

CASE REPORT

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Positive Personal Identity of Skeletonized Remains Using Abdominal and Pelvic Radiographs

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ABSTRACT: Premortem and postmortem radiographs of the chest and abdomen are often available for comparison and provide a basis for making or rejecting an identification. The case reported here exemplifies the way that individualizing features, such as contours of bony elements, skeletal anomalies, and radiodensities and radiolucencies, are used in establishing personal identity.

KEYWORDS: physical anthropology, human identification, X-ray analysis, musculoskeletal system, radiography

One of the most difficult tasks of the anthropologist is ascertaining the personal identity of a decedent. Although a basic part of the anthropological investigation, few cases have been reported that illustrate this phase of the analysis [1-5]. This paper, based on a recent case, deals with the methods and criteria employed to establish personal identity using skeletal features visible on premortem and postmortem radiographs of the abdomen and pelvis.

Case History

In February 1991, an officer from the Forensic Unit of Montgomery County, Pennsylvania, presented the authors with a skeleton suspected of being that of a 76-year-old white male recently found in a heavily wooded area. The anthropologists received no information regarding the identity of the victim prior to completion of their examination. When found, the bones were skeletonized except for remnants of dessicated ligaments holding the hips, knees, feet, and lower spine together. Based on the season when recovered, the terrain, the degree of skeletonization, sun bleaching, soil staining, and

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the lack of odor, it was estimated that the individual had been dead for a period of about two years. Forensic anthropological examination indicated that the remains were those of a white male more than 60 years of age. There was no skeletal evidence of foul play or injuries sustained at or near the time of death. However, the anthropologists did note a number of unusual skeletal traits that could be used to ascertain the personal identity of the decedent.

The police provided the anthropologists with a premortem radiograph of the abdomen, pelvis, and upper portions of the legs of a suspected decedent (Fig. 1). The radiograph, taken approximately one year before the decedent was last seen, was put on a light box, and the skeletal features were compared with those of the dry-bone specimens lying on a table. The next step was to articulate and radiograph the portions of the skeleton that were visible on the premortem radiograph (that is, the spine, pelvis, and femora) for comparison of the premortem and postmortem radiographs (Fig. 2).

Receiving special attention in the examination were the shape of each vertebra in the spine (Fig. 3), the bony projections (that is, enthesophytes) along the iliac crest and ischium of the pelvis, and the radiodensities (that is, the radiographically whitish areas showing dense bone) and radiolucencies (that is, dark areas showing thin bone) in the pelvis and femoral heads. Other individualizing features noted were the spinal curvature and skeletal anomalies, including a separate transverse process on the first lumbar vertebra and a separate neural arch (that is, fifth lumbar spondylolysis).

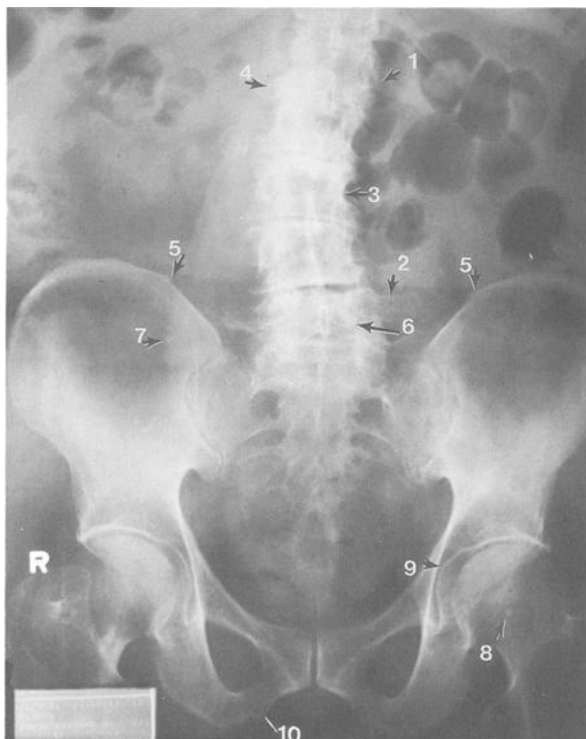


FIG. 1—Premortem radiograph of the abdomen and pelvic region of the 76-year-old white male (taken one year before death). The numbers indicate the skeletal features (see text) used for comparison with a postmortem radiograph (see Fig. 2).

