



# Inter-examiner Calibration Study Using ICDAS in University dental clinic

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## Objective

To evaluate the reproducibility of the International Caries Detection and Assessment System (ICDAS) in clinical setting compared with the conventional dental charting.

## Materials & Methods

Thirty adult patients who attended SEGI University dental clinic were screened using the ICDAS along with conventional dental charting. Three clinicians, two Dental Public Health specialists (KCG, DD) and one Oral Medicine specialist (AM) with previous training in ICDAS screened the patients separately under similar clinical setting. The teeth were visually examined after air-drying with the 3-way syringe and the codes per tooth were recorded on a new clinical chart which includes ICDAS score per tooth and conventional dental chart. Kappa statistics were used to calculate the inter-examiner reproducibility.

## Results

The inter-examiner reproducibility ranged from 0.775 to 0.852 between KCG-DD, 0.740 to 0.827 between AM-DD and 0.768 to 0.849 between KCG-AM. The time difference in charting between ICDAS and conventional dental charting was not significant.

Observer DD	Observer KCG							
	0	1	2	3	4	5		6
0	114	4	0	0	0	0	0	118 (32.7%)
1	57	60	2	0	0	0	0	119 (33.0%)
2	0	32	18	2	0	0	0	52 (14.4%)
3	0	0	8	29	0	0	0	37 (10.2%)
4	0	0	0	1	10	0	0	11 (3.0%)
5	0	0	0	0	0	14	0	14 (3.9%)
6	0	0	0	0	0	0	10	10 (2.8%)
	171	96	28	32	10	14	10	361
	-47.40%	-26.60%	-7.80%	-8.90%	-2.80%	-3.90%	-2.80%	

Weighted Kappa <sup>a</sup>	0.814
Standard error	0.02
95% CI	0.775 to 0.852

<sup>a</sup> Linear weights

Observer AM	Observer DD							
	0	1	2	3	4	5		6
0	86	23	0	0	0	0	0	109 (31.0%)
1	27	62	30	0	0	0	0	119 (33.8%)
2	0	32	18	2	0	0	0	52 (14.8%)
3	0	0	4	31	2	0	0	37 (10.5%)
4	0	0	0	0	11	0	0	11 (3.1%)
5	0	0	0	0	0	14	0	14 (4.0%)
6	0	0	0	0	0	0	10	10 (2.8%)
	113	117	52	33	13	14	10	352
	-32.10%	-33.20%	-14.80%	-9.40%	-3.70%	-4.00%	-2.80%	

Weighted Kappa <sup>a</sup>	0.783
Standard error	0.022
95% CI	0.740 to 0.827

<sup>a</sup> Linear weights

Observer AM	Observer KCG							
	0	1	2	3	4	5		6
0	98	57	0	0	0	0	0	155 (46.0%)
1	2	58	31	0	0	0	0	91 (27.0%)
2	0	2	18	8	0	0	0	28 (8.3%)
3	0	0	2	27	1	0	0	30 (8.9%)
4	0	0	0	0	10	0	0	10 (3.0%)
5	0	0	0	0	0	13	0	13 (3.9%)
6	0	0	0	0	0	0	10	10 (3.0%)
	100	117	51	35	11	13	10	337
	-29.70%	-34.70%	-15.10%	-10.40%	-3.30%	-3.90%	-3.00%	

Weighted Kappa <sup>a</sup>	0.809
Standard error	0.02
95% CI	0.768 to 0.849

<sup>a</sup> Linear weights

## Conclusion

The ICDAS has demonstrated reproducibility and diagnostic accuracy characteristics in the detection of caries at varying stages of the disease process. Comparing conventional dental charting and ICDAS showed no significant difference in charting time. The ICDAS achieved substantial to good agreement between examiners and is practical in clinical dental practice.

**Intraoral Assessment**

ICDAS Scoring criteria: 0: Sound; 1: First visual change; 2: Distinguish visual change in enamel; 3: Localised enamel breakdown due to caries with no visible dentine; 4: Underlying dark shadow from dentine; 5: Distinct cavity with visible dentine; 6: Extensive distinct cavity with visible dentine.

Occlusion	Gingival status
Over jet	Colour
Over bite	Contour
Crowding	Consistency
Spacing	Surface texture
Attrition	Size
Abrasion	Bleeding on probing
Erosion	

**Code Visible Signs**

- 0 No bleeding or pocketing detected
- 1 Bleeding on probing; no pocketing
- 2 Plaque-retentive factors present; no pocketing >3.5 mm
- 3 Pockets >3.5 mm but <5.5 mm in depth
- 4 Pockets >5.5 mm in depth
- \* Loss of attachment of 7 mm or presence of furcation involvement

For patients with BPE codes of 3 or 4, more detailed periodontal charting is required.

Notes

Figure 1: Intraoral assessment sheet used to record ICDAS scores in patient folder