

Technical Report

Assessment of Clinical Skills™ 2017

The National Dental Examining Board of Canada



The National Dental
Examining Board of Canada

Le Bureau national d'examen
dentaire du Canada

™

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Table of Contents

Introduction.....	4
Part A – NDEB Examinations and Assessments.....	5
Conditions for Receiving a Certificate.....	5
Current Examinations for Graduates of Accredited Programs	7
Current Assessments for Graduates of Non-Accredited Programs (NDEB Equivalency Process)	8
Part B – Development	10
Test Construction Process and Validity Evidence	10
Examinations Committee	10
Staff Support	11
Selection of Assessment Centres	12
Requirement Selection.....	12
Assessment Preparation and Administration	13
Evaluation of Assessment Materials	13
Test Validity and Reliability.....	14
Documentation.....	14
Part C – Administration.....	16
Validity and Reliability Evidence Collected and Evaluated during the Administration of the Assessment	16
Personnel.....	16
Training and Calibration.....	17
Set Up and Verification	17
Participant Registration, Orientation and Set up	18
During the Assessment	18
Part D - Scoring	19
Validity and Reliability Evidence Collected and Evaluated during the Evaluation Session	19
Personnel.....	19

Training and Calibration.....	20
The Evaluation Process.....	20
Grading Process	21
Post Evaluation Review.....	22
Reporting Results	22
Appeals.....	26
Part E - Security.....	27
Part F – Outcomes Summary	29
Assessment of Clinical Skills (ACS)	29
Pass Rate Statistics.....	29
Historical Participant Numbers.....	29
Results by Requirement	30
Part G - Glossary.....	33
Part H – Appendices.....	34
Appendix A – Key Supporting References	34
Appendix B – Competencies for a Beginning Dental Practitioner in Canada	35
Appendix C – External Evaluation Procedures	38
Appendix D – Publications	39

Introduction

Organizations who administer high-stakes examinations must be concerned with validity, reliability and fairness because these measures are required in making pass/fail decisions affecting candidates for licensure or certification. Fairness to examinees and protection of the public are the foremost concerns for the NDEB and the NDEB has an obligation to provide the highest quality examination program possible.

This Technical Report is a summary of the processes followed by the NDEB to develop, administer, and score the Assessment of Clinical Skills (ACS) administered in 2017. It provides a summary of the information needed to support the validity and reliability of the assessment. For additional detailed information, key references are included in Appendix A.

This report serves as a reference for the members of the NDEB Examinations Committee, NDEB Board, and Provincial Dental Regulatory Authorities (DRAs). The processes described in this report may differ from those used in other years.

Part A – NDEB Examinations and Assessments

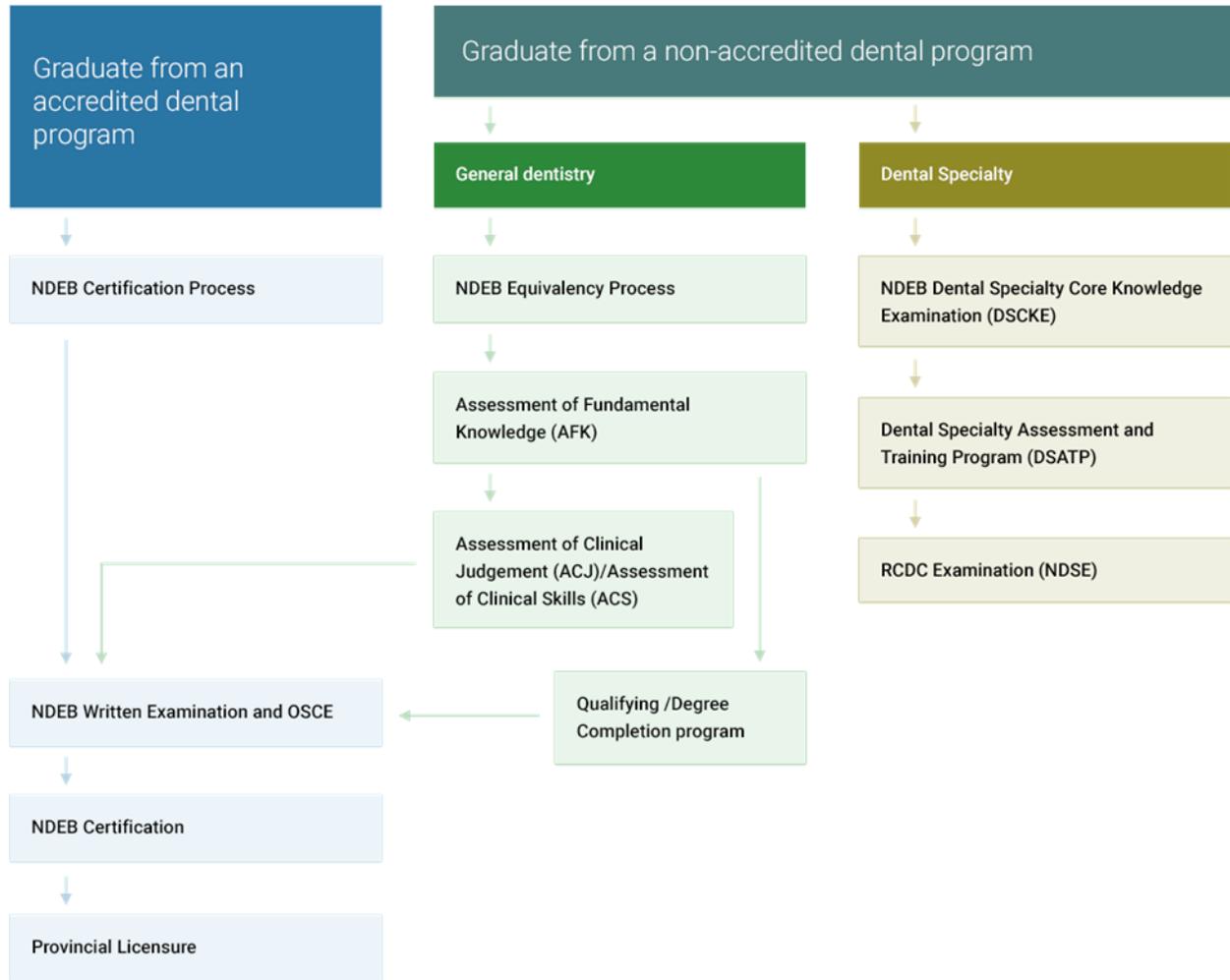
This section of the Technical Report outlines the full examination and assessment processes to demonstrate all of the aspects needed to obtain an NDEB Certificate.

