# THE CROW CREEK MASSACRE: THE ROLE OF SEX IN NATIVE AMERICAN SCALPING PRACTICES

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A Thesis

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Master of Arts

in

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by

Ashley Kendell

Spring 2011

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APPROVED BY THE DEAN OF GRADUATE STUDIES
AND VICE PROVOST FOR RESEARCH:

_____
Katie Milo, Ed.D.

APPROVED BY THE GRADUATE ADVISORY COMMITTEE:

_____
P. Willey, Ph.D., Chair

_____
Antoinette M. Martinez, Ph.D.

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ABSTRACT

THE CROW CREEK MASSACRE: THE ROLE OF SEX IN NATIVE AMERICAN SCALPING PRACTICES

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Archaeological evidence of warfare on the Great Plains precedes the initial date of European contact by several hundred years. Evidence of warfare in the archaeological record includes skeletal indications of violent injury, mass graves, fortification structures, and village abandonment. Among these indicators of warfare, scalping is a reliable and easily recognizable expression of intergroup conflict. Scalping is represented by a characteristic pattern of cut marks in the archaeological record, and is therefore an accurate skeletal indicator of violence.

Previous research reports that there is not a significant relationship between a victim's age and sex and whether or not they became a scalping victim. The primary objective of this study is to present a thorough assessment of different treatment between the sexes, as well as different treatment among adult age groups at the Crow

Creek Site. A secondary goal of this study is to determine whether or not a significant relationship exists between sex, age and burial placement in the human bone bed at the Crow Creek Site. Finally, this study attempts to present a preliminary assessment of the role of gender in Native American scalping practices.

This skeletal sample is composed of massacre victims recovered from the human bone bed at the Crow Creek Site in Buffalo County, South Dakota. All skeletal material used in this study originates from the Initial Coalescent Component occupation that terminated at the time of the massacre, roughly 1325 A.D. Skeletal material from the Crow Creek Site was repatriated in May 1979. Because skeletal material was previously repatriated, all data used in this study are drawn from the age and sex assessments recorded by Mark Swegle in 1979 and the scalping mutilation data collected by an anonymous investigator at the University of South Dakota that same year. In total, a sample of 77 aged and sexed crania is used in this study.

The major findings can be summarized. Statistically significant relationships exist between the total number of cuts on male and female crania, and age and breadth of the frontal cuts. Factorial ANOVA results indicate the interaction between age and sex by frontal cut breadth is significant, and from this test result we conclude that sex differences in the breadth of cuts on the frontal are affected by the age of the victim. Regression and correlation are performed on the frontal cut breadths to clarify the relationship between sex and age. There is 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. Finally, there is not a significant relationship between the

location of the victim in the bone bed and the victim's age and sex, suggesting that individuals were placed in the fortification ditch at random.

Explanations for the disparity in the number of cut marks observed on male and female victims of the Crow Creek massacre include the following: female scalping victims experience higher levels of brutality than males, more cuts are observed on female victims because their attackers are not hurried because of a fear of retaliation, female scalps are more valued than male scalps and therefore more time is spent removing a larger piece of scalp from female victims, and finally, differences in hairstyle cause differences in the size of the scalp removed. Of the four explanations presented for the disparity in total cuts observed on males and females, the first explanation, that female victims of the Crow Creek massacres suffer higher levels of brutality, is the most plausible.

The results of the regression and correlation analyses indicate that variability in frontal cut breadths is explained by age only in male victims. The most plausible explanation for this result is that warfare was predominantly a male activity. Because warriors are typically young males, a distinction is made between male age groups because warrior scalps are considered more valuable. Because the scalp is used as an indication of bravery and prowess in battle, it is likely that a higher value is placed on the scalp of a young and virile male, than the scalp of an older male victim.

The chi-square goodness of fit test indicates that there is no difference in the burial location of Crow Creek massacre victims by sex or age. The results suggest that all Crow Creek victims are treated similarly regarding burial location. If victims experi-

ence similar treatment after death, there would not be any observable relationship between an individual's age and sex and that individual's placement in the bone bed.

# CHAPTER I

## INTRODUCTION

Much literature has been devoted to the analysis of interpersonal violence in its modern form. However, little research has been devoted to understanding causes of violence in earlier, prehistoric societies (Walker 2001). Bioarchaeological research demonstrates that humans have been prone to interpersonal violence, especially among men (Walker 2001: 573). Further interpretation of the historic and archaeological record, however, shows that women 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.

The archaeological record contains evidence of Great Plains warfare that precedes the arrival of Europeans by hundreds of years (Bamforth 1994). Evidence of violence in the Great Plains, however, is infrequent before A.D. 950 (Lambert 2002: 224). Indications of violent injury, increased use of fortifications, and village abandonment become more prevalent in the archaeological record of North America after A.D. 1200.

Analysis of human remains also yields data pertaining to extrinsic factors, such as environmental fluctuations, economic shifts, and resource instability, which may exacerbate violent human interaction (Walker 2001: 574). Human skeletons often yield otherwise unobtainable information about the interactions of prehistoric peoples,

including hostility and warfare (Milner 1995). Traumatic injuries in ancient human remains 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 (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. 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 themselves as they make contact with the ground. Parry fractures are just one example of trauma that cannot be reliable 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 probably the most reliable and most easily identified expression of intergroup conflict (Olsen and Shipman 1994). Scalping is defined as “the forcible removal of all or part of the scalp” (Nadeau 1944: 1677). Different methods of scalp removal were practiced by different tribes, and these methods were most likely derived from each tribe’s forefathers (Burton 1864). No matter the method, evidence of scalping left in the archaeological record is distinct.

Evidence of scalping in the archaeological record 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).

While scalping was not directly intended to take another's life because it removes only the skin of the head, 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 have been of European origin. While Europeans may have encouraged and promoted the practice, the ethnographic and archaeological records indicate that is was present before European arrival (Allen et al. 1985: 23; Neumann 1940: 289; Owsley and Berryman 1975: 44). Early explorers and settlers had no pre-existing words to describe the practice when they first encountered it among the Indians (Axtell and Turtevant 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 Native American practice of scalping. Crow Creek is the site of a prehistoric massacre that took place around 1325 A.D. (Willey 1990: 1; Figure 1). During the massacre, Crow Creek 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% (Willey 1990: 151). Skulls and mandibles showed signs of violence, including cuts, fractures and evulsion fractures (Willey and Emerson 1993: 243). Cuts observed on the radii, ulnae, tibiae and fibulae suggested the removal of hands and feet as trophies of war (Willey and Emerson 1993: 260-261). The most prevalent manifestation of interpersonal violence, however, was the presence of cuts on the frontals of victims, indicative of scalping. Altogether, nearly 90% 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 tradition. In many cases, the scalps of individuals in non-combatant categories, such as women, children, the sick and elderly, were considered valuable because they provided evidence that a warrior had penetrated

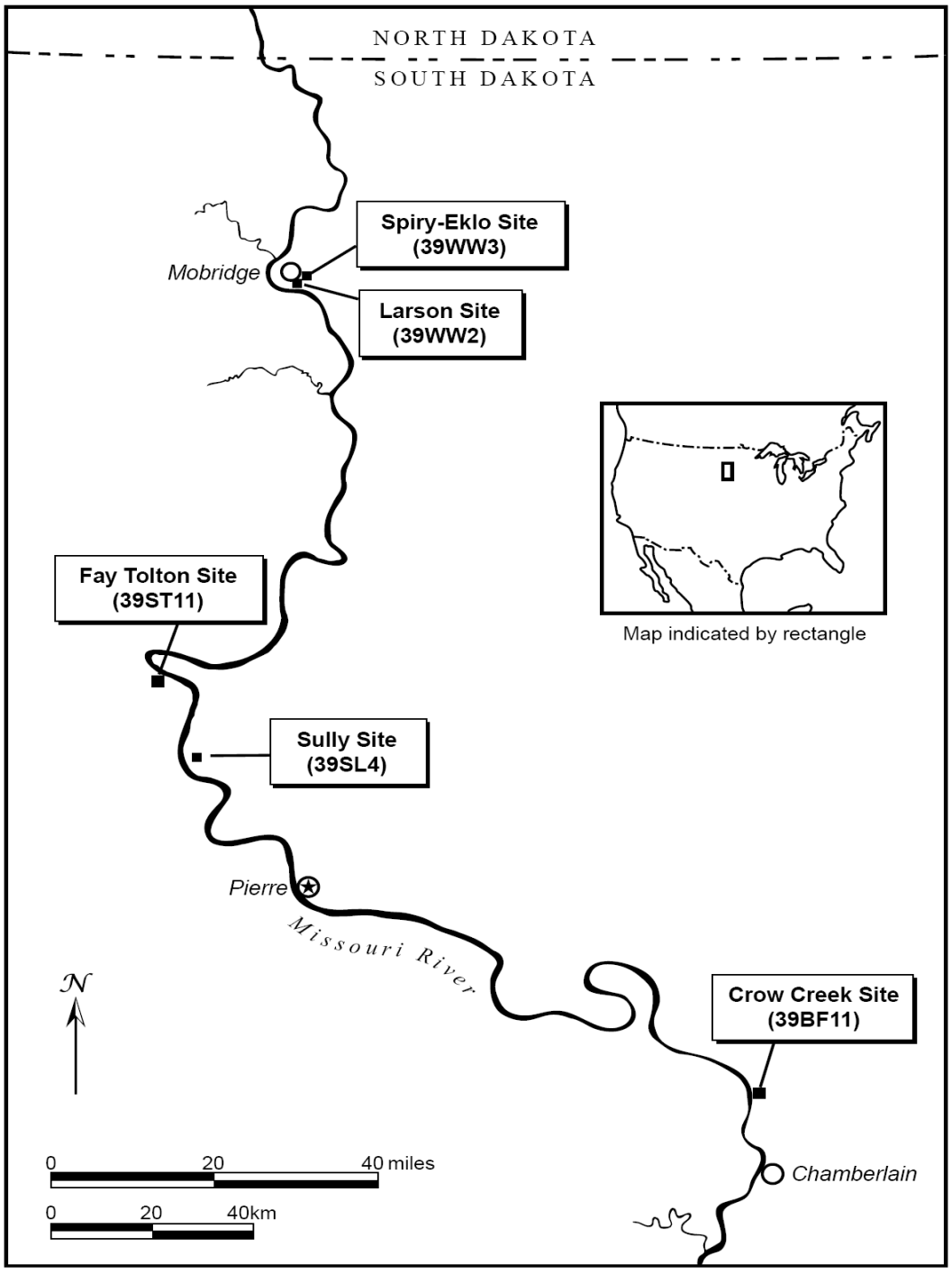



Figure 1. Location of the Crow Creek Site and other important archaeological sites along the Missouri River.

Source: Kivett, Marvin F., and Richard E. Jensen, 1976, Archaeological Investigation at the Crow Creek Site (39BF11). Nebraska State Historical Society Publications in Anthropology 7. Reproduced with permission.

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 victims of Native American trophy-taking practice. Also, members of all adult age groups were scalped.

Initially, the Crow Creek Site does appear to corroborate previous speculation about the relationship between age, sex and the likelihood of an individual being scalped. However, the goal of this study is to provide an in-depth assessment of the relationship between scalping, sex, and age.

## Purpose of Study

With nearly 90% of the Crow Creek villagers falling victim to scalping, the specimens lend themselves to the analysis of demographic trends in scalping practices. This study provides a thorough assessment of scalping differences between the sexes, as well as scalping differences among adult age groups.

Three dependent variables are used to assess the relationships between age and sex, and differences in the number of scalping cut marks. The dependent variables used in this study are total number of cuts on the cranium, total number of cuts on the frontal, and distance of cuts across the frontal. By analyzing the number and breadth of cuts, it is possible to ascertain differences in treatment according to sex and age.

Each cranium's location in the bone bed is also analyzed. Spatial distribution within the bone bed was recorded by excavation unit (Willey 1990: 6). A secondary goal

of this study is to ascertain relationships between sex, age and location of crania in the bone bed.

## Outline

Chapter I gives a brief history of interpersonal violence and discussed the history of scalping. This chapter introduces the Crow Creek Site and presents the purpose of this study, which will be followed by an overview of the history of scalping in North America.

Chapter II examines the history of scalping, providing both a historical review and an analysis of the prehistoric skeletal evidence of scalping. This chapter includes a review of women's roles in war. Chapter II prepares the reader to understand the massacre that occurred at the Crow Creek Site.

Chapter III provides a description of the Crow Creek Site, discusses the Nebraska State Historical Society's excavation procedures and conclusions, outlines the discovery and excavation of the human bone bed, and discusses the osteological implications of this osteological sample. Chapter IV follows and presents the research hypotheses and the author's expectations.

Chapter V outlines data acquisition and the methods employed in the study. This chapter also discusses descriptive and inferential statistics used to evaluate the research hypotheses.

Chapter VI presents results of statistical analyses performed on the scalping data. First, descriptive statistics are presented for cut marks, including the means and standard deviations of total number of cuts on the cranium, number of cuts on the frontal,

and breadth of cuts across the frontal. The minimum, maximum and range are reported for the variables. The results of inferential statistical comparisons by sex and age follow.

Chapter VII discusses the behavioral implications of the results presented in Chapter VI. Reasons are presented for the differences in the number of cut marks observed on male and female victims of the Crow Creek massacre, as well as differences in the number of cuts by adult age group. This chapter concludes with a discussion of study limitations.

Finally, Chapter VIII summarizes and emphasizes the importance of the Crow Creek Site. The site represents the largest prehistoric skeletal massacre sample in the world (Willey 1990: xxx). Chapter VIII concludes with suggested topics for future research.

# CHAPTER II

# LITERATURE REVIEW

Scalping is a reliable indicator of war because it leaves unambiguous documentation of interpersonal violence on the human skeleton. Much literature has been devoted to the analysis of scalping patterns; however, no research has been devoted to the analysis of how sex and age influenced Native American scalping practices. This chapter examines the history of scalping, providing both a historical review and an analysis of the skeletal evidence of scalping in prehistory. This chapter also provides a review of women's roles in war because the relationship between gender and Native American scalping practices has not previously been explored.

## History of Scalping

The origin of scalping in the New World is unknown, however historic documentation proves that scalping was widespread during the historic period (Catlin 1975; Friederici 1907). More recently, analysis of archaeological materials provides evidence for the existence of scalping practices during pre-Columbian times too.

Scalping is "the forcible removal of all or part of the scalp" (Nadeau 1944: 1677). Scalping in the archaeological record is recognized by a diagnostic pattern of cut marks. Scalping marks occur on the cranium, as cuts, or clusters of cuts, typically forming a rough circle around the superior aspect of the skull (Bueschgen and Case

1996: 230). However, it is possible to scalp an individual and leave no cuts (Hamperl 1967: 630). The presence or absence of cuts produced with different cutting tools has been demonstrated by experiments on cadaver crania (Hamperl 1967). In general, scalping cuts were not left on the cranial bones if the incisions made into the soft tissues were made with metal knives (Steinbock 1976: 26). When stone cutting instruments were used, these tools often had irregular edges that left parallel incisions or cuts on the surface of the cranial bones (Steinbock 1976: 26). While scalping was most often performed at death or minutes following death, it was not always the dead that were scalped (Jacobi 2007: 312).

In some instances, scalping was performed on living individuals (Friederici 1907 cited in Hamperl 1967: 630). In cases when living persons were scalped, in addition to cut marks on the crania, these individuals also exhibited bone changes resulting from the removal of the periosteum from the skull (Steinbock 1976: 26). Deprived of its periosteal blood supply, the outer table became necrotic and granulation tissue separated the necrotic area from the deeper layers of the living bone. As the wound healed, new bone was produced and resulted in a slightly depressed area of spongy bone that corresponded to the area of the scalping (Hamperl 1967: 632). Evidence of scalping may be suggested by the presence of periosteal reaction on the frontal and/or parietal bones from infection (Hamperl 1967: 632; Miller 1994: 212; Snow 1941: 55).

There are two behavioral interpretations of cut marks observed on human crania. The two most likely behavioral interpretations of cut marks are scalping and ritual defleshing (Owsley et al. 1994: 370). The number, location and placement of cuts can be used to distinguish a skull that was ritually defleshed and one that was scalped (Owsley et

al. 1994). A greater number of cuts and cuts that are scattered across the frontal usually indicate a skull that was systematically defleshed, rather than scalped (Owsley et al. 1994: 370). The typical pattern of cuts on scalped skulls consists of fewer incisions, generally in clusters, that form a distinctive circumferential configuration (Bueschgen and Case 1996: 230). Also, scalped frontals often show cuts that originate at the temporal line, extend to approximately halfway between the hairline and the browridges, and finally terminate at the opposite temporal line (Owsley et al. 1994: 370). Similar cuts may be observed circumscribing the parietals and occasionally the occipital.

Determining whether or not cut marks observed on a cranium indicate scalping requires understanding how the act of scalping was performed (Bueschgen and Case 1996: 232). There were several methods of scalping in North America and the technique typically differed by tribe and location (Nadeau 1944: 1677). The scalping techniques utilized by different tribes were culturally transmitted behaviors passed down by each tribe's ancestors (Burton 1864: 52). Scalping methods differed in the amount of skin taken from the head, the number of scalps lifted from the same head, and the method of scalp removal (Nadeau 1944: 1677). If the whole scalp was removed, it was a total scalping. If only a portion of the scalp was removed, it was termed partial scalping (Nadeau 1944: 1677). If only one scalp was removed from a victim, the scalping was single; if multiple scalps were removed, it was multiple. If the removal of the scalp was not preceded by a circular incision outlining the perimeter of the scalp, the method was termed sabrage. The scalp could also be removed with the teeth, as in the case of bald warriors (Nadeau 1944: 1677). There were also complete contrasted with incomplete scalping methods (Nadeau 1944). When the scalp was completely separated from the

cranium, the scalping was complete. Incomplete scalping occurred when the avulsion of the scalp was not completed and the scalp was left hanging from a small pedicle at the back of the head (Nadeau 1944: 1681). Two contributing factors to the variation of scalping methods were cultural preference and the duration of time allotted for the removal of a trophy (Bueschgen and Case 1996: 232). Partial, multiple and total scalping are discussed in greater detail.

Partial scalping was the act of removing a portion of the scalp (Nadeau 1944: 1678). Some Native American tribes, particularly those who inhabited the Plains, preferred to carry off only a select piece of the scalp (Nadeau 1944: 1678). The portion of the scalp removed was usually procured by cutting off a portion of the skin on the crown of the head, typically about the size of one's palm (Catlin 1975). The portion of the scalp that was removed was referred to as the "scalp-lock" (Bueschgen and Case 1996: 232). To be a genuine scalp, it was necessary to remove the crown of the head, which contained the hair whorl (Catlin 1975). If the scalper was skilled at the practice, no damage might occur to the underlying bone. Partial scalping most likely developed because the custom of many male, Native America warriors was to cultivate a single lock of hair on the very vertex of the head, thereby indicating the region to be scalped (Nadeau 1944: 1678). This hairstyle acted as a provocation to enemy warriors to come and obtain the wearer's scalp (Nadeau 1944: 1678).

Partial scalping included other methods that caused significant damage to the outer table of the skull and resulted in an inflammatory lesion if the scalping victim survived (Bueschgen and Case 1996: 232). In the "sabrage" method, the scalp was separated from underlying bone when the hair was grasped and pulled free (Bueschgen

and Case 1996: 232). This process of yanking the scalp free often resulted in a piece of the periosteum being removed with the separated scalp (Nadeau 1944: 1680). Forceful removal of the periosteum left portions of the subperiosteal bone exposed, and if the scalping victim survived, the incident resulted in areas of necrosis with exfoliation of the outer table and diploë (Hamperl 1967: 632; Ortner and Putschar 1981: 93).

A second method of scalping practiced by Native Americans was multiple scalping. Multiple scalping involved the participation of several warriors and occurred when more than one individual contributed to the slaying of the victim (Nadeau 1944: 1679). Each participant in the killing removed a small portion of the victim's scalp and every one of the pieces removed had an equivalent value as a trophy (Nadeau 1944: 1679). The piece of scalp containing the crown of the head was allotted to the chief, or the man thought to have inflicted the lethal wound (Nadeau 1944: 1679). The practice of multiple scalping increased in frequency with the advent of firearms, which made killing more anonymous and increased the uncertainty of who fired the lethal shot.

