

Rubrics for Practical Endodontics **Roula S Abiad**

Received: March 20, 2017; **Accepted:** March 22, 2017; **Published:** March 29, 2017

Assessment of acquired knowledge, affective processes and professional skills represents a corner stone in various educational disciplines and dental education is no exception [1]. A student is not able to refine those skills without acknowledging delicacies. A well-structured assessment is key for improving quality of dental education

Assessing students in applied fields such as dentistry represents an ongoing challenge for assessors due to the subjective nature of practical work. One instructor's definition of perfect could be another's definition for disastrous. Therefore, questions related to grading and assessments are common among faculty members due to lack of professional training especially amongst junior clinicians and researchers who are new to this career paths.

O'Donnell et al. [2] proposed that one way to objectify the assessment process could be through the use of rubrics: "scaled tools with levels of achievement and clearly defined criteria placed in a grid". Rubrics establish clear rules for evaluation and define the criteria for performance. Such clear rules provide faculty members with guidelines standardizing the grading process. Students on the other hands can understand the rationale behind their mark. Consequently, students can identify the level at which they stand according to the provided rubric and hence can tackle points of weakness. Rubrics can also be utilized by students to self-assess their work. Self-assessment has been shown to enhance active learning and improve practical skills [3]. It is evident that accurate self-acknowledgment of flaws can lead to high dexterity in any subject area especially those

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Citation: Abiad RS. Rubrics for Practical Endodontics. J Orthod Endod. 2017, 3:1.

requiring high level of practical skills, going about such flaws will only be a matter of time and practice for the student (**Figure 1; Tables 1 and 2**).

The purpose of this article is to present the rubric implemented at Beirut Arab University, Faculty of Dentistry, and Division of Endodontics for assessing dental students' progress towards competence in practical endodontics which was developed at three grid level and as described in the educational literature.

Points			Proper (1)	Partial (1/2)	Improper (0)	
SITE	Ant.	+1	Middle Middle third (MM1/3) of the Palatal/ Lingual surface.	Shifted away from the MM1/3	Any surface other than the Palatal/Lingual	
	PM		Center of the Occlusal Surface			
	Mo		Mesial half of the Occlusal Surface, with the oblique ridge left mostly intact.	Occlusal Surface but shifted away from the PROPER	Any surface other than the Occlusal	
	L		Mesial of the Occlusal Surface, slightly shifted to the buccal.			
SIZE	Ant. & Post.	+1	Reflects the internal pulp chamber size (recognized by the radiograph)	Undersized: Size 1 mm less than the confines of the pulp chamber Oversized: Size 1 mm more than the confines of the pulp chamber	Undersized: Just Exposure Oversized: Preparation is 2-3mm beyond the pulp chamber size	
SHAPE	U	+1	TRIANGULAR with the Base Incisally and the Apex towards the Cervical.		Incomplete shape of the Triangle.	Any deviation of the shape of the Triangle.
			OVOID in an Inciso-Cervical direction		Little wide in M-D direction but still ovoid	Any deviation of the I-C ovoid shape
			OVOID in a Bucco-Lingual direction		Little wide in M-D direction but still ovoid	Any deviation of the B-L ovoid shape
			TRIANGULAR with the Base to the Buccal, parallel to the outer buccal surface, & the Apex of the triangle towards the Lingual.		Incomplete shape of the Triangle	Any deviation of the shape of the Triangle
	L	+1	Elongated Triangle in Labio-lingual direction		Incomplete shape of the elongated Triangle.	Any deviation of the shape of the Triangle
			OVOID in Labio-lingual direction		Little wide in M-D direction but still ovoid	Any deviation of the L-L ovoid shape
			OVOID in Bucco-lingual direction		Little wide in M-D direction but still ovoid	Any deviation of the B-L ovoid shape
			TRAPEZOID, RHOMBOID, or RECTANGULAR in a M-D direction		Incomplete shape	Any deviation of the shape
EXTENSION	Ant	+1	Incisally: Spare the Incisal edge Proximally: Spare the Marginal ridge Cervically: Spare the Cingulum	Not reaching the limit of ONE of the extensions Or Going beyond ONE of the extensions	Not reaching ALL the extension limits Or Going beyond ALL the extensions	
	PM		B-Lifrom the Buccal cusp tip to the base of the lingual cusp M-D: Spares the M & D Marginal ridges.			
	L		MB: MB cusp tip. MLi: at the base of the MLI cusp, online with MB, just lingual to the central developmental groove. The line joining the MB & MLI is parallel to the MMR (Mesial Marginal Ridge) D: ≈ 2mm distal to the central pit.			
	Mo		MB: MB cusp tip DB: ≈ 2mm D & P to MB (up to the B developmental groove) Joining MB & DB line will be parallel to Buccal Surface. Palatal: Base of the MB cusp (in the center of the tooth), when joining with DB it's perpendicular to the palata surface. If MB2 is present, it should be M & P to the MB.			
Complete Deroofing	+1	Uncovering of ALL pulp horns & connections between them+ Removal of the lingual shoulder in Anterior teeth.	Partial catching of the Probe on one or two of the walls	Deep catching of the Probe on one or more walls		
Convenience form	+1	Proper Funneled out preparation	One or more walls are not funneled out	Not all the walls are funneled.		
Caries Removal	+1	Complete caries removal with the removal of undermined tooth structure & questionable restoration.	Caries removed but cavity left unadjusted for temporary or permanent restoration.	Presence of caries &/or undermined tooth structure.		
Gouging	-1	Canal orifice should be with a straight-line connection with all side walled,without any bur indentations or steps.	Shallow bur indentations on one or two of the side walls.	Shallow bur indentations on more than two side walls. Deep bur indentations on one or more of the side walls.		
Perforation	-2	NO perforation.		Reparable perforation.		