Conditions for Receiving a Certificate

Successful completion of the NDEB's Written Examination and Objective Structured Clinical Examination (OSCE) is one of the conditions for receiving a licence to practice dentistry in Canada. A candidate, as defined under NDEB's published By-Laws, is granted a certificate upon presentation of the following documentation:

- evidence of graduation from an Accredited Program or successful completion of a Qualifying Program or NDEB Equivalency Process, and
- evidence that the candidate has passed the Written Examination and OSCE.

The following diagram illustrates the pathways to obtaining NDEB certification and licensure as a dentist in Canada.



Current Examinations for Graduates of Accredited Programs

Written Examination

The purpose of the Written Examination is to assess the Competencies for a Beginning Dental Practitioner in Canada that can be evaluated through multiple-choice formats. The content categories that form the blueprint for the Written Examination are based on the 47 competencies. The Written Examination assesses the following constructs: basic science knowledge and applied clinical science knowledge and judgement, including diagnosis, treatment planning, prognosis, treatment methods, and clinical decision making.

The Written Examination consists of two books, each with 150 single answer multiple-choice questions. Each book is given in a 2.5 hour (150-minute) examination session. The sessions are held in the morning and afternoon of one day at established examination centres. Generally, candidates complete the Written Examination with time remaining. Consequently, there is no evidence that the Written Examination is a speeded test.

The NDEB website displays the examination blueprint, a list of reference texts commonly used in Canadian dental programs, and all necessary logistical details. Approximately 3,500 questions, including many used on past examinations are also available on the NDEB website (www.ndeb-bned.ca). These released questions are updated annually.

Objective Structured Clinical Examination (OSCE)

The OSCE is a one-day station-type examination administered the day after the Written Examination. It is designed to test aspects of clinical judgement. OSCE stations generally have two questions, and require the candidate to review the information supplied (e.g. patient history, photographs, radiographic images, casts, models) and answer multiple response type questions. Each question has up to 15 answer options and one or more correct answer(s). Some stations may require the candidate to review the information supplied and write an acceptable prescription for a medication commonly prescribed by general dentists in Canada. Candidates have five minutes at each station to answer the questions. After five minutes, the candidates move to the next station.

Current Assessments for Graduates of Non-Accredited Programs (NDEB Equivalency Process)

Graduates of non-accredited dental programs are required to complete the NDEB Equivalency Process or a two-year Degree Completion Program prior to being eligible to participate in the Certification Process.

Self-Assessment

Prior to applying for the Equivalency Process, individuals are advised to complete a 100-item single answer multiple choice question self-assessment available on the NDEB website. Guidance is provided to individuals based on their self-assessment results.

Credential Verification

The NDEB performs an in-depth credential verification procedure for each individual applicant prior to approving the applicant as a participant in the NDEB Equivalency Process.

Assessment of Fundamental Knowledge (AFK)

The AFK consists of two books, each with 150 multiple-choice questions. Each book is given in a three-hour session. The sessions are held in the morning and afternoon of one day.

The AFK tests biomedical science knowledge and applied clinical science knowledge. Prior to the assessment, participants are advised to go on the NDEB website to look at the blueprint and a list of reference texts commonly used in Canadian dental programs along with all necessary logistical details.

Assessment of Clinical Skills (ACS)

During the two-day ACS, participants perform simulated dental procedures on manikins in a clinical setting.

Each day participants receive:

- a typodont mounted in a manikin on a dental chair.
- a detailed list of requirements specifying tooth numbers and surfaces.

Participants are required to perform 12 requirements over the two days. Calibrated Examiners evaluate the requirements anonymously.

Assessment of Clinical Judgement (ACJ)

The ACJ consists of two books given in a single day.

Book 1 A and B - Diagnosis, Treatment Planning and Clinical Decision Making

These components contain single and multi-answer multiple choice questions, and evaluate the participant's ability to formulate a diagnosis and to make clinical decisions. Patient histories, dental charts, and photographs may be provided for patients of all ages, including those with special needs.

Book 2 - Radiographic Interpretation

This component contains multi answer multiple choice questions and evaluates the participant's knowledge in oral radiology and ability to make a radiographic interpretation and diagnosis using radiographic images.

Part B – Development

Test Construction Process and Validity Evidence

Examinations Committee

The Examinations Committee of the Board consists of nine members appointed by the Board. One of these members may be the Public Representative. No more than two persons can be recommended to be members by each of the Ordre des dentistes du Québec and the ACFD. Staff support for the Committee includes the Executive Director, Managers, and the Chief Examiners for all assessments and examinations.

Examinations Committee members must abide by a terms of reference document that forms part of the NDEB By-Laws. According to the terms of reference, the Examinations Committee members must be elected by the NDEB Board. Term limits and other administrative processes are also outlined in the terms of reference.

