Journal of Dental Sciences 20 (2025) 1648–1659

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.e-jds.com

Original Article

Comparative evaluation of scenario-based clinical examinations in orthodontic certification: Insights from Taiwan and the United States

Chia Tze Kao [a,b*], Tzu Ying Wu [c], Chun Liang Kuo [d], Chung-Hsing Li [e], Chen-Feng Cheng [f], Yu-Kun Chih [g]

[a] *Department of Orthodontics, Chung Shan Medical University Hospital, Taichung, Taiwan*
[b] *School of Dentistry, Chung Shan Medical University, Taichung, Taiwan*
[c] *Orthodontic Department, Department of Stomatology, Taipei Veterans General Hospital, Taipei, Taiwan*
[d] *Department of Orthodontics, Chi Mei Medical Center, Tainan, Taiwan*
[e] *Department of Orthodontics, Tri-Service General Hospital, Taipei, Taiwan*
[f] *Chair of Taiwan Board of Orthodontics, Taipei, Taiwan*
[g] *President of Taiwan Association of Orthodontists, Taipei, Taiwan*

Received 23 February 2025; Final revision received 11 March 2025
Available online 26 March 2025

KEYWORDS
Scenario-based clinical examination;
Orthodontic certification;
Taiwan board of orthodontics;
American board of orthodontics;
Clinical competency assessment

Abstract *Background/purpose:* The scenario-based clinical examination (SBCE) is a structured assessment used in orthodontic certification to evaluate candidates' clinical reasoning, decision-making, and problem-solving abilities. This study compared the implementation of SBCE in Taiwan (Taiwan Board of Orthodontics, TBO) and the United States (American Board of Orthodontics, ABO) to determine whether their examination structures aligned with clinical practice demands.

Materials and methods: The TBO and ABO certification processes were analyzed based on their examination structure, scoring criteria, and pass rate trends from 2019 to 2024. Both organizations incorporated a written examination and an SBCE, but TBO required additional self-completed case submissions, whereas ABO did not. The TBO SBCE process included examiner training, collaborative question development, and structured scoring criteria based on predefined competency benchmarks.

Results: TBO pass rates remained stable between 75 and 87.8 % after implementing SBCE, whereas ABO pass rates showed greater variation (64–91 %), potentially due to COVID-19

* Corresponding author. School of Dentistry, College of Oral Medicine, Chung Shan Medical University, Department of Orthodontics, Chung Shan Medical University Hospital, No. 110, Chien Kuo N. Road, Taichung, 00407, Taiwan.
E-mail address: ctk@csmu.edu.tw (C.T. Kao).

https://doi.org/10.1016/j.jds.2025.03.013

disruptions. The structured TBO SBCE process ensured fairness, transparency, and standardization, maintaining stable examination outcomes.
Conclusion: SBCE has proven to be a reliable and objective method for orthodontic certification. By implementing a criterion-referenced scoring system, TBO ensures that its examination aligns with professional standards. The study suggests that SBCE enhances orthodontic competency assessment and should be considered for broader adoption in certification programs worldwide.

Introduction

The scenario-based clinical examination (SBCE) aims to objectively assess orthodontists' knowledge, skills, and clinical reasoning abilities. The purpose of SBCE is to ensure that candidates can apply evidence-based medicine in clinical decision-making. It provides a structured and measurable testing method to reduce subjective scoring bias. Through case analysis and simulated scenarios, candidates can engage in self-assessment and reflection, ultimately enhancing their clinical decision-making skills.

The American Board of Orthodontics (ABO) has long been recognized as the premier certifying body for orthodontists globally, upholding the highest standards within the specialty. Among both medical and dental certifying boards, the ABO holds the distinction of being the first specialty board in dentistry and the third in either field in the United States. Its planning and design for education and clinical certification have served as a model for many countries.

In 2017, the ABO conducted a survey among its members, revealing that the traditional certification examination posed unnecessary barriers for candidates. These barriers included educational challenges and difficulties related to the practice environment. By 2019, the ABO transitioned its clinical examination from a case-based clinical examination to a scenario-based oral clinical examination, an approach endorsed by the American Association of Orthodontists (AAO). This change aimed to enhance accessibility while maintaining high standards.[1,2] Due to the pandemic, the ABO administered its first scenario-based virtual clinical examination in November 2020 at testing centers worldwide. This transition is part of the ABO's SBCE initiative.[3]

Inspired by the ABO, the Taiwan Board of Orthodontics (TBO) has designed its own certification examination system. The TBO examination aims to objectively assess candidates' comprehensive orthodontic knowledge within a shorter time frame, leveraging predefined standardized answers for objective scoring. This system also enables training institutions to refine or adjust their clinical teaching methods to align with examination requirements.

On December 3, 2024, during the Asia Pacific Orthodontic conference and the Taiwan Association of Orthodontists (TAO) annual meeting, the TAO invited Dr. John Callahan, president of the AAO, and Dr. Jae Hyun Park, president of the ABO, to participate in a summit meeting in Taiwan. This summit facilitated discussions between the AAO and TAO, with a particular focus on SBCE, providing a platform for exchanging ideas and refining examination formats (Fig. 1).

