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**KING SAUD UNIVERSITY**

**College of Dentistry**

**Department of Restorative Dentistry**

**DIVISION OF OPERATIVE DENTISTRY**

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**213 RDS**

**Pre-Clinical Dentistry**

**Laboratory Manual**

Course Director: Dr. Noura Shono

Student’s Name :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Computer No. :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Serial No. :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1434-1435 H**

**2013-2014**

**RDS 213**

**General Laboratory Rules**

* + Students should bring extra-fine permanent marker and pencil and wear name tags at all times.
	+ Personal and laboratory hygiene should be maintained at all time.
	+ Proper seating positions and operation and maintenance of the dental unit.
	+ Safety measures should be exercised at all lab sessions, including:
* Wearing white lab coat, disposable gloves, face masks, protective glasses precautions to reduce hazards associated with flying particles of restorative materials and inhalation of amalgam dusts.
* Amalgam manipulation, handling and disposing.
* Promote mercury hygiene and minimize mercury exposure in dental lab, precaution should be taken to protect the dental student and dental staff.
* When restoring, finishing & polishing or removing amalgam, rubber dam should be in place, air water spray and high volume evacuation should be used.
* Free mercury and amalgam scraps should be stored in unbreakable tightly closed containers away from any source of heat.
* Collection of natural teeth (anterior & posterior), properly sterilized and stored in formalin solution.
	+ Instrument distribution and obligation of the students towards neatness, hygiene and maintenance of the manikin head and typodent as well as the instruments.

**Dentoform:**

**Check the following.**

* **The dentoform should have complete set of upper and lower teeth.**
* **The Manikin rubber and dentoform gum should be intact and in a good condition.**
* **Adjust the dentoform on the manikin head.**
* **Operate the dental unit, including the light (learning the appropriate light position).**

**Seating position:**

* **The dentist knee should fit under the headrest with feet stabilized on the floor.**
* **The dentist’s back should be supported, feet flat on the floor and the top of the thighs sloping about 15 degree to the floor.**
* **The long axis of the dentist’s upper arm should be vertical and the elbows close to the rib cage, while the head is titled forward so that the eyes can see the finger tips.**
* **The operator’s body should not be wrenched out of its physiologic form.**

**Right-handed operator seating position:**

* **7:00 – 11:00 O’clock position: operator works on right side of the patient.**
* **Most common position 9:00 O’clock or to the rear 11:00 O’clock position**
* **Frontal operating position: include elevation of the patients head.**
* **Seating behind the patient using a mouth mirror, for upper anterior palatal.**
* **8:00 O’clock position: operator works on the mandibular teeth (semi-upright chair position)**

**GUIDELINES & PRACTICAL PROJECTS**

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**Guidelines & Evaluation for Rubber Dam Placement**

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| --- | --- | --- | --- |
| **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Proper placement; no leaks, tearProper inversionFrame properly placed | Dam not properly inverted around some teethImproperly placed | Dam not properly inverted all teeth Possibility of leakage | Dam is tornToo few teeth included |

**Introduction to Instrumentation and Rubber Dam Application**

|  |  |  |  |
| --- | --- | --- | --- |
| **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| Rubber Dam Application (lower) |  |  |  |
| Rubber Dam Application (upper) |  |  |  |
| Cutting on Plastic Teeth **H** Shaped Preparation |  |  |  |
| Cutting on Plastic Teeth **I** Shaped Preparation |  |  |  |

**Guidelines for Class I Amalgam Cavity Preparation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guidelines** | **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Occlusal Extensions | Follow central /Bu /Li grooves precisely | Slight deviation from grooves | Deviation from grooves | Does not follow grooves |
| Outline | Smooth curve | Slight sharp | Markedly sharp | Lack of a curve |
| Width | ¼ intercuspal | Slightly <; > ¼ intercuspal | 1/3 intercuspal | Greater than 1/3 intercuspal |
| Margins | Smooth, regular 90° to unprepared tooth structure | Slight roughness; small areas where margins not 90° | Significant roughness | Beveled margins |
| Walls | Smooth, slight convergence B; L wallsSlightly divergent M, D | Slight roughness | Rough; wall not properly aligned | Divergent Bu; Li walls |
| Line Angles | Rounded line angles; axio-pulpal line angle rounded | Some sharp internal line angles; axio-pulpal line angle still rounded | Most internal line angles are sharp | All internal line angles sharp |