The Examinations Committee ensures the examinations and assessments are conducted in a fair and equitable manner for all concerned. The Committee:

- reviews the standards and procedures of all examinations and assessments and makes recommendations to the Board on all matters concerning the examinations and assessments.
- reviews the passing standard for each examination and assessment and makes a recommendation to the Board.
- recommends to the Board, Chief Examiners for each of the Board's examinations and assessments.
- reviews the protocols for each of the Board's examinations and assessments and submits the protocols to the Board for approval. Suggestions for changes to the protocols are initiated by staff and the Chief Examiners.
- recommends to the Board future changes to the structure or format of the examinations and assessments.
- reviews the names of individuals recommended for appointment as Examiners by the DRAs, the Deans and Directors of the dental programs in Canada, and the Canadian Forces Dental Services recommends Examiners to the Board for appointment. This appointment process ensures that Examiners represent various areas of practice and come from across Canada.
- recommends the appointment of consultants who are recognized for their expertise and/or experience in examination and assessment development to the Board.
- reviews results of the examinations and assessments to ensure consistency of the examinations and assessments over each administration. This is to confirm that the performance required to meet the standardized passing score is the same for each version and that participants and candidates results from different versions are comparable.

- contributes to maintaining examination and assessment integrity by reviewing summaries of reports from Test Administrators, Presiding Examiners and Assessment Supervisors on irregularities identified during an administration.
- If an examinee is reported to have compromised the process by cheating or violating the regulations, the Committee has the authority to void the results of that examinee's examination and to prohibit the examinee from taking the future examinations.

Staff Support

The Director of Examinations, who reports to the Executive Director and Registrar, is responsible for staff supervision and the implementation of all policies approved by the Board to ensure the process operates efficiently and effectively.

The Board appoints the Chief Examiner and Assistants to the Chief Examiner. The ACS Chief Examiner is responsible for the development of the Assessment including selection of Assessment Supervisors, Invigilators, Facilitators, Evaluators, Assessment teeth, calibration (both of materials and personnel), and review of results.

The Chief Examiner and Assistants to the Chief Examiner, in consultation with the Executive Director and Registrar, Director of Examinations, and other NDEB staff, are responsible for overseeing the preparations for the ACS administration including:

- appointing appropriate personnel
- assisting with communications between the NDEB and personnel for each site
- selecting the specific teeth used in the Assessment
- preparing typodont teeth for Assessment restorations
- drafting Assessment documents
- preparing training and calibration documents including PowerPoint presentations
- directing staff on the preparation and assembly of materials
- assuring uniformity of the typodont set ups

The Manager-Assessments, in consultation with the Executive Director and Registrar, Director of Examinations, and Chief Examiner, prepares and administers the Assessment including preparing typodonts, protocols, production and translation of Assessment material, and identification cards. The Manager-Assessments is supported by an Assessments Coordinator and Assessments Assistant.

The Manager-CVPS and Manager-Communications correspond with Assessment Supervisors, Assistant Assessment Supervisors, Invigilators, Facilitators and Evaluators to arrange assessment/evaluation facilities and participation in the Assessment and Evaluation Session.

All staff are responsible for carrying out directives from the Examinations Committee as approved by the Board.

Selection of Assessment Centres

The ACS is held in June and December at participating Faculties of Dentistry across Canada and at the University of Otago in New Zealand. A minimum of 25 participants must register for a location to establish an Assessment centre at that location. At least one centre must be able to accommodate participants who request to take the ACS in French.

At least nine months prior to the Assessment, a letter is sent to the Dean/Director of nine Canadian Faculties of Dentistry requesting that their school host an ACS session. This letter provides detailed information regarding both the physical and human resources required in order to host a session and the financial arrangements.

For new ACS sites, the Chief Examiner, the Assessment Supervisor and Assistant Supervisor assigned to the Assessment Centre and an NDEB staff person perform a site visit and orientation session. During the site visit, the Chief Examiner determines that the school's dental clinic is acceptable and Assessment equipment is compatible with the clinic's equipment. There is variation in the equipment at the different schools but all ACS centres have equipment, lighting, and space that meet the standard of a clinical practice.

Requirement Selection

The ACS evaluates a participant's clinical skills through the completion of dental procedures (requirements) on a simulated patient (manikin). The NDEB Examinations Committee reviews and revises the ACS requirements annually and recommends the requirements to the Board as part of a protocol.

Assessment Requirements - Blueprint

- Class II amalgam preparation
- Class III composite resin preparation
- Full metal crown preparation
- Metal-ceramic (porcelain fused to metal) crown preparation
- Endodontic access preparation on a molar tooth
- Direct Class II composite resin restoration on a pre-prepared* tooth
- Direct Class IV composite resin restoration on a pre-prepared* tooth
- Class II amalgam restoration on a pre-prepared* tooth
- Provisional crown restoration for a pre-prepared* metal-ceramic (porcelain fused to metal) crown preparation on Day 2 of the Assessment.
June ACS: The original unprepared tooth was in the typodont used on Day 1 of the Assessment and the crown preparation was performed on Day 2.
December ACS: A study model (one arch of a typodont) was given to each participant the morning of the provisional requirement.
- Dental dam application

- Record keeping
- Infection control and material hygiene

* the pre-prepared tooth is supplied.

Selection of Daily Requirements

The selection of the teeth for the Day 1 and Day 2 typodont requirements, the tooth and restorative procedure for the Dental Dam requirement and the procedures for the Record of Procedure Requirement is performed by the Chief and Assistant Examiner(s) for each assessment.

Assessment Preparation and Administration

The NDEB performed an in-depth review of commercially available manikins and typodont products prior to deciding to use the Nissin system distributed in North America by Kilgore International. The NDEB determined that this product simulates actual patient conditions better than other available systems. Simulation and technology are periodically reviewed to ensure that the examination reflects current practice.

Typodont systems are reviewed every three years so that advances in simulations can be integrated into the Assessment.

In the Assessment protocol, participants are supplied detailed information on all of the simulated teeth used in the Assessment. Kilgore International sells teeth to individuals, allowing participants to become familiar with the simulated teeth used in the ACS. For some of the requirements, Nissin manufactures custom teeth for the NDEB and these are only available to the NDEB. However, standard versions of these custom teeth are available for participants to purchase.

Evaluation of Assessment Materials

To ensure calibration several assessment teeth with caries are cut in the axial and sagittal planes and are made available to the examiners at the Evaluation Session and for the meetings of the Appeals Committee.