The Taiwan ministry of health and welfare department (MHWD) aims to safeguard public health and the quality of dental care. To achieve these objectives, it has established a specialized certification system in dentistry. Graduates from dental schools are required to complete a two-year postgraduate training program (postgraduate year training) before applying for entrance to the orthodontic specialty training program. The specialty training spans three years of full-time education and is only conducted at institutions accredited by the TBO following evaluation. The TAO was founded in 1987, and in 2008, the first official board examination under the TBO was recognized by the Taiwan MHWD. In 2024, the TBO introduced its first SBCE to assess orthodontic specialists (Fig. 2).

According to the 2012 World Federation of Orthodontists (WFO) survey, the majority of countries worldwide have not yet incorporated scenario-based oral examinations into their orthodontic certification processes.[4] A review of the most recent available data indicates that, to date, only the United States and Taiwan have formally adopted SBCE as a prerequisite for orthodontic specialty certification.

Given this context, the present study aims to conduct a comparative analysis of the SBCE frameworks employed in TBO certification system and the ABO certification process. By systematically evaluating the outcomes of these examinations, this study seeks to determine whether their content and structure are aligned with the demands of clinical practice. Ultimately, this research aims to ensure that orthodontic specialists who undergo these assessments meet high clinical competency standards, both in theoretical knowledge and practical application.

Materials and methods

Structure of the TBO certification examination

Since its establishment in 1987, the TBO certification process for orthodontic specialists has comprised two main components: a written examination and a clinical oral examination. Applicants for the written examination must hold a valid dental license in Taiwan and have completed orthodontic training at a TBO-accredited institution. Candidates meeting these criteria are eligible to take the examination. Foreign orthodontic specialists certified by TBO-recognized organizations may be exempt from the written examination and proceed directly to the clinical oral examination.

Figure 1 On December 3, 2024, the AAO president and ABO president attended the AAO/ABO & TAO/TBO summit in Taipei, Taiwan. A: Dr. John Callahan, president of the AAO. B: Dr. Jae Hyun Park, president of the ABO. C: Chia Tze Kao, TBO oral examination committee chair. D: TBO committee and AAO, TBO president discussion venue. E: 2024 Asia Pacific dental conference brochure.

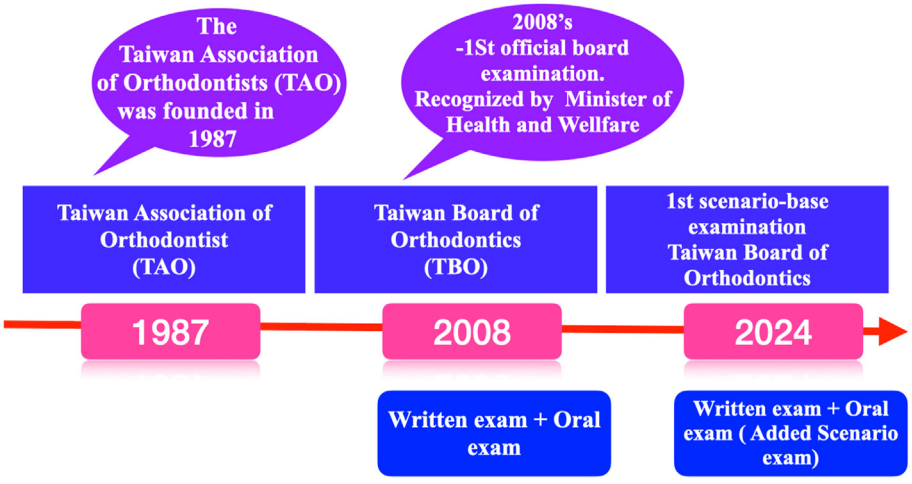


Figure 2 The history and milestones of the establishment of TAO and TBO.

The clinical oral examination consists of two parts:

1. Presentation of five self-completed cases by the candidate.
2. Evaluation of cases assigned by TBO.

Beginning in November 2024, the oral examination will transition to a scenario-based format, allowing for a more comprehensive assessment of clinical decision-making and problem-solving skills.

Structure of the ABO certification examination

The ABO certification process includes:

1. Written examination: A 240-question multiple-choice exam evaluating fundamental knowledge in basic sciences and clinical orthodontics, conducted annually.
2. SBCE: Introduced in 2019, this component assesses candidates' clinical decision-making and problem-solving abilities through structured clinical scenarios. It

follows a c criterion-referenced scoring system to ensure objective and standardized evaluation.[5]

TBO scenario-based clinical examination preparation process (Fig. 3)

The TBO SBCE is developed under an oral test committee using a structured, multi-phase process: examiner training, selection of examiners, question development, topic finalization, question bank review and consensus meetings. This structured process ensures the SBCE effectively assesses candidates' clinical judgment, problem-solving abilities, and orthodontic expertise.

TBO oral examination process

Candidates who pass the written examination become eligible for the oral examination, which consists of two components.

