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A BIOARCHAEOLOGICAL PERSPECTIVE ON THE HISTORY OF VIOLENCE

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■ **Abstract** Traumatic injuries in ancient human skeletal remains are a direct source of evidence for testing theories of warfare and violence that are not subject to the interpretative difficulties posed by literary creations such as historical records and ethnographic reports. Bioarchaeological research shows that throughout the history of our species, interpersonal violence, especially among men, has been prevalent. Cannibalism seems to have been widespread, and mass killings, homicides, and assault injuries are also well documented in both the Old and New Worlds. No form of social organization, mode of production, or environmental setting appears to have remained free from interpersonal violence for long.

INTRODUCTION

Injuries and deaths caused by interpersonal violence are a major worldwide health problem. Such violence occurs in many different social situations, ranging from attacks by serial killers on strangers to the highly organized bombing raids of multinational government coalitions. In the United States, injuries and deaths from gang warfare and spousal abuse are viewed as health problems of epidemic proportions, and violence is the leading cause of premature death among young adults (Cornwell et al 1995, Whitman et al 1996).

What have anthropologists contributed to our understanding of the causes and cultural correlates of violence? A survey of the anthropological literature shows that in spite of its social and economic significance, few anthropologists have focused on this topic (Ferguson 1997, p. 344; Krohn-Hansen 1994). As Keeley (1996) points out, the contribution of anthropologists to our understanding of the causes of violent conflict in earlier, nonindustrialized societies (an area of great theoretical significance that we are ideally positioned to explore) is miniscule in comparison to the vast literature historians and sociologists have generated in their explorations of warfare and violence in modern industrialized societies. This is unfortunate because anthropology's broad, cross-cultural, historical perspective has the potential to yield key insights into the complex web of

intricately related biological and sociocultural factors that shape our modern violent propensities.

Among anthropologists, bioarchaeologists are ideally positioned to explore the causes of violence in earlier societies. Human remains from archaeological sites are a unique source of data on the environmental, economic, and social factors that predispose people to both violent conflict and peaceful coexistence. The controversy over the effects that expansion of Western societies had on patterns of warfare in non-Western cultures provides a good example of bioarchaeology's relevance. Some anthropologists believe that patterns of warfare documented by ethnohistorians and ethnographers in formerly "isolated" non-Western societies of the New World and elsewhere are a reflection not so much of precontact cultural patterns as of the social disruption and economic inequalities created by the trade goods and diseases that inevitably accompany contact with Westerners (Dunnell 1991, Ferguson 1995, Walker 2001b). From this perspective, the warfare historically documented in modern non-Western societies is little more than a reflection of the violent competition and insatiable desire for the accumulation of material wealth that taints the modern world. Some researchers consequently dismiss the ethnographic and ethnohistoric records as largely irrelevant to understanding earlier patterns of violence and speculate that the warfare that did exist in premodern societies was a rarely deadly, typically ineffective, ritualized form of culturally mediated dispute resolution designed to efficiently maintain social boundaries while minimizing fatalities. Although there are those who strongly disagree with the factual basis of this neo-Rousseauian view of premodern passivity (Keeley 1996), it is an argument that resonates with many people and is difficult to counter without reference to bioarchaeological data from our distant, preindustrial past.

Skeletal studies have the potential to greatly expand our understanding of the human potential for both violent and nonviolent behavior. Historical documents and ethnographic records provide a narrow view of the spectrum of human capacities for selfless kindness and utter cruelty. The number of historically documented groups is minuscule in comparison to the enormous number of extinct societies for which we have no written records. When historical descriptions of warfare and violence are available, it is difficult (some say impossible) to disentangle their factual basis from the observer's cultural biases concerning this highly emotionally and politically charged aspect of life. Human skeletal remains, in contrast, provide direct evidence of interpersonal violence in both prehistoric and historically documented societies that, in many respects, is immune to the interpretive difficulties posed by literary sources (Walker 1997, 2001b). Several flint arrow points embedded in a person's spine are not symbolic constructs (Figure 1). They say something indisputable about physical interactions that occurred between those bones and those stones. Of course, an infinite number of more-or-less likely alternative explanations could be given for such injuries (homicide, burial ritual, hunting accident, scientific hoax, extraterrestrial intervention, and so on), but the fact remains that the vertebrae have arrow points embedded in them. A single piece of evidence such as this concerning past human behavior

has limited evidentiary value. However, when many such examples are assembled and viewed within their larger archaeological and paleoecological context, it is possible to greatly constrain the range of plausible alternative behavioral explanations. Through such laborious bioarchaeological research, we can gradually obtain a better, more-useful understanding of the violence that afflicts the modern world.

