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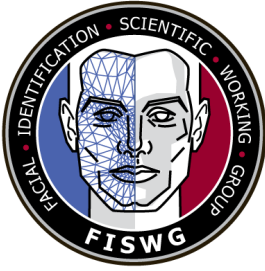
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Guideline for the Use of ACE-V Methodology in One-to-One Examinations

1. Scope

1.1 The purpose of this document is to provide guidance for the use of Analysis, Comparison, Evaluation, and Verification (ACE-V) methodology in one-to-one facial examinations.

1.2 This document describes the various steps within the methodology of ACE-V.

1.3 This document does not address applying ACE-V to a facial review or assessment.

2. Referenced Documents

2.1 *ASTM Standards*¹:

E3149 Facial Image Comparison Feature List for Morphological Analysis

E2917 Standard Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs

2.2 *FISWG Documents*²:

FISWG Glossary

FISWG Physical Stability of Facial Features of Adults

FISWG Facial Comparison Overview and Methodology Guidelines

FISWG Minimum Guidelines for Facial Image Comparison Documentation

¹ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

² Available from Facial Identification Scientific Working Group (FISWG), <http://www.fiswg.org/documents>.

FISWG Image Factors to Consider in Facial Image Comparison

FISWG Facial Images Comparison Feature List for Morphological Analysis

FISWG Image Processing Techniques for Facial Image Comparison

FISWG Facial Image Comparison Best Practices for Markups & Annotations

2.3 Other Standards³:

OSAC Standard Framework for Developing Discipline Specific Methodology for ACE-V

OSAC 2022-S-0001 Standard Guide for Image Comparison Opinions

3. Terminology

3.1 Definitions:

3.1.1 *analysis*: (1) the first step of the ACE-V method (2) the assessment of an image to determine suitability for comparison, including the ability to discriminate significant features.

3.1.2 *comparison*: (1) the second step of the ACE-V method (2) the examination of two or more samples to establish similarities and dissimilarities.

3.1.3 *evaluation*: (1) the third step of the ACE-V method, where a practitioner assesses the value of the details observed during the analysis and comparison steps and reaches an opinion (2) ascertaining the value of dissimilarities and similarities between two or more samples.

3.1.4 *examination*: A comparison of image(s)-to-image(s) often used in a forensic application.

3.1.5 *one-to-one comparison*: the direct comparison of facial features in one image to facial features in another image by a trained practitioner.

3.1.6 *verification*: (1) the final step of the ACE-V method; (2) the review or independent analysis of the assessment, comparison, and evaluation performed by another qualified practitioner.

3.2 Acronyms:

3.2.1 *ACE-V: analysis, comparison, evaluation, and verification*

³ Available from Organization for Scientific Area Committee (OSAC) for Forensic Science, <https://www.nist.gov/organization-scientific-area-committees-forensic-science/osac-registry>

4. Significance and Use

4.1 This document outlines the methods and criteria to be applied during a one-to-one examination.

4.2 The documentation of the ACE-V process during examination should follow the FISWG Minimum Guidelines for Facial Image Comparison Documentation.

5. Applying ACE-V to One-to-One Comparisons

5.1 *Analysis*: the step during which a practitioner observes and makes note of the questioned image(s) or known image(s) in terms of its properties and facial features to assess whether a given image is suitable for comparison.

5.1.1 The practitioner should visually analyze the questioned image(s) before the known image(s).

5.1.2 Visual analysis and documentation should include, but is not limited to, the following considerations:

5.1.2.1 Imaging factors (see FISWG Image Factors to Consider in Facial Image Comparison)

5.1.2.2 Image capture timeframe

5.1.2.3 Image alterations (e.g., filters, enhancements)

5.1.2.4 Subject factors (see FISWG Facial Images Comparison Feature List for Morphological Analysis and FISWG Physical Stability of Facial Features of Adults)

5.1.2.5 Metadata

5.1.3 The determination of image suitability is based on the practitioner's subjective assessment of whether an image has sufficient detail and comparability for a reliable and meaningful examination. If the images (questioned and known) are deemed to be suitable for comparison, the practitioner will move on to the comparison step.

5.2 *Comparison*: the step during which the practitioner conducts a visual side-by-side comparison of facial images utilizing morphological analysis (see FISWG Facial Images Comparison Feature List for Morphological Analysis) and considering physical stability (see FISWG Physical Stability of Facial Features of Adults) to compare the facial features.

5.2.1 Practitioners should note any similarities or dissimilarities, along with any associated considerations where necessary (see step 5.1.2). Dissimilarities that can be explained by subject variance (such as expression, pose, weight, or age changes) between images or imaging conditions should also be noted.

5.2.2 The practitioner may produce visual aids in which they annotate images to demonstrate the noteworthy facial features in the comparison (see FISWG Facial Image Comparison Best Practices for Markups & Annotations).

5.3 *Evaluation*: The step during which the practitioner evaluates the weight of the findings, similarities and dissimilarities, to form an opinion⁴. This evaluation is based on the quality, quantity, specificity, reproducibility, expected variation, and persistence of the findings. Information gathered in the analysis phase should also be considered.

5.3.1 Expected variations that should be considered during the evaluation include, but are not limited to:

5.3.1.1 Stability of features (see FISWG Physical Stability of Facial Features of Adults)

5.3.1.2 Imaging Factors (see FISWG Image Factors To Consider In Facial Image Comparison)

5.3.2 At this time, there is no discipline-specific opinion scale for facial comparisons. There is an OSAC Standard Guide for Image Comparison Opinions (OSAC 2022-S-0001) that should be referenced when creating an opinion scale.

5.3.2.1 Agencies should define the opinion scale utilized in conducting the facial comparison to include the following:

- (1) Consideration of alternative propositions (both the propositions of same source and of different source).
- (2) Criteria necessary to reach each of the opinions.

5.3.2.2 An opinion shall not be expressed as an absolute certainty. The following words or phrases shall not be used when expressing an opinion: “‘individualize,’ ‘individualization,’ ‘identifies,’ ‘identification,’ ‘includes,’ ‘inclusion,’ ‘excludes,’ ‘exclusion,’ ‘to the exclusion of all others’.

5.4 *Verification*: The step in which the analysis, comparison, and evaluation steps shall be completed by a second, independent practitioner. Verification should be blind (without knowledge of the other practitioner’s opinion) rather than non-blind (performed with knowledge of the other practitioner’s opinion). If verification is non-blind, the practitioner should document in writing the special circumstances requiring non-blind.

5.4.1 A statement of verification (all opinions) shall be included within the documentation (see FISWG Minimum Guidelines for Facial Image Comparison Documentation) of a requested comparison. This documentation should be completed

⁴ See OSAC definition “view, judgment, belief – takes into consideration other information in addition to observations, data, calculations, and interpretations”

by all practitioners who have rendered an opinion of the same requested comparison.
The number of practitioners verifying may vary and be agency specific.

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