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TECHNICAL NOTE

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The Use of Panoramic Radiographs for Comparisons in Cases of Identification

The specific aim of this project was to determine the value of panoramic radiographs in cases of identification through a series of double blind comparisons and to formulate a comparative evaluation of the effectiveness of such interpretation. The study was conducted from a forensic approach through the use of all means of comparison of simulated "antemortem" to "postmortem" panoramic radiographs. These various means of comparison consisted of dental restorations (size, shape, location, and various materials), tooth morphology, anatomical landmarks, maxillary sinus configuration, foramina (mental, posterior palatine, mandibular, and incisive), bony trabeculation patterns, condylar morphology, mandibular canal morphology and location, morphology of the lower border of the mandible, third molar root formation, apical calcification, path of eruption evaluated through time intervals, hard tissue healing in old extraction sites, endodontically treated teeth, prostheses, malposed teeth, fixed orthodontic appliances, caries, coronal fractures, bone loss interpretation, and attrition.

Materials and Methods

This study was conducted at the U.S. Coast Guard Academy, New London, Conn. on 14–15 Feb. 1976 with the use of panoramic radiographs of cadets. It consisted of 2 panoramic radiographs of 192 individuals taken at approximately 3-year intervals. An additional 27 panoramic radiographs with no counterparts were added to similate the situation where no antemortem radiographs were available. This tended to complicate the identification process and made the study more precise.

All panoramic radiographs were taken by various qualified dental technicians and assistants at various time intervals and were unrelated to the study when taken. A vast majority of individuals had received dental treatment in the 3-year period, which tended to alter the final radiographic appearance. Furthermore, all subjects were in the same age group (17 to 22 years).

An S.S. White Panorex machine with an S.S. White cassette model 512 were used with a peak of 90 kV, 10 mA, and exposure time of 18 s. The film was Kodak RP X-omat

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(high speed) panoramic dental X-ray film DF-75. An S.S. White Auveloper, Kodak RP X-omat developer, and Kodak RP X-omat fixing solution were used.

The names of the individuals were masked on all radiographs. The only variation was that the initial radiographs were tagged with black tape on the upper right corner to represent an antemortem radiograph and the subsequent radiographs and the 27 with no counterparts were tagged with purple tape in the same manner to simulate postmortem evidence.

Results and Discussion

All 411 radiographs were distributed at random in a pile, and two dentists with experience in the field of forensic odontology attempted to compare the unknowns with their counterparts. There was one dental technician with no experience in forensic odontology who assisted in recording this project, which was conducted over a 1½-day period. The investigators worked from three basic files:

1. Unidentified—This file consisted of radiographs of the "unknown" individuals.
2. Possible identified—This file consisted of radiographs that were similar (example—resemblance of anatomical landmarks).
3. Identified—This file consisted of radiographs that had been compared and positively identified with "known" radiographs.

Initially, obvious exclusions were compared and positively identified (postmortem radiographs with no restorations, serial extractions, antemortem missing third molars, presence of fourth molars). Next, characteristics (such as restorations, malposed teeth, prosthesis) were categorized. It is interesting to note that eight of the subjects compared had neither "antemortem" or "postmortem" caries or restorations. Furthermore, no bone pathology was noted on any of the 411 radiographs.

A third person disclosed the findings of each of two forensic dentists by removing the name-covering tapes from each radiograph. This revealed 100% accuracy in identifying each "victim" by comparing the "antemortem and "postmortem" panoramic survey.

Conclusion

The purpose of this paper is to demonstrate the value of panoramic radiographs in the identification of simulated unknown deceased persons. The number of correct identifications and procedures with no error makes it very significant.

Based on the results of this study and the increasing use of the panoramic survey, the authors conclude that this is a very effective and valid means of dental identification.

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