For the June ACS, assessment teeth were placed in the typodonts by NDEB staff. NDEB staff verified the cleanliness of the typodonts and integrity of the gingiva and teeth. For the December ACS, assessment teeth were placed in the typodonts by Kilgore. Each examinee received a brand new typodont.

The typodonts with the assessment teeth in place are individually reviewed by the Chief Examiner and/or the Assistant Examiner(s). The position, alignment, occlusion and tightness of the teeth are checked.

Test Validity and Reliability

The primary basis for establishing validity for certification examinations is to show that the process and results for examination development are a valid reflection of that part of the professional domain that the examinations purport to assess. That is, construct validity is about the relationships between the construct (professional competence) and the examination instruments. The Assessments in the Equivalency Process are built to be consistent with the “Competencies for a Beginning Dental Practitioner in Canada” (Appendix B). The content categories reflect both the educational programs and the demands of practice, and practitioners vet the assessments. The content blueprint of the Assessment of Clinical Skills (ACS) was established on the direction of the Canadian Dental Regulatory Authorities and is identical to the blueprint of the Assessment of Clinical Skills administered by l’Ordre des dentistes du Québec from 2001 to 2010. The blueprint was approved by a joint Examinations Committee meeting of the NDEB and l’ODQ and is shown as Requirement Selection. The blueprint is under revision following the 2015 Task Analysis.

In addition to the logical basis for asserting construct validity, the NDEB has carried out several studies, both internal and published, that support validity claims (Appendix C).

Documentation

Evidence of test validity is collected through multiple means, one of which is the documentation of development and administration procedures. The NDEB makes these documents publicly available. Only confidential material or material that could jeopardize the integrity of the examination/assessment is retained internally. These documents are also updated frequently (generally on an annual basis) to reflect the most recent information.

Publications and external evidence reinforcing the validity and reliability of NDEB processes can be found in Appendix C and D.

To support the various sources of validity and reliability evidence, NDEB produces the following documents:

NDEB By-Laws

The NDEB By-laws contain a number of sections related to the NDEB’s examination and assessment programs. Examples of relevant information include:

- Certification eligibility
- The Board’s certification and equivalency processes
- Examinations and assessments
- Conduct and appeals policies
- Terms of Reference for various examination-related committees
- Test Accommodations
- Misconduct

The By-Laws are available free of charge on NDEB’s website (www.ndeb-bned.ca).

Competencies for a Beginning Dental Practitioner in Canada (Appendix B)

This document outlines the body of knowledge that is assessed by the NDEB's examinations and assessments. A clearly outlined body of knowledge is key to establishing the content validity of examinations/assessments by providing a link between practice and the examination/assessment. This document is available in English and French on NDEB's website (www.ndeb-bned.ca).

Assessment of Clinical Skills Protocol

Updated annually, the Assessment of Clinical Skills (ACS) Protocol contains all the information the participant needs to prepare for the ACS. In addition to providing logistical information, this document is meant to reduce construct irrelevant variance related to testing. Participants acquire advance information on assessment content, instructions, and other procedures. At a high level, the ACS Protocol contains the following information:

- Schedule
- Instructions
- Requirements
- Equipment, Instruments and Supplies
- Regulations
- Grading Requirements
- Results
- Criteria
- Repeats

ACS Examiner's Manual

Reviewed and updated annually, the ACS Examiner's Manual is an internal document provided to Examiners and outlines the roles of the individuals involved in the ACS administration and Evaluation Session and provides information about calibration and grading.

NDEB website

The NDEB website, www.ndeb-bned.ca, has a comprehensive description of the ACS process. The information includes details of costs, times and locations. It identifies the registration process and Assessment requirements; details the criteria used in the evaluation process of the requirements and grade derivation grids. The grading criteria provided on the website are identical to the criteria used by Examiners. The website is thorough and available to interested individuals prior to application.

The quality and comprehensiveness of the information on the website about the ACS represents best practices in transparency and accountability. The objective information available ensures fairness in allowing participants to prepare and practice the requirements.

When participants receive confirmation of their ACS registration, they are also provided with details of the equipment available to them at their assigned Assessment centre. This includes a written description and several photographs of the handpiece coupler compatible with the school's equipment.

Part C – Administration

Validity and Reliability Evidence Collected and Evaluated during the Administration of the Assessment

Personnel

The following personnel are appointed to be present at each Assessment centre.

Assessment Supervisors and Assistant Supervisors

These are examiners appointed by the Board on the recommendation of a DRA or Faculty of Dentistry. They have advanced training in the ACS process and procedures. These individuals are calibrated and responsible for:

- ensuring appropriate training and calibration of Examiners
- set up and security of Assessment materials;
- ensuring compliance with standardized Assessment protocols;
- addressing any onsite disputes on process
- ensuring independent Examiner assessments of infection control and dental dam requirements
- confirming the evaluation of the onsite assessments of infection control and dental dam requirements.

Examiners (2-10)

These are individuals appointed by the Board on the recommendation of a DRA or Faculty of Dentistry act as Examiners. They are calibrated to set up, monitor the process, and evaluate the onsite requirements. In a session, held just prior to the ACS, Examiners receive training and are calibrated using standardized PowerPoint presentations. They then prepare the clinic facilities for the ACS. Examiners are responsible to set up the clinic, monitor participant compliance during the Assessment, report infractions, evaluate infection control and dam placements based on the standardized criteria, and assist in securing Assessment materials for transport.

Registered Dental Assistants (2-4)

The host institution recommends dental assistants. They have knowledge of the clinic and operations, provide access to Faculty sites, obtain and monitor Faculty equipment, and support Supervisors and Examiners in their Assessment functions. Dental assistants do not provide dental assisting services to any of the participants. Dental assistants are trained and delegated tasks by the Assessment Supervisors.

NDEB Staff (1-2)

NDEB staff members are onsite to provide support, ensure compliance with NDEB standardized processes and procedures, and secure Assessment material and equipment during transport to and from NDEB offices in Ottawa.