1. Self-prepared case examination (40 % weight): Candidates must present five self-prepared cases, including:
   a. Patient treatment records
   b. Cephalometric analysis data
   c. Pre-, mid-, and post-treatment photographs
   d. Pre- and post-treatment dental models
2. TBO-assigned case examination (60 % weight): Candidates participate in a scenario-based examination using TBO-assigned cases. Provided materials include:
   a. Patient treatment records
   b. Cephalometric analysis data
   c. Pre-, mid-, and post-treatment photographs
   d. Pre- and post-treatment dental models

The SBCE assesses candidates' knowledge and clinical decision-making skills.

Scoring criteria for TBO scenario-based clinical examination

The assessment system follows a criterion-referenced scoring approach to ensure fairness, objectivity, and consistency. The evaluation framework consists of five key domains (Fig. 4):

a. Accuracy — Evaluates the candidate's ability to establish an accurate diagnosis and formulate an effective treatment plan.
b. Problem-solving — Assesses the capability to design appropriate diagnostic tests and select optimal treatment modalities based on clinical presentation.

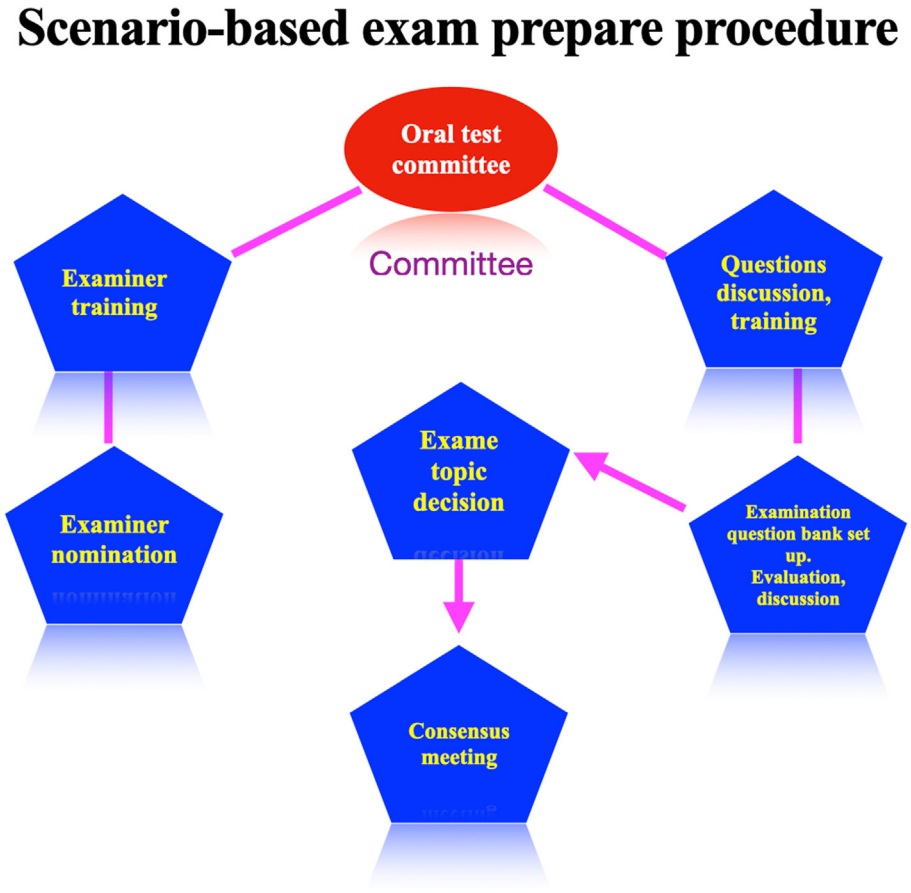


Figure 3 The preparation process for the simulated oral examination.

Domains of evaluation

Item	Weight	Score	Remarks
1. Accuracy of diagnosis	10%		
2. Problem-solving skill „ (Understanding and explanation of biomechanics)	30%		
3. Explanation and review of treatment results	20%		
4. Adaptability .tability & retention	10%		
5. Professional knowledge	30%		
Total score			

Item	Weight	Score	Remarks
1. Accuracy in data analysis and diagnosis	20%		
2. Appropriateness of treatment objectives and plan	30%		
3. Scenario question 1	30%		
4. Scenario question 1	20%		
Total score			

Oral exam scoring sheet
Taiwan board orthodontics specialist examination (2024 edition)

Candidate code:
Examiner signature:

Self-prepared case scoring sheet
(Exam case: ▫ A ▫ B ▫ C ▫ D ▫ E)

TBO-Assigned case scoring sheet
(Exam case: ▫ A ▫ B ▫ C ▫ D)

Exam weightage:

- Self-prepared cases: **40%**
- TBO-assigned cases: **60%**

Guidelines for assigned case scoring:

1. **Evaluation focus:**
   Assess the candidate's proficiency in analyzing case data, diagnosing, and formulating treatment objectives and plans.
2. **Scoring instructions:**
   Each scoring item should be graded based on the weight percentage and incorporated into the overall score calculation.
   - **10% Weight:** Score range: 0-6 (fail) or 7-10 (pass).
   - **20% Weight:** Score range: 0-11 (fail) or 12-20 (pass).
   - **30% Weight:** Score range: 0-17 (fail) or 18-30 (pass).
3. **Score consolidation:**
   - The team leader will collect all scoring sheets, discard outlier scores (defined as scores deviating by more than 20 points from the median), and calculate the average score for submission to the secretariat.
4. **Fairness principle:**
   To ensure impartiality, examiners affiliated with the candidate's training institution must refrain from asking questions during the examination.

