M, Lee J, et al: Evaluation of palatal bone density in adults and adolescents for application of skeletal anchorage devices. The Angle Orthodontist 82(4): 625-631, July 2012.
<https://meridian.allenpress.com/angle-orthodontist/article/82/4/625/59255/Evaluation-of-palatal-bone-density-in-adults-and>
- McNamara, J. A., & Franchi, L. The cervical vertebral maturation method: A user's guide. The Angle Orthodontist. Vol. 88, No. 2, March 2018.
<https://static1.squarespace.com/static/5320bccee4b045629856f4fe/t/60522f0564f15121b84d80f4/1615998726199/cervical+vertebrae+maturation.pdf>
- Moschos A. Papadopoulos, and Spyridon N. Papageorgiou: Current evidence on clinical performance of miniscrew implants in orthodontic treatment. Semin Orthod 2013; 19:162–173
- Scheffler NR, Proffit WR, Phillips C: Outcomes and stability in patients with anterior open bite and long anterior face height treated with temporary anchorage devices and a maxillary intrusion splint. American Journal of Orthodontics and Dentofacial Orthopedics 146(5):594– 602, November 2014.
[https://www.ajodo.org/article/S0889-5406\(14\)00700-8/abstract](https://www.ajodo.org/article/S0889-5406(14)00700-8/abstract)
- Oral examination role-play with colleagues and mentors
 - Presenting own cases in ABO format
 - Asking critical thinking clinical questions about unfamiliar cases
- Continue to complete cases using ABO format for consistency and familiarity

As part of preparation for the Scenario-based Clinical Examination, the ABO highly recommends that examinees gain as much experience as possible working through patient cases completing an objective analysis of the facts to form their own judgment. These critical thinking exercises will strengthen an examinee's skills as he or she prepares for the scenario-based examination. This process also promotes the opportunity for self-evaluation and reflection on case outcomes.

Tools previously created by the ABO to assess case outcomes will be utilized within the scenario-based examination process. These tools include the cast-radiograph evaluation, case management form (CMF), and cephalometric superimposition technique and interpretation.

- Examinees should be fluent in the [CRE measurement technique](#)
- The CMF treatment objectives should be thought of in three planes of space
- Set objectives should be determined by what is best for the patient, not by what the patient/family wants to hear
- Examinees should be able to determine correct landmark placement for cephalograms
- Examinees should be able to identify appropriate regional anatomy for cranial base, maxillary, and mandibular superimpositions
- Examinees should be able to interpret superimpositions and know how to differentiate changes due to growth vs. treatment mechanics
- Examinees should be able to detect tracing and superimposition errors

Examination Model Responses, Number of Questions, and Possible Question Topics

The number of scored scenario cases an examinee is being tested on will remain the same for each candidate in a given testing window. As a quality assurance step, field test questions have been added to some cases. The field test items, which will not be counted in scoring or identified to examinees, are on the test for trial purposes. The statistics generated for the field test items will be used to ensure the quality of future forms of the test.

Some scenario cases will include a full set of records and associated questions. Some scenario cases will include partial records and associated questions. Finally, some scenario cases may include single unrelated records that require individual analysis. However, the examinee will have access to the necessary records to answer that specific question.

The following list includes some examples of case records and information that may be provided for cases presented:

- Patient history
- Chief complaint
- Patient records
- Tracings and superimpositions
- Cast-radiograph Evaluation (CRE)
- Case Management Form (CMF)
- Hypothetical patient situations

Examination Components

The examination will be composed of four domains for assessment, equally weighted:

| Domain | Weighted % of Exam |
|--------------------------------------|--------------------|
| 1. Data Gathering and Diagnosis | 25% |
| 2. Treatment Objectives and Planning | 25% |
| 3. Treatment Implementation and | 25% |
| 4. Critical Analysis and Outcomes | 25% |

The cases and questions presented will represent situations that may be dealt with within residency programs or orthodontic practice. Examinees will be expected to demonstrate an understanding of the tasks performed by an orthodontist and the related decision-making skills that may be assessed in the examination. Some of these may include:

Domain 1 – Data Gathering and Diagnosis

Task 1

Perform a screening examination using established guidelines to determine if and when treatment is indicated.