DEFINITION OF VIOLENCE

Evaluating skeletal evidence of ancient violence is made difficult by both the technical problems of interpreting injuries and some fundamental definitional issues related to the distinction between accidental and intentional injuries. In medicine, "injury" means the damage or wound caused by trauma, and "trauma" refers to an accidental or inflicted injury caused by "harsh contact with the environment" (Stedman 1982). Although seemingly straightforward in their reference to physical damage, the concepts of trauma and injury are often extended to encompass psychological as well as physical injuries.

The distinction commonly made between accidental and intentional traumatic injuries is even more problematic because of the causal implication of human malevolence. Accidental injuries are those caused by unplanned events that happen unexpectedly. The concept of "violent injury," on the other hand, often carries with it, in its vernacular use, the implication of human intentionality. This seemingly clear-cut causal distinction can easily become obscured. Although most people use "violence" to imply a harmful interaction between people (i.e., "interpersonal" violence), epidemiologists show little concern for this fundamental distinction and typically include accidental deaths along with homicides and suicides in their classificatory schemes under the heading of "violent injuries" (Holinger 1987; Lancaster 1990, p. 341; Murray & Lopez 1996).

Even if we can agree that a key element of any definition of violence is that it refers, as in some international human rights statements (United Nations 1993), to the behavior of people relative to each other in ways that are likely to cause personal harm or injury, there is room for argument over the degree of intentionality required for an act of violence to have occurred. For example, it can be argued that all injuries resulting from the marginalization of one group by another through territorial expansion, social dominance, or economic exploitation meet the definition of violence if the dominant groups shows callus disregard for the safety and physical well-being of the people they have marginalized.

There is also the problem of cultural contingency: The term violence means different things in different cultures and even to members of the same culture (Krohn-Hansen 1994). In many societies, beating children and spouses to discipline them is socially sanctioned because it is considered beneficial, not harmful, to the recipients of the beatings. On the other hand, it is common in the social sciences and humanities to expand the concept of violence to embrace "any unjust or cruel state of affairs or maltreatment of another human being" (Straus 1999).

Because of the limited physical evidence available to document interpersonal violence in earlier societies, there are few opportunities to make subtle distinctions such as these in bioarchaeological studies. Instead, the complex array of behaviors that result in accidental and intentional injuries is reduced to skeletal remains or occasionally mummified tissues and the archaeological context within which these human remains are found. Owing to these evidentiary limitations, it is wise to restrict use of the term violent injury in bioarchaeology to skeletal injuries for which there is strong circumstantial evidence of malevolent intent (e.g., the presence of several arrow points embedded in the skeleton of a man in a mass grave with other injured young men whose skulls show cutmarks consistent with scalping) and to reserve the term accidental injury for cases lacking such clear evidence of malevolent intent.

INTERPRETING SKELETAL INJURIES

Traumatic injuries are some of most common pathological conditions seen in human skeletons. Osseous changes associated with trauma include unhealed fractures, calluses from old injuries, remodeling subsequent to joint dislocations, and the ossifications that occur within injured muscles, tendons, and the connective tissue sheath (periosteum) that encapsulates bones. Interpreting this evidence of ancient trauma requires a complicated decision-making process (Figure 2). Of great significance from a behavioral perspective is distinguishing among injuries suffered before death (antemortem), around the time of death (perimortem), and after death (postmortem) through soil movement and other site formation processes. Antemortem and perimortem injuries are of considerable anthropological interest because of the implications they have for human behavior.

Antemortem fractures are comparatively easy to identify because the well-defined callus of new bone that usually forms around the fracture persists long after the trauma that produced it (Figure 3). If a fracture shows no signs of healing, it is safe to say that it is either a perimortem injury, postmortem damage caused by site-formation processes, or postrecovery damage from archaeological excavation or museum curation. It is comparatively easy for a well-trained osteologist to distinguish fractures that occurred long after death from perimortem injuries. Fractures in the bones of the living and recently dead tend to propagate at an acute angle to the bone's surface in a pattern comparable to that seen in other plastic materials (Figure 4). After death, collagen loss makes a bone much more brittle. As a result, breaks in old bones caused by soil movement and other site-formation processes tend to propagate at right angles to the bone's surface, like those seen in a broken piece of chalk (Villa & Mahieu 1991) (Figure 5). Often, postmortem fractures in old bones also can be identified because of a color difference between the bone's surface (usually darker) and that of the area exposed by the fracture (usually lighter). This surface discoloration, which is produced through prolonged

