

G6 Smile Selfie Images in Forensic Dental Identification: A Novel Procedure Proposal

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Learning Overview: After attending this presentation, attendees will understand how the identification process of human remains can benefit from the supplementary dental information detectable from smile selfie images of missing persons.

Impact Statement: This presentation will have a positive impact on the forensic community by presenting the results of a structured protocol on the visual comparison of images of front teeth by forensic odontologists and dentists and the protocol's application in the field of forensic dental identification.

The collection of postmortem dental evidence from unidentified human remains is fundamental to the initial reconstruction of—as well as to the definitive comparative identification of—those remains.¹ The main challenge of dental identification may be collecting antemortem dental data from dental clinics and hospitals. However, relevant dental data may be available from the family of the missing person by conducting a thorough interview and collecting dental information that is in the home of the missing person or victim, information that could be converted into useful secondary forensic antemortem identifiers. For example, old radiographs or dental devices or orthotics such as a bruxism bite, a sports mouthguard, bleaching trays, and orthodontic retainers are examples of these identifiers. In this regard, a portrait showing the person smiling can provide identifying features that could lead to the comparison of postmortem and antemortem dental data.^{2,3} This study processed smile selfie images for the purpose of introducing a structured protocol as a supplementary tool in forensic dental identification.

Materials and Method: A sample of 253 people was recruited on a voluntary basis. Each person was asked to take a selfie while smiling and showing the front teeth. These images were considered antemortem photos found on a victim's phone or social media profiles; 71 of the 253 people were also asked to take an intraoral picture for the purpose of simulating postmortem pictures. Five odontologists were involved in a blind and random comparison of the images to evaluate the degree of recognition of the 71 images from among the 253 smile selfie images sampled.

Results: The visual comparison had an average recognition of 65.5%. The Shapiro-Wilk test showed normality of the study, and the Student test showed no significant differences among the observations of the operators involved. This study observed that the shift variables of the front upper incisors presented the least differences and that the axis of central and lateral incisor edges—rounded or straight—were the variables most easily identified. Conversely, the offsets of the lateral incisors in relation to their adjacent central incisors were the criteria with the most subjective differences among the operators. The features that were best recognized by all operators were the axes of the front incisors and the shapes of the central upper incisors' edges

Discussion: This analysis demonstrated a recognition rate of more than 50%, which is not sufficient to make this process reliable in a disaster victim identification scenario but is sufficiently reliable for application in single identification cases when also applying the exclusion criteria. The shooting angle of the photographic snapshot and the lens distortion can lead to interpretation errors when teeth do not lie on the sample plane because they are either more lingual or more vestibular. This study recognizes that visual recognition is not a reliable enough method to use in human identification, but that visual recognition can be used as a preliminary sorting tool when dental features, such as diastema, malpositions, rotations, pigmentation, crown morphology, dental piercing, and restorations, are visible on the front teeth.⁴

Conclusion: A selfie picture search on social media should be performed by forensic odontologists as adjunct data in the preliminary reconstructive identification process. Smile selfie pictures can be used in the preliminary search of compatible reported-missing persons as supplementary data and when dental records are not yet available. The proposed protocol and the current state of research on the smiling selfie are showing promising developments when combined with artificial intelligence and facial recognition software.

Reference(s):

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