The final method of scalping was total scalping and involved the removal of the entire scalp in one piece (Nadeau 1944). In addition to the scalp, portions of the neck and face might also be removed. This method involved making short, parallel cuts across the frontal bone, followed by short cuts around and behind one ear, then across the occipital bone near the nuchal crest and behind the other ear, and finally connecting with the initial cuts on the victim's frontal bone (Bueschgen and Case 1996: 233). This series of cut marks facilitated removal of the scalp in one complete piece. In the total scalping method, a genuine scalp contained the crown or whorl of the hair, to prove that two scalps were not taken from one head (Catlin 1975). The whorl of the hair was also

thought to possess the inner life of the individual (Allen et al. 1985: 25). Multiple methods of scalping may have developed because the custom had cultural significance in many Native American groups.

Scalping has long been recognized as a custom of cultural significance for both those performing the act of scalping and those being scalped (Hamperl and Laughlin 1959). The ethnographic literature suggested that scalping was most often performed at death or in the minutes directly following death (Jacobi 2007: 312). The act of scalping, however, was not calculated to take another's life. Because scalping removed only the skin of the head, it was aimed at acquiring a trophy rather than the taking of another's life (Reese 1940: 9). In both prehistoric and historic times, scalping by Native Americans was interpreted as a final insult or curse upon the victim. The underlying idea of scalping was the desire to preserve a souvenir of the slain enemy, while simultaneously dishonoring his remains (Burton 1864: 49). To guarantee entry into the afterlife, some Native American tribes believed that an individual had to be physically complete and removal of an enemy's scalp precluded physical wholeness (Jacobi 2007: 312). Scalping, therefore, was a tangible symbol of physical and spiritual dominance (Seeman 2007: 171).

Among the Arikara, and presumably other related Native American groups, survival of scalping appeared to have strong cultural significance (Owsley 1994: 337). The survivors of scalping were known as scalped men, or tshunúxu' in the Arikara language (Parks 1982: 48). Similarly, in Arikara, the term for scalping survivor, "scalpquot" was synonymous with the term "ruinquot" signifying that the survivor was no longer thought to be human (Owsley 1994: 338). In accordance with Arikara folklore, a male scalping survivor was forced into a solitary life outside of his village and had to

stay hidden to avoid shocking or offending others (Gilmore 1933: 30). The figure of the solitary scalping victim eventually became the focus of myths and legends. The scalping survivor was believed to have supernatural powers, including the ability to bring good fortune in battle and the ability to heal the sick (Parks 1982: 52). This persona, however, was rarely filled by a female scalping victim (Owsley 1994: 338). If scalped, only men were forced from their village. In the Plains and Southwest, burial patterns suggest that female scalping survivors were accepted back into their community because female scalping survivors were buried with other members of their tribe. There was no definitive evidence of men continuing to live within their villages after surviving a scalping (Owsley 1994). Disparate treatment between males and females would most likely be reflected in the archaeological record too. Disparate treatment between the sexes should be represented through differential patterns of survival because women are more likely to survive a scalping after being accepted back into their communities. These reports must be read with caution, however, because evidence of scalping survival was rare.

The ethnographic record suggested that scalping occurred in multiple contexts. Scalping was associated with two forms of American Indian warfare: mourning war and shame-aggression war (Mensforth 2001: 111). Mourning war was a mechanism developed to externalize grief and hostility (Mensforth 2001: 111). According to some Native American belief systems, death and disease were interpreted as belonging in the supernatural realm and therefore, were thought to be caused by something rather than someone (Mensforth 2001: 111). Mourning war was a cooperative action involving a war party. Male mourners organized a response to death and disease, and the party did not establish an individual target for their grief. The goal of the war party was to kill the first

member of another tribe they encountered. The scalp of the victim was brought back to the village and rituals were performed.

Scalping occurred most regularly when the purpose of a raid was vengeance (Maschner and Reedy-Maschner 2007: 37). Shame aggression war was initiated by an individual who had lost status or prestige. To reverse his loss of status, the warrior would kill and often scalp the first person he could find that was not a member of his group (Mensforth 2001: 111). The scalp functioned as physical evidence of the feat and in this way the warrior's lost prestige was restored. Because the targets of mourning war and shame aggression war were nonspecific, any man, woman or child who did not belong to the aggressor's group was a legitimate target (Mensforth 2001: 112). According to the beliefs of the Assiniboin, Blackfeet, Sioux, Cree and Arikara, the scalp of a woman or child was awarded equal celebration as the scalp of a man (Denig 1930: 552).

Scalping evolved independently in the Old and the New Worlds (Mensforth 2007: 225). Scalps were light, relatively small, and could be removed quickly, leading to their selection as the preferred human trophy among many cultures (Nadeau 1944). Also, small size made a human scalp highly portable, allowing the victor a hasty retreat. Likewise, scalps were durable and could be stretched, dried and modified for permanent display (Mensforth 2001: 112). A final property of the scalp, which added to its desirability as a trophy, was the fact that a scalp could be used to represent a whole victim for ritual purposes according to some Native American belief systems (Mensforth 2001: 112). A scalp relieved a warrior from having to transport an entire corpse to establish and maintain dominance both physically and spiritually over his victim.

Trophy taking was a form of status competition that occurred at both the individual level and the group level (Maschner and Reedy-Maschner 2007: 33). The prestige of the slain individual was transferred to the victor, thereby making the symbols of success in warfare more important than the act of warfare itself (Maschner and Reedy-Maschner 2007: 40). The most common and widely distributed war trophy was the human head. The custom of head taking was a widespread method among many cultures because the head of a vanquished foe represented the most unequivocal symbol of an enemy's defeat (Keeley 1996: 100). The head was the most identifiable part of the body and was therefore the most appropriate trophy for purposes of revenge and display (Lambert 2007: 67). There was ample evidence of head removal as a form of trophy taking, and it has been suggested that scalping represents a derivation of this earlier practice (Hamperl and Laughlin 1959).

A second hypothesis for the origin of scalping was that the practice derived from the processing of trophy skulls (Owsley and Berryman 1975). Trophy skulls were often marked with cuts or scratches attributed to defleshing of the trophy. During processing, the scalp was removed and saved as part of the trophy (Owsley and Berryman 1975: 51). Over time, it is possible that the value of the scalp increased because of its easy removal and preservation.

The practice of scalping also appears to have had significance beyond mere trophy taking and was linked with the dehumanization of one's victim (Maschner and Reedy-Maschner 2007: 37). The dehumanization associated with the practice was correlated with whether or not combatants considered each other human; this measure of

humanity was often based on the level of social relatedness between groups (Maschner and Reedy-Maschner 2007: 40).

## Historic Scalping

Scalping is a form of trophy taking that can be found in the earliest written records, including the fourth book of Herodotus dating to 484-425 B.C. (Reese 1940: 7). Historical evidence of scalping extends around the globe; however, this thesis emphasizes the custom practiced in North America. Therefore, this section discusses the oldest historical accounts of scalping in North America and progresses through the historical records to the most recent evidence of scalping in 19th century.

The earliest historic account of scalping in North America was recorded in the journal of Francisco de Garay, written during his 1520 expedition to locate a sea route from the Caribbean Sea to India (Reese 1940: 8). An account of scalping by the Indians near Apalachicola Bay, Florida, came from Hernando de Soto's reports written in 1540, one of his men having been a victim (Allen et al. 1985: 24). Historic scalping was practiced in a very limited area of North America in the eastern United States and was also practiced by the Timucuan-speaking tribes upon the arrival of De Soto (Friederici 1907 as cited in Neumann 1940: 288). Scalping branched into the present Gulf States territory, into both sides of the Mississippi, and spread among the Natchez, Tunican and Caddo tribes (Friederici 1907: 428 as cited in Neumann 1940: 288). The Iroquois and the Huron practiced the ritual in the northern regions of North America, and it was suggested that these tribes acquired scalping from the Cherokee, Tuscarora, and Susquehannock (Neumann 1940: 289).

At European contact, the Algonkian tribes on the lower St. Lawrence, in New Brunswick, Nova Scotia, northern Maine, along the Delaware and Chesapeake bays, and down into Carolina practiced scalping (Neumann 1940: 289). Central Algonkian tribes, as well as Plains tribes, including the Blackfoot, Cheyenne and Arapaho, also practiced scalping upon White contact. European explorers observed and reported the practice between 1669 and 1670 among the Siouan-speaking Wateree of South Carolina, but scalping appeared much later among the Siouan-speaking Plains Indians (Frederici 1907 as cited in Neumann 1940: 289). No tribe or linguistic family in North America can be credited with the invention of scalping; however, the ferocious Huron-Iroquois most likely transmitted the custom to the Plains Indians (Reese 1940: 15). The greatest impetus for the spread of scalping was hypothesized to be the introduction of scalp bounties offered by colonial and later governments (Neumann 1940: 289).

Scalping, as depicted in the literature, resulted from the Native American's initial contact with Europeans (Reese 1940: 16). European contact introduced the Indians to steel knives and firearms, which increased the bloodiness and fatalities of war and facilitated the taking of scalps. With the introduction of bounties for scalps of Native Americans and Whites, scalping reached its climax (Reese 1940: 16).

European colonists employed friendly Native American tribes as allies at the beginning of the seventeenth century (Reese 1940: 16). Connecticut troops enlisted the help of the Mohegans in battle against enemy tribes. When Massachusetts colonists waged war against the Pequots and Narragansetts, King Philip established a scalping bounty for the heads or scalps of enemy Indians. Beginning in 1688, French-Canadians offered bounties for any enemy scalp, either Native American or European (Reese 1940:

16). At the beginning of the seventeenth century, English only offered rewards for Native American scalps, but by 1693, the English extended the offer to French scalps, after learning of the French-Canadian bounty policies (Reese 1940: 17). Because the English paid higher bounties than the French, many scalp-hunters were recruited from the French forces to the English leagues. The French retaliated by buying scalps and re-selling them at a profit to the British (Reese 1940: 17).

Scalping was practiced by both sides during the American Revolution (Reese 1940: 17). By the end of the Revolution, Hamilton had earned the nickname of the "hair-buyer general" (Reese 1940: 17). Several references to scalping were published in *The Medical Military Journal* by surgeon James Thacker, during the period 1775-1783 (Reese 1940: 17). More recent accounts of scalping were published in the *Early Life among the Indians*, where Thomas Wentworth (1892) recounted his observations of scalping in the last great battle of the Midwest between the Chippewas and the Sioux. By the end of the 1700s, scalping occurred with enough regularity that treatment methods had developed on the frontier (Bueschgen and Case 1996: 232). Evidence of historic scalping comes from the ethnographic record as well as the archaeological record.

The most recent evidence of protohistoric scalping found in the archaeological record came from the Sully Site (39LS4) in South Dakota (Figure 1). The Sully Site dated to the Postcontact Coalescent tradition, A.D. 1650 – 1725 (Owsley and Jantz 1978: 139). The scalping victim was a young female, age 15 to 17 years, with a narrow groove encircling her cranial vault. The groove appeared to be an osteoclastic response to scalping, and a number of cuts occurred inside the osteoclastic ring. This pattern of cuts was consistent with the pattern observed in the cases of scalping survival.

More recent archaeological evidence of scalping during the protohistoric period came from the Larson Site (39WW2) in Walworth County, South Dakota (Owsley et al. 1977: 121, Figure 1). The Larson Site was on the east bank of the Missouri River, approximately two miles south and east of Mobridge. The site belonged to the Post-Contact Variant of the Coalescent Tradition and represented an Arikara village dating approximately A.D. 1750 – 1785 (Owsley et al. 1977). Forty-one skulls were recovered from Larson Village, and of these skulls, 17 individuals were scalped and 13 were too badly crushed or broken to determine whether they were scalped (Owsley et al. 1977: 121-122). Of the 17 skulls with evidence of scalping, one was a child aged 5-9 years of indeterminate sex, one was an adolescent male aged 10-19 years, six were adolescent females aged 10-19 years, seven were adult males, and two were adult females (Owsley et al. 1977: 122).

A site dating to the Disorganized Coalescent period, A.D. 1802-1832, also yielded evidence of historic scalping (Owsley 1994). The Leavenworth Site represented an Arikara village in the Northern Plains and contained the remains of one individual with cuts indicative of scalping (Olsen and Shipman 1994). The scalping victim was a male, approximately 20 years in age (Olsen and Shipman 1994: 385).

The most recent account of scalping in the written historic record comes from a report of medical treatment submitted by R.C. Moore to the Nebraska Medical Society at Omaha, June 7-8, 1870 (Reese 1940: 18). William Thomson was scalped by the Cheyenne near Plum Creek Station, Nebraska, on August 6, 1867, and was placed under the care of Moore. The medical report documented the size and periosteal reaction of the

wound, as well as the treatment received by Thomson during a three month period (Reese 1940: 18).

There are four additional sites worthy of discussion that yielded evidence of scalping from the historic period. However, no proveniences were recorded for these sites. The first case of scalping came from the Madisonville Cemetery, a Fort Ancient aspect site in Illinois (Neumann 1940: 288). The site postdates White contact; however, no date was given for the skeleton.

The second case of historic scalping came from the Yellowhouse Draw Site. The remains of an old adult male (50+ years) were recovered from the Yellowhouse Draw in Hockley County, Texas (Wilhelm and Taylor 2008:207). This individual displayed cut marks consistent with scalping. A cluster of cuts were observed on the right portion of the frontal bone near the temporal line (Wilhelm and Taylor 2008: 207). Another cluster of cuts was observed on the coronal suture near the intersection of the suture and the temporal line. The provenience of the site was unknown, but the preservation of the skeletal remains suggested a late prehistoric or historic date (Wilhelm and Taylor 2008: 207).

The third case of historic scalping came from the Mission San Juan Capistrano Site. An adult male was recovered from the Mission San Juan Capistrano Site (41BX5) in Texas. The mission was established in 1731 A.D., and the skeletal remains dated to a time after its establishment. The adult male scalping victim from this site had parallel cuts on his parietal (Baker 2001: 327). While cut marks on this individual could not be definitively identified as scalping, they occurred in the perimortem interval (Baker 2001: 327).

Additional archaeological evidence for historic scalping in Texas came from the Mission Nuestra Señora del Refugio Site (41RF1) (Jantz et al. 2002). Three crania recovered from the site represented adult males with similar patterns of cut marks on the frontal, parietal and occipital bones (Jantz et al. 2002: 63). No provenience was given for the site, but Mission Refugio was the last Spanish Mission founded in Texas (Wilhelm and Taylor 2008: 208).

The final historic case of scalping came from the Humboldt Sink area in the Nevada Great Basin (Stark and Brooks 1985). Although evidence of scalping in Nevada was rare, two individuals from Humboldt Sink show the diagnostic pattern of cuts associated with scalping. The first individual was an adult female, approximately 28 years old, with cut marks on her frontal, occipital, right and left parietal (Stark and Brooks 1985: 71). The second individual was also an adult female, approximately 35 years old, with cuts on her frontal and left parietal bones (Stark and Brooks 1985: 71). The burials were thought to date to the historic period because the cuts appear to have been made with a metal knife, rather than a stone cutting instrument (Stark and Books 1985: 71).

## Prehistoric Scalping

Scalping was documented and widespread among Native American groups during the historic period. Before World War II, scalping was assumed to have been present in Pre-Columbian times as well. This assumption was largely based on the observations of early explorers who either witnessed the practice firsthand or encountered linguistic evidence for the early existence of scalping indicated by specialized terms in

certain Native American languages (Friederici 1907). Recently, with the advent of more sophisticated dating techniques and archaeological methods, osteological evidence of prehistoric scalping in North America has increased rapidly. This section presents the evidence for prehistoric scalping, beginning with the most recent cases of scalping and proceeding through the prehistoric record.

Evidence of scalping survival occurred as recently as A.D. 1690 to 1720, at a protohistoric site in South Dakota, Spiry-Eklo (39WW3) (Hamperl and Laughlin 1959). The Spiry-Eklo Site was an Arikara Indian village near Mobridge, South Dakota (Hamperl and Laughlin 1959: 81, Figure 1). A series of skeletons recovered from the site included the remains of three adult females, one adult male, three children and some 19 infants (Hamperl and Laughlin 1959: 81). One of the adult females showed evidence of scalping survival, including exfoliation of the outer table and diploe, followed by the subsequent replacement with new bone of the traumatized area. The scalping survivor was approximately 50-60 years of age (Hamperl and Laughlin 1959: 82).

Another example of scalping where the individual did not survive the incident came from the Mouse Creek sites in the Chickamauga Reservoir of East Tennessee (Smith 2003). The Chickamauga Reservoir was located in the Eastern Tennessee River Valley, northeast of present-day Chattanooga (Smith 2003: 304). The Mouse Creek sites were found in the Hiwassee River Valley and included North and South Mouse Creeks (4MN3), Rymer (15BY11), Ledford Island (16BY13), and components of Ocoee (1,2PK1) (Smith 2003: 304). All sites belonged to the Late Mississippian phase and dated to A.D. 1400-1600.

Four individuals from the Mouse Creek sites exhibited osteological evidence of scalping. Two cases from the Mouse Creek sample displayed cut marks associated with scalping. One Mouse Creek victim was male and the other was a probable female. The remaining two cases exhibited changes to the external cortex and underlying cancellous bone of the cranium, suggesting post-scalping survival (Smith 2003). Both scalping survivors were male, aged 23-39 and 30-40 years (Smith 2003: 307).

A second group of sites in the Chickamauga Reservoir also yielded evidence of scalping from late prehistory. The Dallas sites were clustered in the reservoir and included the type site of Dallas (7,8HA1), Sale Creek (64,65HA10), and components of Hixon (1,3HA3) and Hiwassee Island (37,38,63,VT1MG31) (Smith 2003: 304). The Dallas and Mouse Creek sites overlapped temporally, but were separate cultural units. In the Dallas sample, there were 10 cases of interpersonal violence (Smith 2003). Two individuals exhibited signs of scalping. One individual, a female aged 28-39 years, appeared to have survived the scalping and showed evidence of healing (Smith 2003). The second scalping victim, a male, age unknown, did not survive the incident.

Evidence for scalping survival was also recovered from the Hampton Site (40RH41) in East Tennessee (Smith 2008). The Hampton Site was a late prehistoric site dating to A.D. 1200 to 1600. Burial 21 from the Hampton Site was a middle-aged adult female with a well-demarcated depressed area on the calotte, which was attributed to scalping survival (Smith 2008: 593). The perimeter of the depressed area horizontally bisected the squamous portion of the frontal bone and proceeded laterally to include the superior portions of the left and right parietals. Horizontal cut marks on the frontal bone suggested the site of incision and the ragged occipital margin indicated where the scalp

was torn (Smith 2008: 593). The external cortex of the neurocranium outside the depressed margin was intact. Inside the boundaries of the circular depression were several reactive sequelae of varying degrees of ischemia, chronic inflammation and secondary osteomyelitis. The pathological changes evident on the calotte of Burial 21 were consistent with surviving a scalping (Smith 2008: 594).

Evidence of prehistoric scalping also occurred at two pueblo sites in Arizona, Nuvakwewtaqa (Chavez Pass) and the Grasshopper Ruin (Allen et al. 1985). Nuvakwewtaqa was a Sinagua culture site at the edge of the pinon/juniper zone in Coconino National Forest. The most intense occupation of the Nuvakwewtaqa Site began in the 13$^{th}$ century A.D and lasted until the early 14$^{th}$ century (Allen et al. 1985: 26). The Grasshopper Ruin Site was located in a pine forest on the Fort Apache Indian Reservation. Tree-ring dating of the Grasshopper Site indicated a brief occupation from A.D. 1300-1375 (Allen et al. 1985: 26). Ten crania with cut marks were recovered from the sites, seven from Nuvakwewtaqa and three from Grasshopper Ruin (Allen et al. 1985: 26-29). Scalping victims from the Nuvakwewtaqa Site included an adult female aged 25-30 years, adult male aged 25-30 years, adult male approximately 40 years, adult male aged 30-40 years, adult female aged 28-30 years, adult female 30-35 years and an adult male 40+ years (Allen et al. 1985: 26-28). Scalping victims from the Grasshopper Ruin Site included an adult male aged 35-40 years, an adult male approximately 40 years, and an adolescent female aged 13-15 years (Allen et al. 1985: 28-29).