Figure 4 The scoring sheet and scoring explanation for the simulated oral examination.

c. Communication — Measures active listening skills and the ability to provide clear and appropriate responses in patient interactions.
d. Adaptability — Examines the ability to manage patient emotions, resistance, and compliance issues with reassurance and professionalism.
e. Professional knowledge — Assesses the candidate's proficiency in explaining relevant medical concepts, diagnostic methods, and evidence-based treatment approaches.

This structured evaluation model ensures that examinees meet high clinical and professional standards, aligning with contemporary orthodontic practice.

Case example from the TBO scenario-based clinical examination (Figs. 5—10)

Candidates are provided with a board case that includes initial patient photographs, cephalometric analysis, and a

Figure 5 Extraoral photographs of the patient before treatment in the simulated oral examination. A 23-year-old female with no history of traumatic injury to the head or neck. Chief complaint (CC) were crowded dentition, left canine blocked labially, and lip protrusion.

Figure 6 Intraoral photographs of the patient before treatment in the simulated oral examination. The patient presents with mild upper occlusal plane canting, exhibiting a right-side downward tilt. Tooth 23 is buccally blocked out with transposition, while teeth 12 and 22 exhibit peg-shaped morphology. A 1.5 mm diastema is noted, along with distal buccal bone plate collapse at tooth 22. Additionally, tooth 16 was extracted due to severe caries more than five years ago.

Figure 7 Pre-treatment photographs of the patient showing the relationship between the dental midline and facial midline. The incisor show was 100 %, with the maxillary incisor midline coinciding with the facial midline, while the lower incisor midline was shifted to the left.

dental model. The examination process is structured into three main steps.

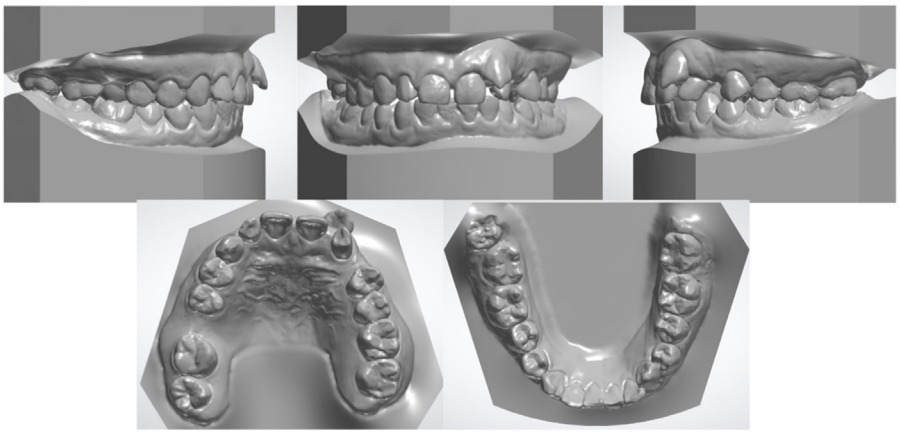
Step 1: Case review and diagnosis

Candidates review patient data, perform cephalometric tracing, record tracing data, and formulate a diagnosis and treatment plan.

Step 2: Candidate presentation and examiner interaction

Candidates present their findings and respond to examiner questions in the following domains.

1. Diagnosis & treatment goals:
   a. Describe the diagnosis, classification, and possible etiology of canine transposition.
   b. Explain treatment goal considerations, including skeletal, dental, and soft tissue aspects.
   c. Discuss soft tissue considerations when treating an ectopically erupted maxillary canine.



OJ	2-3 mm		Full arch space analysis	Q1. 0	Q2. -1
OB	1 (#31) -2 (#41) mm			Q4 -0.5	Q3. -1.5
Bolton ratio	3-3	0.80 (0.77) 12,22 peg lateral			
	6-6	0.90 (0.91) (If 16 replaced by 17)			

Tooth size : #13-23 : 46 mm , #33-43: 37 mm , #17-26 : 98 mm. #36-46 = 89 mm, #24 size = #23 size

Figure 8 3D scanned model of the patient before treatment, providing tooth size data and Bolton analysis values.

Figure 9 Panoramic X-ray of the patient before treatment in the simulated oral examination.

d. Outline management approaches for a high canine soft tissue attachment.

2. Treatment plan & mechanics:
   a. Explain the biomechanical principles for moving an ectopically positioned maxillary canine.
   b. Discuss interdisciplinary treatments required for periodontal health and esthetics.
   c. Evaluate the pros and cons of closing versus retaining the space of a missing molar.
   d. Design orthodontic mechanics for space closure if necessary.
3. Stability & retention:

Design a retention appliance considering long-term occlusal stability.