**Guidelines for Class I Amalgam Restoration**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guidelines** | **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Margins | Interface between tooth and restoration not detectable with explorer | Over-contoured margins, but still closed | Restoration short of margin, but still closed | Open margins |
| Occlusion | Proper intensity and location of occlusal contacts | In proper contact, but inappropriate location | Light occlusal contact | Restoration is high/completely out of occlusion |
| Anatomy | Restoration duplicates tooth anatomy | Slight deviation from ideal anatomy | Significant deviation from ideal anatomy | No resemblance to tooth structure |
| Finish | Burnished and smooth; no voids, pits, or roughness | Slight roughness | Rough; some pits; voids | Grossly rough |

**Guidelines for Class II Amalgam Cavity Preparation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guidelines** | **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Occlusal Extensions | Follow central/ Bu/Li grooves precisely | Slight deviation from grooves | Significant deviation from grooves | Does not follow grooves |
| Outline | Smooth curve | Slight sharp | Markedly sharp | Lack of a curve |
| Width | ¼ intercuspal | Slightly <; > ¼ intercuspal | 1/3 intercuspal | Greater than 1/3 intercuspal |
| Margins | Smooth, regular 90° to unprepared tooth structure | Slight roughness; small areas where margins not 90° | Significant roughness | Beveled margins |
| Walls | Smooth, slight convergence B; L wallsSlightly divergent M, D | Slight roughness | Rough; wall not properly aligned | Divergent Bu; Li walls |
| Line Angles | Rounded line angles; axio-pulpal line angle rounded | Some sharp internal line angles; axio-pulpal line angle still rounded | Most internal line angles are sharp | All internal line angles sharp |
| Preparation Depth | 2.5mm from external walls | >2.5mm, <2.5mm | >3.0mm; <2.0mm | >3.5mm; <1.5mm |
| Proximal Extensions | Bu gingival contact broken by line of explorer; Li contact broken by no more than 1mm | Contact broken slightly more than line of explorer Bu; gingival | Tooth still in contact with adjacent tooth | Bu; Li; gingival contact broken by over 1mm |
| Proximal Box Form | Follows curvature to tooth; gingival floor 1mm wide; proper box form | Gingival floor slightly greater/less than 1mm wide | Does not follow curvature of tooth | Gingival floor greater than 2mm wide |
| Adjacent Tooth Damage | No damage | Slight | Significant | Gross |

**Guidelines for Class II Amalgam Cavity Restoration**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guidelines** | **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Margins | Interface between tooth and restoration not detectable with explorer | Over-contoured margins, but still closed | Restoration short of margin, but still closed | Open margins |
| Occlusion | Proper intensity and location of occlusal contacts | In proper contact, but inappropriate location | Light occlusal contact | Restoration is high/completely out of occlusion |
| Anatomy | Restoration duplicates tooth anatomy | Slight deviation from ideal anatomy | Significant deviation from ideal anatomy | No resemblance to tooth structure |
| Interproximal Contact and Contour | Proper contact/ contour restored with adjacent tooth | Tight interproximal contact | Light interproximal contact; poor contour | No interproximal contact |
| Finish | Burnished and smooth; no voids, pits, or roughness | Slight roughness | Rough; some pits; voids | Grossly rough |

**Guidelines in Finishing and Polishing of Amalgam Restorations**

**Consider the following points:**

1. No overhangs
2. Not Under/Over-contoured
3. No Rough surface
4. No dim surface
5. No eradication of part or all anatomy
6. No ditching around margins
7. No Injuries to gingiva
8. No Injury to adjacent teeth
9. Have to be smooth continuation with the margins
10. Shiny surface

**Amalgam Cavity Preparations and Restorations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **46** | **Occlusal Class I Amalgam Cavity Prep.** |  |  |  |
| **46** | **Buccal Pit Cavity Prep.** |  |  |  |
| **24** | **Occlusal Class I Amalgam Cavity Prep.** |  |  |  |
| **44** | **Occlusal Class I Amalgam Cavity Prep.** |  |  | **Class I** |
|  | **Buccal Pit** |
| **46** | **Occlusal Class I Amalgam Restoration and Buccal Pit** |  |  |  |
| **24** | **Occlusal Class I Amalgam Rest.** |  |  |  |

