

# Designing and implementing standards based, summative competency tests

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# Competency testing – Why?

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## Evaluation and feedback:

- the examinees skills
- fitness for progress junctures - Sim  
lab/year-year /graduation
- the skills training programme
- a quality assurance mechanism

# Competency Testing

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- **Transparency**
- **Documentation**
- **Mapping**
- **Domains and grade descriptors**

# Competency proforma

**Key Skill 4.1** Resin-bonded or hybrid bridge preparation

**AREA:** Oral Rehabilitation

**YEAR/ MODULE:** From BDS IV Module 4- BDS V Modules 1-4

## **RELEVANT GRADUATE COMPETENCES:**

### **Domain 2: Ethics & Jurisprudence**

*Major competence: Ethical Practice*

2.3 Sufficient information provided in order to gain informed consent for decisions regarding oral health care delivery

### **Domain 3: Communication**

*Major competence: Professional Communication*

3.1 Empathy shown with patient

### **Domain 4: Knowledge Base**

*Major competence: Application of basic biological, biomedical, social and behavioral, and clinical sciences*

4.2 Scientific basis of all aspects of dentistry, dental biomaterials, and other materials used in dentistry

### **Domain 6: Treatment Planning**

6.1 Comprehensive treatment plan established to promote oral health and to prevent and manage oral diseases and oral conditions

6.2 Obtaining consent for all treatment planned

### **Domain 7: Delivery of Oral Health Care**

7.5 Selecting and using materials appropriately in the delivery of oral health care

7.14 Replacing missing teeth and supporting tissue where appropriate, by means of fixed or removable prostheses

# Competency proforma

**RELEVANT YEAR LEARNING OUTCOMES:** By the end of year four, the learner should be able to:

4.5 Justify the selection and use of appropriate materials for all clinical and laboratory stages associated with the construction and placement of prostheses in patients.

## **CASE SELECTION CRITERIA**

A patient requiring the replacement of one or two missing adjacent teeth using a resin-bonded or hybrid bridge that has been appropriately treatment planned, special investigations completed and oral health appropriately managed.

Prior to the evaluation session, all dental disease should have been controlled and any residual periodontal issues should be receiving appropriate maintenance therapy. The following should have been completed: fixed partial denture design approved, mounting and surveying of study casts, trial tooth preparations on a duplicate cast, and aesthetic wax-up.

## **SCOPE OF THE CLINICAL PROCEDURE**

The student is required to:

- a) produce accurately mounted and articulated study casts – including diagnostic wax-up
- b) explain the rationale for the fixed partial denture and its design
- c) produce a duplicate cast on which a trial preparations have been completed with an outline of the framework
- d) give a critical assessment of the prepared abutment(s)/Snapstone model including an outline of the framework design on the Snapstone model to evaluate the following features: survey line, path of insertion, axial reduction, resistance, retention, wraparound, occlusal clearance/reduction and margin definition.

## **ASSESSMENT DOMAINS**

The performance is assessed on aspects of infection control, patient management, operating posture, and clinical procedure.

The student presents the completed work to the assessor and is invited to give a critical appraisal of their work.

The key skills performance will be graded according to the defined criteria:

# DEFINE ASSESSMENT DOMAINS

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- Professionalism
- Communication
- Knowledge
- **Case preparation**
- **Skills performance**
- Critical evaluation

# Define Criteria

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- Individually valid
- No hidden or missing criteria
- Sequential and logical
- No compensation

# Define Criteria

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- Distinguishable levels of achievement
- Alignment with other assessments
- Determine degrees of criteria



# Key Skill proforma – Case Preparation

Graduate Competences	Grade	
Domains and competences	Yes: Proceed	No: Fail – Do not proceed
<p><b>Domain 6: Treatment Planning</b></p> <p>6.1 Comprehensive treatment plan established to promote oral health and to prevent and manage oral diseases and oral conditions</p> <p>6.2 Obtaining consent for all treatment planned</p>	<p>Case assessment:</p>	<p>Case assessment:  <b>Oral health is not satisfactory for receiving prosthodontic treatment. Preventive, periodontal, and/or restorative treatment is not complete or is inappropriate. The fixed partial denture design has not been approved, and/or casts have not been correctly mounted. The trial tooth preparations have not been performed on a duplicate cast and or the diagnostic wax-up has not been performed.</b></p>