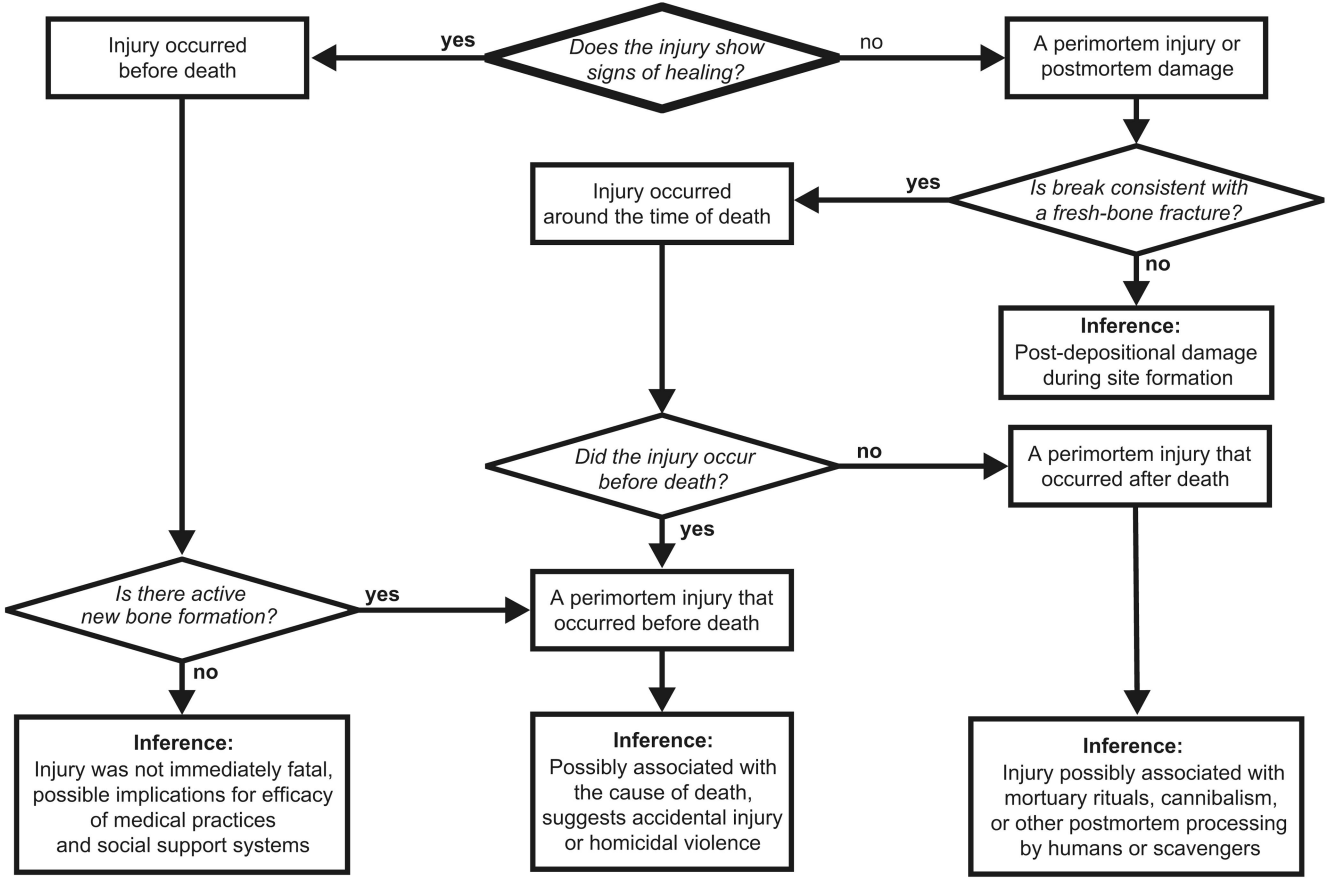

Figure 2 Flow diagram showing the process through which skeletal remains are assessed for evidence of interpersonal violence.

contact with the surrounding soil, makes it possible to distinguish cutmarks made around the time of death by weapons or other tools from damage that occurred long after death, such as during archaeological excavation or museum curation (Frayer 1997, White & Toth 1989).

Signs of healing, of course, are unequivocal evidence that the injury occurred before death. Osseous responses to injury, however, are not immediate. In forensic work on modern trauma victims, it is often possible to differentiate antemortem-perimortem and postmortem-perimortem injuries because there is little bleeding around antemortem injuries sustained after the heart stops beating. Although staining from decomposed blood is sometimes seen in ancient mummified remains, the absence of such evidence in most archaeological situations means that fractures in the bones of the living and recently dead are essentially identical in appearance. It may be impossible, for instance, to decide if a perimortem cranial fracture is the result of a lethal blow to the head or rough treatment of the corpse after death. Although such issues sometimes cannot be resolved, the type of perimortem injury is often telling. A skeleton riddled with arrow wounds strongly suggests malevolent intent, even if some of the injuries were inflicted posthumously as a gesture of disrespect.

Reconstructing the behavioral implications of antemortem and perimortem injuries is a two-stage process (Lovell 1997). First, the proximate, or most direct cause of the injury needs to be considered. The mechanical properties of bone are well known, and these, along with clinical experience and common sense, provide a basis for reconstructing the mechanical cause of an injury. The diagnostic features of fractures produced by blunt objects, bladed weapons, and high-velocity projectiles are the focus of much forensic work, and principals guiding their interpretation are well understood (Spitz 1993). After the range of probable proximate causes is delimited, a second, more-difficult analytical phase aimed at reconstructing the cultural context of an injury can begin. This search for the injury's "ultimate cause" requires detailed consideration of both intrinsic biological variables, such as age and sex, and extrinsic factors, relating to the physical and sociocultural context. Considering an injury from a population perspective is essential. When viewed in isolation, a person's injuries often are open to many different interpretations. However, if the same injuries are seen in many of the person's colleagues, a likely behavioral explanation is often suggested.