Evidence of scalping in the late prehistoric period came from three archaeological sites widespread geographically across the state of Texas. All three sites dated to approximately 700- 1500 A.D. The first scalping victim came from the Andrews

Lake/Salt Cedar Site (41AD2) (Wilhelm and Taylor 2008). This individual was an adult male, at least 40 years of age, and had cut marks on the right portion of the frontal and the left portion of the occipital below the nuchal line (Wilhelm and Taylor 2008: 203). The second scalping victim was a male, aged 17-23 years, recovered from the Grimes-Houy Site (41CV17) (Wilhelm and Taylor 2008: 205). This individual had multiple cuts on the frontal, both parietals and the occipital. The third scalping victim was an adult female, approximately 20 years old at the time of death. This individual was recovered from the Lawrence Island Site (41CH1) and was represented by a cranium that was missing the frontal bone and the facial bones (Wilhelm and Taylor 2008: 206). However, cuts were evident on both parietals.

Evidence of scalping survival from an earlier time period came from the Arnold Site, in Williamson County, Tennessee (Ferguson 1972). The Arnold Site represented the Middle Cumberland Culture (Ferguson 1972). Two radiocarbon dates were obtained from the site, 1200 ± 80 A.D. and 1680 ± 65 A.D. (Ferguson 1972: 38-40). The scalping survivor was an adult male of an unspecified age. The skull of this individual exhibited a groove 3mm to 4mm wide that originated on the frontal and completely circumscribed the skull. Pitting within the circumscribed area suggested that this individual survived the scalping incident. Two other adult males from the Arnold Site, Burials 63A and 63B, also exhibited cut marks suggestive of scalping (Ferguson 1972). Burial 63A represented an adult male aged 25-35 years. Cut marks on the cranium of Burial 63A originated on the frontal bone and extended to the left and right temporal lines. Shallow cuts also appeared on the left and right parietals and occipital (Ferguson 1972: 40). Burial 63B represented an adult male aged 30-40 years, and only the cranium

and first cervical vertebrae were present, suggesting that this individual had been decapitated (Ferguson 1972). Cut marks on the cranium of Burial 63B appeared on the frontal bone and the left parietal, with no evidence of cuts on the occipital or right side of the skull.

Between 1947 and 1951, two sites in the John H. Kerr Reservoir Basin were excavated and one site, the Clarksville Site, yielded human remains with evidence of prehistoric scalping. The Clarksville Site (Mc14) was in Mecklenburg County, Virginia, and was occupied during the Middle to Terminal Woodland times, A.D. 800 – 1630 (Hoyme and Bass 1962: 329). Of the 78 burials excavated at Clarksville, three crania had long shallow grooves on the frontal and parietal bones suggesting scalp removal near the time of death (Hoyme and Bass 1962: 378). Burial 14 was an adult male aged 25 years, with cuts on the frontal and left parietal, suggestive of scalping. Burial 22 was a female aged 20-24 years with cuts on the left parietal bone and near lambda, suggesting an attempt at scalping. Burial 35 was an adult male aged 38-45 years with cuts on the frontal bone, suggesting that this individual had been scalped (Hoyme and Bass 1962: 342-351).

In the late 1930s, a late prehistoric agricultural community in northwestern Alabama was excavated at Koger's Island (Bridges 1996). Koger's Island was a cemetery site which contained four mass graves of individuals with perimortem trauma and scalping. The mass graves contained at least 108 individuals and represented the largest known Mississipian Period (A.D. 1200-1500) cemetery on this section of the Middle Tennessee River. Marks attributed to scalping generally matched the exterior surface of the bone in color, and were present on the frontal, parietal, and occipital bones, as well as a few marks found on the temporal bone (Bridges 1996: 67). The configuration of the

marks in all scalping cases was distinctive. Cuts tended to be short (usually about 1cm in length), thin, and following a characteristically circular patterning on the vault, consistent with those created with a stone knife (Bridges 1996: 67).

At Koger's Island, seven individuals showed evidence of scalping cuts on their crania: six individuals were recovered from multiple burials and one individual from a single interment (Bridges 1996). Five of the seven scalping victims were male. The first two scalping victims were excavated from a multiple burial consisting of five individuals. Both victims were male aged 25-35 years and 30-34 years (Bridges 1996: 67). The second group of scalping victims was excavated from a multiple burial of five individuals. This second group consisted of a male aged 40-44 years, a male aged 20-24 years, and a male aged 40-49 years (Bridges 1996: 68). The sixth scalping victim was recovered from a single interment and was a female aged 17-19 years. The final individual with evidence of scalping was a female aged 30-39 years excavated from a multiple burial of five individuals. In most cases, cuts were observed in a series of parallel or subparallel lines, although some individuals had less patterned cut marks (Bridges 1996: 67).

In 1933, an aboriginal site in Fulton County, Illinois, was excavated, uncovering the remains of an adult male with evidence of scalping (Neumann 1940: 287). The Fulton County Site (Fˇ896) was on the Norman Crable Farm, two miles north of Bluff City. The Fulton County Site dated to A.D. 1000-1500 and belonged to a Middle Mississippian culture group (Bueschgen and Case 1996: 231). The scalping victim showed no evidence of healing and the distribution of cuts suggested that the victim had probably been laying face down during the scalping incident. Cut marks originated on the

frontal bone and extended in a rough circle around the crown of the head (Neumann 1940: 287). Neumann's 1940 report of the Fulton County Site is the first published archaeological evidence of prehistoric scalping.

One year later, Snow described a scalping survivor recovered from a Middle Mississippian component at Moundville, Alabama (Snow 1941). The Moundville Site dated to A.D. 1000-1500. The scalping survivor was a female, approximately 24 years of age, whose cranium was completely encircled by a groove that ran from the approximate hairline around the cranial vault (Snow 1941: 55). An infection-induced osteitis was noted on the crown of the head and its presence was interpreted as an infectious reaction to exposure of the outer table of the skull. For such an inflammatory response to occur, the scalping victim would have had to survive the incident for at least a few days or weeks (Bueschgen and Case 1996: 231).

Evidence of prehistoric scalping dating to the same time period came from the Wallace Mound (25SY67) in Sarpy County, eastern Nebraska. The site dated to roughly A.D. 1050-1400 and was associated with the Nebraska Phase of the Central Plains Tradition (Holliman and Owsley 1994: 351). The cranium of a young female, age 16 to 18 years, was recovered from the Sarpy County site. The cranium was in poor condition and was missing large portions of the left and right parietals, however, evidence of a bony reaction was still evident on the remaining portions of the skull (Holliman and Owsley 1994: 351). The ring appeared to encircle the cranial vault, and several areas of necrosis were visible within the resorptive groove. This individual probably survived the scalping for a period of time as the reactive process of healing appeared to have had time to progress (Holliman and Owsley 1994: 351).

Evidence of prehistoric scalping also occurred in the Sargent Site Ossuary (25CU28) in Custer County Nebraska. The Sargent Ossuary was located on top of a prominent sand dune approximately one mile north of the Middle Loup River (O'Shea and Bridges 1989: 7). The ossuary belonged to the Central Plains Tradition, a tradition that spanned from A.D. 900 – 1450. Excavation of the ossuary uncovered human skeletal material buried within a well-defined pit. Of the 12 individuals uncovered in the burial, three crania exhibited similar thin, straight, often overlapping cuts which were characteristic of scalping (O'Shea and Bridges 1989: 11). Individual 1 was a fairly young adult male with several small (under 1cm) cuts on the left frontal. Individual 4 was a fairly young female with several shallow, long cuts on the left parietal and small cuts on the right frontal. Finally, Individual 8 was an adult male with several small cuts on the right frontal (O'Shea and Bridges 1989: 9).

In 1957 the Heerwald Site in Custer County, west-central Oklahoma, was excavated and revealed the remains of a near-term fetus, a young adult female, and a child of unknown sex (Bovee and Owsley 1994: 355). The adult female skeleton had numerous indications of a violent death, including cut marks on portions of the cranium that suggested the woman had been scalped. Thirty cuts spanned the squamous portion of the frontal bone, parallel to the supraorbital margin (Bovee and Owsley 1994: 357). Cuts were also observed on the left and right parietals, the right temporal and the occipital, forming a rough circle. Testing of the burial yielded a radiocarbon date of A.D. 1300 ± 80 years (Bovee and Owsley 1994: 355).

A cemetery in the central Illinois River Valley yielded osteological evidence of prehistoric scalping dating approximately to the same time as the Heerwald Site.

Norris Farms #36 belonged to a regional variant of the Upper Midwestern Oneota Tradition. Excavation of the Norris Farms #36 cemetery uncovered 264 burials dating to A.D. 1300 (Milner et al. 1991). Of the 264 burials, 43 complete or partial skeletons indicated violent deaths (Milner et al. 1991:583). Fourteen individuals from Norris Farms #36 cemetery were scalped. Evidence of scalping included multiple, parallel cut marks on the anterior, lateral, and posterior sides of the cranial vaults of the victims. The pattern was consistent with other scalped crania elsewhere in North America. Forty-one of the 43 individuals that died violently were estimated to be older than 15 years of age at the time of death (Milner et al. 1991: 587). Approximately half of the individuals who died violently were males and half were females. The frequency of each sex that was scalped at the Norris Farms #36 site was not reported.

Evidence of scalping in the Southern Plains came from the Nagle Site (340K4) in eastern Oklahoma (Brooks 1994). The Nagle Site was a cemetery situated on a low terrace adjacent to the North Canadian River (Brooks 1994: 45). The site dated to the late 13$^{th}$ to early 14$^{th}$ century and was linked to the Caddoan cultures of the southeast. Of the five individuals excavated from the site, one individual had cranial cuts indicative of scalping (Schafer 1957). The scalped individual was an adult male, approximately 30 years in age (Schafer 1957: 93).

Additional evidence of prehistoric scalping in the Southern Plains was discovered at the Wickham #3 Site in western Oklahoma (Bovee and Owsley 1994). Wickham #3 was a Zimms Complex site that dated to A.D. 1265 – 1425 (Brooks 1994: 41). Upon excavation, the site revealed two burials, both with osteological evidence of

violence. The second burial to be excavated contained the remains of a young adult male that had been scalped.

Skeletal evidence for the existence of scalping in prehistory also came from the Orendorf Site in west-central Illinois. Orendorf was a Middle Mississippian site dating to A.D. 1150-1250, located in the Central Illinois River Valley (Steadman 2008). Nine percent ($N = 25$) of all 268 individuals from Orendorf suffered warfare-related trauma (Steadman 2008: 51). Thirteen individuals exhibited cut marks on their crania indicating scalping. Both males and females fell victim to scalping: 16% of males showed evidence of scalping, contrasted with 12% of females (Steadman 2008: 56). Long cut marks were most commonly recorded on the frontal bone, and short, overlapping cut marks were evident on other regions of the cranium. All but one victim of scalping was adult; the other individual was an adolescent aged 12-18 years (Steadman 2008: 54). None of the individuals appeared to have survived the scalping incident.

In 1970, during the Arizona State University field school, four crania were recovered from the Vosberg Site in Arizona (Bueschgen and Case 1996). All four crania had parallel clusters of cut marks characteristic of scalping with a stone knife. The Vosberg Site was located 10 miles southeast of the town of Young in a 2.5-mile-long valley in central Arizona known as the Vosberg District. The site dated to A.D. 1050-1250 and all four scalping victims came from two contemporaneous occupation components roughly 40 meters apart (Bueschgen and Case 1996: 234). The first scalping victim was a male, aged 40-50 years. Cut marks appeared in parallel clusters that completely encircled the cranium, indicating that the entire scalp was removed. The cuts originated on the frontal, superior to the supraorbital torus and extended across the right

side of the cranium. Horizontal marks were visible on the occipital, above the nuchal crest. On the left parietal, another cluster of marks was observed 2cm above the squamosal suture and these cut marks extended to the left portion of the frontal (Bueschgen and Case 1996: 236). In addition to the cut marks that encircle the cranium, there were a number of parallel cut marks on the most superior aspect of the cranium suggesting that the scalp was removed by skinning rather than torn from the victim's head.

The second scalping victim at the Vosberg site was also a male, probably aged 35-45 years (Bueschgen and Case 1996: 239). Only the calvarium of the second victim was present and the left temporal and most of the left parietal were missing. Cut marks originated on the right frontal near the temporal line. Deep cuts were observed on the right temporal, just superior to the external auditory meatus, continuing posteriorly and ending inferior to the nuchal line (Bueschgen and Case 1996: 239). The left side of the frontal had large clusters of parallel cut marks. Most of the scalp appeared to have been removed, as suggested by the presence of parallel cut marks on the frontal and right temporal (Bueschgen and Case 1996: 233).

The third victim at the Vosberg Site was a female aged 30-40 years (Bueschgen and Case 1996: 240). That cranium was damaged postmortem and the face, base of the skull and right temporal were absent. Cut marks originated on the right frontal and extended to the right parietal. Shallow marks were present on the occipital and deep marks were on the left mastoid process. The fact that this cranium exhibited fewer cut marks than the other scalping victims may have indicated the skill of the scalper,

sharpness of the knife, or that the scalp was torn, rather than cut, from the cranium (Bueschgen and Case 1996: 240).

The final scalping victim at the Vosberg Site was a female aged 25-35 years (Bueschgen and Case 1996). A large, deep cluster of cut marks were observed on the occipital, inferior to lambda. A second cluster of cuts was located on the right parietal and a third cluster of cuts was visible on the right mastoid process. No other cut marks were evident on the superior region of the cranium.

Pre-dating the Vosberg Site by 100 years, the Fay Tolton Site offered evidence of a scalping survivor. The Fay Tolton Site (39ST11) represented a fortified Plains village located on the Missouri River in central South Dakota (Holliman and Owsley 1994; Figure 1). Fay Tolton was an Initial Middle Missouri village, belonging to the Anderson Phase, A.D. 950-1250. Five individuals were excavated from the Fay Tolton Site, and of these five, one individual showed scalping. The scalping victim was a child, aged 5-7, with areas of cranial necrosis from scalping. Bone necrosis was apparent on the left parietal and occipital. There were also islands of normal cortical bone, exhibiting cuts that lay within the boundaries of the necrotic bone reaction. The degree of bone necrosis and reaction suggested the victim survived for at least two weeks after the incident (Holliman and Owsley 1994: 349).

Unlike the evidence of scalping discussed previously, a cluster of Fremont sites in south-central Utah showed evidence of scalping that was consistent with processing rather than a warfare-related mutilation pattern (Novak and Kollman 2000). Backhoe Village, a Fremont site, was located adjacent to the Wasatch Plateau, in an intermountain valley. Backhoe Village was occupied from A.D. 450 -1110 (Novak and

Kollman 2000: 67). Human remains were excavated from a single pithouse that dated to A.D. 894. From a total of 546 human skeletal elements and fragments, nine individuals were identified in the pithouse. Five of the individuals were adult males, two adult females, and two juveniles (Novak and Kollman 2000: 68). Although the crania were fragmented, they all had evidence of cut marks. All the crania had a circular exfoliated and burned area on their most superior aspect and the cut marks on the vault bordered this burned region. The pattern of cut marks was consistent with scalping. The pattern of burning on the superior surface of the vault suggested the scalp had been removed before heat exposure, thus eliminating the tissue barrier between the cranium and the fire (Novak and Kollman 2000: 69). The pattern of scalping observed at the Fremont Site at Backhoe Village was inconsistent with typical scalping patterns and instead was more consistent with the processing pattern for butchering animal bones or the execution of witches. Backhoe Village was an interesting site because men, women and children all showed evidence of scalping.

A rather unusual case of scalping came from the Mason Site in Franklin County, Tennessee. The Mason Site dated between A.D. 700 and 1000 and excavation revealed an adult male with cut marks suggestive of scalping (Owsley and Berryman 1975). Cuts originated on the frontal bone and extended laterally and posteriorly to the right parietal and right temporal (Owsley and Berryman 1975: 48). Cut marks observed on the frontal bone were shallower than would be expected from severing the frontalis muscle. Also, cut marks on the frontal appeared inferiorly, located above the supraorbital ridges (Owsley and Berryman 1975: 48). While the pattern of cuts deviated slightly from the typical scalping pattern, the victim was most likely a victim of scalping.

Early evidence of scalping in the prehistoric record came from the Spencer Lake Mounds in Burnett County, Wisconsin, which dated to A.D. 490 – 580 (Neiburger 1989: 204). The scalping victim recovered from the Spencer Lake Mounds was a Native American male (Neiburger 1989: 204). The skull of this individual showed five distinct cuts that encircled an area located to the right of the crown of the head, an area where hairlocks were traditionally worn on prehistoric Native American warriors (Axtell 1977; Neiburger 1989). Careful analysis of the archaeological remains revealed that the Wisconsin Native American male was killed and scalped 900 years before European contact in North America (Neiburger 1989: 207).

Two sites in northeastern Nebraska yielded evidence of scalping survival in prehistory; however, no chronological determinations were reported for these particular sites. None of the individuals from northeastern Nebraska had cut marks; however, there was evidence of periosteal reaction and infection which were consistent with scalping survival (Miller 1994). Three individuals were recovered from the Dixon County Site. The Dixon County Site was a Nebraska Culture ossuary that was excavated in 1938 (Miller 1994: 213). The three scalping survivors were recovered from a pit containing the remains of seven individuals. Age and sex were not reported for these scalping survivors. The first cranium belonged to Individual 16, and exhibited signs of healing on the parietals, across the sagittal suture, and the healing region extended inferiorly onto the occipital. It was suggested that Individual 16 survived the scalping for several years (Miller 1994: 213). Individual 27 was represented by a portion of the frontal bone with substantial evidence of infection. It is likely that Individual 27 only survived the scalping for a number of months before succumbing to the infection (Miller 1994: 213). Individual

28 was also represented by a single frontal bone with evidence of infection. The infection present on Individual 28 led to bone necrosis, as did the infection on Individual 27, and also led to proliferation of bone, typical of granulomatous response (Miller 1994: 214). The final individual that showed evidence of scalping survival in northeastern Nebraska came from a possible St. Helena Phase site (25DK9) in Dakota County (Miller 1994). Individual 5 at the Dakota County site was represented by a cranium and mandible. This individual showed evidence of a massive infection that covered the entirety of the skull (Miller 1994: 216).

There is also evidence of scalping dating to the Woodland period. The calvarium of an adult male scalping victim was recovered from the Blasky Mound Site in the Northern Plains (Williams 1994). The calvarium had a coarse irregular appearance. Several well-healed cuts were present on the posterior margin of the parietals. The occurrence of well-demarcated sclerous tissue suggested the presence of an active infection at the time of death (Williams 1994: 97). Radiocarbon dates placed the site in the Woodland period dating from A.D. 1 – 900 (Hollimon and Owsley 1994: 351).

In 1983, the Hanging Valley Site in Harrison County, Iowa, was excavated (Tiffany et. al 1988: 219). The Hanging Valley locale was located in a small, northeast-to southwest trending drainage, and represented a stratified woodland burial that dated to A.D. 190 – 310 (Tiffany et. al 1988: 220). One individual recovered from this site showed evidence of scalping. The sex and age of this individual were not reported.

The earliest evidence of scalping is found in Archaic period sites. Scalping marks were observed at the Archaic Bahm Site in the Northern Plains (Williams 1994). Excavation of the Bahm Site revealed the remains of an adult cranium with cuts

consistent with scalping. A second juvenile skull was also recovered and this skull provided evidence of an unhealed scalping (Williams 1994: 97). The Bahm Site dated between 6000 B.C. and A.D. 500 (Hollimon and Owsley 1994: 351).

The earliest evidence of scalping from the Archaic period came from the Western Tennessee Valley (Smith 1997). Scalping evidence was recovered from the Kentucky Lake Reservoir, which consisted of seven sites that yielded human remains (Smith 1997: 241). All seven sites in the Kentucky Lake Reservoir dated to the late Archaic period circa B.C. 2500 – 500, with the addition of a middle Archaic component at the Eva Site, dated to B.C. 6000 – 3500 (Smith 1997: 244). Three individuals recovered from the Kentucky Lake Reservoir had characteristic patterns of cranial cuts consistent with scalping. All scalping victims were male. Burial 62 from the Eva Site, Burial 84 from the Kays Landing Site, and Burial 49 from the Big Sandy Site all had cuts that circumscribed the most superior aspect of the cranium in a pattern consistent with scalp removal (Smith 1997: 252).

