



Standard Test Method for Objective Quantification of Dental Plaque Using Digital Still Cameras¹

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INTRODUCTION

Dental plaque is a biofilm, which grows on teeth and surrounding tissue. In many cases, dental plaque is the underlying cause of many oral diseases, that is, cavities and gum diseases. Thus, controlling dental plaque through its removal and inhibition of re-growth is essential to maintaining good oral health. Today, there are hundreds of products produced to control dental plaque. Examples are; toothbrushes, toothpastes, floss, rinses, gums and routine dental cleanings. One universal design objective maximizes plaque control through enhanced cleaning ability or chemistry which inhibits plaque growth; that is, anti-bacterial agents. Often, the effectiveness of a product or procedure is measured in a clinical trial with traditional methods of estimating plaque coverage. For example, the modified Turesky index is often used. This index is an integer scale ranging from 0 (no plaque) to 5 (complete plaque coverage). The clinical examiner estimates the numerical value or score based on visual observation of the plaque. Unfortunately, there are drawbacks to this approach. First, the scale is non-linear with respect to plaque area coverage. Second, the application of the scale is subjective by nature. Therefore, an objective method of measuring the amount of plaque on teeth represents a significant improvement in the science of plaque measurement.

1. Scope

1.1 This method covers the procedure, instrumental requirements, standardization procedures, material standards, measurement procedures, and parameters necessary to make precise measurements of dental plaque on the teeth revealed by fluorescence. In particular it is meant to measure the amount of plaque and plaque coverage on human teeth.

1.2 Digital images are used to measure the coverage of dental plaque on the teeth using discrimination analysis. All localized discoloration, such as stains, inclusions, pigmentations, etc., may be separated from the measurement and the analysis. All other non-relevant parts, such as teeth, tongue, spaces, dental restorations or prostheses, etc., must be separated from the measurement and the analysis.

NOTE 1—This procedure may not be applicable for all types of dental work.

1.3 The broadband reflectance factors of the teeth and surrounding tissue are measured. The colorimetric measure-

ment is performed using an illuminator system that provides controlled illumination on the teeth and surrounding tissue. A Digital Still Camera (DSC) is used to capture the digital image.

1.4 Data acquired using this method may be used to assess personal plaque coverage for the purposes of identifying overall health status, health status at specific sites in the mouth, or to track changes in personal health status for individuals over time. Pooled data may be used to assess plaque coverage, health, disease among populations in epidemiological surveys, evaluation of comparative product efficacy, or safety and treatment response in clinical trials involving plaque coverage or disease.

1.5 The apparatus, measurement procedure, and analysis technique described herein are generic. The intent is not to exclude a specific apparatus, measurement procedure, or analysis technique.

1.6 The values stated in SI units are to be regarded as standard. The values in parenthesis are for information only.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

¹ This test method is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.06 on Display, Imaging and Imaging Colorimetry.

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