Assessment Coordinator (1)

The Assessment Coordinator is a full time clinical Faculty member, usually the Faculty of Dentistry Clinic Director. They provide onsite pre-Assessment logistical support, provide general support to the Assessment Supervisors, and monitor use of Faculty supplies and personnel.

Equipment Technician (1-2)

An equipment technician is provided by the Faculty of Dentistry to calibrate equipment prior to the Assessment, assist participants in initial set up, address any malfunctions during the Assessment, and provide general support to the Assessment Supervisors.

Training and Calibration

Each category of Assessment personnel receives specific written instructions before the Assessment. On the day prior to the Assessment, the Assessment Supervisor and Assistant Supervisor conduct training and calibration sessions for Examiners and school staff. Strict adherence to the ACS schedule and procedures for uniform administration of the ACS are emphasized. Assessment Coordinators review any unique features of equipment or operations of each clinic and discuss safety and emergency protocols.

Set Up and Verification

On the day prior to the Assessment, all personnel assist in setting up the clinic for the Assessment. Participants are assigned to specific clinical operatories based on seating charts prepared by NDEB staff. NDEB Assessment personnel verify that the typodont ID number on each typodont matches the operator assignment map and that the appropriate participant photo ID card is visible in each operatory. Assessment Supervisors and Examiners verify the uniform setup of each manikin, torso and typodont, including the occlusion. The opening of the typodont is adjusted using a gauge. Supervisors and Evaluators sign each participant's ID card during set-up confirming there is no existing damage to the gingiva.

Participant Registration, Orientation and Set up

On the morning of Day 1 of the Assessment, participants are required to provide government issued photo identification for comparison to material sent to the NDEB during the application process.

Participants receive a short, scripted orientation session accompanied by a standardized PowerPoint where ACS procedures and regulations are reviewed. Participants have the opportunity to ask questions of the Assessment Supervisor and Coordinator.

At the time indicated in the ACS schedule, participants are directed to their pre-assigned operatories in the clinic. All Assessment personnel are available to assist participants setting up their equipment and ensuring that equipment is in working order. The equipment technician addresses any technical issues. During this time, participants are also able to prepare the teeth assigned for practice.

During the Assessment

At the indicated time, the list of requirements for the day is distributed and the Assessment begins.

Supervisors and Examiners circulate and ensure that anatomically possible operating and patient postures are maintained throughout the Assessment. Participants are not graded on improper postures, but they are directed to correct non-anatomically possible positions. The infection control requirement is observed and graded by Examiners throughout the two days of the Assessment. Violations are noted and recorded on forms pre-printed for each participant. Final grades for this requirement are tabulated after the Assessment is completed.

The dental dam requirement is performed at different operatories at times pre-assigned to each participant throughout the two days of the Assessment. Participants are advised of their assigned time in their Day 1 registration materials.

Very few defects with typodont teeth are found. If there are voids on the axial surfaces, pre-printed stickers are placed on the participant's Communication Form to alert Evaluators to these manufacturing defects. If the voids are on margins, the teeth are replaced and participants are given a time extension.

Participants who experience undue delays because of clinic equipment failures or other circumstances, are given time extensions by the Supervisors or Examiners. Time delays are recorded on the Participant's ID card. When the total of the time delays reaches 30 minutes, a time extension is given.

For the December ACS, participants were given a study model to take the impression for the provisional crown preparation requirement on Day 2.

When provisionals are collected, invigilators sign off to indicate that the provisional crown is intact or broken. The provisional crown is placed in a clear crown container for secure shipping to the NDEB office.

Following the end of day procedures on Day 2, all typodonts and documents are boxed and shipped to Ottawa for grading. Grading forms used at the centres for the infection control and dental dam requirements are duplicated, with the instructions that they be destroyed once the originals are verified to be received intact in Ottawa.

Part D - Scoring

Validity and Reliability Evidence Collected and Evaluated during the Evaluation Session

Personnel

Chief Examiner and Assistants to the Chief Examiner

The Chief Examiner and Assistants are responsible for:

- ensuring appropriate personnel are appointed for the evaluation session
- preparing all training and calibration material including PowerPoint presentations and example requirements for calibration,
- directing the text programming of the evaluation computers
- drafting documents used in evaluation procedures
- directing the set-up of the typodonts and documents for evaluation and
- providing direction to Facilitators and Evaluators throughout the evaluation session.

Facilitators

These are Examiners appointed by the Board on the recommendation of a DRA or Faculty of Dentistry. Two or more Facilitators are appointed for each requirement. They direct the calibration session for their assigned requirement, review requirements and grades in cases where Evaluators have not fully agreed on grades or locations and determine the appropriate final grades, and coordinate discussion between Evaluators on any issues that arise during the evaluation session.

Evaluators

These are examiners appointed by the Board on the recommendation of a DRA or Faculty of Dentistry. Sufficient Evaluators are appointed for each requirement. They evaluate the required procedures performed by the participants' and assign grades based on the criteria listed in the ACS Protocol.

NDEB staff

Full-time staff members of the NDEB are onsite to secure Assessment material and equipment during transport to and from the NDEB offices in Ottawa, set up and take down the calibration and evaluation material, provide computer support, and enter participant grades from the Assessment centres into the central evaluation computer system.

Training and Calibration

About six weeks prior to the Evaluation Session, Facilitators and Evaluators are sent specific material related to the requirement they are assigned to evaluate. Materials include the grading criteria, written guidelines for evaluation, a typodont and several Assessment teeth for their assigned requirement. Evaluators and Facilitators are directed to practice the requirement several times so that they are familiar with how the typodont teeth differ from natural teeth and the challenges that participants face during the Assessment. Evaluators are also directed to familiarize themselves with the evaluation criteria and guidelines.