## Women's Roles in Warfare

Anthropologists have viewed warfare as a predominantly male activity (Ewers 1994). The ethnographic literature stated that male status in many Native American cultures revolved around being a warrior. An in-depth look at the historic and archaeological record showed, however, that women played roles in warfare from prehistory through modern times (De Pauw 2000). According to De Pauw, women's roles in warfare could be grouped into four categories (2000: 17-18). The first category consisted of the classic women's roles including victim and instigator. The second

category encompassed all combat-support roles and was characterized as camp follower. The third category challenged historic gender constructs and was comprised of virago positions that involved women's active participation on the battlefield. The fourth category consisted of the androgynous warrior role where women were engaged in active hand-to-hand combat with enemy male warriors. Each category is explained below.

The classic women's roles of victim and instigator complied with the gender norms typically associated with warfare (De Pauw 2000). Women victims may have suffered torture, mutilation and death, all without violating normative gender norms, as long as they made no attempt at retaliation towards their attackers (De Pauw 2000: 18). Likewise, women's passive roles in battle were also implied when they were viewed as male dependants. When an enemy warrior failed to protect his dependants, his status was damaged and he was humiliated (De Pauw 2000: 18). Similarly, enemy women may be viewed as wicked because they supported enemy forces, and therefore, their mutilation, torture and death was justified (De Pauw 2000: 18).

Similar to victim categorization, instigator roles also conformed to normative gender roles in war. According to De Pauw, women acting as instigators played a more active role in warfare; however, they were still not active participants in battle. Women's instigator roles could be filled in a number of ways: women cheering men to death and valor on the battlefield, praying for the protection of their husbands and brothers, working magic for their warriors, etc. (2000: 19). While women would, in all cases, encourage their men to fight, women instigator roles did not include direct combat participation (De Pauw 200).

Camp followers could be either men or women that followed an army or group of warriors (De Pauw 2000: 19). Camp followers performed support functions necessary to sustain the warriors. Support functions included cooking, caring for the wounded, and preparing warriors for battle (De Pauw 2000: 19). Women acting as camp followers played an active role in warfare and this role complied with the normative gender roles associated with warfare. Although camp followers did not participate actively in warfare, they were a necessary component in contemporary and prehistoric wars.

Women filling virago roles were those that stood at the top of the power hierarchy (De Pauw 2000). Women could reach these superior positions either through inheritance or by establishing their prowess in battle. Virago roles ranged from the role of war leader to the role of guardian. As leaders, women may have had complete control of military power (De Pauw 2000: 21). As guardians, women played the typical male role of warrior. Guardians would actively defend their children when men were debilitated or detained (De Pauw 1000: 21).

The final role of women in war was the androgynous warrior role (De Pauw 2000: 23). Androgynous warrior roles were filled by women that took part in hand-to-hand combat with their male counterparts. Women in these roles could disguise their femininity or engage in battle openly as a woman (De Pauw 2000: 23-24).

Research into current and ethnographic literature provided evidence of women, in particular Native American women, filling all of the previously listed roles during times of war. Warfare played a significant role in Plains Indian life, and women's roles were both passive and active (De Pauw 2000; Ewers 1994). In 1832, George Catlin

wrote about a war story told to him by a Mandan Chief, Four Bears (Ewers 1994). The chief spoke of avenging a murder of one of his tribesmen, how he penetrated a village and killed two women in full view of the tribe (Catlin 1975: 154 as cited in Ewers 1994: 325). Although his victims were women, the murder was avenged, and he was entitled a victory to his credit. Interestingly, there is an earlier reference to the switch from killing and scalping women, to taking enemy women captive during the historic period (Ewers 1994: 325).

Members of the Piegan tribe believed that women had to be saved and adopted into their village to bolster their population in strength and number (Ewers 1994: 326). However, the killing of enemy women persisted in Plains warfare throughout the nineteenth century (Ewers 1994: 326). Preference for the killing or capture of enemy women appeared to have been dictated by tribal affiliation and location.

Despite the risk of death, scalping and capture, the ethnographic literature proved that not all women were content to stay home and pray for their warrior's homecoming (Ewers 1994: 328). In 1751, the governor of New France wrote in a letter to the French minister that the Comanche and Wichita tribes take their women into battle with them (La Jonquire 1908: 88 cited in Ewers 1994: 328). Literature dating to the 1860s and 1870s provided ample evidence of Native American women fighting alongside men against the United States Army (Powell 1981, 2: 964 cited in Ewers 1994: 328).

Women's level of involvement in warfare can also be determined through an analysis of gender roles in the Native American practice of scalping. Women's roles in scalping ranged from active participation in scalping to being the victim of scalping (Ewers 1994: 325). References in the ethnographic literature report that the Assiniboin,

Blackfeet, Sioux, Cree and Arikara celebrated the scalps of women and children as much as they celebrated the scalps of men (Denig 1930: 552 as cited in Ewers 1994: 325). Similarly, some Native American tribes valued the scalp of a woman more than that of a man because it signified the infiltration of an enemy village and therefore, indicated greater prowess and bravery in war (Bridges 1996: 27).

Marked differences of opinion have been expressed about the level of involvement that women have had in times of war. One Sioux anthropologist concluded that the warrior role was not an obligatory male role, but also an alternative female role that any woman could adopt (Albers and Medicine 1983: 274-275 as cited in Ewers 1994: 329).

## Summary

Scalping is a reliable indicator of interpersonal violence and warfare because it leaves an identifiable pattern of marks on the human cranium. According to historic accounts, scalping was recorded as early as 1540 in North America, and was observed as late as the 19$^{th}$ century. From the previous discussion, it is evident that scalping was actively practiced by aboriginal inhabitants of North America, as it was throughout the rest of the world. Although scalping may have been encouraged through the establishment of European bounties, it was not introduced to Native Americans upon European contact. However, the practice reached its climax with bounties for both Native American and European scalps. While bioarchaeologists have viewed warfare as a male activity, the ethnographic literature and the archaeological record indicated that scalping was also practiced upon women and children.

# CHAPTER III

## ARCHAEOLOGICAL BACKGROUND OF THE CROW CREEK SITE

The previous chapter provided both ethnographic and archaeological evidence for scalping in North America. The archaeological record presented conclusive evidence that scalping was a Native American tradition that was practiced long before the arrival of Europeans and also suggested that no man, woman, or child was protected from this Native American tradition. The Crow Creek Site allows anthropologists to analyze whether or not there was a relationship between an individual's gender and/or age and Native American scalping practices. This chapter describes the Crow Creek Site, discusses the Nebraska State Historical Society's excavation procedures and conclusions, outlines the discovery and University of South Dakota's excavation of the human bone bed, and discusses the osteological implications of this particular archaeological sample.

The Crow Creek Site is "arguably the most famous archaeological site on the Northern Plains" (Bamforth 2007 and Nepstad-Thornberry: 153). The site has played a major role in the reconstruction of Native American past, particularly violence on the Plains (Willey 1990). The Crow Creek Site lay on the east bank of the Francis Case Reservoir, 10.5 miles north of Chamberlain, South Dakota (Kivett and Jenson 1976: 1; Willey 1990: 3; Figure 1). The site was a large, well-fortified village resting on the first and second terraces above the confluence of the Crow and Wolf creeks (Figure 2).

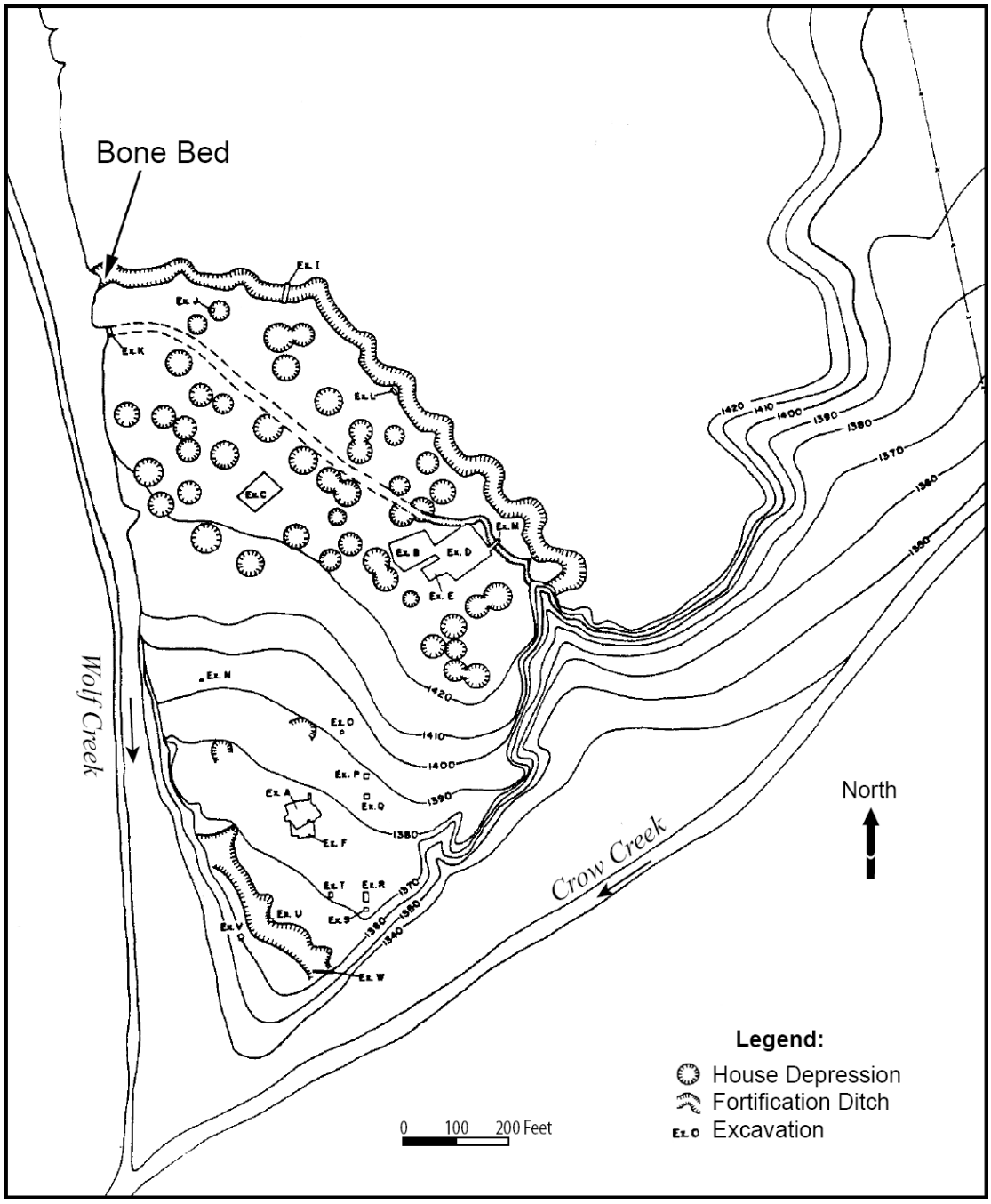



Figure 2. The Crow Creek Site located at the confluence of Wolf and Crow Creeks. The human bone bed is located at the northwest corner of the site. Map modified from Kivett and Jensen (1976: 2, Figure 1).

Source: Adapted from Kivett, Marvin F., and Richard E. Jensen, 1976, Archaeological Investigation at the Crow Creek Site (39BF11). Nebraska State Historical Society Publications in Anthropology 7. Reproduced with permission.

Human skeletal remains were discovered at Crow Creek in May of 1978 during a South Dakota Archaeological Society tour of the site, led by State Archaeologist Robert Alex (Willey and Emerson 1993: 227). The Corps of Engineers, Omaha District and the Crow Creek Sioux Tribal Council became aware of the discovery when Alex initiated efforts to recover and document the remains (Willey and Emerson 1993: 227). Alex also contacted the local coroner and the Registry of Historic Landmarks to request permissions to excavate the site. With Larry Zimmerman as principal investigator, Thomas Emerson as field director, and P. Willey and John B. Gregg as consulting osteologists, a contract was awarded to the University of South Dakota and site excavation commenced (Willey and Emerson 1993: 227).

Earlier excavation of the Crow Creek Site in the 1950s revealed the presence of two prehistoric aboriginal occupations (Kivett and Jensen 1976). The earlier component dated to the Initial Middle Missouri Variant, approximately 12$^{th}$ century A.D. The later 14$^{th}$ century Wolf Creek component belonged to the Initial Coalescent Variant (Kivett and Jensen 1976: 77-78). All skeletal material used in this study was associated with the later cultural component, the Initial Coalescent Variant. Excavation and surface assessment of the site revealed a settlement of at least 50 dwellings, including houses, middens, and two fortification ditches. The fortification ditches were used as defensive structures and support the hypothesis that aggression was anticipated at this site.

Excavation of the inner fortification ditch revealed an abundance of cultural material and refuse (Kivett and Jensen 1976: 9). The material was attributed to the Wolf Creek component dating into the 14$^{th}$ century. Archaeologists believed that the inner fortification ditch was constructed during the earliest habitation of the Wolf Creek

component and was later abandoned and used as a refuse dump when the threat of violence subsided (Willey and Emerson 1993: 230-231). Associated bastions and palisades support the hypothesis that the inner fortification ditch was constructed as a defensive mechanism (Kivett and Jensen 1976: 8). However, the outer fortification ditch lacked defensive palisades (Kivett and Jensen 1976: 8).

It has been suggested that a village expansion led to the construction of the outer fortification ditch and the inner ditch's subsequent use as a refuse dump (Willey and Emerson 1993: 230-231). This hypothesis was supported by 12 house depressions lying between the inner and outer ditches. After initial expansion of the village, the threat of danger reappeared and villagers constructed the outer ditch to surround the perimeter of the village (Bamforth and Nepstad-Thornberry 2007: 154). Unfortunately, the villagers were massacred before the completion of the outer fortification palisade (Willey and Emerson 1993: 231).

After exposure above ground, the bodies of the victims were gathered and interred at the western end of the outer fortification ditch (Willey 1990: 130). Surface exposure was suggested by the presence of taphonomic indicators including puncture marks and broad grooves, indicative of canid scavenging (Willey 1990: 131). The human remains were most likely exposed to the elements for more than a few days, but less than several months (Willey 1990: 179). It was also suggested that the massacre and exposure occurred during cold temperatures because the human remains lacked fly pupae casings (Willey and Emerson 1993: 179).

Human remains were recovered from two stratigraphically separated bone beds, upper Bone Bed A, and lower Bone Bed B (Willey and Emerson 1990: 7). A hard-

packed layer of clay, approximately 30cm thick, lay between the two bone beds. Lower Bone Bed B contained the majority of the human remains, and the upper Bone Bed A consisted of a thin scattering of disarticulated human remains and five bison scapula hoes (Willey and Emerson 1993: 239). The bison scapula hoes were likely tools used to bury the dead and subsequently discarded. It was suggested that Bone Bed A represented a secondary interment of bones following a scavenger disturbance of Bone Bed B (Willey 1990: 180). The clay was most likely laid down at the time of the secondary interment to discourage scavenging. It is also possible that Bone Bed A represented a second recovery of bones after the bones from the first recovery had been interred in the lower of the two bone beds (Willey 1990: 181).

The presence of the clay layer suggested that Bone Bed B was a deliberately placed burial area (Willey and Emerson 1993: 237). The closest source of clay was the floodplain located at the bottom of the bluff. It would have been a laborious task to bring the clay from the floodplain. Therefore, this task was likely done by surviving villagers and family members of the victims who returned to bury their dead (Willey and Emerson 1993: 237).

It was also possible that the villagers were buried by their attackers, because the burial pattern was consistent with mortuary practices associated with mass deaths resulting from genocide (Komar 2008). The use of a pre-existing feature and the commingling of remains were factors consistent with a mass grave generated by an unaffiliated people (Komar 2008: 130). However, scavenging marks on the skeletons suggested they were exposed after death. It was unlikely that the attackers remained in

the village with the decaying human remains or returned to bury the dead (Willey and Emerson 1993).

Following bone bed excavation, the human skeletons were prepared for analysis at the University of South Dakota Archaeology Laboratory (Willey 1990: xviii). One of the most crucial laboratory assessments was determination of the minimum number of individuals killed at the time of the massacre. Elements were inventoried by minimum and maximum counts. The greatest minimum count ($n$ = 486) was from the right temporal (Willey 1990: 14). The least minimum count ($n$ = 91) was from the left radii. The difference between the greatest and least minimum counts was attributed to variation in the size, density, and proximity to the torso of each skeletal element (Willey 1990: 14). Subsequent research proved that bone mineral density is an important variable in bone preservation and recovery in archaeological contexts (Willey et al. 1997: 527). In general, denser elements and denser sections of bone are more likely to survive and therefore provide a more accurate measure of element presence in an archaeological site. Likewise, sex and age differences in bone mineral density may affect the survival of skeletal elements (Willey et al. 1997: 527).

There was also a discrepancy in the minimal element count when assessing the remains according to age (Willey 1990: 17). The greatest discrepancy between the counts of the temporals and the long bones was found in the number and proportion of sub-adult elements recovered. Adult elements were represented more completely than the elements from younger individuals. Several explanations were posited for this discrepancy. The higher proportion of adult elements may have resulted from the scavenging and destruction of younger, smaller bodies (Willey 1990: 17). After burial,

smaller remains may have been more highly fragmented. Finally, misinterpretation of epiphyseal fusion of long bone elements may have resulted in some individuals being classified incorrectly as adults. Following osteological procedures at the time of analysis, if all observable epiphyses of a long bone were fused, the bone was classified as belonging to an adult (Willey 1990: 19).

The paleodemography of the Crow Creek Site is also worthy of discussion. During analysis of the human remains, differences in the proportion of each sex based on age were noted. There appeared to be a relative deficit of young adult females and old adult males present in the human bone bed (Willey 1990: 49-50). At the time of the massacre, Crow Creek was estimated to be occupied by at least 831 people (Willey 1990: 61). During the Crow Creek massacre, villagers were attacked and their houses burned. Physical anthropologists counted a minimum of 486 persons represented in the human bone bed. The remains of up to 50 individuals remained unexcavated, in the fortification ditch (Zimmerman and Alex 1981a: 6). Therefore, roughly 300 individuals, primarily young females and old adult males, were unaccounted for in the human bone bed (Zimmerman and Alex 1981a: 6).

The apparent lack of young females may be attributed to a number of factors. First, fewer females may have been recovered due to their being taken captive by the raiders (Willey 1990: 50). Second, when the Crow Creek villagers were overcome, men may have tried to delay the attackers, providing women and children a chance at escape (Willey 1990: 50). Finally, there is also the possibility that women were killed, but not gathered for interment.

The relative absence of older adult males may be explained by them escaping from the village and massacre (Willey 1990: 50). As females, there is the possibility that older males were killed but not recovered from the site. It is also possible that the paleodemography of the site is an accurate representation of the proportion of older males in the village at the time of the massacre. If males were subject to higher levels of mortality than the females during the period preceding the massacre, fewer older males would have been present in the village at the time of the massacre (Willey 1990: 50).

Laboratory analysis of the human remains recovered from Bone Bed B also provided insight into the events surrounding the massacre. There were several sources of evidence that indicated the victims were the Initial Coalescent occupants of the Wolf Creek component. First, all recovered cultural materials were diagnostic of the Initial Coalescent Variant (Willey and Emerson 1993: 238-239). A series of dendrochronology dates, C-14 dates and radiocarbon determinations dated the massacre to A.D. 1325 (Willey 1990: 1). The Initial Coalescent peoples were present at the Crow Creek Site by A.D. 1300. Crow Creek craniometric affinities, determined from relatively complete skulls, were most similar to St. Helena and early Arikara samples (Willey 1990: 85). Previous research suggested that similarities observed between the Crow Creek sample and the St. Helena samples were a result of interaction between the two groups and not an ancestorial-descendant relationship (Willey 1990: 85). When comparing the Crow Creek sample to early Arikara samples, however, it was observed that the Arikara samples were more recent. It was suggested that the Arikara samples may have been Crow Creek descendants (Willey 1990: 85).