# Key Skill proforma – Clinical Performance

Domain 7: Delivery of Oral Health Care			
7.14 Replacing missing teeth and supporting tissue where appropriate, by means of fixed or removable prostheses			
Criteria	Concerns	Safe	Proficient
<b>Supporting knowledge</b>	<b>Insufficient</b> knowledge of the key elements of principles, practice, and materials relevant to the key skills performance	<b>Sufficient</b> knowledge of the key elements of principles, practice, and materials relevant to the key skills performance	<b>Accurate, detailed and elaborate knowledge</b> of principles, practice, and materials relevant to the key skills performance
<b>Case presentation:</b> - justification and rationale for fixed partial denture design - appraisal of trial tooth preparations	<b>Unable to</b> justify and/or provide rationale for the proposed fixed partial denture design and tooth preparation plan	<b>Able to</b> justify and/or provide rationales for the key features of the proposed fixed partial denture design and tooth preparation plan	<b>Able to justify with discrimination and provide detailed rationale</b> for the proposed fixed partial denture design and tooth preparation plan.
<b>Outcome and evaluation:</b> - Tooth preparation Evaluation and appraisal of Snapstone model	<b>Insufficient/excessive preparation</b> occlusally or axially such that it does not match the planned preparation. Psychomotor performance <b>exposes lack of</b> procedural knowledge or skill in execution of desired outcome.  <b>Inaccurate</b> evaluation of critical features of the tooth preparation(s) and or framework outline on Snapstone model	<b>Sufficient and correct</b> preparation occlusally and axially that matches the planned preparation. Psychomotor performance <b>demonstrates</b> procedural knowledge and skill in execution of desired outcome.  <b>Accurate</b> evaluation of critical features of the tooth preparation(s) and framework outline on Snapstone model	<b>Skillful and neat</b> preparation occlusally and axially that matches the planned preparation. Psychomotor performance demonstrate <b>proficient</b> procedural knowledge and skill in execution of desired outcome  <b>Analytical, detailed and accurate</b> evaluation of features of the tooth preparation(s) and framework outline on Snapstone model

# Clinical Performance

Domain 7: Delivery of Oral Health Care			
7.14 Replacing missing teeth and supporting tissue where appropriate, by means of fixed or removable prostheses			
Criteria	Concerns	Safe	Proficient
Supporting knowledge			
Case presentation: - justification and rationale for fixed partial denture design	<b>Unable to justify and/or provide sufficient rationale for the proposed procedure ...</b>	<b>Able to justify and provide sufficient rationale for the <u>key features</u> of the proposed procedure...</b>	<b>Able to justify and or discriminate a detailed rationale</b> for the proposed procedure
Outcome and evaluation:			

# How to implement?

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- **Engage clinical discipline support – ownership - assessors**
- **Incremental development -**
  - **Generic grade descriptors**
  - **Skill specific grade descriptors - Workshop**
  - **Assessor training and calibration**
  - **Exemplars of performance**
- **Vertical and horizontal Integration – years/disciplines, Sim Lab/clinics/workshops/lectures**

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**Thank you**

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# Levels of discrimination

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- ◉ Standard met – Standard not met
- ◉ Meets, above, below – expectations
- ◉ Excellent, acceptable,  
unacceptable but correctable,  
unacceptable and not correctable.
- ◉ A, B, C, and F

<b>BDS.</b>	<b>Key Skills</b>	<b>Area</b>
<b>1</b>	Placement of rubber dam	<b>Operative Dentistry</b>
<b>2</b>	History taking, examination, caries and simple periodontal diagnosis and preventive approaches	<b>Operative Dentistry</b>
<b>2</b>	Taking bitewing radiographs, periapical radiographs for an upper central incisor and an upper or lower molar (or premolar)	<b>Operative Dentistry</b>
<b>2</b>	Oral hygiene assessment and appropriate oral hygiene instruction	<b>Periodontology</b>
<b>3</b>	Moderate operative procedure	<b>Family Dentistry</b>
<b>3</b>	Scaling and root surface instrumentation	<b>Periodontology</b>
<b>3</b>	Making impressions and facebow record for the production of articulated study casts for a patient with missing teeth	<b>Oral Rehabilitation</b>
<b>3</b>	Tooth extraction	<b>Oral and Maxillofacial</b>
<b>4</b>	Tooth preparation for removable partial dentures	<b>Oral Rehabilitation</b>
<b>4</b>	Full veneer crown preparation	<b>Family Dentistry</b>
<b>4</b>	Evaluation of periodontal treatment outcome and re-evaluation of periodontal treatment plan	<b>Periodontology</b>
<b>4</b>	Pulpotomy or pulpectomy for a primary molar tooth	<b>Paediatric Dentistry</b>
<b>5</b>	Tooth preparation for a bridge	<b>Oral Rehabilitation</b>
<b>5</b>	<b>Minor oral surgery consultation</b>	<b>Oral and Maxillofacial Surgery</b>