Step 3: Scenario-based questions and case summary (Figs. 11 and 12)

Following candidate responses, additional scenario-based questions are provided:

Scenario 1: After three months of continuous traction, the maxillary canine shows no movement.

a. Explain the possible reasons for this issue.
b. Describe the necessary steps, including patient explanation, additional diagnostic procedures, and revised treatment strategies.

Scenario 2: The patient had early appliance removal, resulting in midline discrepancy.

c. Identify potential areas of occlusal improvement.

Case F 23 Y	Original	F (15-30 year)
Skeletal analysis		
SNA°		82.9 ± 2.8
SNB°		80.8 ± 2.5
ANB°		2.1 ± 1.5
SN-MP°(Go-Gn)		30.9 ± 3.9
Dental analysis		
Upper 1 to NA mm		5.3 ± 1.7
Upper 1 to SN°		106.3 ± 4.9
Lower 1 to NB mm		6.1 ± 2.6
Lower 1 to MP°(Go-Gn)		94.1 ± 5
Facial analysis		
U Lip- E-line (mm)		1.9 ± 1.2
L Lip- E-line (mm)		1.8 ± 1.6

Figure 10 Lateral cephalometric X-ray and cephalometric analysis form of the patient before treatment in the simulated oral examination. S: Sella, N: Nasion, A: Subspinale, B:Supramentale, Go: Gonion, Gn: Gnathion, SNA: Sella-Nasion-A point angle, SNB: Sella-Nasion-B point angle, ANB: A Point-Nasion-B point angle, MP (Go-Gn): Mandibular plane angle.

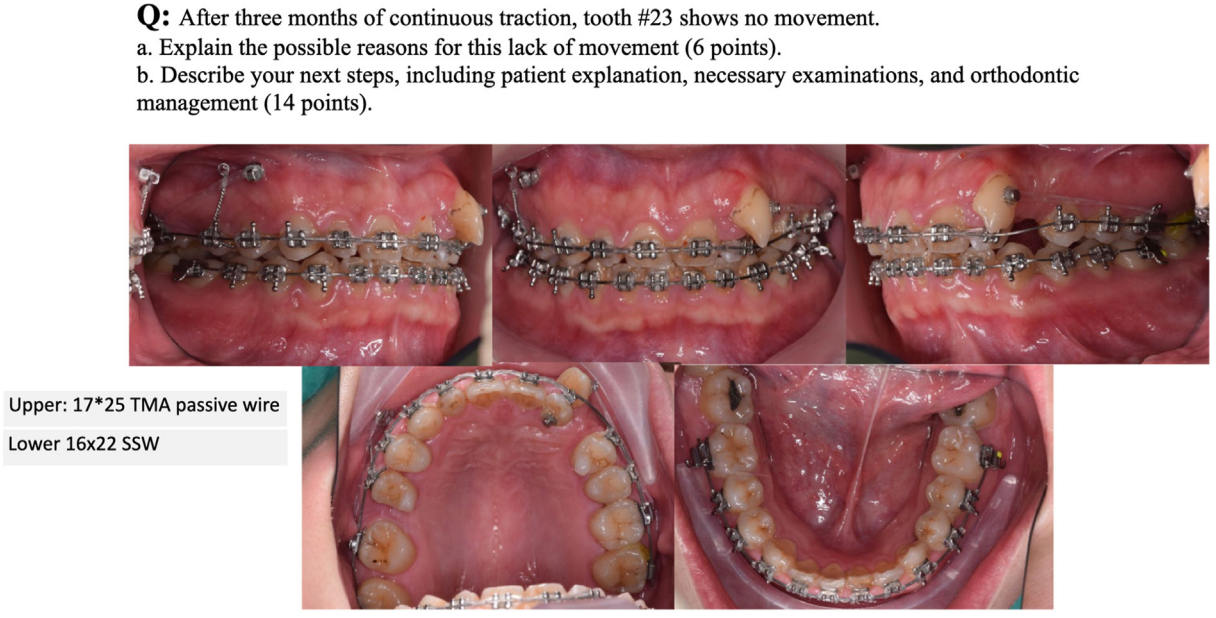


Figure 11 Intraoral photographs of the patient during treatment in the simulated oral examination, with accompanying examination questions. TMA wire: Titanium Molybdenum Alloy wire.

d. Propose a revised treatment plan if the patient requests non-extraction correction.

The TBO's scenario-based oral examination aligns with principles outlined by Park et al. in the development of scenario-based clinical examinations for the ABO.[5] This framework ensures a comprehensive assessment of clinical reasoning and decision-making skills in a realistic context.

Results

Comparative analysis of scenario-based clinical examination in orthodontic certification: The United States. and Taiwan

Orthodontic certification varies globally, with some nations incorporating scenario-based examinations (SBCE) to assess clinical competencies.