Mutilations were observed on many of the skeletal remains from Crow Creek. Skulls and mandibles showed signs of violence, including cuts, fractures and evulsion fractures (Willey 1990: 95-105). In general, cuts observed on the cranial vault were interpreted as scalping; however, the frequency of scalping was based solely on the presence of cuts on the frontal (Willey 1990: 96; Figure 3). In Bed A, 17 (94.4%) of the


Figure 3. Scalping cuts on the frontal of a juvenile Crow Creek massacre victim.

frontals displayed cut marks, and one (5.6%) may have had cut marks (Willey and Emerson 1993: 254). In Bed B, 354 (89.2%) of the frontals had cut marks and 24 (8.1%) may have had cut marks. Also, two skulls lacking cut marks showed osseous remodeling attributable to survival following scalping (Willey and Emerson 1993: 254; Figure 4). The presence of scalping survivors indicated that violence was not limited to the Crow Creek massacre, but was longer term. In all, nearly 90% of the crania from Crow Creek

Figure 4. Superior view of a cranium of a scalping survior with periosteal reaction and bone remodelling concentrated on the right parietal and frontal.

showed evidence of scalping. In actuality, the percent was higher because the scalping survivors were excluded from this count, and it is possible to scalp an individual and leave no marks on the skull (Willey 1990: 113-114). The frequency of scalping calculated from cuts on the frontals was, therefore, a conservative estimate of the number scalped.

Osteological analysis indicated signs of severe malnourishment on the bones of Crow Creek villagers (Symes 1983). Seventy-five percent of the tibiae and 90% of the humeri recovered from the site had Harris lines which are indicators of malnutrition (Bamforth 1994: 106; Zimmerman and Gregg 1986: 197). Active lesions from cribra orbitalia were also observed on a large number of individuals (Zimmerman and Bradley 1993: 217). This rate of malnutrition suggested that the Crow Creek massacre resulted from subsistence stress. Middle Missouri villages from this time period often suffered major region-wide drought (Bamforth 2006: 68). Crow Creek villagers were probably in

the midst of a drought at the time of the attack because violence in the region during the precontact period had strong correlations with periods of severe drought (Bamforth 2006: 93). It has been hypothesized that Crow Creek was massacred for access to its potential resources (Zimmerman and Bradley 1993: 218).

The raiders of the Crow Creek Site remain anonymous (Willey 1990: 178). It was suggested that the Crow Creek attackers were the ancestors of the Mandan and possibly the Hidatsa tribe (Bamforth 1994: 108). However, all skulls recovered from the site were craniometrically similar to early Arikara samples (Willey 1990: 85). Therefore, if the skulls of the raiders were included with their victims, the two were morphologically indistinguishable, suggesting the attackers were also Arikara (Willey 1990: 179). It is also possible that no raiders were placed in the bone bed.

## Summary

The Crow Creek Site has played a major role in the reconstruction of Native American prehistory, particularly violence on the Plains. Excavation of the site revealed the remains of at least 486 people killed in a violent raid around A.D. 1325. Crow Creek craniometric affinities were most similar to the St. Helena and early Arikara samples and the human remains showed indication of severe malnourishment at the time of the massacre. Of particular importance, the site yielded evidence of multiple forms of trophy taking, including scalping which was observed on more than 90% of the recovered crania. 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 Native American scalping practices.

# CHAPTER IV

# EXPECTATIONS

In large-scale raids, such as the Crow Creek massacre, it has been hypothesized that the aggressors often dehumanize their victims (Chacon and Dye 2007; Kelly 2000; Willey 1990; Willey and Emerson 1993). Crow Creek villagers were most likely butchered as if they were large game animals. At some level, however, the victim's humanity was acknowledged by the attackers and this may be observed in the different treatment of males and females. With nearly 90% of the Crow Creek crania showing evidence of scalping, the site lends itself to the analysis of patterns. The research presented here tests the hypothesis that female crania show evidence of a greater number of cut marks and cut marks that extend a longer distance across the frontal bone than those of male victims. For the purposes of this study, the frontal distance and total number of cut marks are used as an indication of the brutality against the scalping victim. A larger number of cut marks and cut marks that span a greater distance across the frontal bone suggest that the attackers were more brutal and spent more time mutilating those victims.

In addition to analyzing treatment between the sexes, this study assesses brutality among age groups. All adult victims of the Crow Creek massacre are assigned to one of three age groups: young adult (20-25 years), middle adult (27.5-37.5 years), and old adult (40+ years). The research presented here tests the hypothesis that the greatest

number of cut marks and greatest breadth of cut marks are observed on young adult males and young adult females. Because young adult males were most apt to participate in battle, the attackers should direct the greatest level of violence against this sex and age group. According to the ethnographic literature, Arikara women were viewed as beasts of burden and served the function of laborer during the protohistoric period (Holliman 2000: 27). Arikara women were most likely viewed as beasts of burden throughout the prehistoric period as well. Young adult females should show evidence of an increased number of cut marks and cut marks that extend a greater distance across the frontal bone. This increased brutality signifies dehumanization of young adult females during the Crow Creek massacre.

The final hypothesis this study tests is whether males and females and individuals of different adult age groups were selectively placed in the fortification ditch. While it is unknown who buried the Crow Creek massacre victims, it has been suggested that the village survivors, or affiliated kin members, returned to bury their dead (Willey 1990:179). Because the burial took place after the catastrophic events of the massacre, it was hypothesized that there was no preferential placement of males and females or members of different adult age groups in the bone bed. With the remains of over 486 people to bury – men, women and children of all ages – it is likely that the survivors completed the burial process expeditiously rather than taking time to relegate specific burial locations to particular village members. If the burial process had not been rushed, or the corpses had remained more recognizable, increased consideration may have been given to the burial location of each individual, specifically regarding the person's age and/or sex as an indicator of that person's social status.

# CHAPTER V

# MATERIALS AND METHODS

Much research has been devoted to the analysis of both historic and prehistoric cases of scalping. No research, however, has been directed towards the analysis of sex roles in Native American scalping practices. This study provides an assessment of how an individual's sex influenced the treatment of Crow Creek massacre victims, particularly whether or not female scalping victims experienced higher levels of brutality than their male counterparts did. Data from the Crow Creek victims and the current study methods are outlined in this chapter. A discussion of the descriptive and inferential statistics used to evaluate the research hypothesis follow.

## Materials

Excavation of the Crow Creek Site was performed by the University of South Dakota from August to December 1978, with Larry Zimmerman as the principal investigator, Thomas Emerson as field director, and P. Willey and John B. Gregg acting as consulting osteologists (Willey 1990: xvii). The skeletal remains were processed at the University of South Dakota, Vermillion, where data collection and skeletal analyses were performed. In May 1979, remains were repatriated to the Crow Creek Sioux Tribe and reburied on August 10, 1981 (Willey 1990: xviii).

All data used in this study were drawn from the age and sex forms recorded by Mark Swegle in 1979 and the scalping mutilation datasheets recorded by an anonymous investigator at the University of South Dakota. The Crow Creek crania included in this study were those complete enough for an analysis of scalping manifestations to be performed. In all, this study consisted of 77 aged and sexed adult crania. The author did not perform any original observations for this study because all skeletal material from the Crow Creek Site was repatriated in 1979 and reburied in 1981.

One scalping mutilation datasheet was used for each cranium and the following information was recorded: skull number, box-bag number, and distance from bregma to lambda. A sample scalping datasheet is provided (Appendix 1). Each skull had been assigned a skull number and a box and bag number while at the University of South Dakota. All scalping measurements were recorded by cranial vault bone: frontal, left and right parietals, and occipital. For the frontal, the following information was recorded: cut marks extend to the coronal suture (yes or no) on the left and right side of the bone, the distance from bregma to the left extent of the cuts, angle from bregma to the left extent of cuts, distance from bregma to right extent of cuts, angle from bregma to right extent of cuts, and total number of cuts. For the parietals, the following information was recorded: distance from bregma to the anterior extent of the cuts, angle from bregma to the anterior extent of cuts, distance from bregma to the posterior extent of cuts, angle from bregma to the posterior extent of cuts, and total number of cuts on the left and right parietals. For the occipital, the following information was recorded: cut marks extend to the lambdoidal suture (yes or no) on the left and right side of the bone, distance from lambda to the left extent of cuts, angle from lambda to the left extent of cuts, distance from lambda to right

extent of cuts, angle from lambda to right extent of cuts, and total number of cuts on the occipital. Descriptions were provided of cuts observed on the left and right temporal bones and space was provided for additional remarks. Data from the scalping mutilation sheets were compared to the notes taken by Willey. Notes recorded by Willey included an assessment of location for cut marks observed on each cranial vault bone. Location of cuts recorded by the anonymous data collector and Willey were compared (Appendix B).

## Methods

During excavation, each skull's location in the bone bed was recorded by grid system. Spatial distribution within the bone bed was recorded based on east-west and north-south excavation units divided into one meter squares (Willey 1990: 6). The grid was numbered in an east-west orientation and lettered north-south. After the completion of the excavation and before the 1979 repatriation, each cranium was aged, sexed, and assessed for mutilations.

To assess sex of adult skulls, the following criteria were used: general size, facial robusticity, mastoid size, occipital robusticity, orbital margin shape, and brow ridge size (Swegle 1979). Variables were equally weighted when making the sex determination, except for orbital margin shape, which covaried with brow ridge size and was not weighted as heavily (Swegle 1979). Sexing was double-checked by seriating crania, ranging from the most gracile, feminine cranium to the most robust, masculine cranium. The first sex assessment was compared with the second sorted sex determination. When a difference between the two assessments occurred, the skull was re-examined and a final decision made (Swegle 1979).

Sutural and dental observations were used to estimate age at death (Swegle 1979). Dental attrition was emphasized more than suture closure, especially when the teeth showed minimal wear or when the sutures were all or nearly all closed. When age was estimated using suture closure, only endocranial surfaces were employed (Swegle 1979).

Dental wear was the second method for estimating age at death. Dental wear was scored according to a system proposed by Brothwell (1963). Age estimates, however, did not follow Brothwell, but were instead based on the Swegle's (1979) standards. Based on the midpoint of the age range, each skull was classified into one of three age groups: young adult (20-25 years), middle adult (27.5-37.5 years) and old adult (40+ years). There were no individuals within the sample with an age range midpoint of 26.0, 27.0, 38.0, or 39.0. Age categories were determined by applying a frequency test to the combined male and female data in SPSS and dividing scalping victims into three categories according to the interquartile split, with 25% of individuals falling into the young age group, 50% of individuals in the middle adult age group and 25% of individuals falling into the old adult age group. Age categories were determined according to the interquartile split to ensure adequate sample sizes in each age category.

Of the 77 cranium used in this study, 38 (49.4%) were male and 39 (50.6%) were female (Table 1). A binomial test was applied to the sample employing SPSS (2007). A binomial test is an exact test of the statistical significance of deviations from a theoretically expected distribution of observations into two categories. A 50:50 test proportion was selected for the binomial test, and no statistically significant difference was observed between males and females (Test proportion = 0.50, p=1.00). The test

results indicated that the sexes were represented equally in the scalping data set. Of the 38 males, seven individuals were young adults (20-25 years), 19 middle adults (27.5-37.5 years), and 12 old adults (40+). For the 39 female crania, 12 were young adults, 20 middle adults and 7 old adults. The sample size of each age category was roughly equivalent because scalping victims were grouped according to an interquartile split (Table 1).

Table 1. Sex, number, and age group of Crow Creek scalping sample.

| | MALE | FEMALE |
|---|---|---|
| Young Adult (20-25 years) | 7 | 12 |
| Middle Adult (27.5-37.5 years) | 19 | 20 |
| Old Adult (40+ years) | 12 | 7 |
| Total | 38 | 39 |

For each cranium in the study, the following data were drawn from the scalping forms: total cuts on the frontal, total cuts on the left parietal, total cuts on the right parietal, total cuts on the occipital, distance from bregma to left extent of cuts on the frontal, distance from bregma to right extent of cuts on the frontal. The scalping data were then matched with the age and sex data based on skull numbers. All data were entered into SPSS 16.0 and two additional calculations were performed by the author: total number of cut marks (sum of all cut marks from the frontal, parietals, and occipital) and frontal distance. To estimate the breadth of cut marks across the frontal the Cosine

Rule (a^2 = b^2+c^2-3bcCosA) was employed. The distance that cut marks spanned the frontal was calculated as an approximation of the size of scalp removed.

Statistical analyses were performed using SPSS 16.0 (2007). Descriptive statistics for cut marks included mean number of cut marks by cranium, mean number of cut marks on the frontal, mean breadth of cut marks across the frontal, and their standard deviations. The minimum, maximum and range were also determined for the total number of cut marks by cranium, number of cut marks on the frontal, and breadth of cut marks on the frontal. The frontal was assessed separately because the frontal is the cranial bone with the greatest prevalence of cut marks. Of the 660 adult cranial bone fragments with evidence of scalping, cuts were observed on 259 frontals, 251 parietals, 83 temporals, and 67 occipitals (Willey 1990: 108).

Independent sample t-tests were used to examine sex differences in total number of cranial cut marks, number of cut marks on the frontal, and breadth of cut marks across the frontal. A t-test assumed that the data were normally distributed and the variances of the samples were comparable. An independent sample t-test can be used to assess whether two population means were equal based on the results of two independent samples. The goal of the analysis was to test whether the number of cuts observed by sex and age and the distance the cuts spanned on the frontal was similar. When an assumption of the independent samples t-test was not met (the distributions of the two samples were not normal), a different statistical test, the Mann-Whitney Test, was applied.

The Mann-Whitney test was used as an alternative to the independent-samples t-test. Because the Mann-Whitney test is a nonparametric test, it is less likely than a parametric independent-samples t-test to find statistically significant differences between

two samples when differences exist. The Mann-Whitney test was only applied when the distributions of the two samples were not normal. This assessment tested the null hypothesis that the population means are the same for both sexes. The Mann-Whitney test ranks the combined data values for the two groups, and then finds the average rank in each group. The Mann-Whitney test calculates a p-value for each variable based on rank.

The next statistical analysis performed on the Crow Creek dataset was an analysis of variance (ANOVA). ANOVA examines the variability of samples among three or more groups. ANOVA was applied to Crow Creek age groups to determine if the means of the three age groups were similar. Three ANOVA tests were performed by age groups using the following variables: total number of cuts, number of cuts on the frontal, and breadth of cuts across the frontal. Results of ANOVA indicated if more variance was observed within the groups or among the groups. ANOVA can only show, however, whether a difference existed between groups, but did not indicate which groups were different from other groups. If the number of cuts and the breadth of cuts differed among age categories, a second test was applied, a Bonferroni test. The Bonferroni test demonstrated which age groups differed in number of cut marks.

The fifth statistical test performed on the Crow Creek database was a Factorial ANOVA. Factorial ANOVA was used to study the effects of two or more treatment variables. Factorial ANOVA was utilized to assess whether or not there was a relationship between the two independent variables (age and sex), and the dependent variables (total number of cuts, cuts on the frontal, and breadth of cuts on the frontal). Because Factorial ANOVA was the most robust statistical test employed, it was the most likely to indicate if scalping patterns differed by age and sex.

To determine if a relationship existed between age categories (young, middle, old), total number of cut marks, and total breadth of cut marks on the frontal, regression and correlation analyses were applied. The total number of cuts and breath of cuts were plotted against the individuals' age, and Pearson's r specified the relationship between these two variables. A Pearson's r value of 0.3 and less was a weak relationship, values between 0.3 and 0.6 are moderate, and values greater than 0.6 signified a strong relationship. The $r^2$ value indicated the amount of variation in the number of cut marks and breadth of cut marks that is explained by age (Drennan 2004: 215). The linear regression equation is calculated using the equation $y= a+bx$, where x is the independent variable, and $y$ is the dependent variable, $b$ is the slope of the line, and $a$ is the y-intercept (Drennan 2004: 214). A Pearson's r value is calculated separately for each sex to assess the relationship between age and total number of cuts per cranium, number of cuts per frontal bone, and breadth of cuts across the frontal bone.

The final statistical analysis performed on the Crow Creek dataset was a chi-square goodness-of-fit test to determine if a statistically significant relationship existed between sex and burial location within the burial pit. Chi-square tests also determined if there was a relationship between burial location and age of the Crow Creek massacre victims. A chi-square goodness-of-fit test can be applied to any univariate distribution that has a cumulative distribution function and will determine if a sample of data come from a uniform distribution. Chi-square goodness-of-fit tests were applied separately for the analysis of sex and the analysis of age. The relationship between sex and age and burial location was not calculated because the sample size was too small and the degrees

of freedom too large for accurate interpretation of the chi-square test results when the sample was divided by sex and age group.

## Summary

This study evaluates the hypothesis that sex and age groups were treated differently during the Crow Creek massacre. The study's primary focus is on cuts which are used as an indicator of scalping and brutality against Crow Creek victims. The breadth of cut marks across the frontal bone, the number of cut marks per cranium, and the number of cut marks on the frontal are used to indicate violence against the scalping victim. Comparisons of total number of cut marks and breadth of cut marks are made using independent sample t-tests, ANOVA, Factorial ANOVA, and regression and correlation analyses. To determine if a relationship exists between an individual's age and sex and location in the bone bed chi-square goodness-of-fit tests are applied to the data.

# CHAPTER VI

# RESULTS

With nearly 90% of the Crow Creek Bone Bed frontals displaying cuts, the skulls lend themselves to the analysis of prehistoric scalping. The results of statistical analyses performed on scalping data are reported in this chapter. First, descriptive statistics are presented for cut marks, including the means and standard deviations of total number of cuts per cranium, number of cuts on the frontal, and breadth of cuts across the frontal. The minimum, maximum and range are also reported for each variable. Only skulls with evidence of scalping mutilations are considered in the study. The results of inferential statistical comparisons by sex and age follow.

## Descriptive Statistics

This section presents descriptive statistics of the Crow Creek scalping data. Raw data used in descriptive statistics are presented in Appendix 3. Total number of cuts could be determined for 70 crania from the scalping datasheets. For that 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 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 62 crania. Of these 62 crania, the mean breadth of cuts on the frontal was 103.90, standard deviation was 36.24mm, and variance was 131.42. The minimum cut distance was 3.40mm and the maximum was 157.58mm with a range of 154.18mm.

## Inferential Statistics

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 2, Figure 5; $t$ = -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.

Table 2. Independent samples t-test results for total number of cuts on Crow Creek male and female crania.

| SEX | *N* | $\bar{x}$ | T-VALUE | DEGREES OF FREEDOM | P-VALUE |
|---|---|---|---|---|---|
| Total | 70 | | -2.390 | 68 | 0.020 |
| Male | 34 | 13.15 | | | |
| Female | 36 | 23.89 | | | |

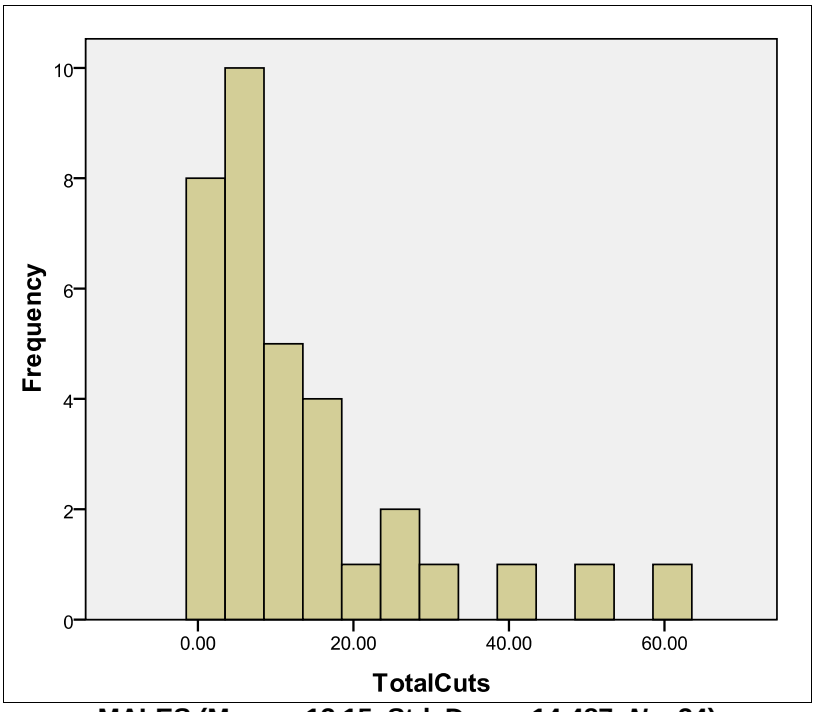


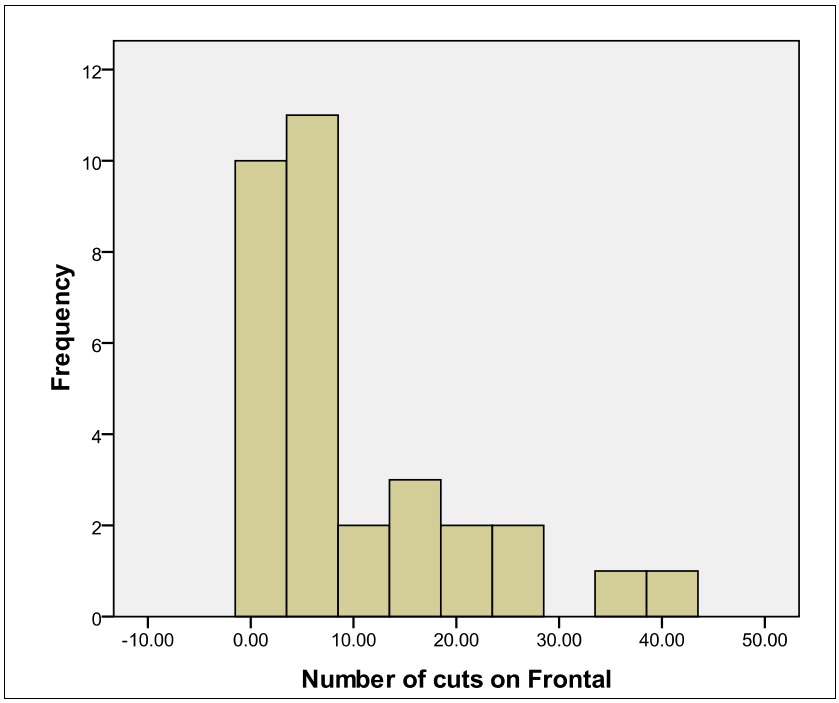

Figure 5. Distribution of total number of cuts for Crow Creek male and female crania.

