AUSTRALIAN
DENTAL COUNCIL

ADC Assessment Process

An overview of the ADC assessment and examinations process for overseas qualified dental practitioners
(General Dentistry)

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1. Introduction

Health professions in Australia maintain integrity and public safety by the regulation of health practitioners. This regulation is guided by the National Registration and Accreditation Scheme (NRAS)[1] and the Health Practitioner National Law Act (2009) (National Law). The regulation of health practitioners includes standards that limit registration only to practitioners who are competent to practise. Australian training programs that lead to qualification as a dental practitioner are accredited to ensure Australian-qualified dental practitioners meet these standards.

Under Section 53 of the National Law, an overseas qualified dental practitioner seeking eligibility to register in Australia is qualified to apply for general registration if

a. the individual holds an approved qualification for the health profession; or
b. the individual holds a qualification the National Board established for the health profession considers to be substantially equivalent, or based on similar competencies, to an approved qualification; or
c. the individual holds a qualification, not referred to in paragraph (a) or (b), relevant to the health profession and has successfully completed an examination or other assessment required by the National Board for the purpose of general registration in the health profession.

The Australian Dental Council (ADC) is the independent accreditation authority for the dental professions in Australia. A not-for-profit company, the ADC is appointed by the Dental Board of Australia (DBA) under the NRAS to conduct assessments and examinations of overseas qualified dental professionals who are seeking eligibility to apply for registration with the DBA.

2. ADC assessment process

The ADC assessment process for overseas qualified dental practitioners (including dentists, dental hygienist, dental therapists, oral health therapists, and dental prosthetists) aims to protect the public by ensuring only dental practitioners who are suitably trained and qualified to practise in a competent and ethical manner are deemed eligible to apply for the DBA process for registration. It is not used to limit or control the number of overseas qualified dental practitioners registering to practise in Australia.

The ADC assessment process is a three-stage process:

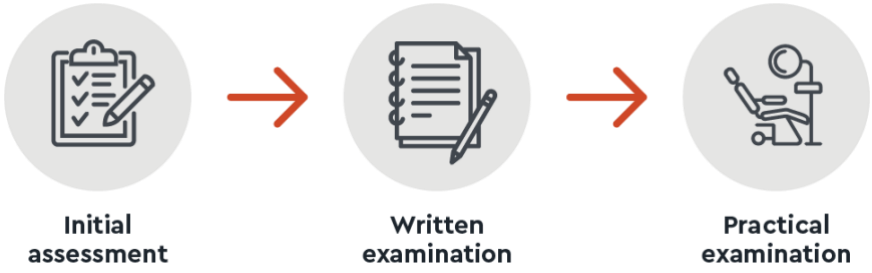

Figure 1 – ADC assessment process

An overseas qualified dental practitioner demonstrates they have the professional ability to perform safely in the role of a dental practitioner in Australia only after the successful completion of the initial assessment of qualifications and professional standing, and the written and practical examinations.

The content of the written and practical examinations is based on the expected competencies of a recently qualified Australian dental practitioner at the point of graduation from an ADC-accredited dental program. These competencies are described in detail in the Professional competencies of the newly qualified dentist; the *Professional competencies of the newly qualified dental hygienist, dental therapist, and oral health therapist*; and the *Professional competencies of the newly qualified dental prosthetist*. These documents are available from the ADC website and are collectively referred to as *the competencies* throughout this document.

3. Assessment design theory

A multi-dimensional assessment framework is used to assist in the design of a robust high-stakes, credentialing assessment process. The framework takes into account the competencies that need to be assessed together with the level of assessment required for each of those competencies.

3.1. Competency

The ADC defines competency as a concept that:

> *includes knowledge, experience, critical thinking and problem-solving skills, professionalism, ethical values, diagnostic and technical and procedural skills. These components become an integrated whole during the delivery of patient care by the competent practitioner. Competency assumes that all behaviours are performed with a degree of quality consistent with patient well-being and that the practitioner self-evaluates treatment effectiveness. The term covers the complex combination of knowledge and understanding, skills and attitudes needed by the graduate.*

The minimum standard of all ADC assessments is set at the level expected of a new graduate from the relevant accredited dental program in Australia.

3.2. Levels of assessment

The basis of competence is knowledge. A health practitioner must know what is required to carry out the competency and must also know how to use the knowledge required for the competency. A practitioner proficient at the knowledge level across all competencies must then be able to demonstrate the performance aspects of their profession by being able to show how and then, at the highest level, do tasks related to these competencies in the clinical setting [2]

This is summarised in Miller's Pyramid which is a widely adopted model of competence used in the development of assessments (Figure 2).

Figure 2 – Adaptation of Miller's Pyramid

Applying Miller's concepts to the assessment of competence, both knowledge and performance-based assessments can be used to identify the proficiency of an applicant in each of the entry-level competencies for a profession. Whilst the knowledge layers of competence do not directly translate to competence themselves, their measurability and role as a foundation to competence allows for a staged assessment approach to occur.

Assessment of the knowledge layers of competence can be assessed at the "knows" and/or "knows how" levels. Knowledge is most commonly assessed using written examinations. If a practitioner is not able to demonstrate adequate *knowledge* in a competency, they cannot be considered competent and there is no need to undertake further, more complex assessments of the *performance* requirements of that profession.

The performance of a competence may be assessed at the "shows how" or "does" levels. Although the "does" level of performance represents the highest level in Miller's pyramid, assessments at this level would require assessing a practitioner performing clinical duties on live patients. Such assessments are difficult to standardise and pose a potential risk to the participating patients. Therefore, most high stakes examinations for entry into a health profession assess at the "shows how" level using simulated environments.