Cognitive skills:

- Interviewing patients and guardians
- Interpreting medical and dental histories
- Determining the need for radiographs
- Interpreting radiographs
- Identifying pathology and deviations from normal
- Determining if and when treatment is indicated

Psychomotor skills:

- Performing intra- and extra-oral examinations

Task 2

Gather pertinent records using established guidelines to diagnose the nature of orthodontic and dentofacial problems and determine their etiologies.

Cognitive skills:

- Deciding which data are needed for a thorough diagnosis
- Interviewing patients and guardians
- Evaluating data gathered from the intra- and extra-oral examinations and all other records to differentiate normal occlusion from malocclusion
- Obtaining and analyzing serial records
- Selecting and using indicated diagnostic technology

Psychomotor skills:

- Taking essential radiographs
- Extracting 2-D images from cone-beam computerized tomography
- Tracing radiographs for cephalometric analysis
- Taking impressions for study casts
- Intra-oral scanning
- Recording inter-occlusal registration
- Taking intra- and extra-oral photographs
- Documenting periodontal status

Task 3

Develop a comprehensive diagnosis based on the patient's chief concerns, medical and dental history, dentofacial condition, growth and neuromuscular status, and psychosocial concerns to serve as the basis for treatment planning.

Cognitive skills:

- Analyzing records in the sagittal, vertical, and transverse dimensions for facial, dental, and skeletal diagnostic considerations
- Establishing a comprehensive and differential diagnosis

Domain 1 Sample Questions

1. What is the etiology of this patient's malocclusion?
2. What additional information is needed from the patient or parent during the initial examination?
3. What additional information is needed prior to the start of orthodontic treatment?
4. What additional records are needed to assist in this patient's diagnosis?
5. What diagnostic tools could be used to assess this patients....?
6. What is the facial / soft tissue diagnosis?
7. Describe the skeletal diagnosis in detail.
8. List all of the dental problems.
9. What is the growth assessment for this patient?
10. What is the rationale for the growth assessment?
11. What is the rationale for treating this patient at this time?
12. What additional records / referrals are required for interdisciplinary treatment planning?

Domain 2 – Treatment Objectives and Planning

Task 1

Develop evidence-based facial, skeletal, and dental treatment objectives based on the patient and guardian's chief concerns and diagnosis to optimize dentofacial health, neuromuscular function, esthetics, and posttreatment stability.

Cognitive skills:

- Determining deviation from normal and its extent
- Establishing treatment objectives based on knowledge of dentofacial growth and development
- Determining achievable outcomes based on the most relevant evidence
- Evaluating research literature and other information critically
- Developing and documenting treatment plans based on sound principles of appliance design and biomechanics and on patient concerns

Psychomotor skills:

- Creating a visualized treatment objective, dental diagnostic setup, and surgical treatment objectives when applicable.

Task 2

Develop evidenced-based treatment plan(s) by selecting the most appropriate options in consultation with and in the best interests of the patient to address the identified concerns and achieve specific objectives.

Cognitive skills:

- Assessing the necessity and efficacy of dentofacial orthopedics and orthognathic surgery
- Identifying treatment options
- Differentiating the efficacy and efficiency of appliance options
- Selecting the most appropriate treatment plan
- Planning all phases of orthodontic treatment, including initiation, completion, and retention
- Planning appropriate biomechanical techniques
- Working effectively in an interdisciplinary treatment environment
- Educating patients and guardians effectively on treatment options and recommendations
- Documenting treatment plans

Task 3

Obtain informed consent in accordance with established documentation procedures in order to enhance the patient and guardian's understanding of treatment options, recommendations, benefits, limitations, and risks.