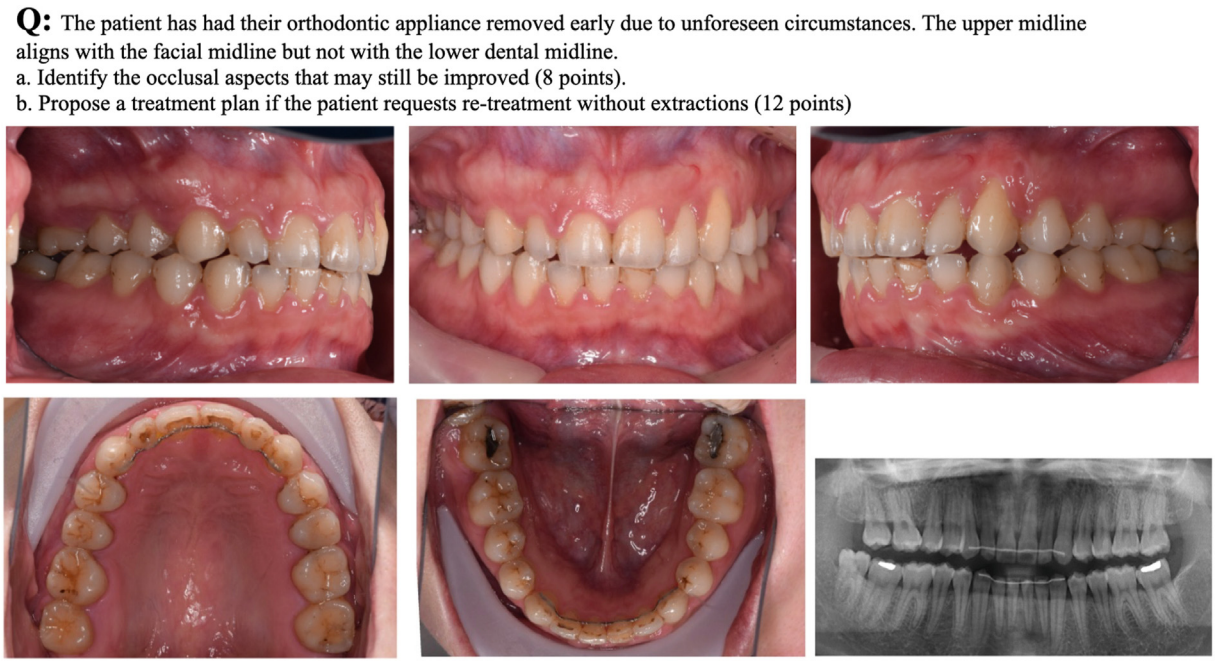


Figure 12 Intraoral photographs of the patient after treatment in the simulated oral examination, with accompanying examination questions.

United States (ABO)

a. Certifying body: American Board of Orthodontics (ABO)
b. Certification process: Requires completion of an accredited orthodontic program and a multi-phase assessment:
c. Written examination: Evaluates theoretical knowledge.
d. Oral examination: Assesses clinical decision-making through case discussions.
e. Scenario-based assessment: The ABO incorporates SBCE through clinical case presentations and oral exams, ensuring evaluation of diagnosis, treatment planning, and execution within real-world contexts.

Taiwan (TBO)

a. Certifying body: Taiwan Association of Orthodontists (TAO)
b. Certification process: Requires three years of specialty training, followed by:
c. Written examination: Covers fundamental and clinical orthodontic knowledge.
d. Oral examination: Conducted by a panel of evaluators, including scenario discussions.
e. Scenario-based assessment: While TBO's oral examination includes case discussions, hands-on clinical simulation is not explicitly required.

Scenario-based assessment is more structured in the ABO system, while the TBO approach primarily combines written and oral evaluations. This reflects evolving testing strategies in orthodontic competency assessment.

TBO and TAO membership status

As of November 2024, Taiwan has 790 certified orthodontic specialists, with 41 new specialists passing the latest TBO board examination. There are 20 accredited training institutions and 119 supervisors (58 full-time, 61 part-time). Regional distribution includes (Fig. 13):

1. Full-time supervisors: 34 (north), 12 (central), 12 (south).
2. Part-time supervisors: 36 (north), 14 (central), 11 (south).

TBO's scenario-based oral examination aligns with the principles established by Park et al. in developing SBCEs for the ABO, ensuring structured assessment of clinical reasoning and decision-making.

Comparison of TBO and ABO pass rates (Fig. 14)

TBO pass rates (2019—2024): 75 %—86.79 %, with 83.67 % in 2024 after SBCE introduction, indicating stable certification outcomes. ABO pass rates (2019—2024): 68 %—91 %, reflecting some variation, possibly due to COVID-19 disruptions. Despite differences in structure, both examinations effectively assess candidate competencies without significantly impacting overall pass rates.