4. ADC assessment design

The ADC assessment for overseas qualified dental practitioners is based on the expected competencies of a recently qualified Australian dental practitioner at the point of graduation from an ADC accredited dental program. To achieve this, ADC assessments are "blueprinted" against the ADC entry-level competencies for the relevant dental profession.

Blueprinting is a form of 'assessment mapping' that ensures an assessment:

- tests the required attributes and competencies,
- uses assessment methods that are appropriate for the competencies being assessed,
- provides coverage of appropriate depth and breadth,
- is not too predictable or unpredictable, and
- is feasible.

Commencing in 2011, the ADC undertook detailed blueprinting exercises against the competency statements current at that time. Blueprint workshop participants reviewed the competencies, identified and prioritised competencies for assessment in the ADC process, assessed the feasibility of alternative assessment strategies (i.e. MCQ, simulated patient, OSCE etc.) and determined the preferred method of assessment for each of the competencies to be assessed.

In 2017 the ADC commissioned an external review of its assessment processes to ensure that examinations continue to conform to contemporary best practice. One outcome was that the ADC has now re-visited the overall assessment blueprints for each profession to ensure that they are based on the most recent competency statements.

In line with the revised overarching blueprint and external environmental changes (including the construction of an ADC-owned and managed examination centre), the blueprint for the general dentistry practical examination was extensively revised in 2018, reducing the focus on restorative skills in the general dentistry examination, ensuring a wider sampling of competencies and introducing a formal objective structured clinical examination (OSCE) component to complement the technical (restorative) skills component of the examination. Additionally, the general dentistry written examination blueprint was subsequently revised in 2021.

5. Written examination

Following on from the overarching assessment blueprints, the ADC has developed individual written examination blueprints for each of the dental professions based on the competency document relevant to that profession.

All written examination blueprints are domain and discipline based. Domains reflect the broad categories of professional activity and concerns that occur in the practice of dentistry (e.g. oral surgery). Disciplines represent a specific area of dental practice.

The blueprint for the written examination for general dentistry is available in Appendix 1; it includes five domains, grouped into four clusters, and 13 disciplines.

The structure of the examination, including the number of examination papers and questions varies by profession. Specific detail about the structure of the examination for each profession can be found in the applicable written examination handbooks available on the ADC website.

5.1. Written examination format

The ADC uses scenario-based multiple-choice questions (MCQs) for its written examinations.

Well-constructed and delivered MCQs are a highly objective method of assessing knowledge in dentistry, with high levels of validity and reliability[3,4]. MCQs are acknowledged for their effectiveness in high stakes assessments, such as for the purpose of registration [4,5]. The use of scenario-based MCQs allows for the assessment of not only knowledge but also the application of knowledge. An example scenario-based MCQs is available on the ADC website.

ADC candidates must successfully complete the written examination before being able to progress to the practical examination. To ensure currency of knowledge, the practical examination must be completed within three years of successful completion of the written examination.