Cognitive skills:

- Communicating with and educating patients and guardians

Domain 2 Sample Questions

1. What are the skeletal treatment objectives?
2. What are the skeletal treatment objectives for the maxilla?
3. What are the skeletal treatment objectives for the mandible?
4. What are the specific treatment objectives for the maxillary dentition?
5. Assuming an ideal treatment plan, what are the specific treatment objectives for the mandibular dentition?
6. What are the facial treatment objectives?
7. Assuming a nonsurgical treatment option, what are the objectives _____?
8. What is the primary treatment plan for this patient?
9. What treatment should be provided for this patient at this time?
10. What treatment options will you consider for this patient?
11. What skeletal and dental changes are necessary to correct this patient's Class II malocclusion?

12. What dental changes are necessary to correct this patient's Class II malocclusion?
13. Assuming a _____ treatment plan, what is the plan for retention?
14. What are the limitations with a _____ treatment plan? (nonextraction/extraction) (nonsurgical/surgical)
15. What compromised results would you expect from an extraction or nonextraction approach?

Domain 3 – Treatment Implementation and Management

Task 1

Manage dentofacial problems in accordance with the treatment plan using orthodontic appliances and technology to achieve treatment objectives efficiently.

Cognitive skills:

- Using appliances effectively and efficiently in the treatment of all types of malocclusions
- Identifying and interpreting the cause of problems

Psychomotor skills:

- Taking impressions and scans for appliances
- Placing fixed and/or removable appliances
- Activating fixed and/or removable appliances
- Fabricating appliances
- Maintaining fixed and/or removable appliances
- Removing fixed appliances
- Performing enameloplasty

Task 2

Evaluate the progress of treatment and its relationship to the objectives and timeline based on appropriate records to maximize treatment efficiency and outcomes.

Cognitive skills:

- Comparing pretreatment and progress conditions
- Analyzing treatment progress with appropriate imaging, accepted periodontal diagnostic protocols, and neuromuscular examination
- Assessing treatment progress with dental casts, imaging, and cephalometric analysis
- Interpreting treatment progress occlusion and treatment efficacy
- Comparing patient progress with treatment objectives
- Communicating with and educating patients and guardians

Psychomotor skills:

- Tracing and superimposing calibrated radiographs for cephalometric analysis
- Taking intra- and extra-oral photographs
- Taking essential radiographs

- Documenting neuromuscular function
- Extracting 2-D images from cone-beam computerized tomography
- Taking impressions for study casts
- Intra-oral scanning
- Recording inter-occlusal registration
- Documenting dental, periodontal, skeletal, and facial status
- Recording and resolving deviations from expected treatment

Task 3

Collaborate in providing interdisciplinary treatment using effective communication and documentation procedures to enhance treatment outcomes.

Cognitive skills:

- Communicating with patients, guardians, and professional colleagues
- Consulting and coordinating treatment with professional colleagues

Domain 3 Sample Questions

1. What is the treatment sequence?
2. Identify all of the significant problems occurring in the mechanics for this patient?
3. Identify the treatment mechanics that caused the dental changes observed in this case.
4. List the concerns for the progress of this patient's treatment.
5. What steps are appropriate to regain control of this patient's treatment?
6. What are the anticipated effects of Class II / Class III mechanics on this patient?
7. What specific treatment changes / mechanics are necessary to achieve an ideal occlusion?
8. How did growth influence this patient's treatment at this time?
9. How could anchorage be effectively utilized to support this patient's outcome?
10. What are the steps to recover from the adverse effects on facial aesthetics due to treatment?
11. What are the anticipated benefits of surgical treatment at this point?
12. How would you modify your treatment based on existing periodontal condition?
13. How would you modify your treatment based on existing enamel condition?
14. Analyze the progress superimposition.
15. How would you alter treatment based on the progress superimposition?
16. What additional diagnostic information is needed to reassess this case?
17. Based on the current diagnostic information, how would you alter your treatment plan?