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 of male and female victims existed (Table 3, Figure 6; $t$ = -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 of male and female scalping victims (Table 4, Figure 7; $t$ = -2.382, $df$ = 60, $p$ = 0.020 Levene's Test assuming equal variances). The mean frontal cut breadth was greater in females than males.

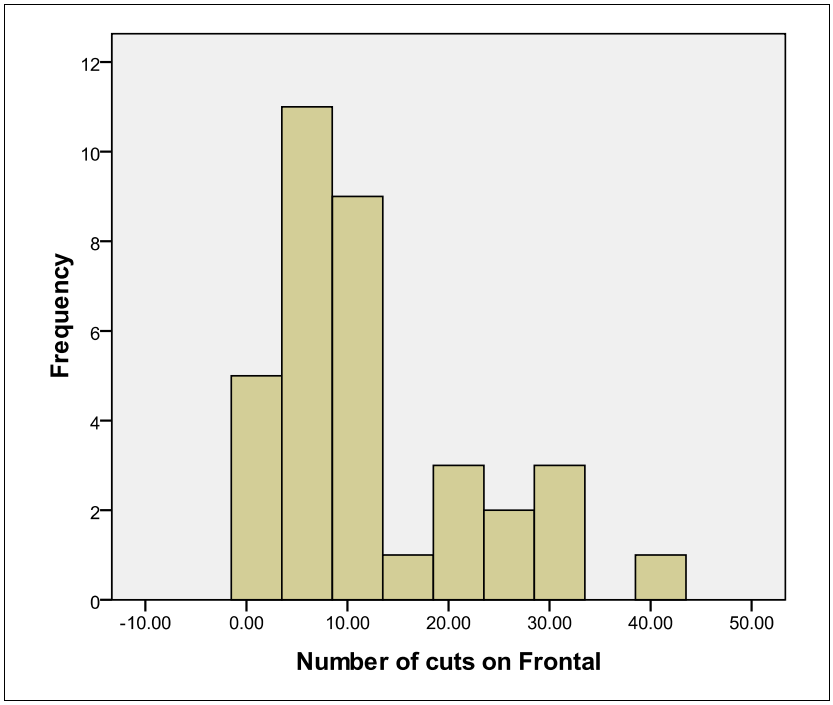
Table 3. Independent samples t-test results for number of cuts on Crow Creek male and female frontals.

| SEX | *N* | $\bar{x}$ | T-VALUE | DEGREES OF FREEDOM | P-VALUE |
|---|---|---|---|---|---|
| Total | 67 | | -1.189 | 65 | 0.239 |
| Male | 32 | 9.94 | | | |
| Female | 35 | 12.91 | | | |

To verify the results of the independent sample t-tests, Mann-Whitney U tests were applied to the data. The first Mann-Whitney U test assessed the relationship between sex and total number of cuts, and verified that there was a statistically significant relationship between sex and total cuts (Table 5, Figure 5; $z$ = -2.782, $p$ = 0.005). Female crania had a significantly greater number of total cuts than male crania. The second Mann-Whitney U test assessed the relationship between sex and number of cuts on the frontal. The results of this test verified that there was no statistically significant relationship between sex and number of cuts on the frontals of male and female scalping




MALES (Mean = 9.94, Std. Dev. = 10.061, *N* = 32)




FEMALES (Mean = 12.91, Std. Dev. = 10.43, *N* = 35)

Figure 6. Distribution of the number of cuts on the frontals of Crow Creek males and females.

Table 4. Independent samples t-test results for breadth of cuts on Crow Creek male and female frontals.

| SEX | *N* | $\bar{x}$ | T-VALUE | DEGREES OF FREEDOM | P-VALUE |
|---|---|---|---|---|---|
| Total | 62 | | -2.382 | 60 | 0.020 |
| Male | 30 | 92.99 | | | |
| Female | 32 | 114.13 | | | |

victims, however, the p value approached significance (Table 6, Figure 6; $z$ = -1.586, $p$ = 0.113). The third Mann-Whitney U test evaluated the relationship between sex and the breadth of cuts on the frontal. The results of this test refuted the results of the Independent samples t-test, and showed that there was not a statistically significant relationship between sex and the breadth of cuts on the frontal (Table 7, Figure 7; $z$ = -1.662, $p$ = 0.096).

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, analysis of variance (ANOVA) tests were applied. The first ANOVA evaluated the relationship between age and total number of cuts by cranium. The test results showed no statistically significant relationship between age and total cuts (Table 8, $F$ = 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

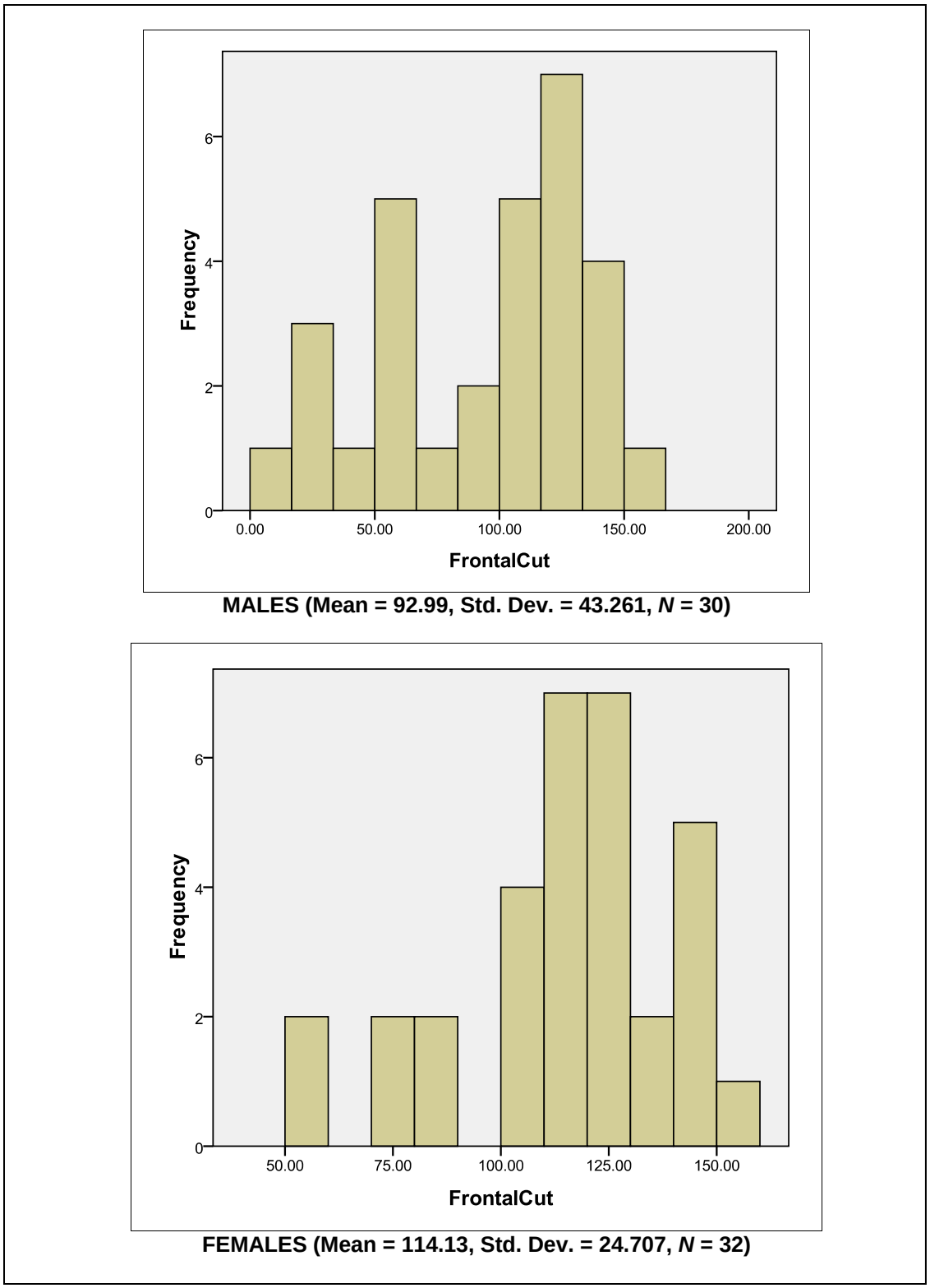



Figure 7. Distribution of frontal cut breadths of Crow Creek males and females.

Table 5. Mann-Whitney U test results for total number of cuts on Crow Creek male and female crania.

| SEX | *N* | MEAN RANK | Z -VALUE | MANN-WHITNEY U | P-VALUE |
|---|---|---|---|---|---|
| Total | 70 | | -2.782 | 375.50 | 0.005 |
| Male | 34 | 28.54 | | | |
| Female | 36 | 42.07 | | | |

Table 6. Mann-Whitney U test results for number of cuts on Crow Creek male and female frontals.

| SEX | *N* | MEAN RANK | Z -VALUE | MANN-WHITNEY U | P-VALUE |
|---|---|---|---|---|---|
| Total | 67 | | -1.586 | 434.00 | 0.113 |
| Male | 32 | 30.06 | | | |
| Female | 35 | 37.60 | | | |

Table 7. Mann-Whitney U test results for cut breadths on Crow Creek male and female frontals.

| SEX | *N* | MEAN RANK | Z -VALUE | MANN-WHITNEY U | P-VALUE |
|---|---|---|---|---|---|
| Total | 62 | | -1.662 | 362.00 | 0.096 |
| Male | 30 | 27.57 | | | |
| Female | 32 | 35.19 | | | |

Table 8. ANOVA results for total number of cuts by age.

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

between age and the number of cuts on the frontal bone (Table 9; $F = 1.095$, $df = 2,67$, $p = 0.340$).

Table 9. ANOVA results for frontal cuts by age.

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

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 10; $F = 4.362$, $df = 2,61$, $p = 0.017$). The results of the ANOVA show that there was a statistically significant difference in the mean number of frontal cuts among the three adult age groups. A post hoc Bonferroni test indicated 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 ($p = 0.036$).

Table 10. ANOVA results for frontal breadth by age.

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

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 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 assessing the total number of cuts on the cranium (Table 11). The test showed that the relationship between the total number of

Table 11. 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 |

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 12). The test showed the relationship between the number

Table 12. Factorial ANOVA results for sex, age and interaction by number of frontal cuts.

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

of cuts on the frontal of males and females was not statistically significance ($F$ = 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). The test showed a statistically 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). From the test results, 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

Table 13. Factorial ANOVA results for sex, age and interaction by breadth of cuts on the Crow Creek frontals.

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

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.

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 14, $r$ = -0.498, $p$ = 0.004). This relationship indicated that 24.8 percent of the variability in male frontal cut

Table 14. 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 |

breadths was explained by age (Figure 8, $r^2 = 0.248$). This relationship was statistically significant and the breadth of the frontal cut was influenced by the age of the male scalping victims.

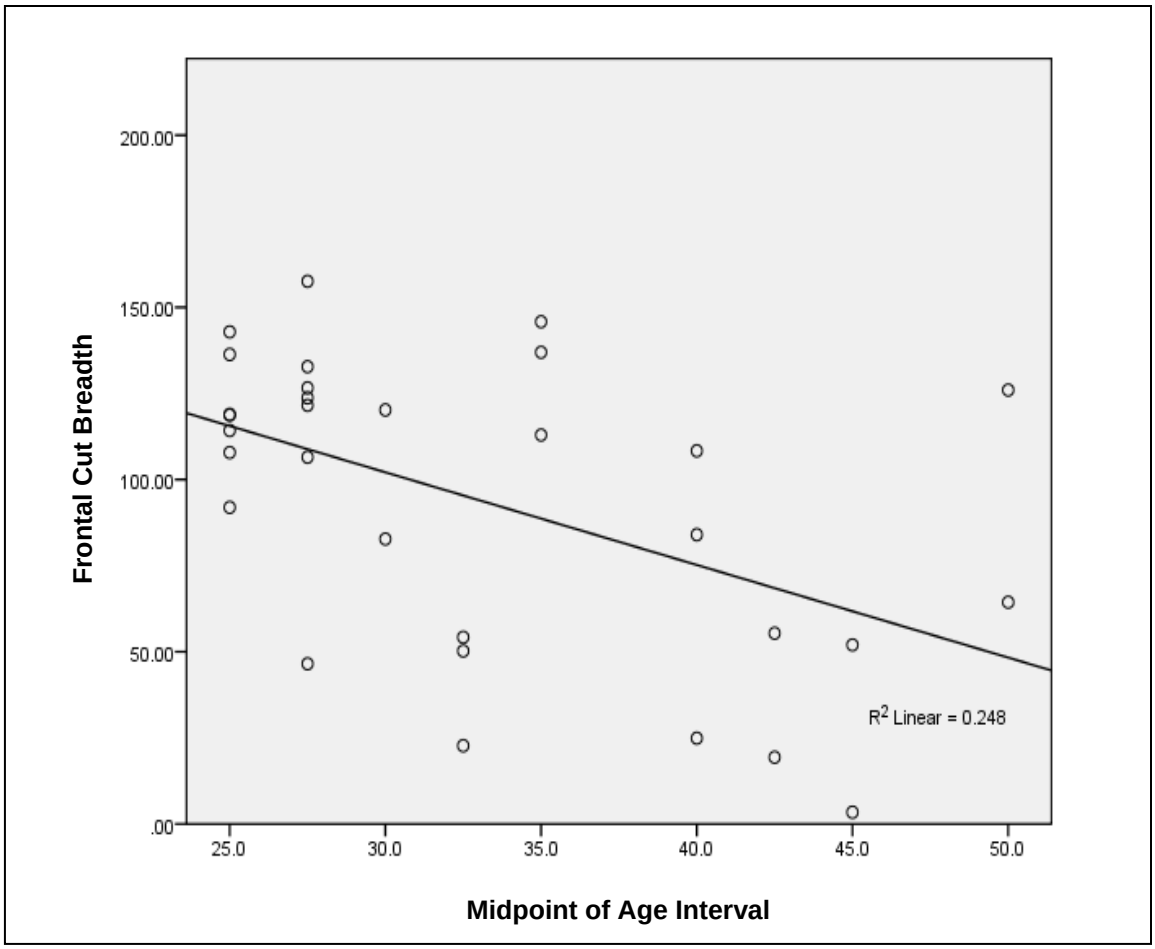



Figure 8. Scatter plot of frontal cut breadths by midpoint of age intervals for male Crow Creek massacre victims.

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 14, $r = 0.075$, $p = 0.673$). This relationship was not statistically significant (Figure 9, $r^2 = 0.006$), so the breadth of the frontal was not explained by female age. The

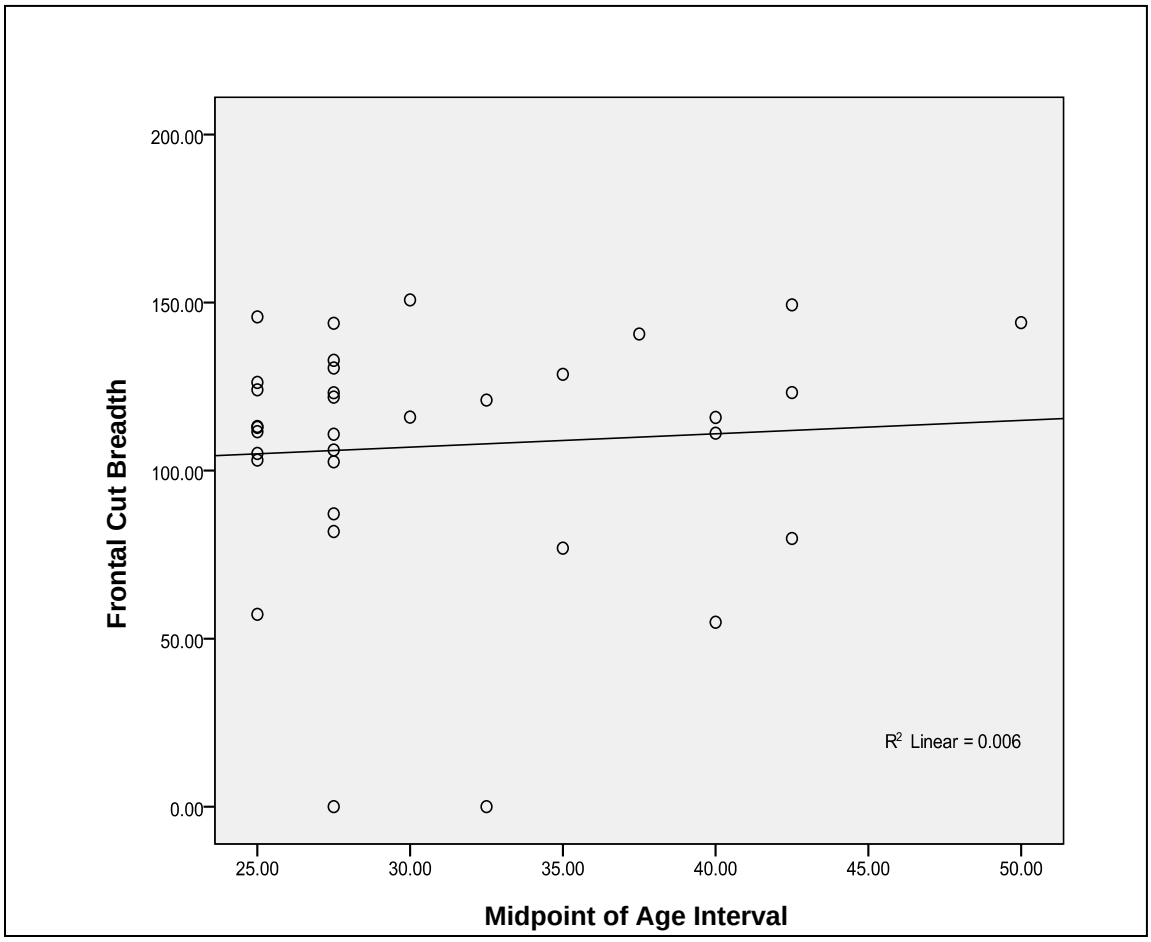



Figure 9. Scatter plot of frontal cut breadths by midpoint of age intervals for female Crow Creek massacre victims.

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 (Figure 10).