The Evaluation Session starts with an introduction to the process and the NDEB followed by an orientation on the use of tablet computers for recording evaluations. Each Evaluator has the exclusive use of a tablet style computer for grading. Then, each requirement's Facilitators and Evaluators spend two to three hours in calibration and practice grading activities. First, they review and discuss example typodont teeth prepared to illustrate the requirement's possible grades. The assessment teeth with caries cut in the axial and sagittal planes are reviewed. They then practice grading using 10 examples of completed requirements, each with a suggested evaluation. They practice entering the evaluations on their tablet computers. The calibration materials are selected and prepared by the Chief Examiner and verified by the Assistants to the Chief Examiner.

Once evaluations have started, Facilitators are given extra instruction in the facilitation process and in the use of the tablet computers for facilitation procedures.

The Evaluation Process

Dental Dam Requirement – Graded on site at the ACS

Two Invigilators independently grade each dental dam placement. A Supervisor performs a third independent grading of the dental dam placement to confirm or facilitate the two Invigilator grades. In case of disagreement, a discussion takes place. The final grade is achieved by consensus. The dental dam requirement grades are entered in MobileLink by staff at the Evaluation Session.

Infection control and material hygiene – Graded on site at the ACS

Infection control and material hygiene is monitored on site by the Invigilators, the Assistant Supervisor, and Supervisor. Violations are documented on the Infection Control Grading sheets. The Infection Control and Material Hygiene requirement grades are entered in MobileLink by staff at the Evaluation Session.

Typodont Requirements – Graded at Evaluation Session

Typodonts and Participant Communication Forms are arranged numerically by participant number with no indication of the participant name or Assessment centre on the material. Each individual requirement is graded independently by two Evaluators. If there is not perfect agreement between the two evaluations (grade and error), the Facilitators' computer will show that facilitation is needed. A Facilitator reviews the typodont and the evaluations and assigns the appropriate grade and error.

Teeth are evaluated in the typodonts. In rare occasions, a tooth may be unscrewed and screwed back in the typodont to confirm the evaluation.

Pictures of debris that may be dislodged are taken.

Record of Procedure – Graded at Evaluation Session

The written Records of Procedure pages are sorted numerically and independently graded by two separate Evaluators. Discrepancies in grading are reviewed and final grades assigned by Facilitators. The Record of Procedure requirement grades are entered in MobileLink by staff at the evaluation session.

Facilitators are advised to look for patterns of grading discrepancies amongst the Evaluators and if such patterns are noted, to revisit the calibration materials with the Evaluators involved.

Grading Process

Grading

All requirements are assessed using a four-point system.

A+	clinically perfect, no corrections needed
A	clinically acceptable. Corrections could be made, but deficiencies will not affect function or durability.
D	clinically unacceptable. Corrections must be made to allow function or provide durability
E	clinically unacceptable. Significant corrections or alternate treatment needed

Requirements have one to three categories for grading. Each category is graded using the four-point system. Final grades for each requirement are calculated using the following grid:

2 A+ and no D or E	= A+
1 D and No E	= A
2 D and no E	= D
3 D or 1 E	= E

Participants overall grades for the twelve requirements of the ACS are calculated using the following grid:

8 A+ or A and no E	= Pass
9 A+ or A and one E	= Pass
Less than the above grades	= Fail

Computer Support

A central server compiles all evaluations and gives reports on the progress of the session. Results are immediately viewable in the same format that participants access results in their on-line. Compassionate Appeals are removed by NDEB staff before results are released. An import from the central server to the NDEB online portal is conducted generating a report of results for verification by senior NDEB staff. Results are released after the statistical analysis and verification steps are completed.

Post Evaluation Review

After all evaluations are completed, the Chief Examiner, Assistants to the Chief Examiner and other selected experienced Evaluators review all of the evaluations. Particular attention is paid to participants who have received scores within close proximity to the passing score. The main objective of the review is to ensure that the number of false negative and false positive results from the Assessment is minimal.

Reporting Results

Detailed results are provided to participants using the NDEB's online portal. Participants receive an email notification once results are posted. Participants can log in and view their overall results and a Report of Results containing details for each requirement. A partial example of a Report of Results follows.

Partial Example of a Participant's Report of Results

Class II Amalgam Preparation	Result: A+
<p>A+: External Outline Form</p> <p>No errors</p> <p>A: Internal Form</p> <p>Minor overpreparation occlusally</p> <p>Axial wall too deep: > 1.5 mm</p> <p>A+: Finish</p> <p>No errors</p>	

Infection Control	Result: A+
<p>A+: Infection Control</p> <p>No violations</p>	

Full Metal Crown Preparation	Result: A+
<p>A: Path of Draw and Axial Convergence</p> <p>A+: Preservation of Tooth/Structural Durability</p> <p>No errors</p> <p>A+: Finish and Margin</p> <p>No errors</p>	

Provisional Crown Restoration	Result: E
<p>D: Margin Contour and Adaptation</p> <p>Underextended 0.5 – 1.0mm</p>	
<p>D: Morphology and Occlusion</p> <p>Undercontoured</p>	
<p>D: Polish</p> <p>Unacceptable roughness</p>	

A: Path of Draw and Axial Convergence

Minor undercuts. Manageable by lab.

D: Preservation of Tooth/Structural Durability

Buccal, mesial, distal reduction 1.5 - 2.5mm

Lingual reduction 1.0 - 1.5mm

A: Finish and Margin

Located supragingival 0 - 1.0mm

Appeals

Participants who fail the Assessment request an appointment to view their Assessment typodonts. Typodont viewing appointments are held at the NDEB office in Ottawa.

Participants who fail the Assessment of Clinical Skills (ACS), can submit a written appeal to the NDEB provided the submission is received within three months of the release of results. Submissions are emailed to appeals@ndeb-bned.ca in PDF format and must include the grade(s) that the participant wants to appeal and outline the reasons why the participant wants the grade(s) changed. No other type of appeal submission is acceptable, including a video or USB.

Part E - Security

The NDEB takes several measures to ensure the security of its processes.

Credential Verification

Credential verification of applicants is performed to ensure that applicants to all processes are eligible for participation. While the credential verification process differs depending on the process applied for, each process includes source verification with the university to confirm the applicant's graduation.

