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The Crow Creek Massacre

The Role of Sex in Native American Scalping Practices

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The study of violence has been a central point of discussion for many social scientists, as violence appears so intimately intertwined with the rise of humanity and civilization. Some of the first records of human history, unsurprisingly, come in the form of military histories, which inevitably are records of violent human interaction (Keeley 1996:3). In fact, records of warfare span the globe from ancient Egyptian hieroglyphs, to Mayan ritual practices, to modern civil war stories (Keeley 1996). Likewise, bioarchaeological research unequivocally demonstrates that humans have been subject to interpersonal violence, especially among men (Walker 2001:573). A deeper look into the historic and archaeological record indicates that women also played an active role in warfare. Women's roles involve not only the acquisition of weapons, and celebration of victories, but also suffering the humiliation and misery of defeat.

While much literature has been devoted to the analysis of interpersonal violence in its modern form, less research has been devoted to understanding causes of violence in earlier, prehistoric societies (Milner 1995; Walker 2001). This facet of human history is worthy of exploration as the archaeological record of the Great Plains yields evidence of warfare preceding the arrival of Europeans by hundreds of years (Bamforth 1994). Evidence of violence in the Great Plains, however, is infrequent before AD 950 (Lambert 2002:224). It is not until AD 1200 that indications of violent human

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interaction, including increased use of fortifications and village abandonment, become more prevalent in the archaeological record of North America.

Indicators of violence can also be observed on the human skeleton. Analysis of human remains can yield data pertaining to extrinsic factors, such as environmental fluctuations, economic shifts, and resource instability, which may exacerbate violent human interaction (Walker 2001:574). In this sense, human skeletons often provide otherwise unobtainable information about the interactions of prehistoric peoples, including hostility and warfare (Milner 1995). Traumatic injuries in ancient human remains also provide a direct source of evidence for testing theories of warfare and interpersonal aggression. The evaluation of skeletal evidence of violence is made difficult, however, because interpretation is often unreliable and violent trauma is not always easily recognized (Milner 1999; Walker 2001).

In prehistoric times, weapons were often indistinguishable from everyday tools (Milner 1999). Therefore, archaeologists and anthropologists are faced with the problem of determining what forms of skeletal trauma constitute intentional violence. The location of an injury may indicate its cause (Armelagos 1977; Lahren and Berryman 1984; Lovell 1997; Merbs 1989). For example, parry fractures, fractures of the ulnar shaft, are frequently associated with victims of assault because they occur when the victim raises his or her hands in a form of defense (Walker 2001). Parry fractures, however, are not always defensive injuries, but can also result from a fall, where an individual attempts to catch him- or herself in making contact with the ground. Parry fractures are just one example of trauma that cannot be reliably distinguished as accidental or violent. Fortunately, traumatic mutilations, such as scalping, decapitation, and other trophy taking, are all manifest on skeletal remains as clearly distinguishable forms of intentional interpersonal violence (Walker 2001).

Scalping is one of the most reliable and most easily identified expressions of intergroup conflict (Olsen and Shipman 1994). Scalping is defined as "the forcible removal of all or part of the scalp" (Nadeau 1944:1677). Osteological evidence of scalping is recognized by a characteristic pattern of cut marks. Cuts, or clusters of cuts, typically encircle the superior and anterior portion of the skull (Bueschgen and Case 1996:230). Evidence of healed scalping is also suggested by the presence of periosteal reaction on the frontal and/or parietal bones from infection or by bone remodeling following the survival of a scalping (Bueschgen and Case 1996:230; Miller 1994:212; Snow 1941:55).

Because it removes only the skin of the head, scalping was not directly intended to take another's life, but the practice was an act of violence that was most often performed upon the enemy, except in certain cases of tribal

ritual (Reese 1940:9). In both prehistoric and historic times, scalping by a Native American can be interpreted as a final insult or ultimate curse upon the victim (Jacobi 2007:312). To guarantee entry into the afterlife, certain Native American tribes believed that an individual must be physically complete, and removal of an enemy's scalp precludes physical wholeness (Jacobi 2007:312). Scalping, therefore, provides a tangible token of physical and spiritual dominance and was rarely practiced upon members of one's own society (Seeman 2007:171).

Scalping has often been claimed to be of European origin. However, while Europeans may have encouraged and promoted the practice, the ethnographic and archaeological records indicate that it was present before European arrival (Allen et al. 1985:23; Owsley and Berryman 1975:44; Neumann 1940:289). Early explorers and settlers had no preexisting words to describe the practice when they first encountered it among Native American tribes (Axtell and Sturtevant 1980: 462). There was no terminology to describe scalping in English, French, or Spanish, so when the Native American tradition was first encountered, new words had to be developed or old words were used ambiguously to refer to the practice (Allen et al. 1985:23). There is also ample evidence in the archaeological record of the occurrence of scalping in North America before European contact (Owsley and Berryman 1975:44).