The final statistical assessments performed on the Crow Creek data were chi-square goodness-of-fit tests. Chi-square goodness-of-fit tests examined the relationship between age, sex and burial location in the Bone Bed. Test results indicated no statistically significant difference in the burial location between male and female victims

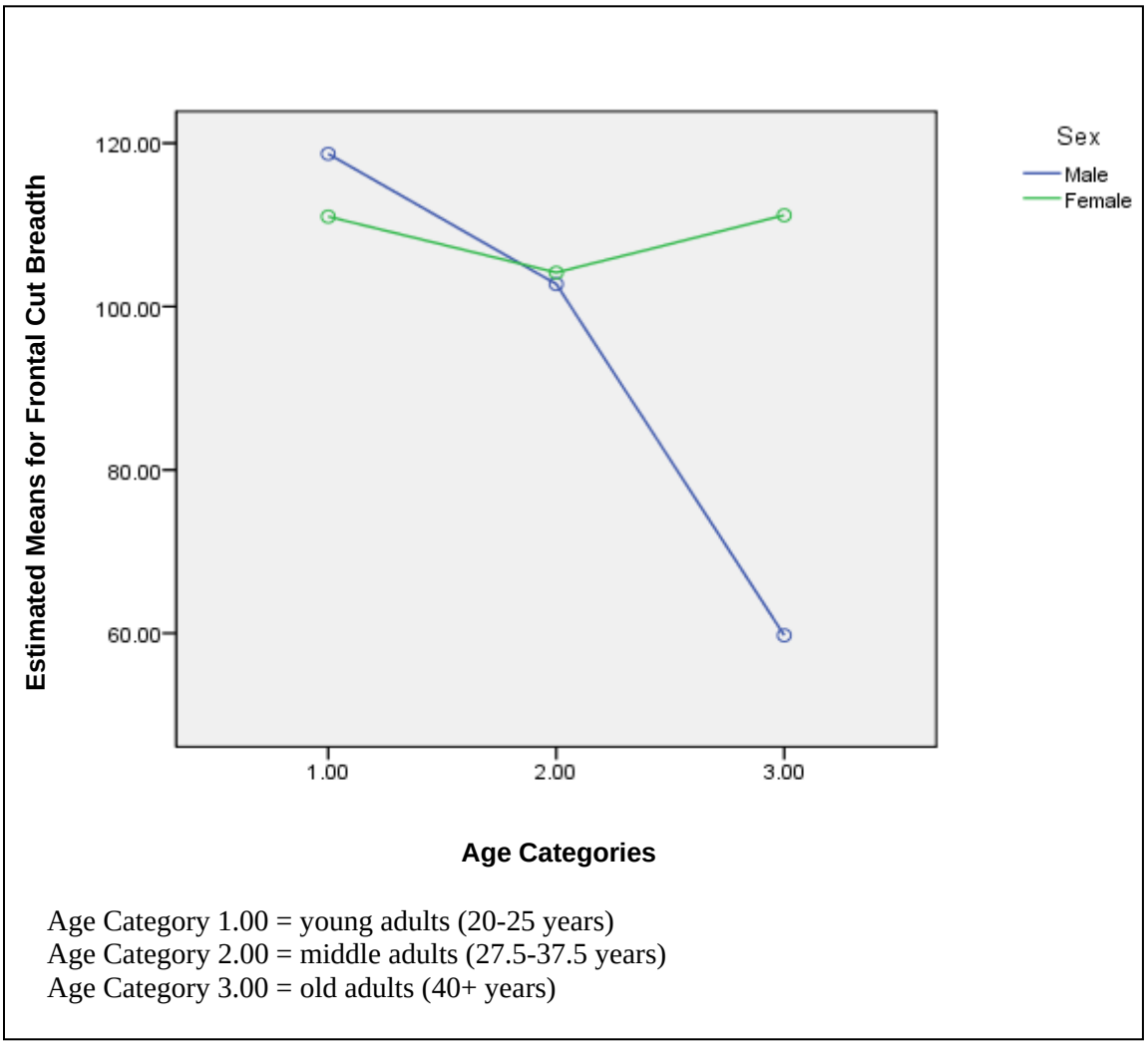



Figure 10. Factorial ANOVA plot of age and sex by Crow Creek frontal cut breadths.

of the Crow Creek massacre ($X^2 = 9.55$, $df = 16$, $p = 0.88$). Males and females were randomly placed in the bone bed, and therefore no pattern of burial placement was observed. The goodness-of-fit test of age and bone bed location was also not statistically significant ($X^2 = 14.64$, $df = 16$, $p = 0.55$). As stated in the preceding chapter, the interaction between sex and age in reference to burial location could not be assessed because the sample sizes were too small and the degree of freedom too large for a reliable conclusion to be drawn. From the final tests, males and females, and all adult age groups

were randomly placed in the human bone bed. Because no significant relationship existed between bone bed location, and age and sex, burial placement was random.

## 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 we concluded 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 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. Finally, there was not a significant relationship between the location of the victim in the bone bed and the victim's age or sex, suggesting that individuals were placed in the fortification ditch at random. The implications of these results will be discussed and explained in the following chapter.

# CHAPTER VII

# DISCUSSION

This chapter discusses the behavioral implications of the results presented in the previous chapter (Chapter VI). Explanations are offered for differences observed in the number of cut marks on male and female victims of the Crow Creek massacre, as well as differences in cuts among individuals of different adult age groups. Finally, limitations of the current study are discussed, followed by suggestions for future research on gender roles in times of war.

## Cut Marks

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 frontal cuts on male and female crania did occur. There were five possible explanations for the difference 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 was that female victims experienced greater brutality than their male counterparts did during the Crow Creek massacre. Second, more cuts were observed on female victims because their attackers were not rushed in their task of removing the scalp. The unhurried removal of a scalp would only occur if the victorious warrior was not fearful of immediate retaliation by an enemy warrior (Bridges 1996: 71). The third

explanation was that female scalps were of higher value, and therefore more time was spent removing a larger area of scalp from female victims than male (Bridges 1996: 72). The fourth explanation claims 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 was that differences in hairstyle led to differences in the amount of scalp removed (Jacobi 2007: 314-315).

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 1995: 49). Age-grade societies were comprised of members of the same sex and relative age (Peters 1995: 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 documents social stratification in Arikara myths that describe 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 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, was related to the dehumanization of one's victim (Maschner and Reedy-Maschner 2007: 37). The dehumanization associated with the practice was caused by whether or not combatants considered each other human (Keeley 1996). 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. Because women were viewed as beasts of burden, 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). Insights gained from analysis of the historic period are the most accurate estimation of what village life was like at the time of the prehistoric Crow Creek massacre (Holder 1958: 213).

The second explanation for females having more frontal 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).

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 killing and humiliation 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 number and breadth of cut marks 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 woman. As stated previously, the ethnographic literature reports that women were viewed as beasts of burden, and served the function of laborer (Holliman 2000: 27). However, there is ample evidence in the literature that Arikara societies were matrifocal and the importance of woman in these societies is evident in every major aspect of village life, including hunting, warfare, and religion (Peters 1995: 158). 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 the social circumstances if the wife did her part (Peters 1995: 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 1995: 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 because there were a number of discrepancies in the number of cuts recorded by two separate individuals (this issue will be discussed later in this chapter). The author could not reconcile these discrepancies due to repatriation of the remains, 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 14, $r = -0.498$, $p = 0.004$). This relationship indicated that 24.8 percent of the variability in frontal cut breadths in males was explained by age (Figure 9, $r^2 = 0.248$). These results could be explained by the fact that warfare was 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 result made sense based on 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.

## Burial Location

Skulls tended to be located in the northeast portion of the bone bed (Willey 1990: 180). However, no tests analyzed whether there was a significant relationship between sex and/or age of the skulls by burial location. Tests conducted by the present author indicated that there was not a statistically significant difference in the burial location between male and female victims or among individuals of different adult age groups. Victims were randomly placed in the bone bed regardless of sex or age. There were three possible explanations for the random spatial distribution of individuals in the bone bed.

The first explanation for the random distribution of scalping victims in the bone bed was that the remains were buried by the surviving villagers while the threat of enemy attack continued. If the remains were buried by the returning villagers, the attackers may have remained in the area and village members were rushed in burying corpses. This explanation was unlikely because the remains were decomposed, exposed to the elements for a significant period of time and permitting time for the victors' departure from the area (Willey 1990: 179). Surface exposure was indicated by the presence of taphonomic indicators; puncture marks and broad grooves, indicative of canid scavenging, were present on the remains (Willey 1990: 131). It is unlikely that the attackers remained in close proximity to the decomposing remains for any significant length of time.

The second explanation for the random distribution of scalping victims in the bone bed was that the massacre victims were buried by their relatives, but men and women did not receive different treatment in the placement of their bodies in the bone bed. If victims experienced equal treatment after death, no observable relationship would have existed between an individual's age and sex and that individual's placement in the bone bed. A victim's placement in the bone bed would not be an indication of that individual's age and sex.

The third explanation for the random distribution of scalped skulls in the bone bed was that the victims of the massacre were buried by their attackers (Komar 2008). Komar suggested that the use of a pre-existing feature and the unpredictable commingling of the remains were consistent with more recent burials associated with genocide (2008: 130). This explanation, however, was not likely because human remains

were left in some of the village lodges, suggesting that neither the survivors nor the perpetrators of the massacre remained in the village immediately after the raid (Willey 1990: 160). Because neither group appeared to have occupied the village following the massacre, it was unlikely that the attackers would have returned to the site to bury the dead.

## Massacre

The ethnographic literature and the archaeological record support the idea that warfare was a male activity (Walker 2001). Exploring historical Plains warfare, however, it was evident that women were killed and captured, and at times they participated as members of raiding parties and other related rituals (Ubelaker 1994: 333). While many of the assumptions in this study were based on the idea that the attackers of the Crow Creek village were males, it is possible that villagers were being attacked and scalped by enemy female raiders too. If women were being attacked by enemy women, the interpretation of cut marks had to be revised.

To explore the possibility that women were being scalped by enemy women, the proposed warfare scenario had to be altered. If males and females were members of the raiding party that attacked the Crow Creek village, attacking males most likely formed the offensive line. Once the perimeter of the village had been penetrated, female warriors went to the core of the village to slaughter females, children, and the elderly. If the village raiders were female, it is possible that male and female members of the attacking party practiced different methods of scalping. Perhaps women placed more value on the scalp and took more time obtaining war trophies. The presence of female scalpers might explain why female crania had a greater number of cut marks.

While scalping was a warfare-related practice and warfare was a historically male activity, there was not a statistically significant difference in the proportion of male and female victims at the Crow Creek Site. Approximately half of the scalping victims were male and the other half were female. The reason behind this observation could be explored by considering previous conclusions about the link between environmental fluctuation, resource depletion and the origin of the Crow Creek massacre.

At the time of the Crow Creek massacre, resources were sparse and it was suggested that the attack took place in response to major region-wide resource depletion (Zimmerman and Bradley 1993: 218). While ethnographic references report enemy women taken captive during the historic period, if resource depletion was common in the region at the time of the massacre, the attackers would be less likely to take female captives. Because these individuals would be additional mouths to feed when food was scarce, it was possible that the attackers chose to kill their victims rather than take them captive. At the time of the Crow Creek massacre, region-wide resource depletion may have prevented the attackers from taking female captives, and instead led to their subsequent slaughter and scalping. This theory will be discussed in greater detail below.

This hypothesis was further supported by the skeletal evidence of malnutrition that was observed on the remains of Crow Creek village members. Analysis of the human remains indicated that there was probably an extended period of unstable climate, most likely drought, in the upper Missouri valley during the Initial Coalescent occupation of the site (Zimmerman and Bradley 1993: 216). It was suggested that severe food shortages and drought were characteristic of the Great Plains region after A.D. 1250 until the time of the massacre (Bamforth 1994: 109). Crow Creek villagers suffered dietary

insufficiency in protein and essential minerals and vitamins (Zimmerman and Bradley 1993: 26). Many of the skeletal remains showed evidence of malnutrition indicated by porotic hyperostosis and/or cribra orbitalia (Willey 1993: 242). The dietary insufficiency appears to have been long-standing and led to chronic iron deficiency anemia, famine, and scurvy (Zimmerman and Gregg 1986).

While the taking of captives may have been limited by the lack of resources at the time of the Crow Creek massacre, captives would have provided a means for securing additional resources and it may have been beneficial to take female captives. Female captives could have provided a valuable labor source, as long as they did not contribute to already critical subsistence activities (Milner 1995: 230). This hypothesis refuted the previous assertion.

Another explanation for the high incidence of scalping at the Crow Creek Site was that the village attackers were simply more prone to killing women than taking them captive. During the historic period, and likely during the prehistoric period, preference for killing or capturing enemy women appeared to have been dictated by tribal affiliation (Ewers 1994: 326). Because the affiliation of the Crow Creek attackers was not determined, it was impossible to conclude whether or not the attacking group's custom was to kill or capture enemy women.

Paleodemographic analysis of the site does not support this hypothesis. During the initial osteological analysis it was found that males out-numbered females in the younger age intervals (20-29, 30-39) and females out-numbered males in the older age intervals (40-49, 50-59) (Willey 1990: 48-49). This observation suggested that females were likely taken captive rather than killed at the time of the massacre.

Interestingly, the sample used in the present study contrasts starkly with the overall adult age distributions.

Of the 77 crania used in the sample, young adult females out-number young adult males (12 and 7 respectively) and old adult males out-number old adult females (12 and 7 respectively). This observation instead supports the theory that females were not taken captive, possibly because of the region-wide resource depletion experienced at the time of the massacre. The relative lack of young adult males may be explained by the fact that male warriors were killed away from the village and not included in the human bone bed. Why the sample does not reflect the age distribution of the site as a whole is unknown, however, it is possible that young adult females and old adult males were simply randomly placed in areas within the human bone bed where they were protected from destructive postmortem damage.

## Study Limitations

There were six limitations to the current study. Limitations included the anonymity of the data collector, repatriation of the human remains, skewed results based on missing individuals, the possibility of scalping an individual without leaving cuts, small sample sizes, and a lack of previous gender studies. These limitations will be discussed in turn.

The largest obstacle of the current study was that scalping mutilations were recorded by an anonymous data collector at the University of South Dakota in 1979. Data from the scalping datasheets were based on interpretation of records by the present author. It is possible that some information was misinterpreted, which could have led to

inaccuracies in the current study. Also, scalping data used in the study were based on the interpretation of cuts in 1979. Because cut marks were observed by an anonymous data collector, there was no way of determining the reliability of the source. The scalping datasheets, however, were compared to the scalping data recorded by Willey to assess inter-observer error between the anonymous data collector and Willey.

Differences between the scalping data recorded by the anonymous data collector at the University of South Dakota were compared to Willey's observations. The differences indicated that there was a tendency for Willey to record a greater number of cuts than the anonymous data collector (Appendix B). Of the seventy-seven crania in the sample, 28 differences were noted when comparing the two datasets. Of the 28 differences, there were only five cases where the anonymous data collector recorded more cuts on cranial bones than did Willey. However, there did not appear to be a sex bias in the number of cuts noted by the two data collectors. Of the 28 individuals with differences, 15 crania were male and 13 crania were female. Also, in the cases where the anonymous data collector recorded cuts on more cranial bones than Willey, three were male and two were female. Because there was not a sex difference, indicating a higher number of cuts on females, in the data recorded by the anonymous data collector, data used in the study did not exhibit a bias toward one sex. Because Willey did not record the number of cuts he observed, the data recorded by the anonymous data collector were selected for this study. It must be acknowledged, therefore, that there may be a greater number of cuts per cranium than was reported in the sample, which may have skewed the results of the current study.

The second limitation of the current study was the skeletons' reburial. The human remains from the Crow Creek massacre were claimed to be ancestral to the Crow Creek Sioux Tribe. Tribal representatives negotiated to have the remains repatriated and the human skeletons were returned to the reservation in 1979 and reburied in 1981. Only five months were permitted for the laboratory analysis, limiting the time osteologists had to study the skeletal remains (Zimmerman and Alex 1981b). As the analysis proceeded, research questions were encountered for which answers could not be pursued due to the time available for the study. Reburial of the material limited the insights that could be gained from analysis of the remains, particularly those concerning the role of interpersonal violence in prehistoric Native American tribes. Also, reburial of the remains prevented subsequent data collection from the human skeletons. Because the crania were no longer available for analysis, the current study was based solely on data collected in 1979 and a few photographs documenting scalping mutilations. Similarly, the few scalping photographs prevented the author from comparing cuts recorded on the scalping datasheets with photos documenting each scalping victim. The paucity of photographic evidence further limited the author's ability to ascertain the accuracy of the data. Likewise, since 1979, additional methods have been developed for the determination of sex and age of skeletal remains (Willey n.d.: 181). Because the remains were repatriated, the present author was unable to verify the sex and age determinations made by Swegle or the cut marks recorded by the anonymous observer.

The third limitation to the current study was the possibility of obtaining skewed results based on the paleodemography of the site. During the initial analysis of human remains, differences in the proportion of each sex based on age were noted. There

appeared to be a relative lack of young adult females and old adult males present in the human bone bed (Willey 1990: 48-50). The differences in the proportion of each sex represented in the bone bed probably did not represent the actual sex ratios at the time of the massacre but instead represented the outcome of events that occurred at the time of the raid (Willey 1990: 50).

If young females were taken captive during the massacre, scalping differences may not have been accurately represented by the skeletal sample. If females were taken captive, different segments of the population would have been represented in the death assemblage and available for scalping analysis. It is also possible that the male villagers defending the village were able to delay the attack for a period of time allowing females time to escape (Willey 1990: 50). These factors may have contributed to a misrepresentation of scalping differences between the sexes.

Similarly, if old adult males were underrepresented in the bone bed, it was possible that these individuals experienced higher levels of brutality but their remains were simply not placed in the bone bed. On the other hand, the relative lack of old adult males may have represented normal mortality rates in the Crow Creek population. Therefore, different segments of the male population would have been represented in the death assemblage and available for scalping analysis. From the relative lack of young adult females and old adult males recovered from the bone bed, interpretation of scalping cut marks may have misrepresented the treatment of individuals by sex and age.

A similar problem may have occurred when identifying scalping marks. It was possible to scalp someone and not leave cuts on the individual's cranium (Hamperl 1967: 630). Some individuals from the Crow Creek Site may have been scalped but show no

indication of cuts. The results of the study, therefore, may have underestimated the number of scalped individuals in the sample.

The next limitation of the study was the sample sizes. While the Crow Creek site yielded a comparatively large sample of seventy-seven skulls, when the sample was divided by sex, the samples consisted of 38 males and 39 females. Thirty-eight and 39 skulls is still a large sample size when compared to other sites with evidence of scalping, however, the sample sizes were reduced further when statistical tests were performed to assess the affect of age on scalping. When the sample was subdivided into young, middle and old adults of each sex, sample sizes were reduced to as few as seven individuals.

Because no previous research had been performed on the topic of gender roles in Native American scalping practices, there were no studies for comparison with the current research. The lack of previous gender studies precluded comparing the incidence of scalping at the Crow Creek Site with other prehistoric sites with evidence of scalping. A comparative study would be of interest because observations of the Crow Creek Site appeared to contrast with previous reports of males suffering higher incidence of scalping.

Finally, it must be acknowledged that all conclusions drawn from this study are preliminary, as the research only pertained to differences observed between the sexes in relation to scalping patterns. Future studies should include a more detailed analysis of prehistoric interpersonal violence by assessing the role of sex in multiple forms of trauma. Therefore, the results of the present study are subject to the scrutiny of future researchers and analysts.

## Future Research

Although Crow Creek was unique because it provided a large sample of a population that suffered extreme levels of interpersonal violence, future studies on gender roles in prehistoric interpersonal violence are needed to substantiate the conclusions of this study. There was a paucity of literature devoted to interpreting the role of gender in Native American scalping practices, and when combined with a lack of comparable gender studies, insights drawn from this research were limited.

While the current study assesses the role of sex in Native American scalping practices, this research has also set the stage for future studies to interpret the role of gender in prehistoric interpersonal violence. The current study analyzed the osteological manifestations of violence leading the author to conclude that scalping differences were being observed between the sexes. However, a deeper look into the ethnographic literature could expand this analysis into the realm of gender studies, allowing future researchers to decipher the role of gender in reference to brutality levels at the time of the Crow Creek massacre. A gender-based study would further substantiate the results obtained by the author regarding sex differences observed at the Crow Creek Site.

Additional research must also be directed toward identifying indicators of brutality on the human skeleton. Scalping provided conclusive evidence of interpersonal violence, and the results of the current study should be compared to gender differences in sharp and blunt force cranial trauma observed on victims of the Crow Creek massacre. Other evidence of violence when compared to the results of this study could be used to test claims that females suffered higher levels of brutality than males during the Crow Creek massacre. The current study employed the number and size of cuts as indicators of

brutality inflicted upon the victims of the Crow Creek massacre, a different variable should be employed in future research.