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| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **44** | **Occlusal Class I Amalgam Rest.** |  |  |  |
| **36** | **[OM Class II] Amalgam Cavity Preparation** |  |  |  |
| **15** | **[OM Class II] Amalgam Cavity Preparation** |  |  |  |
| **45** | **[MOD Class II] Amalgam Cavity Preparation** |  |  |  |
| **16** | **[OM Class II] Amalgam Cavity Preparation** |  |  |  |
| **16** | **[OL Class II] Amalgam Cavity Preparation** |  |  |  |

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| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **36** | **[OM Class II] Amalgam Restoration** |  |  |  |
| **15** | **[OM Class II] Amalgam Restoration** |  |  |  |
| **45** | **[MOD Class II] Amalgam Restoration** |  |  |  |
| **16** | **[OM Class II] Amalgam Restoration** |  |  |  |
| **16** | **[OL Class II] Amalgam Restoration** |  |  |  |
| **Natural Tooth** | **Class II Amalgam Preparation** |  |  |  |
| **Natural Tooth** | **Class Amalgam Restoration** |  |  |  |

**Amalgam Restorations Finishing and Polishing**

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| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **46** | **Finishing and Polishing of Amalgam Restoration Class I** |  |  |  |
| **46** | **Finishing and Polishing of Amalgam Restoration Buccal Pit** |  |  |  |
| **24** | **Finishing and Polishing of Amalgam Restoration Class I** |  |  |  |
| **44** | **Finishing and Polishing of Amalgam Restoration Class I** |  |  |  |
| **36** | **Finishing and Polishing of Amalgam Restoration Class II** |  |  |  |
| **15** | **Finishing and Polishing of Amalgam Restoration Class II** |  |  |  |
| **45** | **Finishing and Polishing of Amalgam Restoration Class II** |  |  |  |
| **16** | **Finishing and Polishing of Amalgam Restoration Class II** |  |  |  |
| **16** | **Finishing and Polishing of Amalgam Restoration Class II** |  |  |  |

**Student’s Notes:**

**Guidelines for Posterior Composite Resin Preparation**

**Occlusal Extensions**: Follows central/B/L grooves precisely

**Outline:** Smooth curve

**Width**: No more than ¼ intercuspal

**Margins:**

* Smooth, regular, 90° to unprepared tooth structure
* Centric occlusal stop located on tooth structure

**Walls:** Smooth, slight convergence Bu; Li, M; D walls

**Line Angles:** Rounded line angles; axio-pulpal line angle rounded

**Preparation Depth:** 0.5mm into dentin

**Proximal Surface:**

* Gingivo cavosurface margin located on intact enamel (above DEJ)
* Placing the bevel of the buccal and lingual walls in accessible location for finishing and polishing
* Bevel 0.5 – 1.0mm
* Gingival enamel bevel (adequate E)

**Guidelines for Posterior Composite Resin Restoration**

Matrix

* Proper placement of matrix over margins
* Wedge compatible of the shape and size of gingival embrasure

Margins

* Interface between tooth and restoration not detectable with explorer

Occlusion

* Proper intensity and location of occlusal contacts
* Establishing of proper proximal contact

Anatomy

* Restoration duplicates tooth anatomy exactly

Finish

* Highly polished and smooth; no voids, pits or roughness

**Guidelines in Insertion, Finishing and Polishing of Direct Tooth-Colored Restorations**

Contour:

1. Over-contoured
2. Under-contoured
3. Improper contour

Margins:

1. Opened margin(s)
2. Under-contoured
3. Overhang

Contacts:

1. Loose or deficient contact
2. Displaced or misplaced contact

Surfaces:

1. Porous
2. Rough surface
3. Material not completely set, contaminated or dehydrated
4. Stained restoration (contamination)
5. Gross defect
6. Gross extension
7. Injury to adjacent teeth
8. Over-polishing, burning the restoration surface

**Direct Tooth-Colored Cavity Preparations and Restorations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **11** | **[ Mesial Class III Lingual Approach] Composite Resin Cavity Preparation** |  |  |  |
| **Natural Tooth** | **[ Mesial Class III Facial Approach] Composite Resin Cavity Preparation** |  |  |  |
| **11** | **Class III Composite Resin Restoration** |  |  |  |
| **Natural Tooth** | **Class III Composite Resin Restoration** |  |  |  |
| **21** | **[Distal Class IV caries] Composite Resin Cavity Preparation** |  |  |  |