The Crow Creek site offers an opportunity to study the practice of scalping. Crow Creek is the site of a prehistoric massacre in which the village was raided and villagers were slaughtered and placed in a mass grave (Willey 1990; Willey and Emerson 1993). The skeletal remains of more than 486 people were excavated from two human bone beds uncovered at the site. The frequency of mutilations recorded on victims of the Crow Creek massacre approached 100 percent (Willey 1990:151). The most prevalent manifestation of interpersonal violence was the presence of cuts on the frontal bones of victims, indicative of scalping. Altogether, more than 90 percent of the frontal bones recovered from Crow Creek showed evidence of scalping (Willey 1990:105; Willey and Emerson 1993:257).

Some authors report that there is not a significant relationship between a victim's age and sex, and whether or not they were scalped (Allen et al. 1985:29). No man, woman, or child was spared from the scalping custom. In many cases, the scalps of individuals in noncombatant categories, such as women, children, the sick, and the elderly, were considered valuable because they provided evidence that a warrior had penetrated an enemy's defenses (Allen et al. 1985:29; Owsley 1994:337). Further evidence comes from the Crow Creek site, where the human bone bed contained equal numbers of scalped males and females.

It is apparent that both males and females were subject to this trophy-taking practice. Also, members of all adult age groups were scalped.

Upon initial inspection, the Crow Creek site does appear to corroborate previous speculation about the relationship between age, sex, and the likelihood of an individual being scalped. The goal of this study is to provide an in-depth assessment of the relationship between scalping and an individual's sex and age.

ARCHAEOLOGICAL BACKGROUND

Crow Creek offers a unique opportunity to study the scalping practice in great detail, as it is the site of a prehistoric massacre. The exact date of the Crow Creek massacre is unknown; however, dates have been posited from the early 1300s to the mid-1400s (Bamforth and Nepstad-Thornberry 2007a; Willey 1990:1). At the time of the massacre, Crow Creek was raided and villagers were slaughtered (Willey 1990; Willey and Emerson 1993). After a period of exposure above ground, the bodies of the victims were gathered and placed into a mass grave at the western end of an outer fortification ditch surrounding the Crow Creek site (Willey 1990:130). Surface exposure is suggested by the presence of taphonomic indicators; puncture marks and broad grooves, indicative of canid scavenging, are present on the remains (Willey 1990:131). Excavation of the outer fortification ditch revealed a mass grave containing the skeletal remains of at least 486 people.

Mutilations were observed on most of the skeletal remains from Crow Creek. Skulls and mandibles showed signs of violence, including cuts, fractures, and avulsion fractures (Willey and Emerson 1993). Cuts were observed on arms and legs that indicated the removal of hands and feet as trophies of war (Willey and Emerson 1993). The most prevalent manifestation of intergroup conflict, however, was the presence of cuts on the crania of victims indicative of scalping.

Scalping is most often performed during the perimortem interval, either at the time of death or minutes before the onset of death (Jacobi 2007:312). Therefore, while it may be argued that scalping is not a direct index of interpersonal violence, as the person is already dead in many cases, this chapter suggests that scalping is in fact a direct measure of brutality. Given the context of Crow Creek, a massacre site with a minimum of 486 people slaughtered and then buried in a mass grave, scalping must be considered in conjunction with all other evidence of violence at this location. Furthermore, two individuals at the Crow Creek site show evidence of healed scalping injuries, suggesting that scalping during the Crow Creek massacre was not a unique experience.

MATERIALS

Excavation of the Crow Creek site was performed by Larry Zimmerman acting as the principal investigator, Thomas Emerson as field director, and P. Willey and John B. Gregg acting as consulting osteologists (Willey and Emerson 1993). The skeletal collection was curated at the University of South Dakota, where data collection and skeletal analyses were performed. In May 1979, remains were repatriated to the Crow Creek Sioux Tribe and reburied in August 1981 (Willey 1990).

In all, this study consists of 77 aged and sexed crania excavated from the Crow Creek site. The dataset is composed of adult skeletal material only. The crania included in this study are those complete enough for an analysis of scalping manifestations to be performed. The author did not perform any original observations for this study because all skeletal material had been repatriated. Therefore, all data used in this study are drawn from the age and sex forms recorded by Mark Swegle in 1979 along with scalping mutilation datasheets recorded by P. Willey and an anonymous investigator at the University of South Dakota.

Of the 77 crania used in this study, 38 (49.4%) were male and 39 (50.6%) were female. No systematic bias is detected in the sample, as there are roughly equal numbers of male and female individuals. Of the 38 males, 7 individuals were classified as young adults (20–25 years), 19 as middle adults (27.5–37.5 years), and 12 as old adults (40+). For the 39 female crania, 12 were young adults, 20 were middle adults, and 7 were old adults. The sample size of each age category was balanced because age categorization was based on an interquartile split.