Domain 4 – Critical Analysis and Outcomes Assessment

Task 1

Assess posttreatment facial esthetics using appropriate guidelines to evaluate form, symmetry, and soft tissue harmony.

Cognitive skills:

- Analyzing treatment outcomes with appropriate imaging and accepted normal values

- Comparing pre- and posttreatment conditions

Psychomotor skills:

- Tracing and superimposing calibrated radiographs for cephalometric analysis
- Taking intra- and extra-oral photographs

Task 2

Assess dental, periodontal, and neuromuscular health using appropriate guidelines to identify posttreatment complications.

Cognitive skills:

- Interpreting posttreatment dental, periodontal, and neuromuscular treatment outcomes
- Analyzing treatment outcomes with appropriate imaging, accepted periodontal diagnostic protocols, and neuromuscular examination

Psychomotor skills:

- Taking essential radiographs
- Documenting dental, periodontal, and neuromuscular status

Task 3

Evaluate posttreatment occlusion using accepted standards to enhance stability and dental health and assess the overall efficacy of treatment.

Cognitive skills:

- Interpreting posttreatment occlusion and treatment efficacy
- Analyzing treatment outcomes with dental casts and appropriate imaging

Psychomotor skills:

- Taking essential radiographs
- Extracting 2-D images from cone-beam computerized tomography
- Tracing and superimposing calibrated radiographs for cephalometric analysis
- Taking impressions for study casts
- Intra-oral scanning
- Recording inter-occlusal registration
- Taking intra- and extra-oral photographs
- Documenting dental, periodontal, and neuromuscular status
- Performing posttreatment cast and radiograph evaluations

Task 4

Evaluate treatment outcomes comparing pretreatment and posttreatment records to assess dental and skeletal changes.

Cognitive skills:

- Comparing the treatment outcomes to the treatment objectives

- Analyzing serial treatment records for understanding and planning treatment and retention procedures
- Interpreting treatment outcomes with appropriate imaging, dental casts, and cephalometric analysis
- Communicating outcomes with patients and guardians

Psychomotor skills:

- Taking essential radiographs
- Extracting 2-D images from cone-beam computerized tomography
- Tracing and superimposing calibrated radiographs for cephalometric analysis
- Taking impressions for study casts
- Intra-oral scanning
- Recording inter-occlusal registration
- Taking intra- and extra-oral photographs
- Documenting dental, periodontal, and skeletal status

Domain 4 Sample Questions

1. Critique the superimposition.
2. What dental changes occurred as a result of treatment?
3. What dental changes occurred as a result of growth?
4. What skeletal changes occurred as a result of treatment?
5. What skeletal changes occurred as a result of growth?
6. Give the rationale for the observed skeletal changes.
7. Give the rationale for the observed dental changes.
8. Critique the final occlusion.
9. What is the score for root angulation?
10. What are the consequences of accepting a compromised treatment result?
11. Critique the final facial aesthetic outcome.
12. Critique the final smile aesthetic outcome.
13. Critique the final dental aesthetic outcome.
14. Describe an appropriate retention protocol for this patient?
15. Give your rationale for the management of third molars.
16. How would future growth affect treatment results?
17. What would you advise a patient to do concerning an adverse final outcome (e.g., periodontal/demineralization/root resorption, etc.)?
18. Give your rationale for the management of an adverse final outcome.
19. What could have been done differently to improve the final outcome?

Cast-Radiograph Evaluation (CRE)

For the CRE examinees will be shown a series of records which may include: photo montage, images of models, and/or panoramic radiographs (as needed). They will be asked to answer questions based on the information provided.

- Examinees will need to be familiar with grading models.
- Examinees will **NOT** be given the [CR-Eval Parameters reference guide](#) during the exam.
- Examinees need to be prepared to answer some **specific** critical thinking questions on the different CR-Eval parameters.

