



## SPAZIO RICERCA – PREMIO “G. CARDAROPOLI”

### Implementation of a software application developed by the Italian Society of Periodontology and Implantology in defining periodontitis cases using the 2017 World Workshop Classification

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The inter-rater and intra-rater agreement in defining the stage, extent and grade of periodontitis cases using the 2017 World Workshop classification among periodontal experts, general dentists and undergraduate dental students and the accuracy of their definitions compared to a gold standard diagnosis were recently evaluated. It was concluded that additional efforts are needed to improve agreement in the periodontitis case definition by identifying and clarifying the “grey zones” and implementing education and training, especially for general dentists. In this sense, help could be provided by empiric decision making algorithms or by a dedicated software.

The purpose of this study was to assess the diagnostic accuracy and the inter-rater agreement when staging and grading periodontitis cases with the aid of software application (SA) developed by the Italian Society of Periodontology and Implantology.

Ten general dentists were asked to independently assess 25 fully documented periodontitis cases using the SA. Accuracy was estimated using quadratic weighted kappa and examiners' percentage of agreement with the reference diagnosis. The reference diagnosis were provided by one of the authors of the periodontitis case definition system developed in the context of the 2017 World Workshop. Inter-rater agreement was evaluated using Fleiss kappa statistics. Statistically significant differences between the expected and the observed frequencies were evaluated using the chi-squared test [significance level ( $\alpha$ ) = 0.05]. The kappa values have been interpreted according to Landis & Koch (1977). With reference to previous data in this field, the expected kappa values were as a minimum of 0.61 for at least 50% of the pairwise comparisons with the reference diagnosis and at least of 0.41 for the inter-group agreement.

The overall case definition agreed with the reference diagnosis in 53.6% of cases. The agreements for each general dentist's pairwise comparisons against the reference definition were at least substantial in 100% of cases for stage, in 70% of cases for grade and in none of the cases for extent. Fleiss kappa was 0.818, 0.608 and 0.632 for stage, extent and grade, respectively. The study recognized possible reasons that could lead to decreased accuracy due to both examiners and SA.

The main findings of this study on the use of a SA to aid general dentists in defining periodontitis cases are: i) overall diagnosis is accurate in more than half of the cases; ii) assignment of stage and grade is substantially accurate, while accuracy is worse in terms of extent; iii) the less severe is the form of periodontitis, the hardest is the chance to properly diagnose each case; iv) the inaccurate definitions are mostly due to overestimation of stage and/or grade; v) presence of high risk modifiers are positively associated to the chance of correctly assign the grade in all the cases; vi) the agreement between general dentists is high for stage and grade but it is lower for extent; vii) results obtained by general dentists with the aid of the SA may appear similar to those obtained by periodontal experts and undergraduate dental students in a published study without the use of the SA.

*Key-words:* classification; periodontitis; reproducibility of results