METHODS

This study evaluates the hypothesis that sexes, as well as members of different adult age groups, experienced differential treatment during the Crow Creek massacre. The study focuses on scalping cuts as an indicator of brutality against Crow Creek massacre victims. Three independent variables were used to indicate the level of brutality against the scalping victim: total number of cut marks per cranium, number of cut marks on the frontal bone, and breadth of cut marks across the frontal bone (this variable is based upon a measure of length from the most lateral extent of cuts on one side of the cranium to the most lateral extent of cuts on the contralateral side of the cranium). The study assesses whether or not there is a statistically significant difference in the aforementioned variables when comparing men and women and members of different adult age groups. All statistical analyses were performed using SPSS 16.0 (2007). The following statistical tests were applied to the Crow

Creek dataset: independent sample *t*-tests, ANOVA, factorial ANOVA, and regression and correlation analyses.

RESULTS

From the scalping datasheets, the total number of cuts could be determined for 70 crania. From this sample, the mean number of cuts per cranium was 18.67, standard deviation was 19.42 cuts, and variance of total cuts was 377.27. The sample had a minimum of one cut mark and a maximum of 94 cut marks with a range of 93 cuts.

Sixty-seven crania had cut marks on the frontal. Of these 67 crania, the mean number of cuts on the frontal was 11.49, standard deviation was 10.29 cuts, and the variance was 105.83. The sample had a minimum of one cut mark and a maximum of 43 cut marks with a range of 42 cuts.

Breadth of cuts across the frontal could be calculated for a total of 62 crania. Of these 62 crania, the mean breadth of cuts on the frontal was 103.90, standard deviation was 36.24 mm, and variance was 131.42. The minimum cut distance was 3.40 mm and the maximum was 157.58 mm with a range of 154.18 mm.

Inferential statistical comparisons assessed whether there were differences between male and female victims of the Crow Creek massacre. First, independent sample *t*-tests examined differences in male and female total number of cuts, number of cuts on the frontal, and the breadth of cuts on the frontal. There was a statistically significant difference between the total number of cuts on male and female crania (table 13.1; $t = -2.390$, df = 68, $p = 0.020$, Levene's Test assuming equal variance). The mean total number of cuts on female crania was nearly twice the total number of cuts on male crania.

Independent sample *t*-tests assessed the relationship between sex and number of cuts on the frontal and breadth of cuts on the frontal. No statistically significant difference between the number of cuts on the frontal bone of male and female victims existed (table 13.2; $t = -1.189$, df = 65, $p = 0.239$ Levene's Test not assuming equal variance). There was, however, a statistically significant difference in the breadth of cuts on the frontal bone of male and female scalping victims (table 13.3; $t = -2.382$, df = 60, $p = 0.020$ Levene's Test assuming equal variances). The mean frontal cut breadth was greater in females than males.

Inferential statistical comparisons also assessed if different adult age groups were subject to different scalping treatment during the Crow Creek massacre. To test the relationship between age groups (young adult, middle adult, and old adult) and number of cuts, ANOVA tests were applied. The first ANOVA evaluated the relationship between age and total number of cuts by cranium.

Table 13.1. Independent samples *t*-test results for total number of cuts on male and female crania.

Sex	*N*	*x̄*	*T-Value*	*Degrees of Freedom*	*P-Value*
Total	70		−2.390	68	0.020
Male	34	13.15			
Female	36	23.89			

Table 13.2. Independent samples *t*-test results for number of cuts on male and female frontals.

Sex	*N*	*x̄*	*T-Value*	*Degrees of Freedom*	*P-Value*
Total	67		−1.189	65	0.239
Male	32	9.94			
Female	35	12.91			

Table 13.3. Independent samples *t*-test results for breadth of cuts on male and female frontals.

Sex	*N*	*x̄*	*T-Value*	*Degrees of Freedom*	*P-Value*
Total	62		−2.382	60	0.020
Male	30	92.99			
Female	32	114.13			

The test results showed no statistically significant relationship between age and total cuts (table 13.4; $F = 1.502$, df = 2,67, $p = 0.230$).

The second ANOVA assessed the relationship between age and number of cuts on the frontal. The test results showed no statistically significant relationship between age and the number of cuts on the frontal bone (table 13.5; $F = 1.095$, df = 2, 67, $p = 0.340$).

The third ANOVA assessed the relationship between age and breadth of cuts on the frontal. The test showed that there was a statistically significant relationship between age and the breadth of frontal cuts (table 13.6; $F = 4.362$, df = 2,61, $p = 0.017$). A post hoc Bonferroni test specified that there was a statistically significant difference in the frontal breadth between young and old adults ($p = 0.032$), and also between middle and old adults ($p = 0.036$). There was, however, no significant difference in the breadth of frontal cuts between individuals classified as young adults and middle adults.

