

LETTER TO THE EDITOR



Reproducibility of a commercially available subgingival plaque sampling strategy with oligonucleotide probes, common mistake

Sir,

I was interested to read the article by Pretzl et al. published in Acta Odontol Scand 2017 May [1]. The purpose of the authors was to evaluate the intra-test agreement of pooled samples from the deepest periodontal pocket of each quadrant with a commercially available test kit based on hybridization of 16S rRNA [1]. Plaque samples of 50 patients with generalized severe chronic periodontitis before therapy were pooled in two separate vials in order to detect and compare counts of *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Tannerella forsythia* and *Treponema denticola*. Cohen's κ and inter-class correlation coefficients were calculated to judge intra-test agreement [1]. Based on their results, Cohen's κ for detection and counts of *Tannerella forsythia* and *Treponema denticola* showed a perfect agreement. *Porphyromonas gingivalis* was identified in both tests with a substantial agreement, whereas detection of *Aggregatibacter actinomycetemcomitans* varied in eight patients resulting in a good agreement. They concluded that the commercial 16S rRNA test is perfectly reproducible regarding detection of red complex pathogens.

Reliability (precision, repeatability or reproducibility) is being assessed by different statistical tests, such as inter-class correlation coefficients (Pearson r), which is one of the common mistake in reliability analysis [2–8]. Inter-class correlation just assess the linearity and we can have a linear correlation with no reliability at all! Any shift in location and scale of the regression line which indicates no reliability cannot be detected by inter-class correlation. In such situation, intra-class correlation coefficient (ICCC) should be applied [2].

Moreover, using Cohen's κ is another methodological mistakes in reliability analysis for qualitative outcomes. Two important weaknesses of κ statistics to assess agreement are as follow: It depends upon the prevalence in each category which means it can be possible to have different kappa value having the same percentage for both concordant and discordant cells! Table 1 shows that in both (a) and (b) situations the prevalence of concordant cells are 90% and discordant cells are 10%, however, we get different kappa value (.41 and .82), respectively. Kappa value also depends upon the number of categories. Therefore, using weighted kappa in such situations can be suggested as a statistical test [3–8].

Table 1. Comparison of two test agreement with different prevalence in the two categories.

	Test 1		Total
	Positive	Negative	
(a)			
Test 2			
Positive	85	5	90
Negative	5	5	10
Total	90	10	100
$K = .41$			
(b)			
Test 2			
Positive	45	5	50
Negative	5	45	50
Total	50	50	100
$K = .82$			

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Disclosure statement

No potential conflict of interest was reported by the authors.

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