

1953

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Recommended Citation

Robert B. Elliott, The Value of Roentgenology in the Identification of Mutilated and Burnt Bodies, 43 J. Crim. L. Criminology & Police Sci. 682 (1952-1953)

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THE VALUE OF ROENTGENOLOGY IN THE IDENTIFICATION OF MUTILATED AND BURNT BODIES

Robert B. Elliott

Robert Betzel Elliott attended Ohio State University and in 1949 received the B. A. Degree from Ohio Northern University. At present he is engaged in his final year of studies at the University of Cincinnati College of Medicine. His interest in legal medicine dates from his youth when he accompanied his father, a county coroner, in the investigation of unexpected deaths. During 1951, he spent some time as an assistant to the pathologist at Lima Memorial Hospital, Lima, Ohio.—EDITOR.

The use of X-rays in the identification of dead human bodies is not a new procedure, having first been suggested by Arthur Schuller of Vienna in 1921. In 1918 Culbert and Law reported a case of a man whom they had treated in New York for chronic sinusitis (1). Some years later, this patient was murdered while attempting to go from India into Tibet. The relatives of the missing traveler prevailed upon the two physicians to attempt a positive identification of a human body that had been found in a river in India. When the dismembered and disfigured body reached New York some 260 days after the traveler's disappearance, identification by all ordinary means was impossible. Culbert and Law took roentgenograms of the nasal accessory and mastoid sinuses which they compared to plates taken of the same areas some 8 years previously. The number of similarities of the two sets of films proved beyond doubt that the body that had been returned from India was that of the missing patient.

In 1944 Dutra made an extensive investigation of the value of skeletal remains in determining the identity of the remains and the cause of death (2). This work dealt not only with the use of roentgenograms, but rather centered on actual inspection of skeletal remains. Many of the facts he sets forth can be applied to the use of roentgenograms as pertains to skeletal characteristics and their aid in identifying bodies. The appearance, growth, and development of different bones follow a regular order and a fairly definite time schedule and are therefore an aid in determining the age of skeletal remains. The sex of a body can be told in the majority of cases in which the skull and pelvis are available. Determination of race by skeletal study is possible but considerably more difficult.

Identification of a large number of bodies by roentgenography received its first real test in 1949 when the Great Lakes liner "Noronic" burned at Toronto, Canada. In this fire there were 119 deaths with 107 bodies burned beyond recognition. Roentgenograms were made of 79 of the victims, an average of 13 films per person being made. Many

of the bodies lacked legs or arms, and some had the skull badly burned. In beginning the investigation, antero-posterior and lateral roentgenograms of the skull, and antero-posterior and lateral roentgenograms of the extremities were made for a preliminary survey. After films that had been taken during the lifetime of some persons who were believed to have been on the boat were secured, it was necessary to take more matching films of the dead bodies and compare these with the films that had been taken during life. In this series it was found that fractures were not too helpful but that congenital abnormalities were of value. In 4 cases there were distinctive abnormalities of the spinal column that were recognized by X-ray and which led to identification of the bodies. Arthritis of the spine was present in 7 other cases and of the knee and calcaneus (heel bone) in one case each.

In most cases identification consisted of an accurate matching of normal bony landmarks, particularly margins of joints. Films that had been taken prior to the deaths of 35 of the missing persons were received. By comparison with films taken of the unidentified bodies, 24 positive identifications were made. Confirmatory but inconclusive evidence was forthcoming in 5 or more cases.

X-ray films may indicate the age of the body by revealing the amount and character of ossification, the degree of closing of cranial sutures and so on. They may aid in determining the sex of a body by studies of the shape, size, and conformation of the pelvis, sacrum, and skull. Of paramount importance, roentgenograms may reveal the true identity of a body, since there are enough differences present in the roentgenograms of various portions of the body that no two people are the same. Congenital abnormalities, abnormalities due to disease, and abnormalities resulting from injuries also may materially aid in determining identity. Diseases which leave recognizable bony alterations include tuberculosis of bones or joints, syphilis, certain vitamin deficiency diseases, arthritis of several kinds, osteomyelitis, and tumors.

The extent of the use of roentgenography depends on the individual case and the factors involved. Thus, if the body was identified by other means roentgenography may be useful only for confirmation. On the other hand, roentgenograms may be the only means by which satisfactory identification can be made.

The availability of films that were taken before death is of untold importance in determining the identity of a body, since by comparison of these films with post-mortem films positive identification can be made in the majority of cases. If no ante-mortem films are available, only tentative identification is possible in most cases.

Roentgenology, though not new to the identification of bodies, is still relatively unused. Where it has been used, it has been of great value and in some cases it may be the only means of identifying bodies. Films made before death can be compared with films of the dead bodies, and the more skeletal peculiarities that are identical in each the more positive the identification.

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