Discussion

The SBCE framework is structured around key principles, including assessment objectives, which evaluate candidates'

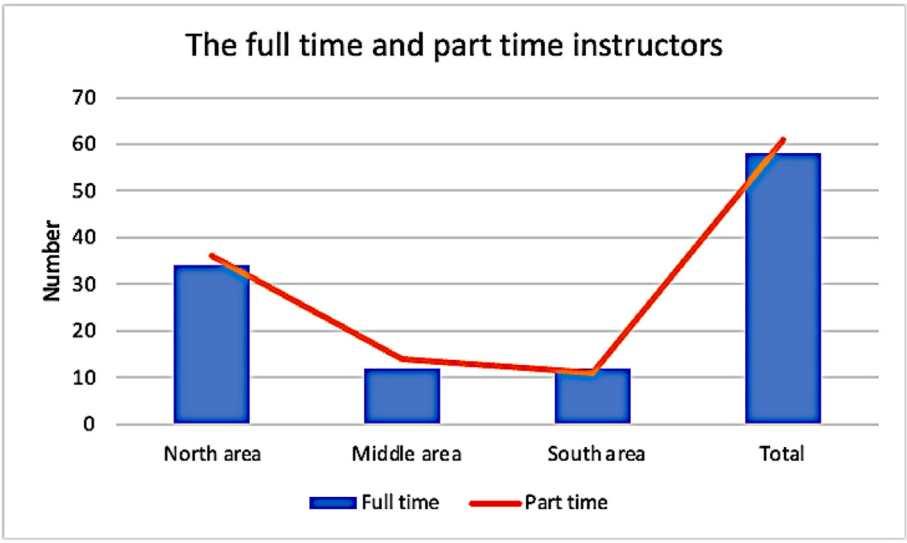


Figure 13 The number and geographic distribution of full-time and part-time supervising physicians in orthodontic specialist training institutions in Taiwan.

ability to apply knowledge, solve problems, communicate effectively, and make sound clinical decisions. Scenario design emphasizes authenticity, ensuring cases are based on real-world clinical situations to assess practical competencies; clarity, providing clear and standardized descriptions for consistent interpretation; and complexity, tailoring difficulty levels to orthodontic training standards while incorporating layered challenges to assess depth of understanding. In terms of exam requirements, TBO still requires candidates to submit and undergo a review of their completed clinical cases, whereas ABO no longer mandates such submissions. However, the preparation, administration, and scoring methods for scenario-based examinations are largely similar between the two organizations.

In the TBO SBCE, steps 1 and 2 assess the candidate's ability to independently analyze clinical data, establish a diagnosis, and formulate a treatment plan. Step 3 introduces hypothetical or observable clinical challenges, presented through examiner-generated scenario-based questions. These scenarios are designed to evaluate the candidate's critical thinking skills and problem-solving abilities when addressing complications that may arise during or after treatment.

Unlike traditional oral examinations, the SBCE is designed to evaluate candidates across multiple competency domains, including data gathering and diagnosis, which assess their ability to systematically collect and interpret diagnostic data; treatment objectives, planning, and prognosis, which evaluate their capacity to establish appropriate treatment goals and predict potential outcomes; treatment implementation, evaluation, and management, which measure their ability to execute and monitor treatment progress effectively; and outcomes assessment and critical analysis, which examine their ability to assess treatment results and make necessary adjustments based on clinical findings. By aligning the examination content with these core competencies, the TBO ensures that the assessment accurately reflects candidates' clinical reasoning and decision-making abilities.

Candidates must be given sufficient time to respond during the scenario-based oral examination. The TBO scenario-based oral examination lasts 30 min and is divided into two sections: Case presentation (5 min): Candidates summarize, analyze, and propose a treatment plan for a case provided by TBO. Followed by 15 min of examiner questioning based on the presentation. Scenario-based response (10 min): Candidates review case details provided by TBO, analyze case images, and respond to displayed questions. Each question is allocated 5 min for response. TBO ensures that candidates have ample time to comprehend the questions and articulate their responses. To maintain fairness in the examination process, examiners are generally restricted from posing follow-up questions beyond the predefined scope of the test items. Consequently, this structured approach contributes to consistent and stable exam performance over time.

In the scenario-based oral examination, the objectivity of scoring is crucial, as it directly determines whether a candidate meets the passing criteria. To ensure a fair and standardized assessment, the examination employs a criterion-referenced scoring system, a widely accepted methodology in professional certification, competency-based evaluations, and licensing examinations within healthcare and education. Unlike norm-referenced assessments, which rank candidates against a peer group, criterion-referenced evaluations measure performance against predetermined competency benchmarks to ensure an objective and consistent evaluation.

Key attributes of the criterion-referenced scoring system include:

a. Absolute performance standards: The passing threshold is established before the examination (e.g., a candidate must achieve $\geq$70 % to pass), independent of score distribution among examinees.

Table 1 Comparison of criterion-referenced and norm-referenced scoring.

Scoring method	Criterion-referenced (Standard-referenced)	Norm-referenced (Comparative-referenced)
Evaluation standard	Based on pre-established criteria	Based on the performance of the examinee group
Scoring method	Absolute score (e.g., passing at 70 %)	Relative ranking (e.g., top 30 % pass)
Result interpretation	Reflects whether the examinee has mastered specific skills	Reflects the examinee's relative position within the group
Application areas	Licensing exams, professional certifications, skill assessments	School tests, standardized exams (e.g., SAT, GRE)

SAT:Scholastic assessment test. **GRE**:Graduate record examination.