The next statistical test applied to the Crow Creek database was a Factorial ANOVA. Factorial ANOVA simultaneously evaluated the relationship

Table 13.4. ANOVA results for total number of cuts by age.

Age (years)	*N*	*F*	*P-Value*
Young (20–25)	18	1.502	0.230
Middle (27.5–37.5)	34		
Old (40+)	18		

Table 13.5. ANOVA results for frontal cuts by age.

Age (years)	*N*	*F*	*P-Value*
Young (20–25)	18	1.095	0.340
Middle (27.5–37.5)	34		
Old (40+)	18		

Table 13.6. ANOVA results for frontal breadth by age.

Age (years)	*N*	*F*	*P-Value*
Young (20–25)	16	4.362	0.017
Middle (27.5–37.5)	30		
Old (40+)	16		

between the two independent variables (age and sex) and each dependent variable (total number of cuts, number of cuts on the frontal bone, and breadth of cuts on the frontal bone). The first Factorial ANOVA examined age and sex interaction for the total number of cuts on the cranium (table 13.7). The test showed that the relationship between the total number of cuts and sex was approaching significance ($F = 3.972$, $p = 0.051$). The difference in the total number of cuts among age groups ($F = 0.949$, $p = 0.393$) was not statistically significant and the sex and age interaction was also not statistically significant ($F = 0.025$, $p = 0.975$).

The second Factorial ANOVA assessed sex, age, and their interaction for the number of frontal cuts (table 13.8). The test showed the relationship between the number of cuts on the frontal of males and females is not statistically significant ($F = 0.759$, $p = 0.387$), no difference in the number of cuts on the frontal among age groups ($F = 0.884$, $p = 0.418$), and no interaction between age, sex, and the number of cuts on the frontal ($F = 0.114$, $p = 0.892$).

The third Factorial ANOVA assessed sex, age, and their interaction for the breadth of cuts on the frontal (table 13.9). The test showed a statistically

Table 13.7. Factorial ANOVA results for sex, age, and interaction by total number of cuts.

	F-Value	*P-Value*
Sex	3.972	0.051
Age	0.949	0.393
Sex*Age Interaction	0.025	0.975

Table 13.8. Factorial ANOVA results for sex, age, and interaction by frontal cuts.

	F-Value	*P-Value*
Sex	0.759	0.387
Age	0.884	0.418
Sex*Age Interaction	0.114	0.892

Table 13.9. Factorial ANOVA results for sex, age, and interaction by breadth of cuts.

	F-Value	*P-Value*
Sex	5.374	0.024
Age	3.954	0.025
Sex*Age Interaction	3.433	0.039

significant difference in the breadth of cuts on the frontal by sex ($F = 5.374$, $p = 0.024$), among age groups ($F = 3.954$, $p = 0.025$), and the interaction between sex and age ($F = 3.433$, $p = 0.039$). Test results indicated that sex differences in the breadth of the frontal cut depended on the age of the victim. For example, when comparing old adult males to old adult females, females had a longer breadth of cuts on the frontal than males, but when comparing young adult and middle adult females to young adult and middle adult males, no significant difference in the breadth of cuts on the frontal occurred between the sexes (figure 13.1).

Factorial ANOVA suggested that a relationship existed between age and sex in relation to frontal cut breadth. Regression and correlation analysis clarified this relationship. Regression and correlation analyses were performed on frontal cut breadth alone because this variable was the only one with a significant interaction between age and sex, and analyses were calculated separately for each sex. Frontal cut breadth was the dependent variable and age was the independent variable. There was a moderate negative relationship between frontal cut breadth and age in males (table 13.10, $r = -0.498$, $p = 0.004$). This