Rating Scales and Examiner Training

After the examination, keyboarded responses are independently scored by a total of 12 trained examiners who use an anchored rating scale to ensure consistency in scoring. The scales to be used in a case address the function of the case (e.g., diagnosis, implementation, critical analysis) and are standardized for all cases serving the specified function. Each unit of the scale is anchored with language that helps to ensure that the ABO's standards are applied by all examiners.

The ABO's examiner training program educates examiners in the intended application of the scales to candidate responses. The examiner training program provides practice opportunities as well as a required assessment of agreement with criterion ratings for a selection of responses.

Results

The rating scales for the clinical examination are weighted to achieve approximately 25% allocations to each of the four domains covered in the examination. Points awarded to candidates are determined as a function of the ratings assigned and the weight of the question. Psychometric analyses are performed by a third-party psychometric company after each testing cycle.

Exam results are presented in a pass/fail format. If an examinee is unsuccessful on the examination, he or she will be provided with feedback outlining their level of success on the four main domains of the examination. Examinees must retake the entire examination in order to pass, and will not have the ability to be re-tested on individual sections. Examinees are allowed to take the Scenario-Based Clinical exam a total of 3 times. See ABO's policy on exam retake, which is available on the ABO's website (<https://www.americanboardortho.com/orthodontists/become-certified/clinical-exam/Scenario-based-Clinical-Examination/>).

After 3 failed attempts at the Scenario-based Clinical Examination, an examinee must wait 2 years before retaking the examination. The examinee must present a petition to the Clinical

Committee before registering for the examination for the 4th attempt. The petition must address the following items:

- i. How the examinee plans to prepare going forward?
- ii. What domain(s) require the most attention when preparing based on past results?
- iii. What is the examinee's understanding of the weak performing areas in the past examinations?
- iv. What adjustments will be made in the preparation process going forward?

If the candidate fails the examination after the 4th attempt, they must wait an additional 2 years and petition before registration for 5th exam. After 5 failed attempts at the Scenario-based Clinical Examination, an examinee is no longer eligible to be Board Certified.

Reliability, validity, and objectivity are assessed by an independent psychometric examination consulting company.

Release of Clinical Examination Results

Clinical Examination results will be emailed to all examinees within three months of the testing window. Diplomate certificates and pins for passing examinees will be mailed within a four-month period. Examinees are responsible for ensuring that their email address and primary mailing address are up-to-date in their ABO portal. The ABO will not be held responsible for packages sent to an outdated mailing address.

All exam correspondence is sent via email; therefore, examinees are responsible for ensuring that their email address in their ABO portal is current and allows for correspondence from The American Board of Orthodontics and Pearson VUE. The ABO and Pearson VUE will not be held responsible for misdirected (sent to spam or trash) communications regarding the Clinical Examination.

Appendix A

ABO Clinical Exam Scheduling with Pearson VUE

Approximately 6 weeks prior to the exam, Pearson Vue will pre-schedule all candidate exam appointments based on the testing center location preferences that were provided during registration. Individual appointment information will be e-mailed to examinees by Pearson Vue. If the appointment that Pearson Vue schedules is not in a location or time that is preferred, examinees will have the opportunity to change the appointment, subject to availability. Detailed information and instructions for rescheduling exams will be e-mailed to candidates by the ABO the week before Pearson Vue starts the pre-scheduling process.

Examinees must ensure that they are available for both dates the exam is administered, as Pearson Vue testing appointments are based on availability and a preferred date cannot be guaranteed.

If a candidate is unable to take the exam at the pre-scheduled appointment and fails to reschedule for a more desirable appointment within the same testing window, and subsequently no-shows for their scheduled exam, the examinee will forfeit their exam seat and registration fees.

