Weighted Gingivitis or Periodontitis Score System for Dogs or Cats

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The crowns and roots of teeth of dogs and cats vary much more widely in shape and size than those of humans (see reference C, below).

Scoring systems for dental parameters used in periodontal research, such as dental plaque and calculus, gingivitis, pocket depth or attachment loss, usually generate a specific score for each tooth scored, and, for analysis between groups, a 'mouth mean' is calculated by summing the scores of individual teeth and dividing the sum by the number of teeth scored. This results in a small tooth contributing the same proportionally to the mean mouth score as a large tooth, even though periodontal disease affecting the larger tooth may be contributing a far greater extent of tissue inflammation or bone resorption than the smaller tooth, as explained in reference A, below. A weighted system was developed to manage this imbalance. The method by which the weighting calculations were developed is described in detail in reference A. The result is a spreadsheet that automatically develops a score that takes these significant tooth size differences into account.

Dogs vary much more widely in size (body weight) than any other species. The spreadsheet also takes the size of the teeth of the dogs in the study into consideration, so that the periodontal attachment loss score is applicable across the vast size difference in dogs.

The system was referred to as the Penn Total Mouth Periodontal Score (Penn-TMPS) in the original publication (reference A). It required scoring all buccal and palatal/lingual locations (120 sites in all in a dog). To simplify the process, a correlation coefficient analysis was run to investigate possibilities; this identified a core list of 15 unilateral buccal tooth root surfaces that is highly correlated with TMPS (reference B); this is the Weighted Gingivitis-Periodontitis Score set that is used in the spreadsheet available from this site

Because the system no longer requires scoring a full set of all surfaces of all teeth, it is now referred to as the **Weighted Gingivitis Score-Dog** (or Cat), (WGS-D or WGS-C) or the **Weighted Periodontitis Score-Dog** or Cat, (WPS-D or WPS-C).

The canine spreadsheet is available for download from this web page. The cat spreadsheet has been developed and is awaiting validation before making it available for general use. Copyright of the spreadsheets is owned by the University of Pennsylvania and Colin Harvey; however, they can be used by other investigators provided that presentation and publications that include use of the WPS/WGS spreadsheet state '© University of Pennsylvania and Colin Harvey, used with permission.' An individual request for permission to use it is not required, though please send an email note to Colin@ColinHarvey.info if you use the spreadsheet.

How to use the WGS-WPS spreadsheet.

The weighted calculations are pre-set within the spreadsheet. The investigator need only to insert the scores into the correct cells. The sequence is:

1. Examine the teeth. If one or more teeth are damaged (crown fractures) or are missing, select the side of the mouth that is most intact. The spreadsheet takes missing teeth into consideration (see reference A for further details).

- Enter the date, name of scorer, animal identification data and the side to be scored in cells C3,
 4, 5 and 6 at top left.
- 3. On the side that will be scored, measure the height of the maxillary canine tooth from the cemento-enamel junction to the cusp of the crown. If gingival hyperplasia is present that obscures the CEJ, gently insert the probe sub-gingivally to determine the location of the CEJ by feeling for the enamel bulge the CEJ is immediately apical to the apical end of the enamel bulge. Measure the mid-buccal CEJ-Crown Cusp height in mm and record it in cell H3.
- 4. Determine the Gingival Bleeding Index score or Attachment Loss measurement for each buccal root site (premolar and molar teeth require each root site to be scored and recorded separately). Enter the score in the correct cells in the Gingivitis light pink cells (C15-30) or light blue Attachment Loss cells I15-30. DO NOT enter anything or change anything in the non-colored computation cells D, E, F, J, K, L 15-31. (Note: The spreadsheet will work with other gingivitis scoring systems, and even plaque and calculus scores, but the validation of the use of the sub-set was based on a study that used the 0-3 Gingival Bleeding Index and mm Attachment Loss methods described in reference A).
- 5. If a tooth is missing, enter 'm' (lower case letter m) in the cell(s) for the root site(s) for that tooth.
- 6. Once all the scores have been entered in the pink or blue columns, the spreadsheet will show the WGS score in cell F31 and the Raw WPS score in cell L31. If a maxillary canine tooth crown height has been entered in cell H3, as in step 3, a WPS score adjusted for the size of the teeth in that dog will be shown in cell J32. Note that a spreadsheet in which cell H3 is blank will show #DIV/0! in cell J32 this is normal, and a figure will be automatically calculated in cell J32 once the canine tooth height is entered in cell H3.
- 7. Once all the scores and subject data, date etc. have been entered and you have checked that cells F31 and J32 show a calculated number, save the spreadsheet include the dog identity and date in the file name.
- 8. Open a new copy of the blank spreadsheet when scoring the next dog.

Primary References for WGS-WPS:

- A. Harvey, Laster, Shofer, Miller: Scoring the Full Extent of Periodontal Disease in the Dog: Development of a Total Mouth Periodontal Score (TMPS) System. J Vet Dent, 25, 176-180, 2008.
- B. Harvey, Laster, Shofer: Validation of Use of Subsets of Teeth when Applying the Total Mouth Score (TMPS) System in Dogs. J Vet Dent, 29, 222-226, 2012.

Periodontal Scoring in Dogs and Cats: Other Relevant Publications:

- C. Harvey: Shape and Size of Teeth of Dogs and Cats Relevance to Studies of Plaque and Calculus Accumulation. J Vet Dent, 19, 186-195, 2002.
- D. Rawlinson, Goldstein, Reiter, Attwater, Harvey: Association of periodontal disease with systemic health indices in dogs and the systemic response to treatment of periodontal disease. JAVMA, 239, 601-609, 2011.