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| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **21** | **[Mesial Class IV traumatic] Composite Resin Cavity Preparation.** |  |  |  |
| **21** | **Distal Class IV Composite Resin Restoration** |  |  |  |
| **21** | **Mesial Class IV Composite Resin Restoration** |  |  |  |
| **13** | **Facial Class V Composite Resin/GIC Cavity Preparation** |  |  |  |
| **13** | **Class V Composite Resin/GIC Restoration****Closed Sandwich Technique**  |  |  |  |
| **15** | **Facial Class V Cavity Preparation for Glass Ionomer** |  |  |  |

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| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **15** | **Class V Glass Ionomer Restoration** |  |  |  |
| **17** | **Fissure Sealant Distal Pit** |  |  |  |
| **17** | **PRR Mesial Pit Prep.** |  |  |  |
| **17** | **PRR restoration** |  |  |  |
| **14** | **[Occlusal Class I] Composite Resin Cavity Preparation** |  |  |  |
| **14** | **Class I Composite Resin Restoration** |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **46** | **[MOD Class II] Composite Resin Cavity Preparation** |  |  |  |
| **46** | **[MOD Class II] Composite Resin Restoration** |  |  |  |
| **35** | **[MO Class II] Composite Resin Cavity Preparation** |  |  |  |
| **35** | **Class II Composite Resin Restoration** |  |  |  |

**Student’s Notes:**

**Guidelines for Pin-Retained Amalgam Preparation and Restoration**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guidelines** | **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Occlusal Extensions | Follows central/ Bu/Li grooves precisely | Slightly deviation from grooves | Significant deviation from grooves | Does not follow grooves |
| Outline | Smooth curve | Slightly sharp | Markedly sharp | Lack of a curve |
| Width | ¼ intercuspal | Slightly <; > ¼ intercuspal | 1/3 intercuspal | Greater than 1/3 intercuspal |
| Proximal Extensions | Bu; gingival contact broken by line of explorer; Li contact broken by no more than 1mm | Contact broken slightly more than line of explorer Bu; gingival | Tooth still in contact with adjacent tooth | Bu; Li; gingival contact broken by over 1mm |
| Margins | Smooth, regular 90° to unprepared tooth structure | Slight roughness; small areas where margins not 90° | Significant roughness | Beveled margins |
| Walls | Smooth, slight convergence Bu; Li walls | Slight roughness | Rough; parallel walls | Divegent Bu; Li walls |
| Line Angles | Rounded line angles; axio-pulpal line angle rounded | Some sharp internal line angles; axio-pulpal line angle still rounded | Most internal line angles are sharp | All internal line angles sharp |
| Preparation Depth | 2.5mm from external walls | >2.5mm; <2.5mm | >3.0mm; <2.0mm | >3.5mm; <1.5mm |
| Proximal Box Form | Follows curvature of tooth; gingival floor 1mm wide; proper box form | Gingival floor slightly greater/ less than 1mm wide | Does not follow curvature of tooth | Gingival floor greater than 2mm wide |
| Pin Placement | Pin properly placed | Pin too far pulpally | Pin placed too close to external tooth surface; incorrect angulation | Pin in pulp; fractured external tooth structure; pin not present |
| Adjacent Tooth Damage | No damage | Slightly | Significant | Gross |

**Application of Bases, Liners and Temporary Restorations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **Application of Dycal** |  |  |  |
| **Application of Vitrebond as a Base** |  |  |  |
| **Application of IRM as a Base** |  |  |  |
| **Application of IRM as a Temporary****Restoration** |  |  |  |

**Student’s Notes:**

**Complex Amalgam Cavity Preparations and Restorations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **36** | **[MOD with MB cusp removal and DL cusp reduction] Complex Amalgam Cavity Preparation** |  |  |  |
| **46** | **[MOD with MB cusp removal and DL cusp reduction] Complex Amalgam Cavity Preparation** |  |  |  |
| **46** | **Pin Placement** |  |  |  |
| **46** | **Slot Preparation** |  |  |  |
| **36** | **Complex Amalgam Build-up** |  |  |  |
| **46** | **Copper Band Placement** |  |  |  |
| **46** | **Complex Amalgam Build-up** |  |  |  |
| **36** | **Finishing and Polishing of Amalgam Build-up** |  |  |  |
| **46** | **Finishing and Polishing of Amalgam Build-up** |  |  |  |