The following information will be emailed to all registered examinees approximately 7 weeks prior to their exam date in case they need to reschedule their exam with Pearson Vue:

- Examination Dates: Dates the Clinical Exam is offered.
- MRA ID: Candidate's individual identification number.
- Exam Code and Title: ABO-CE, ABO Clinical Examination
- Program Reference Name: MRA Specialty Board Exams

RESCHEDULING YOUR EXAM

Rescheduling refers to a process that occurs once an examinee has scheduled a testing date with Pearson VUE and subsequently wishes to change or amend the date, time or location of their scheduled exam within the current testing window. If an examinee needs to switch their exam date, they must cancel their first appointment made and then reschedule for the other date offered.

Examinees may reschedule their exam through Pearson Vue's website (after creating an account) or via telephone. Pearson Vue recommends online registration for the quickest and most convenient access to information and site availability.

If an examinee finds that they must reschedule their exam, please log into Pearson VUE's website at <http://pearsonvue.com/abo/>. ABO Examination fees are non-transferable and non-refundable. Rescheduled exams will only be permitted for the same two-day exam window.

Examinees may not transfer their exam to subsequent exam windows. If an examinee cancels, and does not reschedule their exam, they will forfeit their exam registration fees.

If an examinee finds that they must cancel their scheduled exam, please log into Pearson VUE's website at <http://pearsonvue.com/abo/>. ABO Examination fees are non-transferable and non-refundable, so if an examinee chooses to cancel their exam with Pearson VUE and does not reschedule for the same two-day exam window, they will forfeit their exam registration fees.

WEBSITE RESCHEDULING (PREFERRED SCHEDULING METHOD)

Pearson VUE recommends registration online for the most up-to-date information on site availability and 24/7 access. To register online, examinees will first need to create an account with Pearson VUE. This may take up to two business days.

Website: <http://pearsonvue.com/abo/>

On this website examinees can:

- Create a web account (username and password) to register online. Passwords are emailed within one to two business days.
- Reschedule an exam appointment.
- View testing center locations.
- Obtain Pearson VUE Registration Center phone number.
- Take online tour of Pearson Professional Center and what to expect in a Pearson VUE test center.
- Find Pearson VUE updates.

Please use the above link to visit the Pearson VUE website for FAQs, Tutorial, and Candidate Examination Rules to become more familiar with the exam process.

TELEPHONE RESCHEDULING

If an examinee is unable to schedule online, or has any questions not answered on Pearson VUE's website, candidates may call Pearson VUE directly. Hours of operation are Monday - Friday 7:00 AM - 7:00 PM CST. Please note that Pearson Vue occasionally experiences heavy call volumes and long wait times.

Phone Number: 877-435-1414 (US and Canada)

When prompted, choose the following menu selections:

- Dental Specialties - Option #4
- American Board of Orthodontics - Option #2

CONFIRMATION

Examinees will receive confirmation of their examination date and site via email. Though not required to sit for the exam, the confirmation email will be very helpful, and will include directions to the testing center.

CHECK IN AT PEARSON VUE

Examinees are asked to arrive at least 30 minutes before their scheduled appointment to give adequate time to complete the necessary sign-in procedures. If an examinee arrives 15 minutes after the scheduled exam starting time, they will have technically forfeited their assigned seat and it is up to the discretion of the testing center as to whether they may still take the exam.

IDENTIFICATION REQUIREMENTS

You are required to provide two valid, unexpired forms of identification. The two forms of ID must match the name on your registration, both with signature and one with a photo. Photograph waivers require authorization from MRA and ABO.

If your first and/or last name(s) have changed, please contact Info@americanboardortho.com at least six (6) weeks in advance of the examination date. You will be required to provide legal documentation (i.e., marriage license, legal name change) for this information to be updated in the ABO system. If name change documentation is not received at least 6 weeks in advance of the exam date, the ABO cannot guarantee that Pearson Vue will be able to incorporate the change in their system in time for the exam, which may result in Pearson Vue denying the candidate entry to the exam center. If this should happen, the candidate will not be able to transfer their exam to another date and they will forfeit their exam seat and registration fees.

If you have more than one last name listed on your government-issued ID, the same last names must be reflected in your ABO profile.