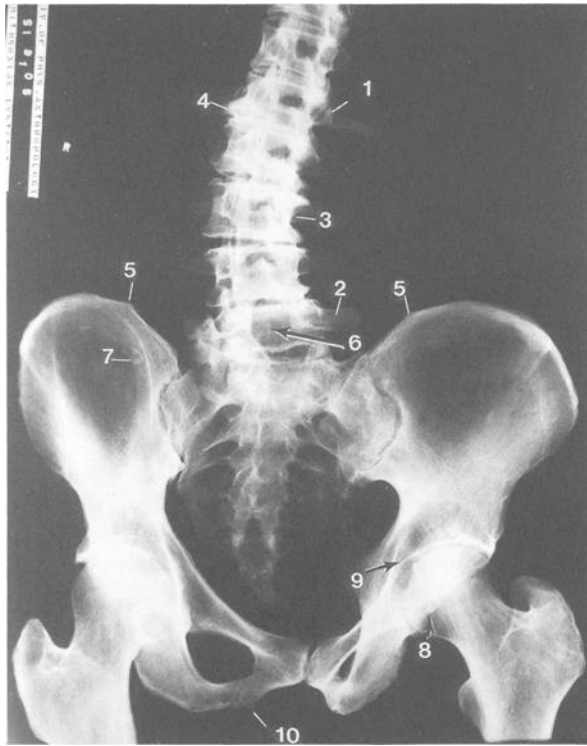


FIG. 2.—Postmortem radiograph of the spine, pelvis, and upper legs of the skeleton brought in for examination (compare with Fig. 1).

Findings

Ten similar skeletal features were noted on the premortem and postmortem radiographs. In Figs. 1 and 2, we can see that these radiographs show consistency and correspondence in the following features:

1. A separate left transverse process on the first lumbar vertebra [the arrow points to the dark line (radiolucency) where this process is attached to the vertebral body].
2. A peculiar shape to the left transverse process.
3. A deeply concave left side of the third lumbar vertebra.
4. A large osteophyte along the right side of the first lumbar vertebra.
5. Small bony projections on the left and right iliac crests.
6. A separate neural arch of the fifth lumbar vertebra (the arrow on the premortem radiograph points to the dark line where the arch is attached to the back of the vertebra; the arch is separate in the dry-bone specimen).
7. A bullet-shaped radiodensity on the right os coxa.
8. A circular radiodensity in the left femoral head.
9. An unusual contour of the left acetabulum delineated by the dense white line.
10. A bony projection along the inferior surface of the right ischium.

The consistent combination of skeletal traits (that is, variants), together with the absence of any inconsistency of features between the premortem and postmortem radiographs, enabled the anthropologists to establish a positive personal identity with reasonable

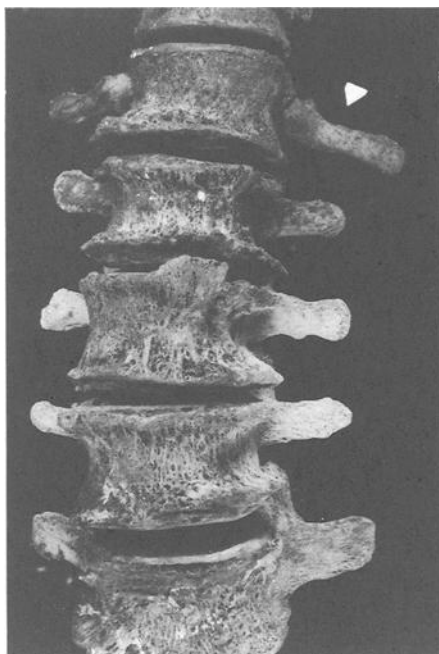


FIG. 3—*Photograph of the lower spine for comparison of the skeletal features visible on the premortem and postmortem radiographs (arrowhead indicates the separate transverse process of the first lumbar vertebra).*

scientific certainty. That two individuals could have the same combination of skeletal traits is extremely unlikely, if not impossible.

Conclusions

Physical anthropologists and other medicolegal authorities should be aware that the human skeleton provides substantial subtle variability, especially radiographically, which can permit the establishment of positive personal identity of fleshed or skeletonized remains. Conversely, gross and radiographic inconsistencies or discrepancies can be used to eliminate a suspected decedent. Individualizing features that contribute especially to identification include the radiographic appearance (that is, pattern) of normal trabecular bone, trauma, degenerative changes of the spine, bony projections and irregularities, and radiodensities and radiolucencies.

Acknowledgment

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References

- [1] Rudnick, S. A., "The Identification of a Murder Victim Using a Comparison of the Postmortem and Antemortem Dental Records," *Journal of Forensic Sciences*, Vol. 29, No. 1, Jan. 1984, pp. 349–354.

- [2] Wienker, C. W. and Wood, J. E., "Osteological Individuality Indicative of Migrant Citrus Laboring," *Journal of Forensic Sciences*, Vol. 33, No. 2, March 1988, pp. 562-567.
- [3] Owsley, D. W. and Mann, R. W., "Positive Identification Based on Radiographic Examination of the Leg and Foot," *Journal of the American Podiatric Medical Association*, Vol. 79, No. 10, 1989, pp. 511-513.
- [4] Ubelaker, D. H., "Positive Identification of American Indian Skeletal Remains from Radiographic Comparison," *Journal of Forensic Sciences*, Vol. 35, No. 2, March 1990, pp. 466-472.
- [5] Rhine, S. and Sperry, K., "Radiographic Identification by Mastoid Sinus and Arterial Pattern," *Journal of Forensic Sciences*, Vol. 36, No. 1, Jan. 1991, pp. 272-279.

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