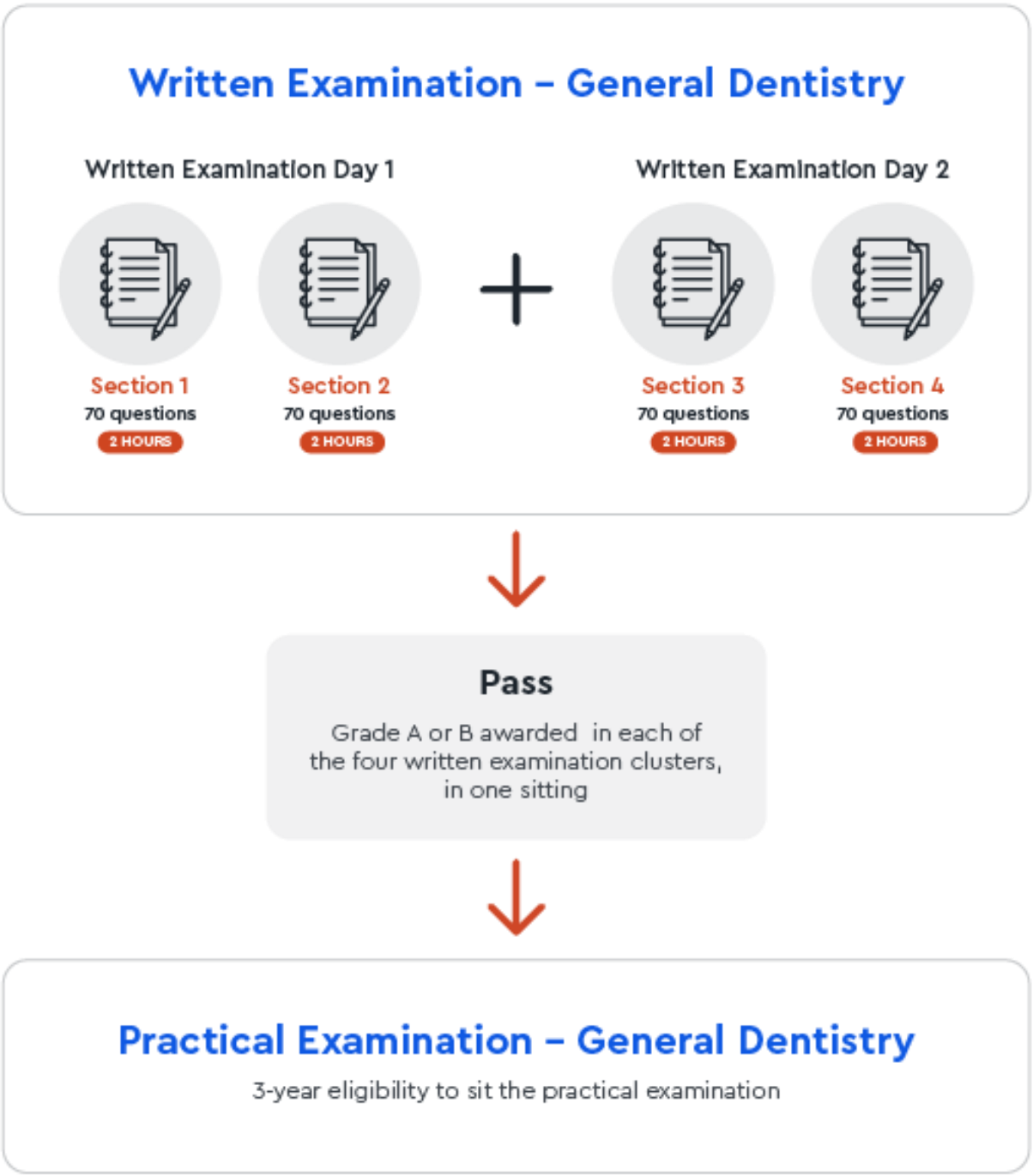

Figure 3 – written examination format

6. Practical examination

Based on the overarching assessment blueprints, the ADC has developed individual practical examination blueprints for each of the dental professions based on the competency document relevant to that profession.

All practical examination blueprints are domain and discipline based. Domains reflect the broad categories of professional activity and concerns that occur in the practice of dentistry. Disciplines represent a specific area of dental practice (e.g. oral surgery). Practical examination blueprints also use groupings which allow assessment of global competencies across multiple tasks.

The General Dentistry practical examination focusses on the competencies listed in Domain 6 (Patient Care) of the competency statement and its subdomains: clinical information gathering (6.1), diagnosis and management planning (6.2), and clinical treatment and evaluation.

To align with the preferred method of assessment and to allow for a wide sampling of different disciplines (clinical areas), the examination specifications for individual examinations require that tasks are selected from items based on specific disciplines.

Each assessment task is scored using task-specific checklists of up to 15 criteria. These criteria are assigned to up to three different groupings per task. The criteria are grouped based on global competencies which are themselves derived from the competencies for the relevant professional group. They include:

- effective communication
- clinical reasoning and judgement
- underlying knowledge base
- professionalism and ethics
- infection control

The use of these groupings (sometimes called sub-domains) allows generic, global competencies to be assessed across multiple tasks.

An example blueprint for the general dentistry practical examination is given below:

Assessment format	Domain		Number of tasks
Clinical skills day			
Standard OSCE (communication-based)	Clinical information gathering	Communication	2
	Diagnosis and management planning		2
	Clinical treatment and evaluation		2
Technical OSCE (technical skill-based)	Clinical treatment and evaluation	Infection control	4
Technical skills day			
Technical task	Clinical treatment and evaluation: *Restoration*		3
	Clinical treatment and evaluation: *Preparation*		3

6.1. Practical examination format

6.1.1. Choice of assessment methods

The General Dentistry practical examination is simulation-based. In this context simulation refers to the use of a device or environment that attempts to mimic an authentic clinical experience [6]. A simulation may refer to the clinic set-up, a standardised patient or simulated anatomy, such as a tooth. Simulations within a practical examination allow a candidate to show how they perform a competency. Multiple competencies can be assessed at one time to more closely represent a real clinical environment without risk of patient harm. The assessment can be standardised for all candidates. Standardisation allows practical examinations and simulations to be highly valid methods of assessment [6–8].

Together with technical tasks performed on simulated teeth in a dental manikin, the practical examination uses OSCEs to assess a candidate's knowledge and performance across a number of stations.

An OSCE is ''an assessment tool based on the principles of objectivity and standardisation, in which the candidates move through a series of time-limited stations in a circuit for the purposes of assessment of professional performance in a simulated environment. At each station candidates are assessed and marked against standardised scoring rubrics by trained assessors''[9].

The station element of OSCEs allows the sampling of various competencies and the opportunity to reproduce a wide variety of clinical situations. Stations can be set up with clinical scenarios or practical skill demonstrations using standardised patients or simulations. OSCEs also have the potential to assess non-patient-based competencies such as infection control [3]. OSCEs have been shown to have high validity, if constructed effectively [3,10]. In simple terms, validity refers to whether or not an assessment measures what it is intended to measure.

A valid assessment must also necessarily be a reliable assessment. Reliability refers to the reproducibility or replicability of an assessment. OSCEs require standardisation of the activities and examiners [11] to optimise reliability. The reliability of OSCEs also increases with the number of stations and the number of examiners. Reliability is commonly estimated using the internal-consistency measure, Chronbach's alpha. The higher the score, the more reliable the test result. OSCEs incorporating between ten and twenty stations have shown reliability scores of 0.8 and greater. Such a score is generally accepted to indicate that OSCEs can be a suitable method of assessment for high stakes purposes, such as the assessment of competence for the purpose of eligibility for registration [3].

6.1.2. Practical examination structure

The General Dentistry practical examination is a two-day examination consisting of a clinical skills day and a technical skills day. The format of each day varies from an OSCE format in the clinical skills day and simulated technical tasks on typodonts in dental manikins in the technical skills day. More detailed structure of each examination day is given in the following sections and is outlined in Figure 4.

