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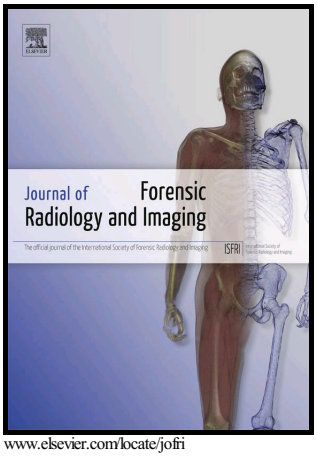

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The Applicability of Dual-Energy Computed Tomography (DECT) in Forensic Odontology – A Review

Norhashirin Norman[1], Matthew Richard Dimmock[1], Kristal Lee[1], Jeremy Graham[2], Richard Bassed[2]

[1]Department of Medical Imaging and Radiation Sciences, Monash University, Clayton, Victoria, 3800, Australia.

[2]Victorian Institute of Forensic Medicine, Melbourne, Victoria, 3006, Australia.

Abstract

Dual energy CT (DECT) is an emerging imaging modality that combines data collected with different x-ray energy spectra. The resulting volumetric reconstructions can be utilised for material differentiation and metal artefact reduction in radiological assessments.

The literature was reviewed to identify articles discussing the use of post mortem CT (PMCT) in odontology, DECT for metal artefact reduction in dental imaging, and current uses of DECT in forensic imaging. Articles written in English and published between 2004 and 2016 were selected for thematic analysis. A total of 54 articles were analysed.

PMCT has been used routinely and validated for identification and age estimation due to its numerous reformatting capabilities and registration techniques. DECT-specific techniques including mono-energetic reconstructions, coupled with extended CT scale visualisation and the use of metal artefact reduction (MAR) software have been shown to overcome the limitations of metal artefact susceptibility in PMCT and enhance material differentiation in forensic odontology. Further benefits of DECT in forensic applications include improved soft-tissue visualisation, virtual bony subtraction and foreign body characterisation. The literature supports the use of DECT in extending the benefits of PMCT for dental identification. Further systematic research is required to explore the use of DECT for material differentiation in forensic odontology.

Keywords: Forensic odontology; Forensic identification; Dual energy computed tomography; Post mortem computed tomography; Metal artefact; Dental restorations