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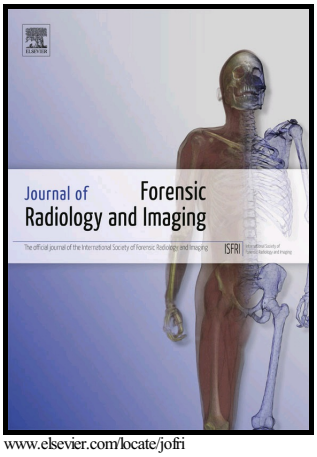

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A novel method for landmark-based personal identification on panoramic dental radiographic and computed tomographic images

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ABSTRACT

Personal identification based on dental work is a well-known and useful method for post-mortem identification. Recently, several odontologists have matched reconstructed post-mortem computed tomographic (CT) panoramic images of unidentified bodies with ante-mortem dental panoramic X-ray images for identification purposes. However, it is not always possible to obtain useful information from these panoramic X-ray and CT images. To obtain more accurate information for personal identification, we focused on the anatomical structures of the maxilla and mandible rather than dental work on the images.

The aim of the present research is to develop a novel method for the personal identification of unidentified bodies, based on landmarks on the tooth sockets, which are not notably subject to post-mortem changes. We calculated the Procrustes distance and Pearson's correlation coefficients of the landmarks of two sample images, and used the results to correctly identify the subjects from among a pool of 100 candidates, without having to rely on information on dental work. We conclude that this method is a reliable tool and can be easily and rapidly applied for victim and missing person identification.

Keywords:

personal identification, panoramic CT, panoramic X-ray, landmark method, Procrustes analysis, forensic odontology

Introduction

Dental panoramic X-ray images are commonly provided by clinical dentists to odontologists as ante-mortem (AM) dental information for police investigations [1]. Computed tomography (CT) images are not as popular as X-ray images for AM dental information because they are not often obtained by clinical dentists [2]. However, post-mortem (PM) CT imaging has recently been widely used in forensic field and

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