Examinee Information

The NDEB uses a third-party web tool called BrightTrac for its registration application. BrightTrac accounts are password protected, and the data is stored on Amazon servers.

In house, the NDEB has candidate information in MS Access databases, and various documents are stored on NDEB servers. This information is only accessible to staff with valid network accounts and drive permissions.

Administration

The NDEB is in regular communication with on-site staff to keep them apprised of changes to administration processes and emphasize the importance of security measures such as standardized check-in procedures and restricted items. Test Administrators and invigilators are trained to identify, manage, and report misconduct.

On-site Security

The Test Administrator stores all examination material in a secure, locked area. After the completion of the assessments, all materials are returned to the NDEB office by courier. NDEB staff verifies the return of all materials including individually labeled books, identification cards, and, answer score sheets. These security measures help maintain the integrity of the assessments by limiting exposure to assessment items before and after the administration of the assessments.

Exam Security

The NDEB's examination metadata and statistics are stored in a SQL Server database on a separate secure server that is only accessible via the database's user interface. Individuals who do not have permissions to access the NDEB network are restricted.

The questions themselves are also restricted to only those users who need to access them via their network group policy rules.

The NDEB has a policy that questions in progress are never sent via email. Rather, they are uploaded to either our password-protected SharePoint or Basecamp sites for sharing and collaboration.

All NDEB portable devices are encrypted using BitLocker so no one can access anything without the proper credentials.

Security Analysis

During exam processing, a test analysis program is applied to the item results of all examinees. Those with extreme values are flagged for attention. In rare cases, examinees are informed that results of the examination/assessment will be delayed pending a review.

Copyright

NDEB staff regularly monitors online forums for exam content that is shared and follows up with legal action as needed.

Part F – Outcomes Summary

Assessment of Clinical Skills (ACS)

Pass Rate Statistics

	ACSJune2017	ACSDec2017
Number of Participants	422	390
Number of Passes	167	150
Pass Rate	39.57%	38.46%

Historical Participant Numbers

Number of Participants	ACSJune2017	ACSDec2017
Total	422	390
No. of 1st Try Participants	225	215
No. of 2nd Try Participants	123	124
No. of 3rd Try Participants	74	51

Note: Numbers are based on original participants who sat the ACS and include compassionate appeals which may have been granted and removed at a later date.

Results by Requirement

REQUIREMENT	Grade	ACSJune2017	ACSDec2017
Full Metal Crown Preparation	A+/A	64.45%	66.41%
	D	24.88%	22.31%
	E	10.66%	11.28%
	Total	100.00%	100.00%
Ceramometal Crown Preparation	A+/A	32.94%	20.26%
	D	51.90%	56.15%
	E	15.17%	23.59%
	Total	100.00%	100.00%
Provisional Crown Restoration	A+/A	57.82%	66.67%
	D	17.54%	16.67%
	E	24.64%	16.67%
	Total	100.00%	100.00%
Endodontic Access Preparation	A+/A	79.86%	78.21%
	D	14.22%	15.38%
	E	5.92%	6.41%
	Total	100.00%	100.00%
Class II Composite Resin Restoration	A+/A	82.23%	81.79%
	D	6.87%	9.23%
	E	10.90%	8.97%
	Total	100.00%	100.00%
	A+/A	40.05%	32.82%

Class IV Composite Resin Restoration	D	25.36%	28.46%
	E	34.60%	38.72%
	Total	100.00%	100.00%
Class III Composite Resin Preparation	A+ / A	82.70%	87.18%
	D	4.50%	6.15%
	E	12.80%	6.67%
	Total	100.00%	100.00%
Class II Amalgam Restoration	A+ / A	38.63%	44.10%
	D	27.01%	26.92%
	E	34.36%	28.97%
	Total	100.00%	100.00%
Class II Amalgam Preparation	A+ / A	47.63%	41.79%
	D	27.96%	30.77%
	E	24.41%	27.44%
	Total	100.00%	100.00%
Infection Control	A+ / A	91.94%	94.36%
	D	6.87%	4.10%
	E	1.18%	1.54%
	Total	100.00%	100.00%
Record Of Procedures	A+ / A	84.36%	93.85%
	D	11.37%	4.62%
	E	4.27%	1.54%
	Total	100.00%	100.00%

Dental Dam Application	A+ / A	79.62%	62.05%
	D	16.11%	27.44%
	E	4.27%	10.51%
	Total	100.00%	100.00%

Part G - Glossary

AADE	American Association of Dental Examinations
ACFD	Association of Canadian Faculties of Dentistry
ADA	American Dental Association
ADAC	American Dental Association Commission on Dental Accreditation
ADC	Australian Dental Council
AERA	American Educational Research Association
APA	American Psychological Association
CDA	Canadian Dental Association
CDAC	Commission on Dental Accreditation of Canada
CDRAF	Canadian Dental Regulatory Authorities Federation
DRA	Provincial Dental Regulatory Authorities
NCME	National Council on Measurement in Education
NDEB	National Dental Examining Board of Canada
ODQ	Ordre des dentistes du Québec
RCDC	Royal College of Dentists of Canada

Part H – Appendices

Appendix A – Key Supporting References

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Appendix B – Competencies for a Beginning Dental Practitioner in Canada

A competent beginning dental practitioner in Canada must be able to provide oral health care for the benefit of individual patients and communities in a culturally sensitive manner.

Competency assumes that all behaviours are supported by foundation knowledge and skills in biomedical, behavioural and clinical dental science and by professional behaviour. Beginning dental practitioners in Canada must be able to apply foundation knowledge and skills to justify their decisions and actions and to evaluate outcomes. Therefore, foundation knowledge, skills and professional behaviour are understood to be a part of every competency.

Competency also assumes that all behaviours are performed to an acceptable level and that the practitioner can evaluate their quality and effectiveness. Competency cannot be achieved without the ability to self-evaluate. Moreover, there are no degrees of competence: a dentist is either competent or not competent. The competencies below refer to general dental practice and include the management of patients of all ages including those with special needs. It is assumed that all oral health care is provided in an ethical manner, in accordance with legal requirements at the national and provincial level.