<b>Key Skills</b>	<b>Case preparation</b>	<b>Psychomotor skill outcome</b>	<b>clinical evaluation/knowledge performance outcome</b>	<b>Outcome evaluation of performance/skill</b>
<b>Placement of rubber dam</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>History, examination, diagnosis and prevention</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>
<b>Bitewing/periapical radiographs</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Oral hygiene assessment and instruction</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>Moderate operative procedure</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>
<b>Scaling and root surface instrumentation</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>
<b>Impressions/facebow for study casts</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Tooth extraction</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>Tooth preparation for removable partial dentures</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>
<b>Full veneer crown preparation</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Evaluation of periodontal therapy/periodontal treatment plan</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>2</b>
<b>Pulpotomy or pulpectomy for a primary molar tooth</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Tooth preparation for a bridge</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Minor oral surgery consultation</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>



# Considerations for Competency assessment

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- **Number of skills – scope, timing, prior experience, failure and remedial**
- **Competency skills manual – transparency for students/staff**
- **Integrated into T and L activities**
- **Assessment scale 2, 3, 4 or 5 divisions**

# CASE SELECTION CRITERIA

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- What the patient needs
- Timely and appropriate procedure performance
- The patient/oral health is appropriately prepared
- Pre-requisites for competency test: design approved, mounted casts, trial preparations etc.

# SCOPE OF THE CLINICAL PROCEDURE

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- Define what to have ready/completed
- To explain and justify the procedure
- Assessment preparatory work
- Critically appraise the performance

# Clinical Performance

Domain 7: Delivery of Oral Health Care			
7.14 Replacing missing teeth and supporting tissue where appropriate, by means of fixed or removable prostheses			
Criteria	Concerns	Safe	Proficient
Supporting knowledge			
Case presentation:			
<b>Outcome and evaluation:</b> - <b>Tooth preparation</b> <b>Evaluation and appraisal of Snapstone model</b>	<b>Insufficient/excessive preparation</b> occlusally or axially such that it does not match the planned preparation.  <b>Psychomotor performance exposes lack of adequate procedural knowledge or skill in execution of desired outcome.</b>	<b>Sufficient and correct</b> preparation occlusally and axially that matches the planned preparation.  Psychomotor performance <b>demonstrates</b> procedural knowledge and skill in execution of desired outcome.	<b>Skillful and neat</b> preparation occlusally and axially that matches the planned preparation.  <b>Psychomotor performance demonstrates proficient</b> procedural knowledge and skill in execution of desired outcome

# Examination of our existing Key Skills

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***A qualitative evaluation of focus groups (n=25 students) and interviews (n=6 staff) transcribed and a thematic analysis was performed***

- **Stress**
- **Fairness**
- **Bias**
- **Clear goals and standards**

# Stress - procedural

- Fail before the psychomotor/performance test

- **Long preparation time skills**

- “worry .. who was your

- **The test!**

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1	Placement of rubber dam	Operative Dentistry
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2	Oral hygiene assessment and appropriate oral hygiene instruction	Periodontology
3	Moderate operative procedure	Family Dentistry
3	Scaling and root surface instrumentation	Periodontology
3	Making impressions and facebow record for the production of articulated study casts for a patient with missing teeth	Oral Rehabilitation
3	Tooth extraction	Oral and Maxillofacial
4	Tooth preparation for removable partial dentures	Oral Rehabilitation
4	Full veneer crown preparation	Family Dentistry
4	Evaluation of periodontal treatment outcome and re-evaluation of periodontal treatment plan	Periodontology
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# Fairness?

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- ◉ Perception of subjectivity
- ◉ Assessors have different case preparation preference

# Assessor Bias

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Prior knowledge of the student can have adverse and beneficial effects -

- ◉ Failing students who should pass
- ◉ Passing students who should fail
- ◉ leniency grading
- ◉ Speed bias



# Assessment standards

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Staff - higher standards satisfactory/good  
less clear

Students - not clear what is expected for  
a pass

Perception of quality based on Operative  
Techniques courses or the teaching  
manual

# Standards based grade descriptors

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- ◉ Generic grade descriptor although reported to be useful by staff and students
- ◉ Desire for skills specific grade descriptors
- ◉ workshop participation to define grade descriptors
- ◉ Train staff and students to use these – while learning skills on clinics or in simulation laboratory.

# Competency testing – Why?

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**For stakeholders:**

**the student**

**the health care institute**

**its University**

**the regulatory bodies**

**the local community and...**

**the patients**

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