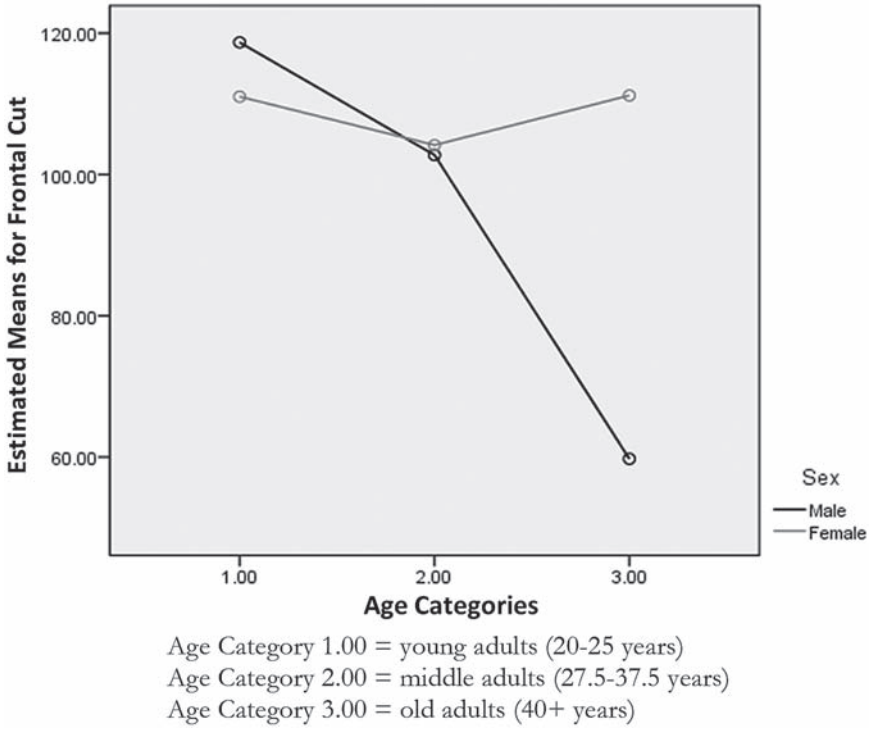

Figure 13.1. *Factorial ANOVA plot of age and sex by Crow Creek frontal cut breadths.*

relationship indicated that 24.8 percent of the variability in male frontal cut breadths was explained by age (figure 13.2, r^2 = 0.248). This relationship was statistically significant and the breadth of the frontal cut was influenced by the age of the male scalping victims.

The opposite relationship existed between frontal cut breadth and female age. A weak positive relationship was observed between frontal breadth and age in females (table 13.10, r = 0.075, p = 0.673). This relationship was not statistically significant (figure 13.3, r^2 = 0.006), so the breadth of the frontal cuts

Table 13.10. Regression and correlation of frontal breadth and age in Crow Creek massacre victims.

Sex	R	r^2	*P-Value*	*Linear Regression*
Male	–0.498	0.248	0.004	Significant
Female	0.075	0.006	0.673	Not Significant

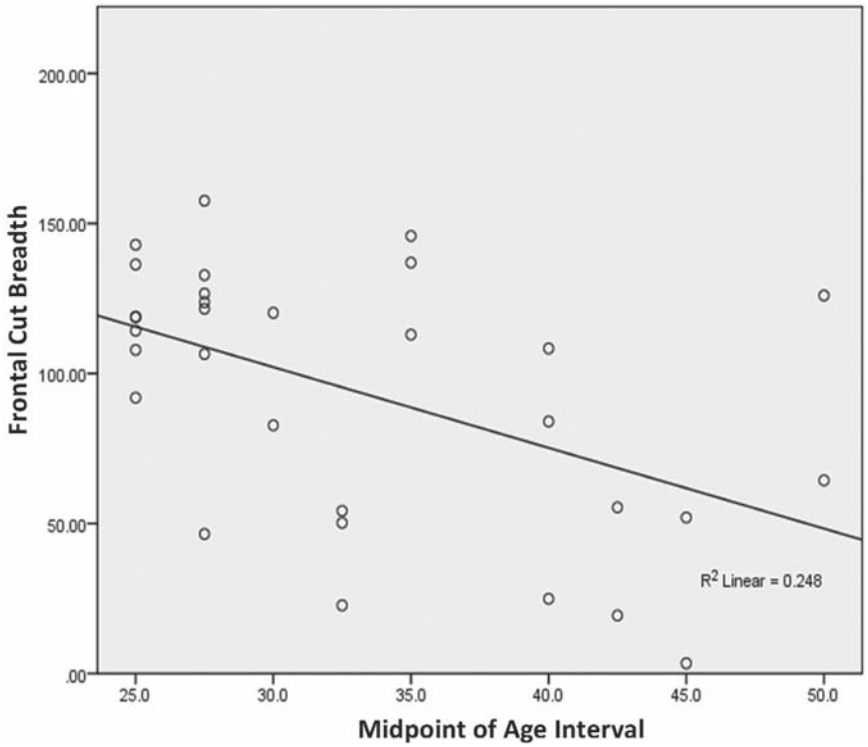

Figure 13.2. *Scatter plot of frontal cut breadths by midpoint of age intervals for male Crow Creek massacre victims.*

was not explained by female age. The relationship between frontal cut breadth and age was only significant in male victims, and age was not related to the breadth of the frontal cut in female victims of the Crow Creek massacre.

