Taking the Complexity Out of CALs

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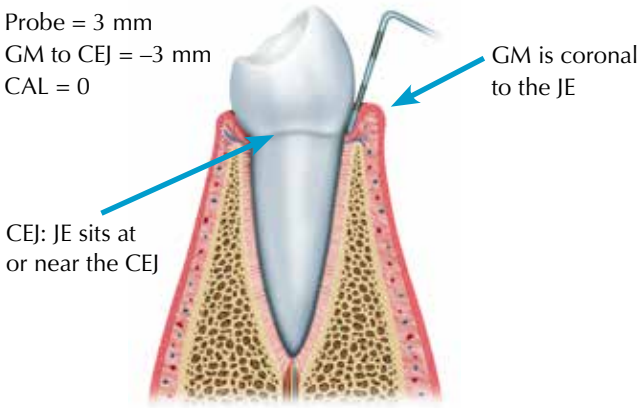
In a recent study conducted in Sweden, nearly 200 dental hygienists participated in a survey to assess their use, knowledge, and attitudes towards the *2018 Classification of Periodontal and Peri-Implant Diseases and Conditions*. The findings revealed a mixed level of familiarity with the system among the respondents. While 36% of the participants felt confident in their knowledge and use of the system, another 33% admitted having poor knowledge. Many comments highlighted that the system was time-consuming and difficult to use.[1]

Reflecting on my 28 years of experience as an educator in histology, radiology, and periodontology, I have often heard colleagues express challenges in calibrating and calculating clinical attachment levels (CALs). These calibration issues are a common concern among oral health professionals. To address these challenges, I return to the basics from histology and use visuals to explain the connection between CAL, the gingival margin (GM) to the cementoenamel junction (CEJ), and radiographic bone loss (RBL).

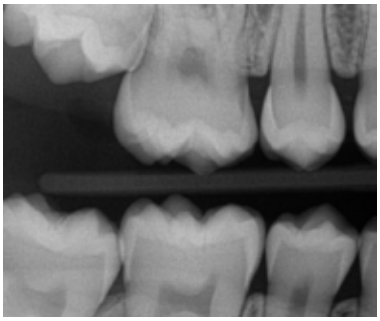
Figure 1. *Healthy or inflamed gingiva with no CAL or RBL*



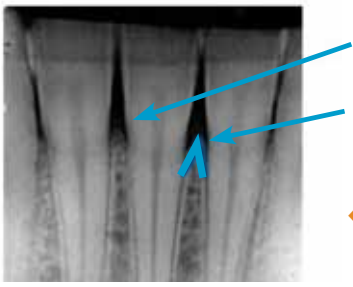
1A. *Healthy example: the gingival margin (GM) is coronal to cementoenamel junction (CEJ) and the junctional epithelium (JE) is at or near the CEJ giving a clinical attachment level (CAL) of 0.*

1B. *Healthy gingiva, knife edged and fills the embrasure space.*

1C. *Inflamed gingiva (gingivitis) with no interproximal apical migration of the junctional epithelium.*



1D. *Horizontal alveolar crest between .5 mm and 2 mm apical to the CEJ.*



1E. *Anterior radiograph with peaked alveolar crest.*

RECOGNIZING THE GINGIVAL MARGIN'S POSITION

When calculating CALs, we know to take a probing depth and either add or subtract the GM to CEJ to determine the clinical attachment level or loss. The challenge is not the probing, but rather the accurate measurement of the distance the GM is to the CEJ. When reviewing our histology, we note that in health the junctional epithelium (JE) sits at or near the CEJ with the GM coronal to the CEJ as in Figure 1.[2] Compare the histological diagram to the clinical presentation with the GM coronal to the CEJ in Figure 1B. Radiographs with no bone loss present with the position of the alveolar crest typically between 0.5 mm to 2 mm apical to the CEJ.[3, p379]

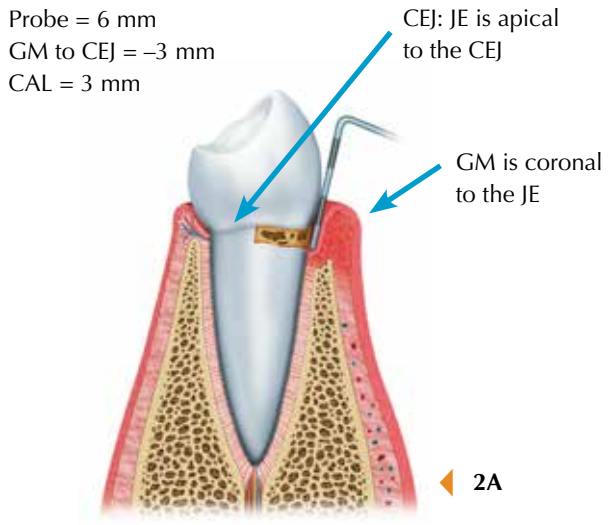
ATTACHMENT LOSS WITHOUT OBVIOUS RECESSION

Bone loss without obvious recession can be more challenging to assess. Understanding the curvature of the CEJ is helpful when looking from anterior to posterior teeth. In the anterior teeth, the distance between the CEJ and the incisal edge is smaller interproximally than the distance on the buccal/lingual of the CEJ to the occlusal edge. The posterior teeth have a flat CEJ wrapping more equidistant to the occlusal edge.