Acceptable forms of ID:

Primary (picture and signature, not expired) Secondary (signature, not expired)

- Driver's license or passport
- School ID or alien registration card (green card, military ID, permanent resident visa)
- Other government-issued ID
- Credit card
- Employee ID
- Social Security card
- Bank ATM card

Appendix B

Pearson VUE Check-in Procedures and Rules

Pearson VUE check-in procedures

Pearson VUE staff is required to follow the procedure below for each candidate:

1. Collect Professional Examination Rules
2. Request two forms of identification (ID)
3. Check IDs
4. Capture signature and verify that signatures match
5. Capture palm vein pattern
6. Capture photograph
7. Show candidate where to store belongings
8. Offer candidate erasable noteboard/pen
9. Admit

As indicated in step 1, candidates receive a list of testing rules. It is important that candidates are aware of the testing rules. There is little or NO flexibility with the rules.

Candidate rules

Please review the following exam rules agreement. Contact the TA if you have any questions. The term TA will be used in this document to mean Test Administrator, Invigilator and Proctor.

1. No personal items, including but not limited to mobile phones, hand-held computers/personal digital assistants (PDAs) or other electronic devices, pagers, watches, wallets, purses, firearms or other weapons, hats (and other non-religious head coverings), bags, coats, jackets, eyeglass cases, pens, or pencils, are allowed in the testing room. No barrettes or hair clips that are larger than 1/4 inch (1/2 centimeter) wide and headbands or hairbands that are larger than 1/2 inch (1 centimeter) wide are allowed in the testing room. No jewelry that is removable and larger than 1/4 inch (1/2 centimeter) wide is allowed in the testing room. No books and/or notes are allowed in the testing room unless authorized by the test program sponsor for your use during the test. You must store all personal items in a secure area (a locker) as indicated by the TA or return them to your vehicle. If you refuse to store your personal items, you will be unable to test, and you will lose your test fee. All electronic devices must be turned off before storing them in a locker.
2. You will be asked to empty your pockets for the purpose of allowing the TA to verify that nothing is in them. If you have hair that covers your ears, you may be asked to show them for the purpose of allowing the TA to verify that no Bluetooth devices are present. The TA may also ask you to roll up your sleeves to verify that you have no writing on your arms. Before you enter the testing room, you will be asked to pat yourself down (for example: arms, legs, and waistline) to show there is nothing hidden on your body. The test center is not responsible for lost, stolen, or misplaced personal

items. Studying IS NOT allowed in the test center. Visitors, children, spouses, family, or friends ARE NOT allowed in the test center.

3. Before you enter the testing room, the TA may collect your digital photograph, digital signature, and/or your palm vein image and may digitally authenticate your ID. This is done to verify your identity and protect the security and integrity of the test. You understand that if there are discrepancies during the check-in process you may be prohibited from entering the testing room, you may not be allowed to reschedule your test appointment, and you may forfeit your test application fee. The identification requirements used during the check-in process are defined by the test sponsor, and the TA has no flexibility to add, delete, or alter this process. Upon entering and being seated in the testing room, the TA will provide you with those materials authorized by the test program sponsor for your use during the test to make notes or calculations on, and you will be provided any other material as specified by the test program sponsor. You may not remove any of these materials from the testing room or begin writing on your notepad until your test has been started. If you need new or additional materials during the test, you must raise your hand. You must return all items and materials to the TA immediately following the test.
4. The TA will log you into your assigned workstation. You will verify that you are taking the intended test that you registered to take. Unless otherwise instructed, you must remain in your assigned seat until escorted out of the testing room by a TA.
5. Once you have entered the testing room, you may not communicate with other candidates. Any disruptive, threatening, or fraudulent behavior in the testing room may be grounds for terminating your test, invalidating your test results, or disqualifying you from taking the test at a future date.
6. You understand that eating, drinking, chewing gum, smoking, and/or making noise that creates a disturbance for other candidates is prohibited during the test.
7. To ensure a high level of security throughout the testing experience, you will be monitored at all times. Both audio and video may be recorded.
8. A Non-Disclosure Agreement or other security statement may be presented to you before the test begins. If so presented, you must read, acknowledge, and agree to the terms and conditions of such document within the specified time limit, if applicable, in order to begin your test. Should you not agree, you will not be permitted to proceed with taking the test and you may forfeit your test fee. If you select "DECLINE," your test session will immediately end.