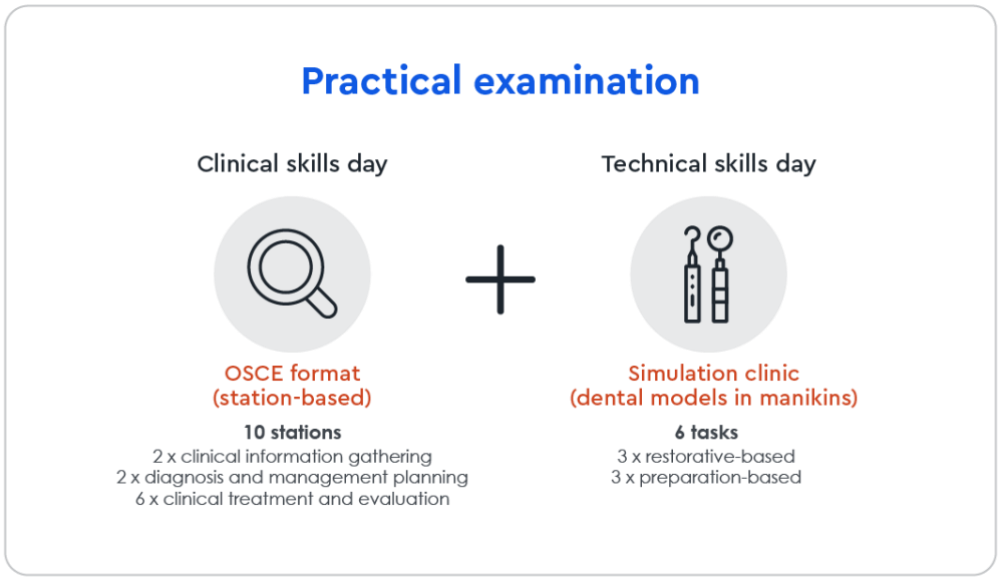

Figure 4 – practical examination format

Each two-day examination can assess a maximum of twenty-four candidates (Figure 5).

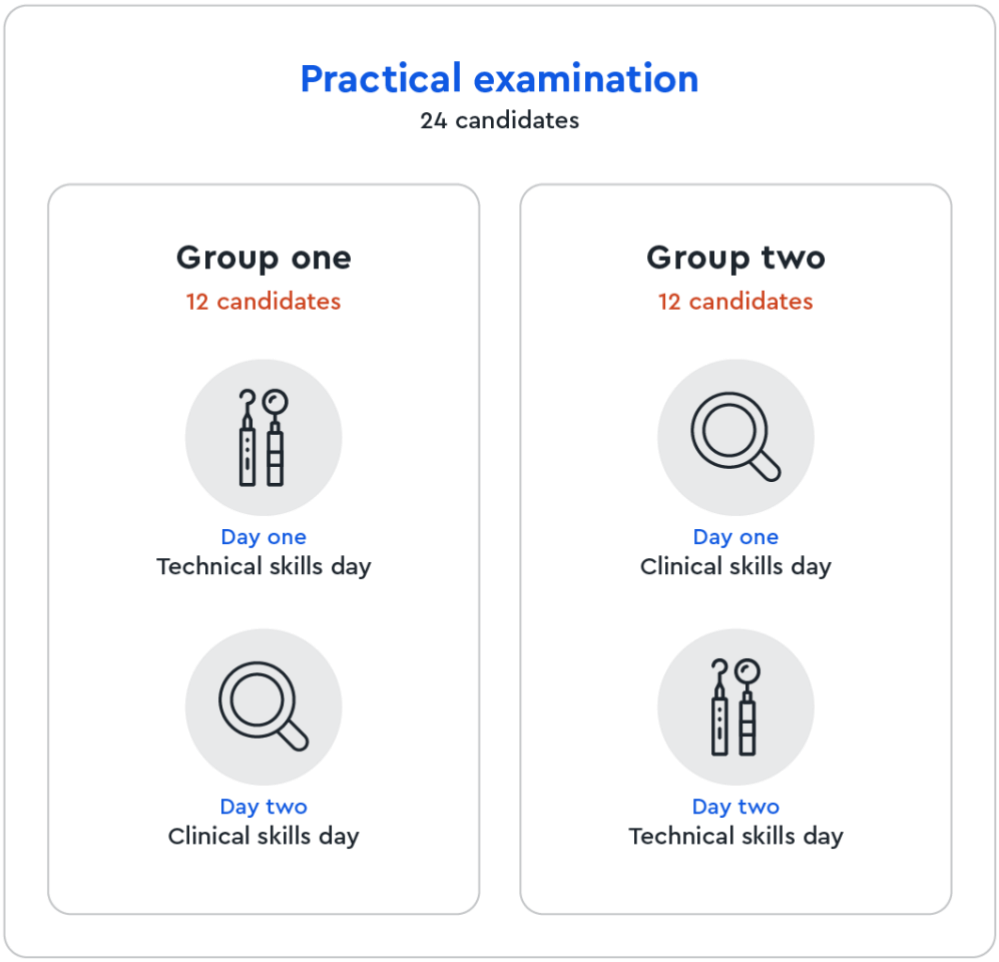

Figure 5 - Day allocations for candidates sitting a practical examination

6.1.3. Technical skills day

Content

The technical skills day focuses on the demonstration of technical skills described under domain 6.3, *Patient Care – Clinical Treatment and Evaluation* of the competencies. This covers the provision of evidence-based patient-centred care and may include tooth preparation and /or restoration related to:

- conservation
- endodontics
- fixed prosthodontics.

Process

During the technical skills day, candidates are required to complete six tasks on pre-prepared, standardised typodont models in manikin heads mounted on clinically realistic simulation units.

Half the technical tasks will be restorative-based i.e. placing a restoration, half the task will be preparation-based i.e. preparing a tooth to receive a restoration or other procedure.

