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**Friday, July 16**

**3135 Between Operator Consistency in Image Analysis Tooth Color Measurement**

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**Objective:** This research evaluated the instrumental color reproducibility of teeth measured by different operators.

**Methods:** Anterior facial tooth color was measured by digital image analysis by an experienced technician operator (STD) and two naive operators (EX1 & EX2). Digital images were collected from 20 healthy dentate adults on a single day under fixed polarized lighting conditions using a high resolution digital camera (JVC CCD) with a zoom lens. Each examiner aligned each subject using a chin rest in order to replicate possible variations in operator-directed subject positioning for each image. After imaging, maxillary anterior facial tooth pixels were classified and counted, and average L*a*b* tooth colors were derived using standard formulas. Intra-class correlations (ICC) and 95% lower confidence bounds (LCB) were calculated comparing each of the naive operators to the standard operator.

**Results:** Mean (SD) age of the 20 subjects was 34.8 (14.2), and all 60 images were included in the analyses. Both naive operators exhibited appreciable alignment reproducibility versus the standard, with an inter-operator pixel count ICC (95% LCB) of 0.977 (0.950) for EX1 and 0.983 (0.963) for EX2. For color, the ICC (95% LCB) for b* (blue-yellow) was 0.998 (0.995) for EX1 and 0.997 (0.994) for EX2. Other color parameters were similarly highly reproducible, with the ICC for L* (lightness) and a* (red-green) exceeding 0.99 and 0.98 respectively.

**Conclusion:** This research demonstrates digital image analysis yields highly reproducible clinical measurement of tooth color for naive systems operators compared to an experienced technician.

**Saturday, July 17**

**4730 Consistency of Overnight Disclosed Plaque with Image Analysis Methods**

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**Objective:** This research evaluated digital image analysis consistency of overnight disclosed dental plaque.

**Methods:** Institutional review and informed consent were obtained, and healthy adult volunteers were provided a blinded, overtubed, regular anticiavity dentifrice and manual brush. Acclimation was for one week. After acclimation, volunteers abstained from eating, drinking, and oral hygiene overnight prior to a morning baseline plaque evaluation visit. Plaque was disclosed using 5 mL of a 1240 ppm fluorescein rinse. After expectoration, subjects were positioned, cheek retractors were inserted, and a digital image was collected under standardized lighting conditions. Oral hygiene products were redistributed for at-home use. Approximately three weeks later, rinsing and imaging were repeated. Image analysis was used to objectively measure disclosed plaque (area%) on facial anterior tooth surfaces. Visits were compared using a paired difference t-test, and intra-class correlations (ICC) and 95% lower confidence bounds (LCB) were calculated using a 0-to-1 scale, where 0 represented no agreement and 1 represented perfect agreement.

**Results:** A total of 52 adults had paired measurements, and all data were included in the analyses. Mean (SD) age was 30.8 (11.97), with females comprising the majority (71%) of study subjects. There was considerable variation in overnight plaque area, with scores ranging from 2.5-38.2% at baseline and 2.6-39.2 after 3 weeks. Plaque area% means (SD) were 12.1 (7.99) and 13.2 (9.06) at baseline and week 3 (p>0.15). Overnight plaque area% means were well-correlated (0.81) across visits (p<0.0001). The ICC was 0.795, with a 95% LCB of 0.694.

**Conclusion:** Overnight disclosed plaque scores were consistent over 3 weeks of routine oral hygiene when measured using digital plaque image analysis.