9. Break policies are established by the test program sponsor. Some tests may include scheduled breaks and, if so allowed, instructions will appear on the computer screen at the appropriate time. It is important to note that whether or not the test time stops depends on the test program sponsor's policy. If you take an unscheduled break at any other time or if you take a break during a test in which the test program sponsor has not scheduled a break, the test time will not stop. The TA will set your workstation to the break mode, and you must take your ID with you when you leave the room. The TA will check your ID before escorting you back to your seat and will then resume your test.
10. If you are taking any break, you MUST receive permission from the TA PRIOR to accessing personal items that have been stored (with the exception of comfort aids, medication, and food, which you may access without permission). Unless specifically permitted by the test program sponsor, personal items that cannot be accessed during any break include but are not limited to mobile phones, test notes, and study guides.
11. You must leave the testing room for all breaks. If you want to leave the test center building during any breaks, verify with the TA whether your test program sponsor permits you to leave the building.
12. You must follow all of the appropriate check-in and check-out processes as defined by your test program sponsor. This may include the need to show identification and/or have your palm vein pattern captured when leaving and re-entering the testing room. Before re-entering, you will be asked to pat yourself down again (for example: arms, legs, and waistline) to show there is nothing hidden on your body. Unless otherwise instructed, the TA will escort you to your assigned workstation and resume the test for you so that you may continue with your test.
13. If you experience any problems or distractions or if you have other questions or concerns, you must raise your hand, and the TA will assist you. The TA cannot answer questions related to test content. If you have concerns about a test question or image, make a note of the item (question) number, if available, in order for the item to be reviewed.
14. After you finish the test, you may be asked to complete an optional on-screen evaluation.
15. Unless otherwise instructed, after you have completed the test you must raise your hand, and the TA will come to your workstation and verify that your test session has ended properly. Depending on the type of test taken, the test program sponsor may display your test score on the computer screen after you have completed the test; or you may be provided with a printed score report; or you may be provided with a

confirmation notice indicating that you have completed the test program sponsor's test. If printed information is to be provided to you, you must present your ID again to the TA and return any and all materials supplied to you prior to the beginning of your test. You must not leave any materials at your testing workstation after you have completed your test.

16. You may not remove copies of test questions or test answers from the testing center, and you may not share or discuss with anyone all or any of the test questions or test answers you saw or viewed during the taking of the test. If you do not abide by these rules, if you tamper with the computer, or if you are suspected of cheating, appropriate action will be taken, including the possibility of the test program sponsor taking action against you.

17. Your Privacy: Your test results will be encrypted and transmitted to Pearson VUE and the test sponsor. The test center does not retain any information other than when and where your test was taken. The Pearson VUE Privacy and Cookies Policy provides additional information, which you can obtain by visiting the Pearson VUE website at www.pearsonvue.com or by contacting the Pearson VUE call center.

18. By providing a digital signature:
I give Pearson VUE my explicit consent to retain and transmit my personal data and test responses to Pearson VUE located in the U.S. and to the test sponsor (either of which may be outside of the country in which I am testing).

I understand the information provided above and agree to follow these rules in addition to any other program rules I may have agreed to during my registration for this test.

I understand that if I do not follow the rules or I am suspected of cheating or tampering with the computer this will be reported to Pearson VUE and the test sponsor, and I acknowledge and understand that my test may be invalidated, and the sponsor may take other action such as decertifying me, and I will not be refunded my test fee.