A beginning dental practitioner in Canada must be competent to:

1. recognize the determinants of oral health in individuals and populations and the role of dentists in health promotion, including the disadvantaged.
2. recognize the relationship between general health and oral health.
3. evaluate the scientific literature and justify management recommendations based on the level of evidence available.
4. communicate effectively with patients, parents or guardians, staff, peers, other health professionals and the public.
5. identify the patient's chief complaint/concern and obtain the associated history.
6. obtain and interpret a medical, dental and psychosocial history, including a review of systems as necessary, and evaluate physical or psychosocial conditions that may affect dental management.
7. maintain accurate and complete patient records in a confidential manner.
8. prevent the transmission of infectious diseases by following current infection control guidelines.
9. perform a clinical examination.
10. differentiate between normal and abnormal hard and soft tissues of the maxillofacial complex.
11. prescribe and obtain the required diagnostic tests, considering their risks and benefits.
12. perform a radiographic examination.
13. interpret the findings from a patient's history, clinical examination, radiographic examination and from other diagnostic tests and procedures.
14. recognize and manage the anxious or fearful dental patient.
15. recognize signs of abuse and/or neglect and make appropriate reports.
16. assess patient risk (including, but not limited to, diet and tobacco use) for oral disease or injuries.
17. develop a problem list and establish diagnoses.

18. determine the level of expertise required for treatment and formulate a written request for consultation and/or referral when appropriate.
19. develop treatment options based on the evaluation of all relevant data.
20. discuss the findings, diagnoses, etiology, risks, benefits and prognoses of the treatment options, with a view to patient participation in oral health management.
21. develop an appropriate comprehensive, prioritized and sequenced treatment plan.
22. present and discuss the sequence of treatment, estimated fees, payment arrangements, time requirements and the patient's responsibilities for treatment.
23. obtain informed consent including the patient's written acceptance of the treatment plan and any modifications.
24. modify the treatment plan as required during the course of treatment.
25. provide education regarding the risks and prevention of oral disease and injury to encourage the adoption of healthy behaviors.
26. provide therapies for the prevention of oral disease and injury.
27. recognize and institute procedures to minimize occupational hazards related to the practice of dentistry.
28. achieve local anesthesia for dental procedures and manage related complications.
29. determine the indications and contraindications for the use of drugs used in dental practice, their dosages and routes of administration and write prescriptions for drugs used in dentistry.
30. manage dental emergencies.
31. recognize and manage systemic emergencies which may occur in dental practice.
32. manage conditions and diseases of the periodontium, provide periodontal treatment when indicated and monitor treatment outcomes.
33. assess the risk, extent and activity of caries and recommend appropriate non-surgical and surgical therapy.
34. manage dental caries, tooth defects and esthetic problems and, when restoration is warranted, use techniques that conserve tooth structure and preserve pulp vitality to restore form and function.
35. manage patients with orofacial pain and/or dysfunction.
36. manage surgical procedures related to oral soft and hard tissues and their complications
37. manage trauma to the orofacial complex.
38. manage conditions and pathology of the pulp and provide endodontic treatment when indicated.
39. manage abnormalities of orofacial growth and development and treat minor orthodontic problems.
40. recognize and manage functional and non-functional occlusion.
41. select and, where indicated, prescribe appropriate biomaterials for patient treatment.
42. manage partially and completely edentulous patients with prosthodontic needs including the provision of fixed, removable and implant prostheses.
43. make records required for use in the laboratory fabrication of dental prostheses and appliances.

44. design a dental prosthesis or appliance, write a laboratory prescription and evaluate laboratory products.
45. apply accepted principles of ethics and jurisprudence to maintain standards and advance knowledge and skills.
46. apply basic principles of practice administration, financial and personnel management to a dental practice.
47. demonstrate professional behaviour that is ethical, supercedes self-interest, strives for excellence, is committed to continued professional development and is accountable to individual patients, society and the profession.

Definition

To “manage” the oral health care needs of a patient is assumed to include all actions performed by a health care provider that are designed to alter the course of a patient’s condition. Such actions may include providing education, advice, treatment by the dentist, treatment by the dentist after consultation with another health care professional, referral of a patient to another health care professional, monitoring treatment provided, but also may include providing no treatment or observation. “Manage” assumes the use of the least invasive therapy necessary to gain a successful outcome in accordance with patient wishes.

Appendix C – External Evaluation Procedures

A Report by the Commissioner of Examinations. Malcolm G. Taylor, Ph.D.-1966

A Study of the Accreditation Mechanism - 1983

Workshop on Preclinical and Clinical Examinations - 1985

1989/90 Certification Review Committee (CRC) to explore whether the granting of a certificate on the basis of accreditation alone continues to be acceptable

A Report of NDEB By-Laws and policies by the Honourable W.D. Parker - 1990

A psychometric analysis of examination evaluation methods by Dr. A. Rothman - 1991

Symposium - 1992

A Workshop on Clinical Competencies - 1993

A Consensus Conference on Certification of Graduates of Dental Programs accredited by the ADA Commission of Dental Accreditation – 1995ndeb

Conference on Competency in Oral Health Care, Education & Practice – 2000

NDEB Program Evaluation – André Boulais – 2001

Strategic Plan for 2006 – 2010

Review and Validation of Statistical Procedures – Mr. Thomas Maguire – 2004

CDA/DCF Teaching Conference: Review of Competencies for a Beginning Dental Practitioner in Canada - 2004

Written Examination Standard Setting Study - Chad W. Buckendahl – July 2007

OSCE Examination Standard Setting Study - Chad W. Buckendahl – February 2008

Psychometric Audit for the National Dental Examining Board of Canada Written Examination Program – M. Geddes – August 2012

Evaluating the impact of releasing the item pool of NDEB's written examination – Chad W. Buckendahl, Scott Russell, Myisha Stokes, Kristina Hallowell – May 2014

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Appendix D – Publications

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