Summary

The findings presented in this section suggested that statistically significant relationships did exist between the total number of cuts on male and female crania, and age and breadth of the frontal cuts. Factorial ANOVA results indicated the interaction between age and sex by frontal cut breadth was significant ($p = 0.039$), and from this test result it was determined that sex differences in the breadth of cuts on the frontal were affected by the age of the victim. Regression and correlation were performed on the frontal cut breadth to

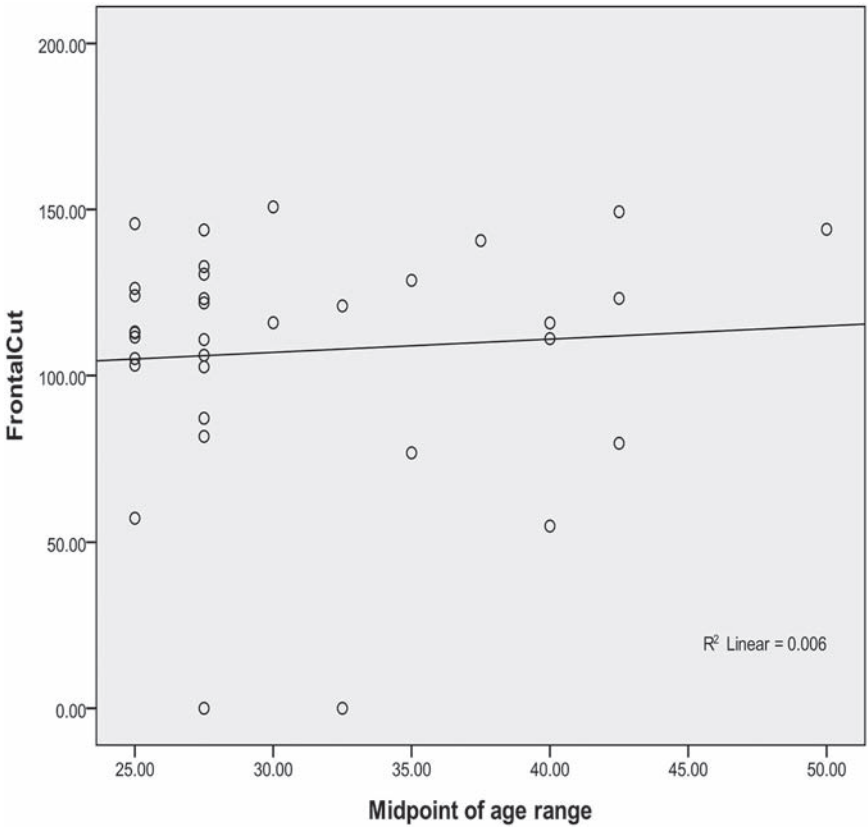

Figure 13.3. *Scatter plot of frontal cut breadths by midpoint of age intervals for female Crow Creek massacre victims.*

clarify the relationship between sex and age, and it was determined that there was a moderate negative relationship between frontal cut breadth and age in males, and a non-significant relationship between frontal cut breadth and age in females. The implications of these results are discussed and explained in the following section.

DISCUSSION

Although there was not a statistically significant difference in the number of cuts on the frontal of males and females, a statistically significant difference in the total number of cuts and breadth of cuts on male and female crania did

occur. There are five possible explanations for the differences observed in the total number of cuts and breadth of frontal cuts on male and female victims of the Crow Creek massacre.

The first explanation for female crania having a higher number and breadth of cuts was that female scalping victims experienced higher levels of brutality during the Crow Creek massacre. Historically, gender appears to have been an important organizing principle in the social stratification of early Arikara societies (Hollimon 2000:27). According to the ethnographic literature, status-climbing in protohistoric Arikara societies was observed primarily among male members of the community (Holder 1958:214). This social climbing was most often achieved by way of the war hierarchy or through a series of near-sacred associations and secular fraternities (Holder 1958:214). The highest-ranking male acted as the war chief of the community (Holder 1958:215). While social climbing was predominantly achieved by males elevating themselves through the war hierarchy, Arikara village life was constructed on a series of age-grade societies through which both men and women passed (Peters 1981:49). Age-grade societies were composed of members of the same sex and relative age (Peters 1981:49). Social-climbing, therefore, was also achieved by Arikara women.

Social stratification in Arikara societies was similarly recognized in the division of labor, which was documented in the ethnographic, linguistic, and archaeological record. The ethnographic record describes social stratification in Arikara myths as a gender-based division of labor (Gilmore 1933:74–75). Anthropological studies have also examined Arikara social structure reflected in material culture, mortuary practices, and skeletal biology (Hollimon 2000:27). Men were depicted in the ethnographic literature as smokers and gamblers with a rampant distaste for physical labor (Hollimon 2000:27). In contrast, numerous references indicated that women led extremely difficult lives, filled with hardship, privation, and backbreaking labor (Hollimon 2000:27). Authors, such as Boller, De Land, and de Trobriand, referred to Arikara women as beasts of burden, as they served the function of laborer in early Arikara society (Hollimon 2000:27). Historic accounts of Europeans reported that women were old beyond their years from working in the cornfields, carrying heavy loads, procuring and preparing food, and bearing and caring for children. These normative gender roles were most likely observable in other areas of the archaeological record, such as in the dehumanization and brutalization of women in times of war.