Arcane technical issues surrounding the interpretation of injuries such as those just discussed can be of great interpretive significance. For example, most people now believe that misidentification of carnivore activity and postmortem damage as lethal perimortem blows led the famous paleontologist Raymond Dart to construct a dismal, culturally influential image of our early australopithecine ancestors as vicious predators (Cartmill 1993). Based on his osteological studies, Dart (1953, p. 209) concluded that the earliest humans were

> confirmed killers: carnivorous creatures that seized living quarries by violence, battered them to death, tore apart their broken bodies, dismembered them

> limb from limb, slaking their ravenous thirst with the hot blood of victims and greedily devouring livid writhing flesh.

Evaluating such claims within the broadest possible frame of reference is a key element of the bioarchaeological method. An individual's injuries are often open to multiple, sometimes even paradoxical interpretations (e.g., violent death and dismemberment vs. veneration of the deceased through careful preparation of their cleansed bones for afterlife adventures). However, when viewed within their larger archaeological and paleoecological context in conjunction with a large number of such instances, many previously viable alternative explanations become increasingly improbable.

This approach of progressively developing more and more contextual information so that the number of reasonable alternative hypotheses can gradually be reduced is well illustrated by a series of recent studies of scattered, highly fragmented collections of ancient human bones from the American Southwest. Although such collections have been reported for many years, they were typically dismissed as residues from secondary burial or carnivore activity. More recently, detailed bioarchaeological studies have been conducted that place these collections within a broader, more-informative archaeological context. In his meticulous analysis of osteological material from the Mancos site, White (1992) demonstrated a clear correspondence between the pattern of cutmarks, percussion damage, fractures, burning, and body part representation in a collection of highly fragmented human remains and the damage pattern present in associated faunal remains discarded as refuse from culinary activities. Several similar collections have been described that show the same pattern of massive perimortem breakage and percussion damage with evidence of subsequent processing, cutmarks, and burning that strongly suggest consumption of human flesh by other humans (Billman et al 2000, Turner & Turner 1999).

The gustatory motivations for such harsh treatment of the dead have been doubted, and alternative hypotheses, including "witch destruction," have been offered as alternatives to cannibalism (Darling 1998, Dongoske et al 2000, Martin 2000). Although the motivations for treating human corpses like the carcasses of game animals are undoubtedly complex, the inference that human flesh was actually consumed has recently been dramatically reinforced by contextual evidence from an unexpected source. Chemical analysis of human excrement from the Cowboy Wash in the Four Corners area of southwestern Colorado, an area where there is strong osteological evidence for cannibalism at a number of sites, has been shown to contain traces of a myoglobin, a human muscle protein, that could have gotten there only through the ingestion of human flesh (Marlar et al 2000). These studies provide an excellent example of the power of the bioarchaeological approach to understanding the human past: Through the progressive accumulation of evidence from disparate sources, it is possible to gradually bring into clearer focus what really happened during the history of our species.

MODERN INTERPERSONAL VIOLENCE

There is an enormous modern trauma literature that is directly relevant to understanding the behavioral significance of the injuries seen in ancient skeletal remains. Data on the physical manifestations of modern interpersonal violence provide a baseline against which bioarchaeological evidence for ancient violence can be measured. Although uncritically projecting what we know about modern trauma into the past is potentially misleading, modern trauma patterns do provide a rich source of comparative data that allows ancient injuries to be placed within meaningful behavioral and cultural-historical contexts.

Age and sex are important dimensions of the modern violence pattern. Put simply, the perpetrators and victims of modern assaults tend to be young men. Throughout their lives, men are much more likely than women to suffer from all types of traumatic injuries, especially those associated with interpersonal violence (Baker 1992). Males commit 84% of the assaults in which the victim reports to hospital emergency rooms (Rand & Strom 1997). For homicides committed in the United States between 1976–1992, the median age of the assailant (87% of whom were males) was 20 years and that of the victims (78% of whom were males) was 25 years (Fox 1994). In an exaggerated form, owing to the selectivity of military recruitment practices, the demographic profile of modern warfare mortality parallels that seen in civilian homicides, with a predominance of young male victims in their early twenties: 40% of the German solders killed in World War I were 20–24 years old (Lancaster 1990, p. 330). Recruitment practices also guarantee that male warfare casualty rates exceed those associated with civilian violence. For example, only 9% of the hospital admissions for chest wounds in the recent Yugoslavian conflict were women (Ilic et al 1999).

