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Twenty-Seven Years of Forensic Anthropology Casework in New Mexico

ABSTRACT: A review of anthropological consult cases for the New Mexico Office of the Medical Investigator was conducted for the years 1974 through 2000. A total of 596 cases are summarized and information is presented on the sex and age of the individuals, season of recovery, depositional environment, body covering, time since death, perimortem trauma, postmortem animal activity, and skeletal element recovery. Results reveal a higher percentage of male victims (76%). No variation is seen in the seasonal distribution of cases. In cases with known time since death, 35% were recovered within one week while 30% had a postmortem interval exceeding one year. Depositional environments include surface (45%), burial (13%), and airplane crashes (9.5%). In 42% of the cases, no evidence of perimortem trauma was observed. Postmortem animal activity was noted in 46% of cases. Data presented in this study may prove useful in supporting expert witness testimony and generating future research models.

KEYWORDS: forensic science, forensic anthropology, taphonomy, time since death, New Mexico

The discipline of forensic anthropology is now sufficiently developed and recognized as to warrant historical review. Most reviews address growth and change within the subfield (1–4), focus on specific careers (5–7), or detail unusual case studies (8–15). Few include a historical overview of casework.

Forensic taphonomy is a younger area of study (16) and has yet to be the subject of retrospective survey. Much of the work published to date relies heavily on case reviews as a source of data (17–21).

A review of the literature reveals that long-term surveys of anthropological casework are uncommon, particularly from a specific geographic region. Bass (22) provides observations on decay rates drawn from 22 years of outdoor decomposition experiments in Tennessee. An additional review of Bass's contributions to forensic anthropology in Tennessee includes case demographics and historical background (23). Grisbaum and Ubelaker (24) report on casework done by the Smithsonian Institution for the FBI from 1962 to 1994. Reichs (25) details the casework of American Academy of Forensic Sciences ABFA diplomates for the period 1986 to 1995. Retrospectives of the careers of T. D. Stewart (26) and William Maples (27) include breakdowns of cases spanning decades of work.

Several reports detailing anthropological casework in New Mexico have been published. A summary for the years 1974 to 1981 (28) provides information on the decompositional state of the remains. A further report (20) draws on a small number of cases from New Mexico to establish decomposition rates. Seven cases from the New Mexico Office of the Medical Investigator (OMI) form the basis for a report on the skeletal manifestation of bear scavenging (18).

This study presents the results of a review of 27 years of forensic anthropological casework from New Mexico. The survey was initially conducted to familiarize the author with taphonomic processes typical of the arid New Mexico climate, in contrast to prior experience and research in cold climate regions such as Canada and the former Yugoslavia. The results can be used to generate research models, support court testimony, and provide comparative data for other taphonomic studies.

Methods and Materials

Information was obtained from the records of the Office of the Medical Investigator currently housed in the Maxwell Museum's Laboratory of Human Osteology at the University of New Mexico (UNM). The case files date from February 1974 through November 2000. A total of 598 cases are represented in this report. Cases involving nonhuman, historic, or prehistoric remains were excluded.

From 1974 through 1995, the reports were authored by Dr. Stanley Rhine and his graduate students. Reports from 1996 through 2000 were written by Dr. Joseph Powell, Dr. Jane Buikstra, the author, and graduate students. A significant change in the reporting format is evident in 1995, with the introduction of a formal anthropology report including skeletal inventories and cited references.

Case files include anthropology reports, OMI Records of Death, police reports, autopsy reports, hospital records, and skeletal inventories, although the completeness of each file varies. Main sources of information varied and included 103 cases drawn directly from the anthropology report, 466 cases taken from OMI documents, and 29 cases drawn from alternative sources (police or hospital records).

Age and sex of the individual were recorded. Information relevant to taphonomic processes such as depositional environment, season of recovery, postmortem animal scavenging, and skeletal element survival rates were also noted. As body covering and perimortem trauma have been shown to affect decomposition rates (17,27,30), scavenging patterns, and element survival and recovery

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rates (31), this survey included data on clothing and other body covers and perimortem trauma. In order to determine whether there is a fluctuation in caseload for anthropology consults throughout the year, the season of recovery was noted.

Results

Season of Recovery—Of the 598 cases, 148 were recovered in the spring (March through May), 151 in the summer (June through August), 137 in the fall (September through November), and 145 in the winter months (December through February). In 17 cases, the season of recovery was not noted or could not be determined from available documentation.

Sex—Males accounted for 456 cases (76.3%), females for 134 (22.4%), and in 8 cases (1.3%) the sex could not be determined (mostly juveniles and isolated skeletal elements). According to the anthropology or autopsy reports, the sex was known in 345 (57.7%) cases, estimated in 245 cases (41%), and was not noted in 8 cases (1.3%).

Age—Of the 598 cases, 291 (48.6%) had a known age-at-death resulting from an identification, while 278 (46.5%) had estimated ages. In 29 cases (4.9%), the age could not be estimated or was not given in the reports. Thirty-five individuals had an age estimation of "adult," while four were categorized as "subadult." A breakdown of individuals into estimated/known age cohorts is given in Table 1. The largest cohorts were 20 to 30 year olds at 25.8% of the total sample and 30 to 40 year olds at 20.6%.