The intensity of trophy-taking, including scalping, can be related to the dehumanization of one's victim (Maschner and Reedy-Maschner 2007:37).

According to ethnographic references to gender roles in Arikara communities during the early Historic period, women were viewed as lesser members of society. As lesser members of society, women would have been further dehumanized by their attackers, and their death and mutilation would have been more likely to mimic the pattern of an animal being slaughtered than the conquering of an enemy warrior. The slaughtering of devalued female victims may be hypothesized to be more representative of a butchering than a ritual practice, leaving female scalping victims with a significantly greater number of cut marks than male scalping victims. While evidence for status differentiation within Arikara society was derived from ethnographic accounts during the Historic period, this pattern could be projected into the prehistoric past to gain insight into the social interactions of earlier societies (Holder 1958:213).

The second explanation for females having a higher number of total cuts and a greater breadth of cuts across the frontal was that the attacker was able to perform the task unhurriedly on female victims (Bridges 1996:71). If there was no danger of retaliation by an opposing warrior, the scalper was able to complete the task in a more thorough manner (Bridges 1996:71). A greater number of cuts signified that the attacker had more time to perform the scalping and was not forced to tear the skin from the bone and risk ripping the scalp, but instead had time to cut the scalp from the bone (Bridges 1996:72). Fear of immediate retaliation would most likely arise when a warrior was in hand-to-hand combat with a fellow warrior. Most warriors were male and when scalping a male victim, the attacker was often in close proximity to other vital enemy warriors (Bridges et al. 2000:56). With other warriors in close proximity, the threat of being attacked was greater and the scalper was rushed in the task of obtaining his trophy of war.

In contrast, when an attacker was scalping a female victim, the attacker was likely to have already penetrated the defensive forces surrounding the village and disabled defending males (Bridges 1996:72). Therefore, the attacker almost certainly had more time to scalp his victim because villagers would tend to be females and children. With sufficient time to perform the scalping, the attacker took time to obtain a larger piece of the enemy's scalp, making more cuts on the victim's cranium instead of rushing and tearing the scalp from the bone (Bridges et al. 2000:71). In a similar vein, it is also plausible that the difference in the total number of cuts observed on males and females is a measure of the experience of the person performing the scalping. If women or elderly members of the population were more likely to be captured than a young, agile warrior, it is possible that only inexperienced warriors were capturing this particular subset of the population. An inexperienced warrior may leave

more cut marks on the female crania than would an experienced scalper who was performing the act on another male warrior. Therefore, the difference in the total number of cuts represented on each of the sexes would simply be a reflection of the level of experience of the individual performing the scalping.

The third explanation for a greater number and breadth of cuts on female crania was that female scalps were more valuable, and more time was spent removing a larger piece of scalp from female victims (Bridges 1996:72). Historically, men gained honor and prestige by killing not only their male enemy, but also their enemy's wives and children. In some ways, the humiliation and killing of another man's close relatives, such as his wife or daughter, conferred a higher status upon the attacker than killing the warrior himself (Bridges 1996:72). Greater honor was associated with sneaking into an enemy village. Infiltration of an enemy village required greater bravery on the part of the warrior than killing an enemy warrior on the battlefield. When women and children were killed, the victor's actions were often based on the concepts of social substitution and collective liability (Kelly 2000:5). The concept of social substitution was based on the principle that an individual's murder was perceived as an injury to his or her group. Therefore, the murder of any group member was substitutable for another (Kelly 2000:5).

Similarly, it has been suggested that women and children were scalped for the trophy itself and death of the victim was only a secondary motive behind the attack (Bridges 1996:72). Scalping victims in prehistory included children and adults of both sexes, supporting the inference that warriors and war parties acted on the principles of social substitution (Kelly 2000:5).

The fourth explanation for the greater total number of cuts and breadth of cut marks across the frontal on female crania contradicts the hypotheses previously presented in this study and claims that females were highly valued members of Arikara society. It has been suggested that the few European and American accounts of early Historic-period Arikara societies represent biased views of women (Sundstrom 2015). As stated previously, the ethnographic literature reports that women were viewed as beasts of burden, and served the function of laborer (Hollimon 2000:27). However, there is ample evidence in the literature that Arikara societies were matrifocal and the importance of women in these societies is evident in every major aspect of village life, including hunting, warfare, and religion (Peters 1981:158; Sundstrom 2015). While social prestige and economic status depended on the reputation of the husband as a warrior, men and women in early Arikara society understood that the husband ascended and remained in good social circumstances only if the wife did her part (Peters 1981:86). Authors have suggested that the

misconception in early European and American accounts of Arikara women were based on preconceived notions of leadership and a misunderstanding of Native American culture (Peters 1981:63). Therefore, it is possible that females experienced higher levels of brutality than males during the Crow Creek massacre because they were recognized as the more valuable members of prehistoric Arikara society.