**Student’s Notes:**

**Guidelines for Inlay and Onlay Cast Preparation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guidelines** | **Accepted****9 – 10** | **Accepted****7.5 – 8.5** | **Accepted****6.5 – 7** | **Unaccepted****Below 6** |
| Extensions | Follow central grooves precisely and appropriately | Slight deviation from ideal | Significant deviation from ideal | Does not follow grooves |
| Outline | Smooth curve | Slight sharp | Markedly sharp | Lack of curve |
| Isthmus Width | Intercuspal | Slightly <or > intercuspal | ½ intercuspal | Greater than ½ intercuspal |
| Proximal Extensions | Contact broken by 1.0 mm | Contact broken only by tip of explorer or slightly greater than 1.0 mm ML and DL | Tooth still in contact with adjacent tooth | Contact broken by over 1.5 mm |
| Occlusal Reduction(If appropriate) | Working1.5-2.0 mmNon-working1.0-1.5 mm | 0.5 mm from ideal | 1.0 mm from ideal | >1.0 mm from ideal orin occlusion |
| Margins (Inlay only) | Smooth, regular 90° to unprepared tooth structure; gingival bevel well-defined | Slight roughness, small areas where margin is not 90° to unprepared tooth structure | Significant roughness; large areas where margins are not 90° to unprepared tooth structure; poor gingival bevel | No gingival bevel |
| Margins-Holding cusps | 1.0 mm shoulder with bevel; smooth; regular | Shoulder too narrow; bevel too narrow; slight roughness | Shoulder too wide; bevel too wide; significant roughness | Bevel not placed; shoulder not placed |
| Non-holding cusps | 1.0 mm reverse bevel; bevel at gingival margin; smooth; regular | Reverse bevel too narrow; slight roughness | Reverse bevel too wide; significant roughness | Bevel not present |
| Walls | Smooth, slightly divergent walls | Slightly rough walls; no divergence (parallel walls) | Rough; undermined enamel | Very rough walls; convergent walls or grossly undermined enamel necessitating extension of outline from |
| Line Angles | Sharp, well-defined line agnles; proper bevel at axio-pulpal line angles | Some line angles rounded or not well-defined | Sharp axio-pulpal line angle | All fine angles rounded or not well defined |
| Preparation Depth | Isthmus depth is 2.5 mm from external walls | Isthmus depth slightly > 2.5 mm from external walls | Very shallow1.0 mm deep | Very deepOver 3.0 mm |
| Proximal Box Form | Follows curvature of tooth; gingival floor 1 mm wide; proper box form | Gingival floor slightly greater/less than 1 mm wide | Does not follow tooth curvature | Undercuts in box walls; gingival floor greater than 2 mm wide |

**Guidelines in Inlay and Onlay Preparation for**

**Indirect Tooth-Colored Restoration**

* Appropriate taper/divergence (greater than cast gold restoration)
* Occlusal depth 1.5 – 2mm
* Pulpal floor needs to be flat and level
* The walls of the preparation should be smooth
* The buccal and lingual wall of the proximal box should diverge toward the occlusal
* Axial wall should be taper
* Gingival seat should have to width of 1mm
* Depth of the proximal box should be no deeper the 0.5mm above the gingival
* The buccal and lingual opening should be wide enough for the explorer to pass through
* The axial pulpal line angle needs to be rounded all internal line angles should be rounded

**Inlay and Onlay Teeth Preparations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **46** | **[MOD Inlay Preparation ] for Cast Gold Alloy Restoration** |  |  |  |
| **46** | **[MOD Onlay Preparation ] for Cast Gold Alloy Restoration** |  |  |  |
| **25** | **[ MOD Inlay Preparation ] for Ceramic Restoration** |  |  |  |

**Student’s Notes:**

**Amalgam and Tooth Colored Cavity Preparations and Restorations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Teeth No.** | **Practical Exercise** | **Date** | **Comments** | **Self-Evaluation** |
| **26** | **Class II Box (OD) Cavity Preparation for GIC/Composite Resin Open Sandwich Restoration** |  |  |  |
| **26** | **OD Class II GIC/Composite Resin Open Sandwich Restoration** |  |  |  |
| **47** | **[MOB] Class II Amalgam Cavity Preparation with Buccal Extension** |  |  |  |
| **47** | **[MOB] Class II Amalgam Restoration** |  |  |  |

**Student’s Notes:**