All tasks are relevant to contemporary practice in Australia and are designed to reflect the skills needed to manage common or important clinical situations. Example technical skills day examination tasks include:

- the preparation of a carious tooth/teeth
- the restoration of a prepared tooth/teeth with resin composite
- the restoration of a prepared tooth/teeth with amalgam
- the preparation and/or temporisation of a tooth/teeth to receive an indirect restoration(s)
- an endodontic procedure.

The ADC continually develops technical tasks for use in these assessments and currently has an "item bank" of tasks that have been shown to have high validity and reliability.

6.1.4. Clinical skills day

Content

The clinical skills day focuses on the demonstration and assessment of the professional competencies described under sub-domains 6.1, 6.2 and 6.3 of the competencies:

- clinical information gathering
- diagnosis and management planning
- clinical treatment and evaluation.

Process

During the clinical skills day candidates are required to complete a ten-station OSCE. This is a station-based examination, where candidates are allocated a defined amount of time at each station. Each station is set up in a designated room with a different task relating to a clinical scenario or clinical skill demonstration. Tasks may include the use of standardised simulated patients, video-based scenarios, procedures on manikins and/or other related resources.

The clinical skills day assessment uses two types of OSCE stations, standard OSCE stations (e.g. history taking, communicating a management plan) and technical/procedural OSCE stations (e.g. taking radiographs, rubber dam application, partial denture design). Standard OSCE stations are observed, whilst technical/procedural OSCEs may be observed or unobserved.

In common with the technical tasks, the ADC continually develops OSCE tasks for use in these assessments and currently has an "item bank" of tasks that have been shown to be both valid and reliable.

7. Assessment of tasks

All observed clinical skills day tasks are marked by an examiner at the time of the task. Unobserved clinical skills day tasks and all technical skills day tasks are marked by two independent examiners after the examination. Examination results are generally released within six weeks of an examination.

Examination areas are fitted with CCTV. Recording of examinations can be used for examiner training purposes. All examiners are trained and calibrated.

7.1. Rating

Individual candidate performance in each clinical skills day OSCE station task and technical skills day task is assessed using both global rating scales and checklists.

A global rating scale gives a rating of a candidate's overall performance in a task. Global rating scales are appropriate when evaluating multifaceted domains such as clinical information gathering.

A candidate can receive one of five global rating grades for their overall task performance: outstanding, pass, borderline, fail or bad fail.

Examiners also assess candidate performance in a task using a checklist. Individual assessment criteria (or items) are presented to the examiner in the form of a checklist and are used by examiners to assess performance in a standardised and reliable manner. Examiners rate candidates across a range of criteria for each task. The criteria have been developed to identify the attributes of the task which are assessed and to define what a competent candidate should be able to achieve.

A candidate can receive one of four possible grades for each checklist criterion: very good, satisfactory, borderline or unsatisfactory. Each grade relates to a numerical score of 3, 2, 1 or 0 respectively.

The grade description for each criterion may vary by task however, in broad terms, the grade descriptors are outlined below.

Very good	identifies a competent performance, above that expected, which is thorough, complete and well executed.
Satisfactory	identifies minor deviations from a very good performance which • could be easily corrected and/or • would not significantly compromise the clinical outcome and/or • might reasonably occur on occasions when a task is undertaken by a competent operator.
Borderline	identifies additional, more major deviations from a very good performance which • should, where possible, have been corrected during the task • would compromise the clinical outcome to a minor extent and/or • should not often occur when a task is undertaken by a competent operator.
Unsatisfactory	identifies additional, major deviations from a very good performance which • cannot be corrected and/or • would significantly compromise the clinical outcome and/or • should not occur when a task is undertaken by a competent operator.

7.2. Scoring

When scoring a candidate's performance, the unit of analysis is the station, task, or cluster and not the checklist criterion as checklist items are mutually dependent e.g. a correct diagnosis would be dependent on a candidate taking an appropriate history. Candidates receive an overall score for each station or technical task. The score is calculated by adding together the checklist scores given to each of the criteria assessed in that task.

The passing score for each station/technical task is established using borderline regression – a criterion-referenced standard setting method. Borderline regression is an objective, reproducible method for calculating the checklist score at the boundary between a satisfactory and an unsatisfactory performance. The borderline regression method uses the expertise of the panel of trained and calibrated examiners to assign appropriate "global scores" and objectively establishes the pass standard in a way that has been shown to provide a more credible and reliable standard than the more traditional standard-setting methods such as the Angoff method [12].

Borderline regression uses all the data of a group of candidates. A linear regression model is used to determine the relationship between global rating scores and checklist scores for all candidates at a station or task to obtain a station pass mark. This can be used to calculate an overall pass mark.

A worked example of borderline regression is provided at Appendix 2.

7.3. Final result grade derivation

To gain an overall pass in the practical examination a candidate must:

- gain an overall pass in each of the five clusters of the clinical skills day, and
- gain an overall pass in both clusters of the technical skills day.

As detailed in the blueprint, all stations in the clinical skills day are assigned to one of three domains. These three domains are used as "clusters" during analysis of the clinical skills day tasks.

In addition, individual criteria which have been grouped into the communication and infection control subdomains across multiple stations (see section 6) form two additional clusters, giving a total of five clusters:

- clinical information gathering
- diagnosis and management planning
- clinical treatment and evaluation
- effective communication
- infection control.

Tasks in the technical skills day are assigned to one of two groups:

- restoration-based tasks
- preparation-based tasks.

These groups are the clusters used in analysis of the technical skills day tasks.