Depositional Environment—A summary of the depositional environments from which bodies were recovered is given in Table 2. The circumstances regarding the deposition of remains were not noted in 41 cases.

TABLE 1—*Distribution of individuals by estimated/known age.*

Age Cohorts	# of Individuals	% of Sample (n = 596)
"Adult"	35	
"Subadult"	4	
<10 years	19	3%
10–20 years	49	8%
20–30 years	154	25.8%
30–40 years	123	20.6%
40–50 years	82	13.7%
50+ years	100	16.8%

TABLE 2—*Breakdown of individuals according to depositional environment.*

Depositional Environment	# of Individuals (%)
Surface	251 (45.1%)
Burial	74 (13.3%)
Water	44 (7.9%)
Building	28 (5.0%)
Building (fire)	31 (5.6%)
Hanging	5 (0.9%)
Cave	4 (0.7%)
Automobile	15 (2.7%)
Automobile (fire)	40 (7.2%)
Airplane crash	53 (9.5%)
Confined space (other*)	12 (2.1%)

* Cooler, footlocker, closet, oil tank, septic tank.

Body Covering—In 339 (56.7%) of the cases, no information regarding associated clothing or covers was given. Fifteen individuals were recovered in the nude, 16 were found wrapped in plastic, and 20 were found wrapped in a blanket or cloth. In eight reports, the clothing was described as burned. Only clothing fragments were recovered in seven cases. One case involved a canvas tarp and another described the individual as "covered with clothes." Two cases were encased in burlap bags.

In reports detailing clothing associated with the remains, 74 indicated the individual was fully dressed in a light, summer style; 46 were dressed in heavier clothing (coats, long johns); while 17 reports stated merely that the individual was fully dressed. Unspecified partial dress was noted in 16 reports, while six cases involved partial dress of the upper body and 14 indicated partial dress of the lower body.

Time Since Death—In 156 cases (26.1%), the time since death (TSD) was known. In 257 cases (43%), the postmortem interval was estimated and in 185 cases (30.9%), no TSD was given. Known and estimated postmortem intervals are given in Table 3.

Perimortem Trauma—Of the 598 cases, 251 (42%) included no evidence of perimortem trauma. A summary of cases involving perimortem trauma is given in Table 4. The broad categories of perimortem trauma were drawn from the anthropology reports, which historically regarded issues relating to cause or manner of death as the responsibility of the forensic pathologist.

TABLE 3—*Summary of known and estimated postmortem interval.*

Time Since Death	Number of Individuals (Percentage)
<1 week	143 (34.6%)
<1 month	27 (6.5%)
<1 year	118 (28.6%)
1+ year	125 (30.3%)

TABLE 4—*Incidence of perimortem trauma.*

Perimortem Trauma	# of Individuals
Gunshot wound (location unspecified)	13
Gunshot wound to the head	65
Gunshot wound to the thorax	15
Blunt force trauma	74
Fracture(s) (location unspecified)	42
Skull fracture(s)	36
Postcranial fracture(s)	23
Sharp force trauma	18
Dismemberment	11
Strangulation	5
Thermal damage	90

TABLE 5—*Postmortem animal activity.*

Activity Noted	# of Individuals	% Sample (n = 596)
Unspecified carnivore scavenging	20	3.4%
Canid gnawing and/or dispersal of remains	70	11.7%
Bear scavenging	10	1.7%
Rodent gnawing	17	2.8%
Unspecified "animal activity"	43	7.2%
Bird scavenging	1	0.1%
Domestic cat	1	0.1%

Postmortem Animal Activity—Of the total, 321 reports (53.7%) contained no comment regarding postmortem animal scavenging. Undefined "animal activity" was noted in 43 cases, carnivore activity was described in 20 cases, canid gnawing or dispersal was indicated in 70 reports, and bear scavenging was identified in 10 cases. Rodent gnawing was present in 17 cases, while bird and domestic cat scavenging were detailed in single reports, respectively. A summary of animal scavenging activity is given in Table 5.

The degree of damage or activity was described as extensive in 65 cases, moderate in 27 cases, and minimal in 28 cases. In 125 reports, animal activity was noted but no assessment of its impact was given.

Skeletal Element Survival/Recovery Rates—Prior to 1995, full skeletal inventories were not standard in the anthropology consultant reporting procedure. Attempts to reconstruct skeletal inventories from written descriptions or partial element lists resulted in the following breakdown: in 216 cases (36.1%), the body was described as complete or virtually complete; 30 reports (5%) describe the remains as highly fragmentary and inventories were not attempted; 33 cases (5.5%) involved the recovery of a skull or cranium only; 215 cases (36%) indicated that one or more major skeletal element was absent; and in 104 cases (17.4%), the amount of skeletal material recovered is unknown.