The final explanation for the greater number of cut marks on female crania was hairstyle. Some prehistoric Native American warriors wore their hair in a scalplock, a braid or lock of hair on the crown of the head (Jacobi 2007:314–315). In war, the scalplock taunted other warriors. At a number of prehistoric sites, male scalping victims show the oval/circular defect associated with scalping located on the most superior portion of the skull. This defect was hypothesized to represent the removal of the scalplock, rather than the entire scalp (Jacobi 2007:314–315). Scalping defects created by the removal of the scalplock, rather than the entire scalp, began higher on the frontal, closer to bregma (Jacobi 2007:314). The hairstyle explanation could not be adequately explored in this study. The exact location of cuts could not be determined from the scalping data recorded in 1979. However, it could be concluded that if only male scalplocks were removed at the Crow Creek site, the size of the scalp should be smaller among male victims. A smaller piece of scalp would require the attacker to make fewer cuts. If the exact location could be determined, it might have been possible to determine whether hairstyle caused the difference in number of cuts observed on male and female victims.

While a greater number of cuts were observed on female crania, the breadth of cuts across the frontal appears to have been influenced by age in male scalping victims only. According to regression and correlation analyses, a negative relationship between frontal cut breadth and age occurred in males (table 13.10, $r = -0.498$, $p = 0.004$). This relationship indicated that 24.8 percent of the variability in frontal cut breadths in males was explained by age (figure 13.2, $r^2 = 0.248$). These results could be explained by the fact that warfare was primarily a male activity (Walker 2001). Because warriors were typically young males, a distinction was made between age groups for men; warrior scalps would have been considered more valuable than the scalps of older males. This hypothesis finds support in ethnographic references to male warriors in the early Historic period. Because the life expectancy during the Prehistoric period was probably much shorter than the life expectancy observed in modern Arikara, male warriors were most likely young adults and possibly middle-aged adults (20–25 and 27.5–37.5 years, respectively). Because scalp-taking indicated bravery and

prowess in battle, a higher value would be placed upon the scalp of a young, virile individual than the scalp of an older victim.

Contrasted with male results, regression and correlation analyses performed on female scalping victims yielded different results. Because the acquisition of a scalp indicated bravery and prowess in battle, no distinction was made between females of different ages, as neither young nor old adult females were typically participating in battle. Therefore, removal of the scalp from female members of different age groups would not be an indication of greater war prowess. The relationship between female age and frontal cut breadth was not significant.

CONCLUSION

The Crow Creek site is "arguably the most famous archaeological site on the Northern Plains" (Bamforth and Nepstad-Thornberry 2007a:153). The site has played a major role in the reconstruction of Native American history, particularly historic violence on the Plains (Willey 1990). Crow Creek is unusual because it offers an extremely rare opportunity to study the skeletal remains of a population at a particular point in time: namely, the time of the massacre (Zimmerman and Alex 1981:26).

Mutilations were observed on many of the skeletal remains recovered from the human bone bed at Crow Creek. Skulls and mandibles showed signs of violence, including cuts, blunt-force trauma, and fractures (Willey 1990:95–105). Scalping was examined in this study for three reasons. First, scalping is the most easily recognizable expression of intergroup violence. Second, over 90 percent of the crania from Crow Creek showed evidence of scalping. Third, equal numbers of male and female skulls showed evidence of scalping. Because of the large sample of both male and female scalping victims, the Crow Creek site provides an opportunity to analyze whether or not there was a relationship between an individual's sex and/or age and scalping practices.

The following statistically significant results were found. There was a difference between the total number of cuts on male and female crania. The total number of cuts on female crania was greater than the total number of cuts on male crania. There was a statistically significant relationship between the three age groups and the breadth of frontal cuts. A post hoc test indicated that the difference in breadth of cuts between young adults (20–25 years) and old adults (40+) approached significance. Regression and correlation analyses were performed separately for each sex and distance of cuts across the frontal. Differences among age groups and breadth of the frontal cut were observed only in male scalping victims.

In conclusion, the Crow Creek bone bed represents one of the largest skeletal massacre series ever recovered. The importance of the Crow Creek skeletons is indisputable and the site has played a major role in understanding Native American life in prehistory. Crow Creek is important for studying not only warfare, but also prehistoric social relations and gender roles in war. Although the remains have been repatriated, the caliber and quantity of data recorded following the bone bed's excavation hold potential for future studies of the Crow Creek site.