The social context of civilian violence shows significant sex differences. In 57% of attacks on females, the assailant is a family member or intimate partner. For males, in contrast, only 17% of the attackers are family members or intimate partners (Craven 1997, Rand & Strom 1997). Homicides show the same pattern, with 49% of the females victims killed by relatives or intimate partners and only 15% of the males (Fox 1994). Intimate partner violence contributes importantly to these sex differences. In the United States during 1994, females were five times more likely to be victimized by intimate partners than were males (Craven 1997). For homicides in which the victim-offender relationship was known, an intimate killed 31% of the murdered females and 4% of the murdered males (Craven 1997).

There also appear to be sex-dependent gender differences in homicide patterns (see Walker & Cook 1998). This is suggested by the fact that same-sex homicides account for 6% of all intimate partner homicides committed by men and only 1% of the same-sex intimate partner homicides committed by women (Fox 1994). This is a substantial bias toward greater violence among gay males, even if one considers the demographic surveys that suggest the ratio of male-to-female homosexual couples is about 3:2 (Croes 1996).

Levels of interpersonal violence have varied significantly in modern societies. This is of considerable theoretical interest for bioarchaeologists because of the sampling problems similar temporal variation in earlier societies would pose. Modern accidental and intentional injury rates show clear daily, weekly, and annual oscillations, and of course there are the well-documented outbreaks of intense violence that erupt sporadically owing to widespread warfare and civil unrest. In the United States, homicides are more likely to occur late at night and early in the weekend (Baker 1992, Fox 1994, Swann et al 1981), and there is clear homicide seasonality, with low rates during the inclement winter months and a modest midsummer increase. Homicides also increase during December and January, a phenomenon possibly associated with social activity during the holiday season (Fox 1994). Longer-term trends over a period of decades are especially clear during the twentieth century among nonwhite males in the United States. Homicide rates were low early in the century, began increasing rapidly during the 1920s, and peaked during the economic depression of the early 1930s. After that, they decreased among civilians until World War II, when they increased briefly. During the last half of the twentieth century, homicide rates increased again to reach unprecedented levels (nearly doubling among nonwhite males) during the 1970s and 1980s (Holinger 1987).

Civilian data such as these neglect the important effects of warfare-related deaths. There have been more than 160 wars and armed conflicts since 1945 (Summerfield 1997). Although they are often relatively small in comparison, warfare-related mortality from malnutrition and disease, deaths, and injuries directly related to military activity can cause dramatic short-term increases in trauma among both combatants and civilians (Summerfield 1997, Toole 1995, Toole & Waldman 1993).

Such short-term fluctuations in violence are problematic from a bioarchaeological point of view. Episodes of mass killing may leave few traces in the archaeological record because systematic disposal of the dead is often impossible, and sometimes even actively prevented, during times of widespread social unrest. On the other hand, the discovery of mass graves of war dead can inflate the evidence we have for violence. Seasonal cycles of violence-associated patterns of economic or ceremonial activity can also be problematic because of their potential to create a distorted picture of violence in mobile groups that use different cemeteries on a seasonal basis. Most cemeteries, however, contain the comingled remains of people who died in various seasons over a period of decades, if not centuries. This is an important impediment to the documentation of prehistoric violence because short-term fluctuations are obscured by the long time spans and low temporal resolution that characterizes most archaeological skeletal collections.

MODERN ASSAULT INJURY PATTERNS

The injury patterns documented in the clinical literature provide revealing analogies that can help us understand the behavioral implications of similar injuries in the past. Modern clinical research is also of great relevance to the fundamental

methodological issue of distinguishing between ancient accidental and intentional injuries. Fortunately, the location of an injury often provides a clue to its cause. For example, anthropologists commonly refer to fractures of the ulnar shaft as "parry fractures" because they frequently occur when an assault victim raises his forearm to deflect a blow to the head. Fractures of the distal radius near the wrist, in contrast, are much less likely to be assault injuries. They often occur when the arms are thrust forward to break an accidental fall. The problem with such causal inferences is that the same types of skeletal injuries can be produced by both accidental and intentional trauma. Parry fractures are not always assault injuries; sometimes accidental twisting of the arm breaks the ulna (Lovell 1997). Thus we cannot simply assume without additional supporting contextual information that similar injuries in ancient skeletons reflect interpersonal violence.