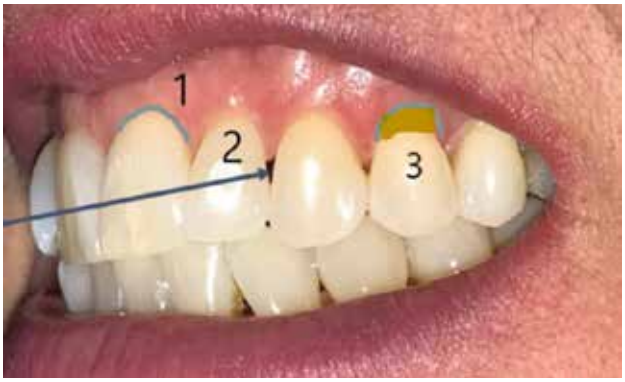
When the gingival margin appears to sit coronally or at the CEJ (Figure 2B, example 1), attachment loss may be harder to detect without completing the CAL, as shown in Figure 2A.

One clinical clue may be an open embrasure space as shown in Figure 2B (example 2). The loss can be confirmed interproximally with a radiograph as in Figure 2C.

Figure 2. *Bone loss examples*



2A



2B

1. GM at the CEJ
2. Interproximal: GM at the CEJ (note the embrasure)
3. GM is apical to the CEJ = recession!

2C. *Tooth 35 has an approximate interproximal RBL of 20%.*

Continued...

Focus: AAP Periodontal Classification

Taking the Complexity Out of CALs…cont'd

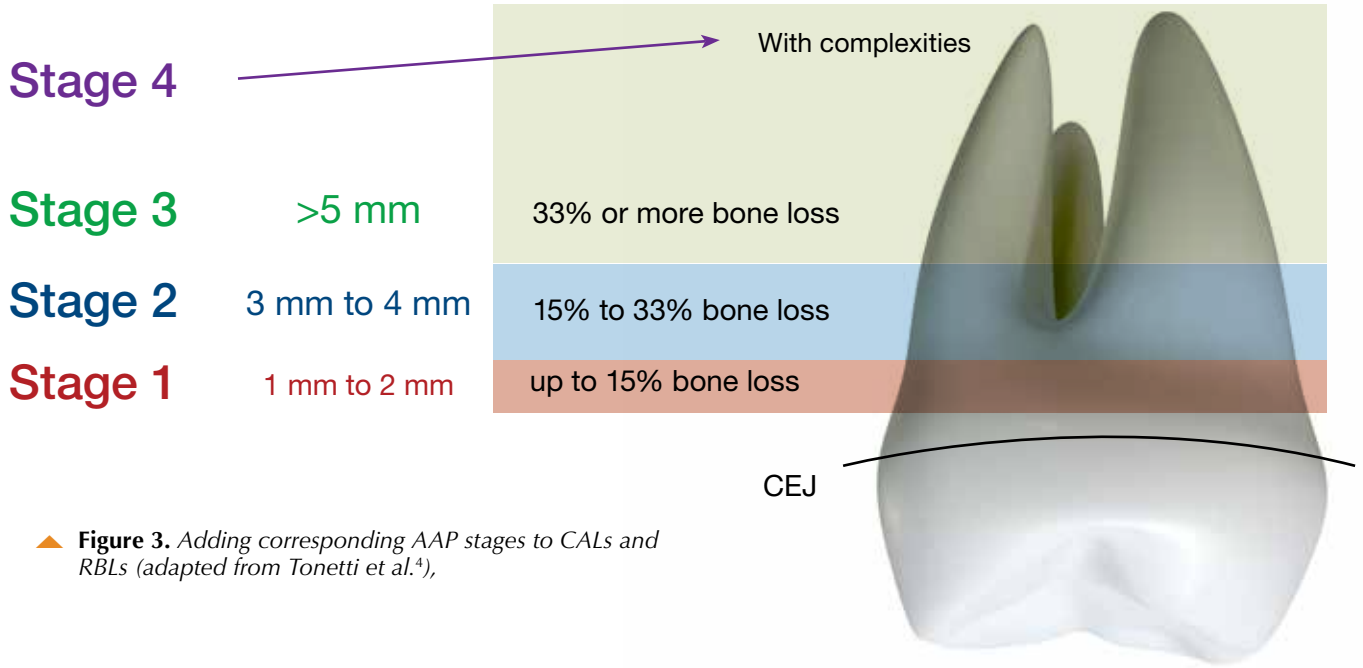


Figure 3. *Adding corresponding AAP stages to CALs and RBLs (adapted from Tonetti et al.[4]),*

ATTACHMENT LOSS WITH OBVIOUS RECESSION

Bone loss with obvious recession is the easiest clinical situation for determining CALs. Using the CEJ as the reference point, the probing depth is added to the amount of visible recession to calculate the overall CAL as in Figure 2B (example 3). Radiographs should correspond with the interdental CAL to RBL percentage. For example, an interdental CAL of 3 mm to 4 mm should correspond to a 15% to 33% RBL as in Figure 3. Once the CALs and RBLs are confirmed, the clinician can determine a periodontitis stage.

SUMMARY AND RECOMMENDATIONS

In summary, when using the *2018 Classification of Periodontal and Peri-Implant Diseases and Conditions*,[4,5] the clinician should use interdental CALs as the primary assessment. Complexity in recognizing the clinical GM position in relation to the CEJ for these calculations requires a comparison of the radiographs to support the findings. Figure 3 illustrates the relationship between CALs, RBLs, and the stage of periodontitis. (Note: additional information, such as complexity, is needed to differentiate between stages 3 and 4.)

By understanding and applying these concepts, dental hygienists can improve their accuracy in periodontal assessments and provide better patient care.

References

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4. *Tonetti M, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. J Periodontol. 2018;89(Suppl 1):S159–S172.*
5. *Caton J, Armitage G, Berglundh T, Chapple ILC, Jepsen S, Kornman KS, et al. A new classification scheme for periodontal and peri-implant diseases and conditions—Introduction and key changes from the 1999 classification. J Periodontol. 2018;89(Suppl 1):S1–S8. Available from: doi.org/10.1002/JPER.18-0157.*