Finally, unlike prehistoric scalping, evidence of scalping from the historic period is bolstered by references to the practice found in the linguistic and ethnographic record. One example of written evidence of scalping is the Arikara tale of the scalped man (Parks 1982). The scalped man was a character of Arikara and Pawnee culture (Parks 1982: 47). The character of the scalped man acted as an historical personage, a legendary figure with supernatural power, a mythological being, a comic and a bogeyman (Parks 1982: 47). The prevalence of scalping helped to promote the transformation of an historical individual into a mythological being (Parks 1982: 47). In cases of historic scalping, the written record may also provide previously unexplored explanations for the differential treatment of male and female victims of interpersonal violence. Therefore, research on the role of gender in historic scalping practices should be performed to enhance the understanding of scalping patterns in prehistoric North America.

## Summary

This chapter explored explanations for the disparity in the number and length of cut marks observed on male and female victims of the Crow Creek massacre, as well as differences by adult age groups. Possible explanations for the difference observed in the number and breadth of cuts on male and female victims of the Crow Creek massacre included female scalping victims experienced higher levels of brutality than males. The second explanation was that more cuts were observed on female victims because their attackers were not hurried because of a fear of being apprehended (Bridges 1996). The

third explanation was that female scalps were more valued than male scalps, and therefore more time was spent removing a larger piece of scalp from female victims (Ewers 1994). The fourth explanation was that females were recognized as the most valued members of early Arikara society (Peters 1995). The final explanation was that differences in hairstyle caused differences in the size of the scalp removed (Jacobi 2007). Of these five explanations for the disparity in total cuts observed on males and females, the first explanation – that female victims of the Crow Creek massacres suffered higher levels of brutality – was the most plausible.

The results of the regression and correlation analyses indicated that differences in frontal cut breadths were explained by age only in male victims. The most plausible explanation for these results was that warfare was predominantly a male activity, and because warriors were typically young males, a distinction was made between male age groups (Walker 2001). Youthful warrior scalps would have been considered more valuable than those of older males. Because the scalp was used as an indication of bravery and prowess in battle, it was likely that a higher value would be placed upon the scalp of a young and virile individual, than the scalp of an older victim. Because females were not typically warriors, no difference was observed in the breadth of cuts on female scalping victims.

The previous chapter indicated that there was no difference in the burial location of Crow Creek massacre skulls by sex or age. The results suggested that all Crow Creek victims were treated similarly regarding burial location.

This chapter concluded with a discussion of the limitations of the current study, including anonymity of the data collector, reburial of the Crow Creek skeletons,

possibility of obtaining inaccurate results from missing individuals, possibility of scalping an individual without leaving cuts, small sample size, and the absence of comparable gender studies. Study limitations were followed by suggestions for future research at the Crow Creek Site and similar sites with evidence of prehistoric interpersonal violence.

# CHAPTER VIII

## SUMMARY

The Crow Creek Site is “arguably the most famous archaeological site on the Northern Plains” (Bamforth 2007: 153). The site has played a major role in the reconstruction of Native American history, particularly prehistoric violence on the Plains (Willey 1990). Crow Creek is unusual because it offers a rare opportunity to study the skeletal sample of a population at particular point in time: namely, the date of the massacre which occurred in roughly 1325A.D. (Zimmerman and Alex 1981b: 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, fractures, and evulsion 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, nearly 90% 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 Native American scalping practices. This chapter summarizes the study and provides concluding remarks.

The current study began with a brief history of interpersonal violence and discussed the history of scalping. The introductory chapter described the Crow Creek Site

and offered explanations for the appropriateness of the skeletal series for an analysis of gender roles in war. The primary objective of this study was to provide an in-depth assessment of whether or not males and females as well as individuals of different adult age groups experienced different levels of brutality at the time of the Crow Creek massacre.

Three variables determined the relationship between age and sex and the likelihood of being scalped. The dependent variables used in this study were total number of cuts on the cranium, total number of cuts on the frontal, and breadth of cuts across the frontal bone. By analyzing the number and breadth of cuts on individual crania, it was possible to ascertain whether or not there was different treatment experienced by male and female victims of the Crow Creek massacre, or by victims of different adult age groups.

Burial location in the human bone bed was also analyzed. A secondary goal of the study was to determine whether or not a significant relationship existed between sex, age and location of each scalped crania in the bone bed.

The literature review examined the history of scalping in North America. That chapter presented the history of scalping and discussed the cultural significance of this practice among Native Americans. The chapter also provided a historical review and an analysis of the skeletal evidence of prehistoric and protohistoric scalping. Evidence of scalping was found in the ethnographic, linguistic, and archaeological record. The archaeological record provided conclusive evidence that scalping was a Native American tradition practiced long before the arrival of Europeans (Owsley and Berryman 1975: 44). The literature review indicated that no age or gender was excluded from the scalping

practice. Finally, the literature review concluded with a review of women's roles in warfare.

The archaeological background described the Crow Creek Site and discussed the University of South Dakota's excavation of the human bone bed. Laboratory analysis of the human remains recovered from Bone Bed B provided insights into the events surrounding the massacre. The archaeological background chapter concluded with a discussion of the osteological implications of this archaeological sample.

Following the background of the Crow Creek Site, the next chapter provided expectations for the present study. The first research hypothesis was that female crania showed evidence of a greater number of cut marks and cut marks that extended a longer distance across the anterior surface of the frontal than male crania. The second research hypothesis was that the greatest number of cut marks and greatest breadth of cut marks were observed on young adult males and young adult females. The third research hypothesis was that males and females and members of different adult age groups were randomly placed in the human bed.

The materials and methods chapter introduced the sample used in the current study. Seventy seven aged and sexed crania were used in this study. Of these 77 crania, 38 (49.4%) were male and 39 (50.6%) were female. Of the 38 males, seven individuals were young adults (20-25 years), 19 middle adults (27.5-37.5 years), and 12 old adults (40+). Among the 39 female crania, 12 were young adults, 20 middle adults and seven old adults. The methods section provided the descriptive and inferential statistics used to evaluate the research hypotheses.

Descriptive statistics were presented for cut marks, including the means and standard deviations of total number of cuts on the cranium, number of cuts on the frontal, and average breadth of cuts on the frontal. The minimum, maximum, and range were also reported for all variables. Comparisons of total number of cut marks and breadth of cut marks were made using independent sample t-tests, ANOVA, Factorial ANOVA, and regression and correlation analyses. To determine if a relationship existed between an individual's age and sex and location in the bone bed, chi-square goodness-of-fit tests were calculated.

Next, the results of statistical analyses were presented. 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 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 only observed in male scalping victims. Finally, results indicated that there was no difference in the burial location of male and female victims of the Crow Creek massacre. Males and females in the sample were randomly placed in the bone bed.

Following the results chapter, explanations were discussed for the differences in the number of cuts and breadth of cuts observed on male and female victims of the Crow Creek massacre, as well as those variables by age groups. Possible explanations for

the differences observed in the number of cuts on male and female victims of the Crow Creek massacre included female scalping victims experienced higher levels of brutality than their male counterparts during the Crow Creek massacre. The second explanation was that more cuts were observed on female victims because their attackers were not hurried from a fear of retaliation. The third explanation was that female scalps were more valuable and more time was spent removing a larger piece of scalp from female victims. The fourth explanation was that females were recognized as the most valuable members of early Arikara society. The final explanation was that different hairstyles caused differences in the size of the scalp removed. Of the four explanations proposed for the difference in total number of cuts observed on males and females, the first explanation, that female victims of the Crow Creek massacres suffered higher levels of brutality, was the most plausible.

Differences in frontal cut breadths by age in male but not female victims may be explained as follows. Warfare was traditionally a male activity. Because warriors were typically young males, a distinction was made between men's age groups because warrior scalps were more valued.

Finally, explanations were proposed for why there was not a difference in the burial location between male and female victims or individuals of different adult age groups from the scalped sample. The random placement of individuals in the bone bed suggested that no consideration was given to the burial location of each individual related to the person's age and/or sex as an indication of that person's social ranking. All community members in the prehistoric Arikara massacre experienced similar treatment after death.

The discussion concluded by stating the limitations of the study, including the anonymous data collector at the University of South Dakota, the reburial of the human remains, the potential bias of test results, the possibility of scalping an individual without leaving cuts, and small sample sizes. Study limitations were followed by suggestions for future research at the Crow Creek Site and future research oriented toward understanding interpersonal violence.

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. The reburial of the human remains in 1981 did limit the insights that could be gained from the Crow Creek Site. However, the site remains a largely untapped resource for studies of prehistoric interpersonal violence. 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.

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# APPENDIX A

Example of Crow Creek Scalping Mutilation Data Collection Form

CROW CREEK
Scalping Data

Skull #_____6_____ Box-Bag #_____36-1_____
Distance from Bregma to Lambda___110_

Frontal 4. L_no_R_yes_ Do cut marks extend to coronal suture? (yes, no)
5._____85____Distances from Bregma to Left Extent of Cuts
6.____315º___Angle from Bregma to Left Extent of Cuts
7._____92____Distances from Bregma to Right Extent of Cuts
8._____70 º__Angle from Bregma to Right Extent of Cuts
9.____~6_____Number of Cuts on Frontal

Left Parietal
10.____70____Distances from Bregma to Anterior Extent of Cuts
11.____275 º__Angle from Bregma to Anterior Extent of Cuts
12.____60____Distances from Bregma to Posterior Extent of Cuts
13.____275 º__Angle from Bregma to Posterior Extent of Cuts
14.____~5____Number of Cuts on Left Parietal

Right Parietal
15.____90____Distances from Bregma to Anterior Extent of Cuts
16.____85 º___Angle from Bregma to Anterior Extent of Cuts
17.___152____Distances from Bregma to Posterior Extent of Cuts
18.___135 º___Angle from Bregma to Posterior Extent of Cuts
19.____4_____Number of Cuts on Right Parietal

Occipital
20.L no_ R yes Do cut marks extend to lambdoidal suture?
21.____67___Distances from Lambda to Left Extent of Cuts
22.____140 º_Angle from Lambda to Left Extent of Cuts
23.____70___Distances from Lambda to Right Extent of Cuts
24.____137 º_Angle from Lambda to Right Extent of Cuts
25._____2___Number of Cuts on Occipital

Left Temporal – Describe
Cuts:_____None_____
_____

Right Temporal – Describe
Cuts:_____Missing_____

Remarks:

# APPENDIX B

Differences in Crow Creek Data Recorded from Willey's Mutilation Forms and the Anonymous Data Collector's Scalping Data Forms

| Box-Bag Number | Willey | Anonymous Data Collector |
|---|---|---|
| 23-5 (M) | No differences | |
| 35-5 (M) | No differences | |
| 36-1 (F) | Cuts on right temporal | |
| 36-3 (F) | No differences | |
| 36-7 (M) | Cuts on right parietal | |
| 41-3 (M) | No differences | |
| 41-5 (F) | Cuts on left mastoid | |
| 48-2 (F) | Cuts on right supramastoid crest | |
| 49-13 (M) | Cuts on right parietal | |
| 54-4 (F) | No differences | |
| 54-8 (F) | Cuts on mid-squamosal of occipital | |
| 58-1 (F) | Cuts on right occipital condyle | |
| 58-14 (M) | Cuts on left temporal | |
| 62-2 (F) | No differences | |
| 64-1 (F) | No differences | |
| 64-2 (M) | No differences | |
| 65-1 (M) | No differences | |
| 65-4 (F) | Cuts on left parietal | |
| 65-8 (F) | No differences | |
| 69-5 (M) | No differences | |
| 69-7 (F) | No differences | |
| 69-10 (M) | Cuts on both parietals and temporal | |
| 76-5 (M) | | Cuts on occipital |
| 78-1 (M) | No differences | |
| 78-5 (M) | No differences | |
| 83-5 (M) | No differences | |
| 86-1 (M) | No differences | |
| 86-4 (F) | No differences | |
| 89-2 (M) | Cuts on both parietals | |
| 90-3 (F) | | Cuts on right temporal |
| 92-2 (F) | No differences | |

| Box-Bag Number | Willey | Anonymous Data Collector |
|---|---|---|
| 92-4 (F) | Cuts on left parietal | |
| 92-5 (F) | No differences | |
| 92-10 (F) | No differences | |
| 94-6 (F) | Cuts on right parietal | |
| 96-1 (M) | | Cuts on right temporal |
| 96-3 (F) | No differences | |
| 97-3 (M) | Cuts on parietal | |
| 98-1 (M) | No differences | |
| 98-6 (F) | No differences | |
| 98-17 (F) | No differences | |
| 99-5 (M) | No differences | |
| 107-1 (F) | Healed scalping | |
| 107-63 (M) | Cuts on right parietal | |
| 108-15 (M) | Cuts on right parietal and left temporal | Cut on occipital |
| 112-1 (M) | No differences | |
| 112-4 (M) | Cuts on both temporals | |
| 112-6 (M) | Cuts on occipital | |
| 114-9 (F) | Cuts on left occipital | |
| 127-1 (M) | No differences | |
| 128-1 (M) | No differences | |
| 128-4 (M) | No differences | |
| 128-5 (F) | No differences | |
| 128-8 (M) | No differences | |
| 132-2 (F) | No differences | |
| 132-4 (F) | No differences | |
| 133-1 (F) | No differences | |
| 139-3 (F) | No differences | |
| 139-3 (F) | No differences | |
| 139-5 (M) | Cuts on left parietal | Cuts on right parietal and occipital |
| 139-6 (F) | No differences | |
| 141-1 (M) | No differences | |
| 141-3 (F) | No differences | |
| 141-6 (F) | Cuts on left parietal, occipital and both temporal | |
| 146-7 (F) | Cuts on occipital | |
| 147-6 (M) | No differences | |
| 147-8 (M) | Cuts on left parietal | Cuts on right parietal |

| Box-Bag Number | Willey | Anonymous Data Collector |
|---|---|---|
| 149-4 (M) | Cuts on occipital | |
| 154-1 (M) | No differences | |
| 154-4 (M) | No differences | |
| 155-1 (M) | No differences | |
| 155-3 (F) | No differences | |
| 159-1 (F) | No differences | |
| 159-3 (M) | No differences | |
| 159-6 (F) | No differences | |
| 165-8 (F) | No differences | |
| 168-4 (F) | | Cuts on right parietal |

APPENDIX C

Information from Crow Creek Scalping Datasheets and Calculated Distance of Cuts on Frontals

| Skull Number | Sex | Age Mid | Total Cuts | Cuts on Frontal | Frontal Breadth |
|---|---|---|---|---|---|
| 1 | M* | 42.5 | 4 | 4 | 55.38 |
| 6 | F** | 42.5 | 17 | 6 | 149.33 |
| 7 | F | 42.5 | 15 | 5 | 123.24 |
| 8 | M | 27.5 | 5 | 5 | 123.75 |
| 11 | F | 32.5 | 14 | 8 | 120.98 |
| 12 | M | 25 | 4 | 2 | 91.92 |
| 35 | F | 27.5 | 1 | 1 | 0 |
| 51 | M | 35 | 13 | 7 | 136.97 |
| 57 | F | 42.5 | 6 | 5 | 79.81 |
| 61 | F | 27.5 | 3 | 3 | 106.13 |
| 63 | M | 40 | 5 | 0 | |
| 66 | F | 25 | 4 | 4 | 105.12 |
| 78 | F | 27.5 | 14 | 6 | 121.88 |
| 91 | M | 25 | 11 | 6 | 142.90 |
| 94 | F | 50 | 34 | 16 | 144.05 |
| 98 | F | 27.5 | 5 | 5 | 87.14 |
| 100 | M | 45 | 2 | 2 | 52.00 |
| 103 | F | 25 | 7 | 5 | 111.59 |
| 105 | F | 35 | 9 | 3 | 76.93 |
| 106 | M | 42.5 | 2 | 2 | 19.36 |
| 108 | M | 40 | 2 | 2 | 24.89 |
| 114 | M | 32.5 | 3 | 0 | |
| 130 | M | 35 | 2 | 2 | 112.95 |
| 134 | M | 25 | 6 | 5 | 136.33 |
| 148 | | | 2 | 2 | 31.24 |
| 151 | M | 27.5 | 9 | 9 | 121.56 |
| 159 | I*** | 50 | 7 | 7 | 108.35 |
| 171 | I | 40 | 4 | 3 | 106.55 |
| 172 | M | 45 | 1 | 1 | 3.40 |

*Males **Females ***Indeterminate

| Skull Number | Sex | Age Mid | Total Cuts | Cuts on Frontal | Frontal Breadth |
|---|---|---|---|---|---|
| 173 | F | 25 | 34 | 13 | 126.25 |
| 186 | M | 27.5 | 5 | 5 | 126.60 |
| 190 | F | 35 | 19 | 13 | 128.67 |
| 194 | F | 25 | 7 | 5 | 103.13 |
| 195 | F | 25 | 36 | 22 | 124.05 |
| 196 | F | 32.5 | 6 | 1 | 0 |
| 197 | F | 40 | 7 | 6 | 111.12 |
| 207 | F | 37.5 | 14 | 13 | 140.65 |
| 216 | M | 50 | 18 | 8 | 126.01 |
| 217 | F | 25 | 13 | 0 | |
| 218 | M | 27.5 | 3 | 3 | 106.51 |
| 228 | F | 40 | 5 | 3 | 54.88 |
| 229 | M | 30 | 3 | 3 | 82.74 |
| 233 | F | 25 | 20 | 13 | 113.14 |
| 236 | M | 27.5 | 18 | 7 | 132.80 |
| 246 | F | 27.5 | 0 | 0 | |
| 264 | F | 35 | 0 | 0 | |
| 265 | M | 32.5 | 31 | 20 | 22.73 |
| 269 | M | 32.5 | 11 | 2 | 54.21 |
| 284 | M | 40 | 25 | 25 | 108.35 |
| 285 | M | 37.5 | 6 | 6 | |
| 286 | M | 40 | 0 | 0 | |
| 289 | F | 27.5 | 26 | 20 | 81.87 |
| 294 | I | 25 | 16 | 16 | 151.43 |
| 298 | M | 35 | 40 | 40 | 145.84 |
| 301 | M | 32.5 | 15 | 15 | 50.24 |
| 302 | I | 32.5 | 73 | 35 | 137.48 |
| 304 | F | 20 | | | |
| 306 | M | 50 | 7 | 7 | 64.38 |
| 307 | M | 25 | 4 | 2 | 107.85 |
| 308 | F | 25 | 80 | 32 | 145.74 |
| 310 | F | 25 | 33 | 33 | 112.87 |
| 315 | F | 27.5 | 13 | 13 | 123.17 |
| 317 | I | 27.5 | 23 | 23 | 148.63 |
| 322 | F | 27.5 | 27 | 27 | 102.63 |
| 323 | F | 27.5 | 61 | 11 | 110.84 |

*Males **Females ***Indeterminate

| Skull Number | Sex | Age Mid | Total Cuts | Cuts on Frontal | Frontal Breadth |
|---|---|---|---|---|---|
| 324 | M | 30 | | | 120.22 |
| 331 | F | 30 | 18 | 11 | 115.92 |
| 332 | M | 27.5 | 0 | 0 | |
| 333 | I | 27.5 | 18 | 15 | 159.35 |
| 335 | F | 30 | 31 | 25 | 150.79 |
| 336 | F | 25 | 17 | 11 | |
| 343 | I | 32.5 | | 10 | 85.55 |
| 345 | M | 25 | | 9 | 118.74 |
| 346 | M | 27.5 | | 5 | 46.52 |
| 348 | M | 42.5 | 22 | 15 | |
| 356 | M | 25 | 61 | 35 | 118.91 |
| 358 | M | 25 | 25 | 21 | 114.25 |
| 360 | M | 27.5 | 0 | 0 | |
| 363 | F | 27.5 | 94 | 43 | 143.85 |
| 368 | M | 40 | 18 | 18 | 84.00 |
| 370 | F | 40 | 41 | 19 | 115.83 |
| 371 | F | 25 | 60 | 12 | 57.23 |
| 377 | F | 27.5 | 54 | 31 | 130.53 |
| 389 | F | 27.5 | 15 | 8 | 132.83 |
| 392 | M | 27.5 | 52 | 25 | 157.50 |

*Males **Females ***Indeterminate