Modern civilian morbidity and mortality reports reveal some clear interpersonal violence-related injury patterns that might be echoed in earlier societies. A Department of Justice study of the people admitted to U.S. hospital emergency departments during 1994 provides a good overview of the assault injuries currently suffered by people in the United States (Rand & Strom 1997). For the most part, these assault injuries (58.4%) did not involve weapons. Nineteen percent were inflicted with an object, such as a rock or a stick, that an assailant held or threw. Modern assault victims show a distinctive distribution of skeletal injuries with high facial trauma rates (Walker 1997). In a study of 539 adult English assault victims, facial injury accounted for 83% of all fractures, 66% of all lacerations, and 53% of all hematomas (Shepherd et al 1990). Of the victims, 26% sustained at least one fracture, and nasal fractures were the most frequently observed skeletal injury (27%). The upper limb was the next most common injury site (14% of all injuries). These injuries most often resulted from assaults involving punching (72%) and kicking (42%). Only 6% of the victims received knife wounds. Broken drinking glasses, a weapon apparently favored by inebriated English pub patrons, produced a surprisingly large proportion (11%) of the injuries.

Although modern assailants of both men and women appear to intentionally target the face, in England at least, women are much more likely than men to sustain fractured facial bones that would be detectable archaeologically (Shepherd et al 1988). In a study of 294 consecutive assault victims, 15% of whom were women, a significantly higher proportion of the women (56%) than the men (26%) had facial fractures ($x^2 = 7.8$, $p = 0.005$). The reasons for this higher rate in females are unclear; it could reflect either sex differences in facial bone strength or culturally conditioned, gender-related differences in the severity of beatings. Whatever their cause, such differences show that the frequency of skeletal injuries seen in archaeological materials may sometimes be related in a somewhat indirect way to the actual frequency of assaults.

The question of why the face and especially the nose are targeted by modern assailants is an interesting one. Archaeological data suggest that this nasal fixation is not a genetically programmed human universal but instead is highly culturally contingent. It seems likely that the ritualized, socially sanctioned fighting that occurs in such sports as boxing influences the assault patterns seen in

the larger society outside of the sports arena (Walker 1997). This hypothesis is supported by coroner records from England that show a striking correlation between the rise of modern boxing and an increase in the proportion of homicides caused by hitting and kicking (Walker 1997, p. 171). Thus offensive techniques learned through viewing and participating in violent sports may shape in important ways the patterns of violence seen outside of this highly ritualized context.

The major consequences technological change can have for patterns of interpersonal violence are abundantly documented in the modern trauma literature. Many people attribute the marked increase in U.S. homicides during the late 1980s, especially among the young, to increased availability and use of firearms (MMWR 1996). This trend is paralleled by less-frequent use of knives for homicides (Fox 1994). Such changes can sometimes be abrupt. In Durban, South Africa, the ratio of fatal stab wounds to gunshot wounds reversed within the 5-year period between 1987 and 1992. Between 1985 and 1995, stab wounds declined by 30% and gunshot wounds increased by more than 800% (Muckart et al 1995). Comparable, technology-related changes have recently been documented in remote areas of highland Papua New Guinea, where an earlier pattern of direct confrontation with bushknives and axes has been replaced, with devastating results, by increased use of bows and arrows and firearms (Mathew 1996).

The apparent propensity of British drinkers to use drinking glasses as weapons (Shepherd et al 1990, p. 76) underscores the role that cultural factors can have in determining weapon choice and also, to some extent, the patterning of assault injuries (Walker 1997). Another example is the apparent tendency of police to avoid hitting the faces of their victims because of the public sanctions such highly visible injuries might stimulate (Aalund et al 1990). Cultural sensitivity of this kind can also be seen among Chinese gang members, who prefer knives to guns in certain situations. When attacking other gang members, they use long knives and make multiple lacerations, or "chops," in the flesh of their victims instead of stabbing them (Yip et al 1997). Often the intention is to wound rather than kill. The massive cranial trauma associated with the recent adoption of the baseball bat as a weapon of choice for certain types of urban violence is another example of a highly culturally contingent violence pattern (Berlet et al 1992, Groleau et al 1993, Ord & Benian 1995).

The social context of an assault clearly influences the weapon an assailant selects. A Massachusetts study, for instance, shows that knives are more likely to be used as weapons during arguments with acquaintances and that firearms are more likely to be used against strangers (MMWR 1995). My analysis (P. L. Walker, unpublished observations) of U.S. homicide reports (Fox 1994) reveals significant differences between ethnic groups in the weapon selected for killing spouses that cannot be readily explained by weapon availability, given the household context that is typical for such murders. Between 1976–1992, the weapon of choice for Native American women who killed their spouses was a knife (46% of all such homicides). Native American men, in contrast, rarely killed spouses with knives (20% of all such homicides); they usually used firearms (40%). Among Americans

of European ancestry, a different pattern is seen, with firearms the weapon of choice for spouse killings by both men (56%) and women (67%).

One important lesson for bioarchaeologists from the modern trauma literature is that most assaults cause soft-tissue injuries that would not be detected in ancient skeletal material. Only 16.6% of the assault injuries in the United States are classified as "muscular/skeletal" (Rand & Strom 1997), and many of these would not be observable in archaeological remains. An additional 5% involve gunshots, but a large proportion of these projectiles only wound soft tissue. According to my calculations, in frontal view, a person's skeleton occupies about 60% of the target area a body presents to an assailant. This means that about half of the time a projectile randomly shot at a person would not impact bone. Thus, we can safely assume that the frequency of injuries detected in ancient skeletal remains is just the "tip of the iceberg" in terms of the actual incidence of injuries.