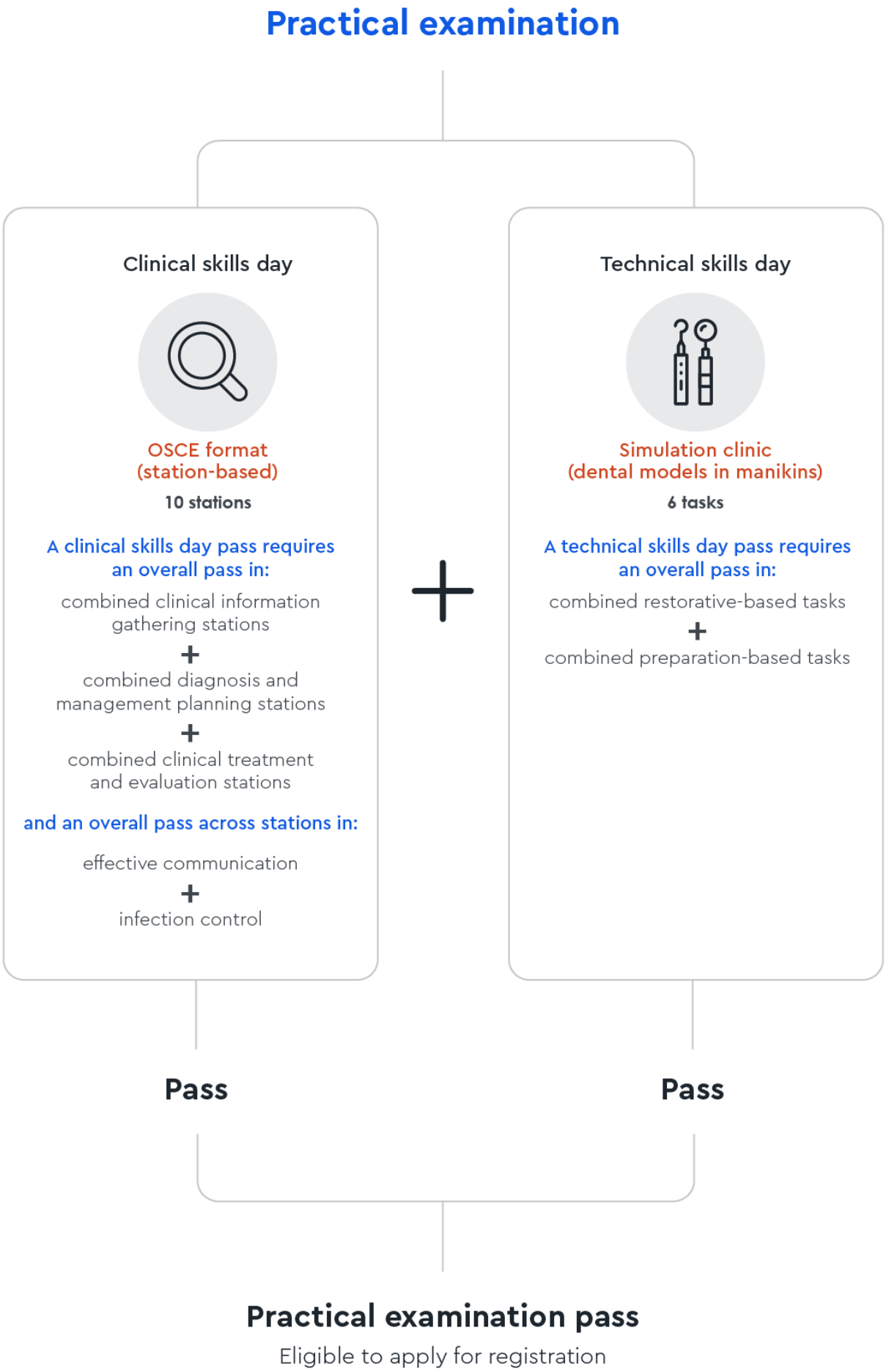

Figure 6 – Practical examination format

A candidate's final result for the practical examination is calculated using a partial compensatory test scoring model. A test scoring model refers to the way station/task scores are combined to arrive at an overall result for the examination as a whole. A partial compensatory scoring model will be used to calculate the final pass/fail decision for each individual examination day.

In a partial compensatory scoring model each station/task is assigned to a "cluster" of other like tasks/stations. A pass/fail decision is reached for each domain cluster by performing a borderline regression of all global scores against all criteria scores within that cluster.

An expert reference panel is used to assign a competency specific rating for the criteria assigned to the communication and infection control subdomain clusters. This competency rating is used in conjunction with the criteria scores for borderline regression.

The use of borderline regression standard setting for setting the passing standard for each station, combined with a partial compensatory method for determining the final pass/fail decisions for an examination, has been shown to be a credible method for minimising the number of incorrect decisions made about passing and failing a candidate [12].

To obtain an overall "pass" in the practical examination candidates must pass both days of the examination at a single attempt. The clinical skills day and technical skills day are assessing fundamentally different competencies and a strong performance on one examination day cannot compensate for a substandard performance on the other examination day.

A worked example of a final grade derivation is provided below.

These are indicative examples of how final grades are derived and do not represent the outcome of actual examinations.

7.3.1. Example 1 – passing candidate

Clinical skills day

Station	1	2	3	4	5	6	7	8	9	10
Station result	Fail	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass
Cluster	**Cluster 1**		**Cluster 2**		**Cluster 3**					
Cluster result	Pass		Pass		Pass					
Explanatory notes	This cluster combines the scores from both clinical information gathering stations. A high score in station 2 compensated for a poor score in station 1. The candidate achieved an overall pass score for this cluster.		This cluster combines the scores from both diagnosis and management planning stations. The candidate achieved an overall pass score for this cluster.		This cluster combines the scores from all clinical treatment and evaluation stations. Combined scores in stations 5, 6, 8, 9, and 10 were sufficient to compensate for a poor score in station 7. The candidate achieved an overall pass score for this cluster.					
Cluster	**Cluster 4**							**Cluster 5**		
Cluster result	Pass							Pass		
Explanatory notes	This cluster combines the scores given for effective communication across multiple stations. This candidate achieved an overall pass for this cluster.							This cluster combines the scores given for infection control across multiple stations. This candidate achieved an overall pass score for this cluster.		
Clinical skills day overall result	Pass									
Explanatory notes	A clinical skills day pass requires a pass in all 5 clusters. This candidate passed all 5 clusters and therefore passes the clinical skills day.									