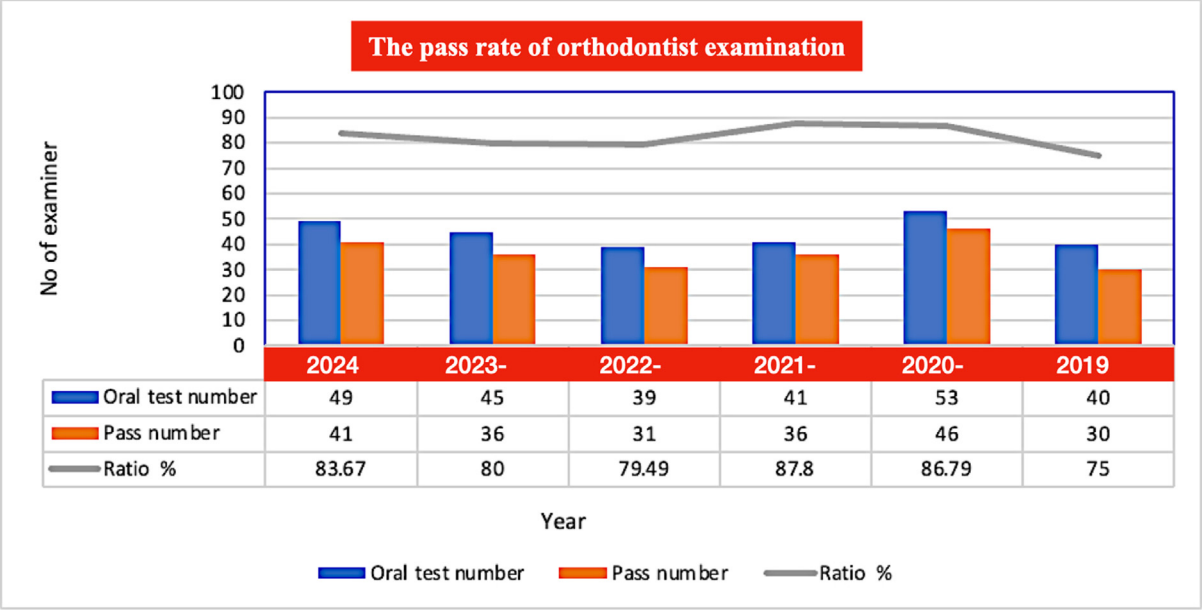


Figure 14 The pass rate of the orthodontic specialist certification examination over the past five years.

b. Objective competency assessment: Candidates are evaluated based on their attainment of specific knowledge and skills, rather than being ranked relative to other participants.
c. Defined clinical competency benchmarks: The assessment ensures that candidates demonstrate proficiency in orthodontic diagnosis, treatment planning, and clinical execution (Table 1).

This structured evaluation methodology enhances fairness, transparency, and standardization, ensuring that orthodontic specialists meet the highest clinical competency standards required for professional practice.

After incorporating scenario-based questions into the exam scoring, the TBO pass rate remained within the 2019—2024 range of 75—87.8 %, showing no significant variation. However, the ABO pass rate during the same period (2019—2024) displayed a wider range (64—91 %) (Fig. 14).[3] It is hypothesized that this greater fluctuation in ABO scores may be attributed to the impact of COVID-19, as the exam results varied significantly between the two test administrations within the same year due to pandemic-related factors. In addition, we also believe that the following factors may contribute to the fluctuations in scores: Updates and adjustments to examination standards (practice analysis study influencing the exam framework). Changes in scoring criteria and evaluation methods (criterion-referenced scoring, examiner scoring consistency). Diversity in candidates' backgrounds (domestic vs. international candidates, training from different schools). Changes in exam content (clinical practice-oriented vs. traditional written knowledge tests).

It is crucial to recognize that the final outcomes of scenario-based assessments may be affected by multiple factors, including the selection of examination topics, the formulation and structure of questions, the implementation of standardized scoring criteria, and the consistency of examiner evaluations. Maintaining strict and uniform standards across these aspects is essential to ensuring fairness, validity, and reliability in the assessment process.

Declaration of competing interest

The authors reported no conflict of interest.

Acknowledgement

Many thanks to AAO President Dr. John Callahan and ABO President Dr. Park JH for their discussions and guidance at the 2024 TBO/ABO Summit. We would like to express our gratitude to the Taiwan Association of Orthodontists for their suponsorship and support.

References

1. Chung CH, Tadlock LP, Barone N, et al. American Board of Orthodontics: time for change. *Am J Orthod Dentofacial Orthop* 2018;153:321—3.
2. Pangrazio-Kulbersh V, Sabott DG, Foley PF, et al. Evolution of the American Board of Orthodontics scenario-based clinical examination. *Am J Orthod Dentofacial Orthop* 2021;159:703—4.
3. Park JH, Hernandez-Orsini R, Rossouw PE, et al. The American Board of Orthodontics: a brief history and update of the orthodontic certification process. *Am J Orthod Dentofacial Orthop* 2024;166:308—12.
4. Kessel NC, DeKock WH, Phillips CL, Hershey HG. A survey of the status of orthodontics among organizations within the World Federation of Orthodontists. *J World Fed Orthod* 2014;3:146—54.
5. Park JH, Hernandez-Orsini R, Rossouw PE, et al. The American Board of Orthodontics: scenario-based clinical examination development and preparation. *Am J Orthod Dentofacial Orthop* 2025;167:7—16.