ASSAULTING THE MYTH OF OUR PACIFISTIC PAST

Considering the many methodological problems I have described, what can we say based on currently available data about the prevalence of violence in earlier societies? First, it is fair to say that there has been a historical bias toward overreporting spectacular cases, such as skulls with embedded projectile points, gaping saber wounds, and gruesome scalping marks. People seem to have a deep-seated fascination with violence, especially if the victim was a stranger (thus the enormous popularity of cinéma-vérité television shows featuring emergency rooms and trauma victims). This prurient interest perhaps explains in part the impressive number of paleopathological case reports devoted to describing the wounds of individual trauma victims (Elerick & Tyson 1997). This "case" approach to the documentation of ancient violence dominated the field of paleopathology during most of the twentieth century and reflects the diagnostic interests and lack of population perspective of the physicians who did much of this earlier work. These problems of possible overreporting and lack of a population perspective mean that most of the paleopathological literature provides little basis for estimating the prevalence of past violence. We know that throughout the prehistoric world, many people died at the hands of others, but almost nowhere are data available for even roughly estimating how the frequency of such assaults varied through space and time (Walker 1997).

In spite of these limitations, case reports do have much to teach us about the history of human aggression. They show us that the roots of interpersonal violence penetrate deep into the evolutionary history of our species. Bones bearing cutmarks inflicted by other humans are surprisingly common considering the paucity of early hominid remains. The anatomical position of stone tool marks on the cheekbone of a Plio-Pleistocene specimen from the Sterkfontein site in South Africa suggests that they were inflicted by someone who cut through this person's muscles during the process of removing the jaw from the rest of the head (Pickering et al 2000).

Similar marks on the forehead of one of the earliest members of our species show that as early as 600,000 years ago, people living at the Bodo site in Ethiopia were defleshing the heads of other people (White 1986). The number of such specimens is small, and the limitations of associated contextual information make it difficult to determine what motivated this early practice of cutting into the flesh of the dead; cannibalism, anatomical curiosity, and ritual manipulation of body parts are all possibilities.

Speculation over the extent to which early humans killed and consumed each other has long been a part of the anthropological literature. In the 1930s, Franz Weidenreich suggested, based on the abundance of cranial vaults with fractured bases and the paucity of infra-cranial remains, that *Homo erectus* specimens from the Zhoukoudien site were the victims of brain extraction during cannibal feasts (Weidenreich 1943). This evidence of cannibalism has always been controversial, and the ongoing dispute will be difficult to resolve because many of the original specimens were lost during World War II. Some prehistorians still accept Weidenreich's evidence as compelling (Lanpo & Weiwen 1990, Walpoff 1996), whereas others have reinterpreted the condition of the Zhoukoudien bones as postmortem damage from porcupine gnawing and other site formation process (Binford & Ho 1985, Binford & Stone 1986).

By the Middle Paleolithic, evidence of skeletal trauma increases markedly, perhaps in part because of the availability of much larger skeletal samples. Healed fractures are especially common among the Neanderthals. Many of these injuries appear to have been accidental and perhaps are explained by the dangers of a predatory adaptation that involved hunting big game with simple tools (Berger & Trinkaus 1995, Gardner 2001, Richards et al 2000, Trinkaus & Zimmerman 1982). Some of these injuries may also be a result of interpersonal violence. Although no bones have been found with embedded points or undisputed weapon wounds, one early *Homo sapiens* specimen from Israel (Skhul IX) has a perimortem injury suggestive of a lethal attack: A spear was thrust through the upper leg and into the pelvic cavity (McCown & Keith 1939).

Cutmarks and other signs of postmortem processing possibly associated with cannibalism have been reported in several collections of Neanderthal remains. The tool marks on a few of these specimens can be explained in much less dramatic, noncannibalistic ways. Scratches on the cranium of the Engis 2 child thought by some to be cutmarks (Russell & Lemort 1986) appear instead to be recent damage from the tools used to prepare and measure the specimen (White & Toth 1989). Since its discovery more than 50 years ago, the isolated Circeo I cranium from Guattari Cave with its damaged base and purported faunal associations has traditionally been viewed as an example of a Neanderthal mortuary ritual involving brain extraction. Recent reexamination of this specimen along with new studies of the associated faunal assemblage, however, suggests that spotted hyenas are most likely responsible for the condition of the skull (Stiner 1991, White & Toth 1991).

It is also important to remember that even in cases where a strong case for cannibalism can be shown, this does not necessarily mean that someone was

murdered to obtain their flesh. Although rare, ritual consumption of portions of the bodies of people who died from natural causes has been reported ethnographically, and the phenomenon of starvation cannibalism among famine victims is a well-documented modern phenomenon (Keenleyside et al 1997, Petrinovich 2000).