Discussion

Personal experience and prior reports (17,32) indicating that snow and leaf cover hinder search and recovery efforts suggest that a reduction in caseload during the late fall and winter months is expected. However, the results of this survey reveal no significant variation in anthropology caseload throughout the year. A summary of total reported deaths by month for the state of New Mexico in the year 2000 reveals only slight fluctuations throughout the year, from a low of 325 in June to highs of 425 in January, March and December (33). This contrasts sharply with a report from the Smithsonian representing FBI casework nationwide that shows significant peaks in caseload in May, November and December (24).

The imbalance seen in the distribution of cases by gender is of interest when compared with the findings of the Smithsonian report (24) and the overview of cases from Tennessee (23). Considerable variation is evident among the regions. In Tennessee, the distribution of male and female individuals remains equal throughout the 1970s; males then account for 60% of the cases through the 1980s (23). In the early 1990s, the distribution in Tennessee mirrors that seen in New Mexico. This contradicts the distributions reported by the Smithsonian (24), in which males greatly outnumber females from 1960 to 1980, but the distribution then equalizes from 1980 through 1994.

The over-representation of males in this survey may be the result of several factors. First, males represent a greater portion of all autopsies conducted by the OMI regardless of manner of death, for example 62.8% in 2000 (33), 63.8% in 1999 (34), 62.1% in 1998 (35). Second, males make up significantly higher proportions of the homicides (80.7%), suicides (82.9%), and accidental deaths (67%) in New Mexico (33–35). Such causes of death often lead to prolonged postmortem intervals (because of burial or isolated deposition sites), fire, or other postmortem modifications that subsequently require the services of a forensic anthropologist.

This tendency of forensic anthropology cases to over-represent individuals who die violently may also explain the large number of individuals in the 20 to 30 and 30 to 40 year old cohorts. Overall age-at-death distributions for all manners of death in New Mexico show the greatest number of deaths occurring in individuals over 65 years (consistent with predominantly natural deaths). However, homicides, suicides and accidental deaths show their peak numbers in the 20 to 40 year old cohorts (33–35). The age distributions reported in this survey are consistent with findings from Tennessee (23) and the Smithsonian (24).

Though anthropological consults often focus on those who die violent or unnatural deaths, only 42% of the individuals in this survey showed signs of perimortem trauma. This is lower than the 59.3% of nationwide FBI cases in which some evidence of perimortem trauma was observed (24). Both reviews agree that the majority of injuries were seen to the head and neck.

While tradition holds that the likelihood of an anthropological consult increases as the postmortem interval increases, this review found that the greatest percentage of consults were requested in cases with a time since death of less than one week. The majority of these cases involved some form of postmortem modification, primarily fire, burial, or extensive animal scavenging, which warranted the involvement of an anthropologist. This contrasts with the nationwide findings by the Smithsonian (24), in which PMI noted in days or weeks accounted for only 6.9% of total caseload.

A prior study by the author (17) indicates that 80% of the individuals had experienced some postmortem animal activity, as compared to the 43% in the present study. The prior study included only 20 individuals from a seven year review, chosen specifically for their advanced state of decay. Also, individuals included in the previous study had been recovered from outdoor environments. A review of Table 2 shows that individuals from the current study were recovered in a variety of environments that may hinder or prevent animal scavenging, including buildings, automotive and airplane fires, hangings, and water. Differences in scavenger species between these two environmentally diverse regions must also be taken into account.

Finally, although not specifically addressed by this survey, the rates of positive identification for anthropology cases are of interest. The results of a questionnaire sent to practicing forensic anthropologists indicated that only 25 to 30% achieve a positive identification (24). From 1975 to 1993, William Bass provided positive identifications in 50% of his cases (24). While statistics are not available for the entire span of this survey, data for the years 1998 to 2001 provide current rates of identification in New Mexico. As all skeletal, decomposed, burned or partial remains are initially identified as John/Jane Doe, the subsequent identification rates for Doe cases encompass the anthropological consult casework. Table 6 provides a yearly breakdown of Doe identifications, which varied from 90% to 98%. Of the individuals who remain unidentified, approximately 50% received an anthropology consult (H. Campbell, personal communication, 2002).

TABLE 6—*Identification of John/Jane Doe cases in New Mexico by year.*

Year	Total Doe Cases	Number Identified	Percentage Identified
1998	105	102	97%
1999	146	131	90%
2000	191	179	94%
2001	258	253	98%

Summary

Nordby (36) suggests that current case-specific research provides the "scientific" basis for future taphonomic and anthropological theory and research design and that the history of medicine reveals how theories and models are generated from anecdotal data. Information on the demographic parameters and taphonomic processes outlined in this review will contribute to future research in New Mexico and elsewhere. A summary of decades of work from a specific region may provide support for expert witness testimony, allowing for a statistical rather than anecdotal response to questions such as whether canid scavenging is common within the region. Data presented may also be used for comparative purposes in other regional studies.

Finally, a long-term survey of prior casework is recommended for the forensic anthropologist who experiences a significant change in geographic region or climate.

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