Technical skills day

Task	1	2	3	4	5	6
Task result	Fail	Pass	Pass	Pass	Fail	Pass
Cluster	**Cluster 1**			**Cluster 2**		
Cluster result	Pass			Pass		
Explanatory notes	This cluster combines the scores from all 3 restorative-based tasks. High scores in tasks 2 and 3 compensated for a poor score in task 1.			This cluster combines the scores from all 3 preparation-based tasks. High scores in tasks 4 and 6 compensated for a poor score in task 5.		
Technical skills day overall result	Pass					
Explanatory notes	A technical skills day pass requires a pass in both clusters. This candidate passed clusters 1 and 2 and therefore passes the technical skills day.					

This candidate would PASS the practical examination as a whole as they passed both days of the examination.

7.3.2. Example 2 – failing candidate

Clinical skills day

Station	1	2	3	4	5	6	7	8	9	10
Station result	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass	Fail
Cluster	Cluster 1		Cluster 2		Cluster 3					
Cluster result	Pass		Pass		Fail					
Explanatory notes	This cluster combines the scores from both clinical information gathering stations. The candidate achieved an overall pass score.		This cluster combines the scores from both diagnosis and management planning stations. A high score in station 3 compensated for a poor score in station 4. The candidate achieved an overall pass score for this cluster.		This cluster combines the scores from all clinical treatment and evaluation stations. Combined scores in stations 5, 6, 8 and 9 were not sufficient to compensate for poor scores in stations 7 and 10. The candidate achieved an overall fail for this cluster.					
Cluster	Cluster 4							Cluster 5		
Cluster result	Pass							Fail		
Explanatory notes	This cluster combines the scores given for effective communication across multiple stations. This candidate achieved an overall pass for this cluster.							This cluster combines the scores given for infection control across multiple stations. This candidate achieved an overall fail score for this cluster.		
Clinical skills day overall result	Fail									
Explanatory notes	A clinical skills day pass requires a pass in all 5 clusters. This candidate failed clusters 3 and 5 and therefore fails the clinical skills day.									

Technical skills day

Task	1	2	3	4	5	6
Task result	Fail	Pass	Pass	Pass	Pass	Pass
Cluster	Cluster 1			Cluster 2		
Cluster result	Pass			Pass		
Explanatory notes	This cluster combines the scores from all 3 restorative-based tasks. High scores in tasks 2 and 3 compensated for a poor score in task 1.			This cluster combines the scores from all 3 preparation-based tasks. The candidate achieved an overall pass score for this cluster.		
Technical skills day overall result	Pass					
Explanatory notes	A technical skills day pass requires a pass in both clusters. This candidate passed clusters 1 and 2 and therefore passes the technical skills day.					

This candidate would FAIL the practical examination as a whole as they did not pass both days of the examination.

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Appendix 1

Example written examination blueprint for general dentistry.

ADC written examination blueprint General dentistry			Domains				
			Professionalism (1)	Health promotion (4)	Clinical information gathering (6.1)	Diagnosis and management planning (6.2)	Clinical treatment and evaluation (6.3)
			Cluster 1		Cluster 2	Cluster 3	Cluster 4
		Target % of questions	8%	12%	30%	30%	20%
Disciplines	Dental emergencies	7%					
	Endodontics	8%					
	General medicine *(inc. medical emergencies and special needs dentistry)*	9%					
	Infection prevention and control	5%					
	Oral medicine and pathology	9%					
	Oral surgery	8%					
	Paediatric dentistry and orthodontics	8%					
	Pain and behaviour management	7%					
	Periodontics	8%					
	Preventive dentistry	8%					
	Radiography	5%					
	Removable prosthodontics	6%					
	Restorative dentistry *(inc. fixed prosthodontics)*	12%					

Examination format:

- Scenario-based, multiple-choice questions
- 240 scored questions
- 40 unscored questions

Subdisciplines (assessed across multiple disciplines)	
Implants	4%
Pharmacology	10%

Appendix 2

A worked example using borderline regression

For each OSCE station, a candidate is scored across 15 different criteria. A candidate can receive one of four possible grades for each checklist criterion: very good, satisfactory, borderline or unsatisfactory. Each grade relates to a numerical score of 3, 2, 1 or 0 respectively. A candidate can therefore receive a minimum score of 0 and a maximum score of 45 for an individual OSCE station.

The examiner also gives each candidate an overall score for that task, called a global rating. A candidate can receive one of five global rating grades for their overall task performance: outstanding, pass, borderline, fail or bad fail. (Each global rating grade relates to a numerical score of 4, 3, 2, 1 or 0 respectively).

Data for an OSCE station was collected over three different examination sessions. Twelve candidates sat each examination session giving 36 individual sets of scores (see figure 1).

During borderline regression candidate scores are plotted against global ratings giving a regression line. The intercept of the regression line on the score axis for those candidates given a global rating of borderline gives the passing score for that station – in this case the passing score is 23 out of 45 (see figure 2).

