INTRODUCTION

Radiographs are an important part of dental practice to confirm diagnosis. In clinical dentistry, intraoral and extraoral radiographs are an integral part of dental disease diagnosis and treatment planning [1]. Forensic dentistry is based on the comparison of ante-mortem and postmortem dental and oral findings with resultant matching or exclusion [2]. Dental records include dental charts, written records and dental radiographs. Radiographs are important when comparing consolidated ante-mortem with postmortem information [3].

Forensic Radiology

Forensic radiology is an integral branch of forensic medicine. It plays an important role in various criminal investigations which are helpful in determination of identity, evaluation of different injuries, various criminal and civil cases [4]. The various modalities of radiology like X-rays, computed tomography (CT), magnetic resonance imaging and ultrasonography etc. can be used depending on various forms of cases and their requirements in routine investigations.

The main advantage of using radiographs in forensic odontology is that it helps in overcoming various international scenarios in identification system that may overlap or give conflicting results and more importantly their acceptance in courts of law as legal evidence [5].

RADIOGRAPHY IN FORENSIC ODONTOLOGY: CURRENT TRENDS

The most accurate data obtained during the forensic dentistry identification procedures are those that are derived from postmortem and ante-mortem radiographs [5]. To convey the importance of radiography, images of a blast victim and her skull radiograph have been shown from our archive [Figures 1 and 2].

ABSTRACT

Forensic odontology is a rapidly developing field. Apart from the documented dental records, casts and photographs; radiographs are one of the main sources of ante-mortem evidence. In this review we have highlighted on the importance of dental radiography. Common difficulties faced during intraoral radiography in post mortem cases and newer modalities of imaging in forensic odontology have also been discussed.

KEY WORDS: Forensic sciences, forensic odontology, dental radiography, imaging
The radiograph shows presence of fragments of stone shrapnel and fractured jaws bones.

In one recent report, the dental radiographs of skeletal remains proved a vital tool for reproducing post-mortem forensic records [6]. Post mortem periapical radiographs were compared to ante-mortem lateral and postero-anterior radiographs of a missing person [6]. Another recently published report has highlighted the importance of dental digital imaging technology to compare ante-mortem and post mortem evidences [7]. The advantage of this modality is that it allows large field of view and excellent digital image quality when compared to conventional radiographs [7].

During post-mortem intra-oral radiography a major problem is placing and retaining radiographic films in the mouth due to rigor mortis affecting the mandibular muscles. In order to overcome this problem, some researchers have suggested the use of balloon catheters which can be inflated within the oral cavity. These catheters will hold the radiographic film in position during exposure [8]. The second challenging aspect of dental radiography in post mortem cases is the exposure parameters. Exposure parameters needs to be reduced especially in postmortem cases where loss of soft tissue is detected [9,10].

In some instances only a fragment or a part of tooth/jaw has to be radiographically examined. In such cases, orientation of radiographs in accurate position is a challenging task [9,10].

Age estimation using dental radiographs has been extensively studied and has proved to be a good indicator in both pediatric and permanent dentition [11].

**RADIOGRAPHY IN FORENSIC ODONTOLOGY: FUTURE PROSPECTS**

Modalities such as transportable multislice CT perform post-mortem dental scans in a short time. An added advantage is that the processing software allows comparison of every possible ante-mortem dental radiograph for the purpose of identification [12]. In one report dental processing software for computed tomography (Dentascan) has been used for scanning three corpses. In all three cases panoramic reconstruction of the image could be obtained which could be compared to ante-mortem records. The images were clear enough to differentiate structures like enamel, dentin, pulp, alveolar bone and restorations. Conventional radiography was only required in cases where streaking artifacts were produced with CT images [13]. However a group of researchers have suggested the use of high resolution eLUC-CT (eXplore Locus Ultra flat panel CT) to reduce problems like streak artifacts caused by metallic dental fillings [14]. “Radiograph-like images” reconstructed using CT in postmortem cases have been used wherein conventional radiograph like images can be simulated to compare with ante-mortem records [15]. A semi-automated image analysis software has also been devised to perform this comparison [16]. In contrast in conventional approach, one recent research paper highlighted a new digital technique, wherein comparison tooth root morphology and spatial orientation of the roots between ante-mortem and postmortem radiographs has been used for identification [17]. Dental biometrics is a new innovation utilizing dental radiographs for human identification. This system matches dental radiographs in two stages. The first stage is called extraction, which uses anisotropic diffusion to improve the images and a mixture of gaussians model to segment the dental work. The second stage termed as matching involves tooth-level matching, computation of image distances and subject identification. Making use of these steps a comparison of the ante-mortem and post mortem radiographs is carried out [18].

**CONCLUSION**

Radiographs and imaging technologies have become a vital component of modern medical practice and will significantly contribute to decision making situations in forensic medicine and odontology which is beyond reasonable doubt.

**REFERENCES**

Achar, et al.: Radiographs in forensic odontology


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