N.B.: Perforation that will affect the treatment plan (Un-reparable) will be considered as fatal mistake

Figure 1 Access cavity preparation grading.

Table 1 Mechanical preparation.

Points		Proper (1)	Partial (1/2)	Improper (0)
Working length (WL)	+2	0.5–1 mm short of the radiographic apex.	Short up to 2 mm	Short more than 2 mm or Over: beyond the anatomical apex
Reference Point (RP)	+1	Rubber stopper seated perpendicular to a reliable repeatable point	File must be moved to reach the reliable repeatable point	Reference point Not Identified
Apical Seat	+2	Forceful tapping on the MAF up to the W.L., confirms the resistance form.	Forceful tapping on the MAF pushes it beyond the W.L.	Gentle tapping on the MAF pushes it beyond the W.L.
Smoothness of the preparation	+1	Dragging the file along the circumference of the root canal walls, gives the tactile sense of SMOOTHNESS	Dragging the file along the circumference of the root canal walls, gives the tactile sense of ROUGHNESS on One of the side walls.	Dragging the file along the circumference of the root canal walls, gives the tactile sense of ROUGHNESS on Two or More the side walls.
Taper	+2	The spreader of size not less than 25 or B, must be able to enter 1-2 mm short of the working length along the side of the Master cone.	The spreader of size not less than 25 or B, cannot penetrate more than 3 mm short of the working length along the side of the Master cone.	Inability to insert any size of spreader along the side of the master cone more than 3 mm short of the W.L.
Maintaining the original shape of the canal & Curvature	+2	Absence of Canal transportation, zipping, stripping, ledges or perforations.	Ledge or zipping	Stripping, Zipped foramen and or any other type of Perforation.

N.B.: Initial File (IF) is the first file that binds to the apex after coronal flaring; Master Apical File (MAF): Is 2-3 sizes larger than the IF; and Perforations are considered FATAL mistakes

Table 2 Obturation.

Points		Proper	Partial	Improper	
Master cone selection	Size	+1	Similar to the MAF	1 size smaller or larger than the MAF	Size is far from the MAF
	Visual	+1	The selected MC is clearly marked at the reference point	The mark of selected MC is 0.5-1 mm ahead of the RP.	The selected MC mark is beyond RP, or more than 1 mm ahead.
	Tactile	+2	Tug back at the working length	Slight resistance to removal only.	No tug back at all.
	Radiographic	+1	The MC is 0.5-1 mm coronal to the radiographic apex	The MC is at the radiographic apex or 1.5 - 2 mm coronal	The MC is beyond the radiographic apex or More than 2 mm coronal to the radiographic apex
Condensation	Length	+1	The filling is at the W.L	The filling is 1-2 mm shorter or longer than the WL	The filling is more than 2 mm shorter or longer than the WL
	Homogeneity	+2	No radiolucencies within the filling	Sight radiolucencies but in non-critical areas.	Many radiolucencies within the filling or Sight radiolucencies but in critical areas. (Like the Apical Foramen)
	Adaptation to the walls	+1	No radiolucencies between the filling and the canal walls & Reflects properly tapered canal preparation	Slight radiolucencies between the filling and one of the canal walls	Many radiolucencies between the filling and the canal walls or Does not reflect properly tapered canal preparation.
	Proper cleaning	+1	Proper cleaning of the pulp chamber from gutta-percha and sealer	Gutta-percha removed from the pulp chamber but sealer not properly cleaned	Gutta-percha and sealer not removed from pulp chamber at all.

N.B: Final Obturation x-ray must be taken without rubber dam AFTER placement of temporary filling

U: Upper; L: Lower; Mo: Molars; PM: Premolar; Ca: Canine; I: Incisor; MM 1/3: Middle Middle One Third; M: Mesial; D: Distal; B: Buccal; Li: Lingual; La: Labial; C: Cervical; RP: Reference Point; WL: Working Length; EWL: Estimated Working Length; IF: Initial File; MAF: Master Apical File; MC: Master Cone

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