Exam date	**Student ID**	**OSCE station 1 score** (out of 45)	**Global rating**	**Global score**
09/07/2018	41	22	Borderline	2
09/07/2018	42	29	Borderline	2
09/07/2018	43	13	Borderline	2
09/07/2018	44	38	Outstanding	4
09/07/2018	45	19	Borderline	2
09/07/2018	46	24	Pass	3
09/07/2018	47	25	Pass	3
09/07/2018	48	24	Borderline	2
09/07/2018	49	26	Pass	3
09/07/2018	50	29	Pass	3
09/07/2018	51	39	Outstanding	4
09/07/2018	52	41	Outstanding	4
16/07/2018	53	8	Bad fail	0
16/07/2018	54	22	Fail	1
16/07/2018	55	25	Borderline	2
16/07/2018	56	34	Outstanding	4
16/07/2018	57	31	Pass	3
16/07/2018	58	30	Pass	3
16/07/2018	59	23	Pass	3
16/07/2018	60	28	Borderline	2
16/07/2018	61	29	Pass	3
16/07/2018	62	16	Fail	1

16/07/2018	63	17	Borderline	2
16/07/2018	64	40	Outstanding	4
23/07/2018	65	9	Bad fail	0
23/07/2018	66	10	Bad fail	0
23/07/2018	67	19	Bad fail	0
23/07/2018	68	26	Borderline	2
23/07/2018	69	27	Pass	3
23/07/2018	70	20	Fail	1
23/07/2018	71	28	Pass	3
23/07/2018	72	30	Outstanding	4
23/07/2018	73	14	Bad fail	0
23/07/2018	74	17	Fail	1
23/07/2018	75	20	Fail	1
23/07/2018	76	19	Borderline	2
23/07/2018	77	36	Pass	3

Figure 1 Candidate scores

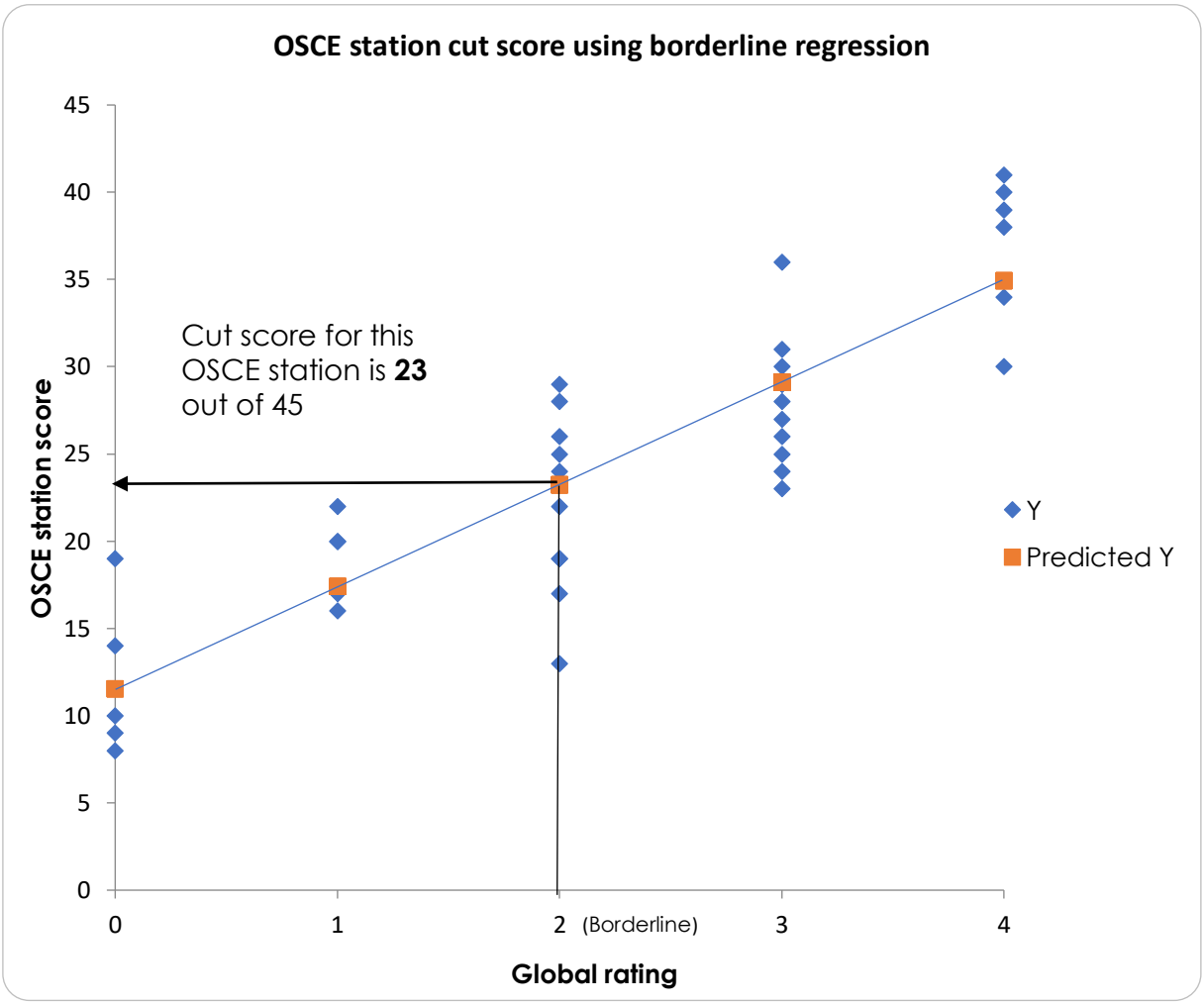

Figure 2. Station cut score estimation using borderline regression