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# An unusual method of forensic human identification: use of selfie photographs

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ABSTRACT

As with other methods of identification, in forensic odontology, antemortem data are compared with postmortem findings. In the absence of dental documentation, photographs of the smile play an important role in this comparison. As yet, there are no reports of the use of the selfie photograph for identification purposes. Owing to advancements in technology, electronic devices, and social networks, this type of photograph has become increasingly common. This paper describes a case in which selfie photographs were used to identify a carbonized body, by using the smile line and image superimposition. This low-cost, rapid, and easy to analyze technique provides highly reliable results. Nevertheless, there are disadvantages, such as the limited number of teeth that are visible in a photograph, low image quality, possibility of morphological changes in the teeth after the antemortem image was taken, and difficulty of making comparisons depending on the orientation of the photo. In forensic odontology, new methods of identification must be sought to accompany technological evolution, particularly when no traditional methods of comparison, such as clinical record charts or radiographs, are available.



## 1. Introduction

As with other methods of identification, in forensic odontology, antemortem (AM) data are compared with postmortem (PM) findings. An individual's dentition forms a unique tridimensional apparatus because of variations in the size, shape, and position of teeth [1]. However, AM dental data may not be available for various reasons, such as for immigrants without a clinical history [2], patients without fillings due to efficient preventive dentistry or no access to a dentist, or cases in which the patient's dentist is unknown to their family.

In the absence of dental documentation, photographs of the smile can play an important role [3]. Few authors have been involved in the elaboration of this method [2]. If the individual's anterior teeth are clearly defined in an AM photograph, then individual attributes of the teeth may be compared and matched to PM photographs [1]. Indeed, anterior dentition can provide sufficient evidence of individuality [1]. Commonly applied and scientifically validated photographic comparison techniques include direct morphological comparison of the teeth, superimposition, and analysis of the incisal outline of the anterior teeth [3]. In spite of advancements in forensic sciences, traditional techniques continue to be of great value, particularly in emerging and developing countries [3].

Some studies [3–5] have used photographs of the smile for identification purposes, but as yet, there is no report of a case with the use of selfie photographs. With advancements in technology, electronic devices, and social networks, selfie photographs are becoming increasingly common. This present study showed yet another type of AM datum that may be useful in identification, particularly when there is no other medical/dental documentation available. The aim of this study was to show a report of a case in which selfie photographs were used to identify a carbonized body, by using the smile line and image superimposition.

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**Fig. 1.** Carbonized body.

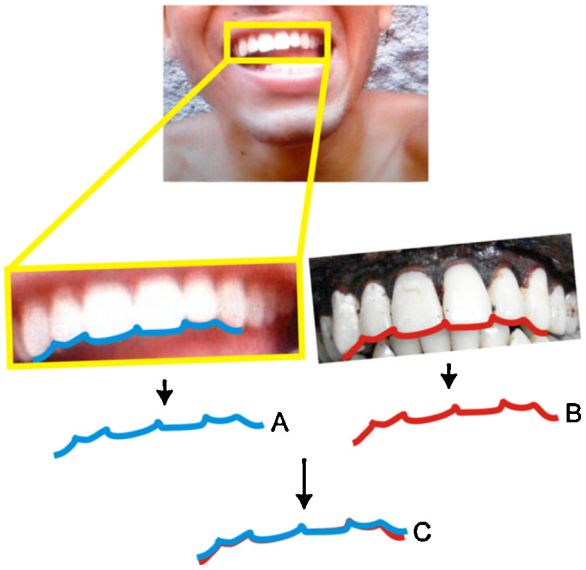


**Fig. 3.** Smile line in AM photographs (A), PM photographs (B), and superimposition (C).

## 2. Case report

In December 2014, a carbonized body of the male sex was admitted to the Legal Medical Institute of Belo Horizonte, Minas Gerais, Brazil (Fig. 1). Necroscopic and dental exams were performed, in which all of the teeth were found to be healthy.

For identification, the family was requested to provide all available medical and dental documentation. As the victim had no history of dental treatment, the family presented six selfie photographs that had been taken with the victim's mobile telephone. These photographs showed the individual's teeth at various angles (Fig. 2).

PM photographs were taken in the same spatial orientations as those of the AM photographs, as described by De Angelis et al. [2], so that comparisons could be made. CorelDRAW X7® (Ottawa, Canada) was used to perform two comparative techniques: the smile line (Fig. 3) and superimposition of the teeth (Figs. 4 and 5). The smile line was traced on the AM and PM photographs, highlighting the incisal outline (canine to canine) of the maxillary anterior teeth. Two matrices were formed, superimposed, and found to be matching (Fig. 3). The superimposition technique was also used, with layers of 0%, 25%, 75%, and 100% transparency of the AM photographs being superimposed on the PM photographs (Figs. 4 and 5).

To make the identification more robust, the semiquantitative score proposed by De Angelis et al. [2] was used. Scores from 0 to 2 were attributed to teeth nos. 13, 12, 11, 21, 22, and 23, in accordance with the degree of correspondence of each component of the matrix with the surfaces of the teeth. The index of correspondence (IC) was 81.25, indicating high probability (Fig. 6).

The victim's father signed a consent form authorizing publication of the case in a scientific journal. Therefore, the ethical aspects of this report were respected.

## 3. Discussion and conclusion

The teeth have biometric properties [6] that may be useful for identification by AM and PM photographs. A photograph of the smile that shows the anterior teeth has points of reference that

**Fig. 2.** Selfie photographs from the victim's mobile telephone.