The earliest evidence of European cannibalism comes from 800,000-year-old human remains recovered at the Spanish site of Atapuerca. The Atapuerca skeletons are highly fragmented and are scored with cutmarks that have been interpreted as evidence of decapitation and defleshing (Fernandez-Jalvo et al 1999). Some of the long bones show perimortem damage consistent with marrow extraction, and the entire human bone assemblage appears to have been treated like food refuse. The cutmarks and fragmentary condition of the Krapina Neanderthal remains from Croatia have often been interpreted as evidence of cannibalism (Gorjanovíc-Kramberger 1906, Ullrich 1978). Others suggest that Neanderthal morticians could have made the cutmarks and attribute the fractures to nonhuman causes, such as natural rock falls or excavation damage (Russell 1987a,b; Trinkaus 1985). The evidence for Neanderthal cannibalism has been greatly strengthened through recent studies of the spatial distributions, tool marks, and skeletal element frequencies on human and animal remains from Moula-Guercy, a French cave site. These studies show strikingly similar patterns of perimortem damage that suggest both the human and the ungulate bones deposited at the site are food refuse (Defleur et al 1999). Bones from La Baume Fontebregoua, a French Neolithic site, show a similar correspondence between fragmentary human remains and faunal collections of food refuse (Villa 1992, Villa et al 1986). These data suggest that the practice of cannibalism was not confined to Neanderthals. Instead, it seems to have persisted through the transition from hunting and gathering to farming.

By Mesolithic times, evidence of mortal injuries strongly suggestive of homicide begins to increase markedly. This is in part a by-product of increased use of bows and arrows, a weapon whose small points embed securely in a victim's bone (Figure 1). When multiple arrow wounds are present, it is unmistakably evidence of homicide (e.g. Boule & Vallois 1937).

Ofnet, a 7720-year-old Mesolithic site in Bavaria, provides the first clear evidence of mass murder (Frayer 1997). The Ofnet collection consists of 38 skulls. Many of these show beveled fractures at the back of the head that strongly suggest perimortem bludgeoning. There is no evidence of cannibalism and few indications of butchering. However, decapitation is suggested by perimortem cutmarks on many of the cervical vertebrae recovered with the skulls. This evidence of mass killing among hunter-gatherers is important because it shows that the development of sedentary agricultural communities is not a prerequisite for organized, large-scale, homicidal activity. It seems clear that Mesolithic hunter-gatherers, like their modern counterparts (e.g Knauft 1987), sometimes lived in societies where fear of becoming a homicide victim was a fact of everyday life.

A recent survey of traumatic injuries in ancient Italy shows some interesting post-Mesolithic trends (Robb 1997). Although the samples are small, clear changes can be seen between the Neolithic and Iron Age. Cranial injuries, which in modern-day people are often a result of interpersonal violence, and infra-cranial injuries, which are more often associated with occupational activity, follow different trajectories. The frequency of infra-cranial injuries increased over time. Cranial injuries, in contrast, were common during the Neolithic, diminished during the Eneolithic, and increased again during the Bronze and Iron ages. The high frequency of cranial injuries among Neolithic farmers is interesting because it is at odds with the traditional view of Neolithic Italians as peaceful compared with later groups, whose iconography glorifies weapons and male warriors (Robb 1997). In other words, the cultural celebration of violence seems to have had an inverse relationship to its frequency.

Probing the antiquity of the modern hegemonic position of men as both the perpetrators and the victims of interpersonal violence is made difficult by the technical problems of accurate sex determination (Walker 1995), and the small sizes of earlier collections, which, when partitioned by sex, often prove inadequate for statistical comparisons. The Ofnet material is interesting in this regard because it is the earliest collection of homicide victims from a single site that is large enough for meaningful demographic analysis. Women and children predominate among the massacre victims. This could be interpreted in several ways: The bodies of men could have been disposed of elsewhere, they could have escaped, or they could have been away from their families at the time of the attack. This last scenario fits well with the pattern seen in the skeletal remains from Saunaktuk, an Inuvialuit (Eskimo) village in the Canadian artic that contains the bones of many women and children with perimortem injuries, which suggests violent death, dismemberment, and probable cannibalism (Walker 1990) (Figure 6). The Inuvialuit have recorded this incident in oral histories that describe an attack by Dene (Indians) that occurred when most of the Inuvialuit men were away hunting whales. During the attack, the people who remained at the village are said to have been tortured in various ways before being slaughtered (Melbye & Fairgrieve 1994).

When ancient collections from large geographical areas and spans of time are pooled, the modern pattern of more male traumatic injuries begins to emerge. Angel (1974) pooled 11 samples from the eastern Mediterranean ranging in age from the early Neolithic to recent times and found a tendency for females to have fewer fractures throughout, especially of the head and neck. Robb (1997) has done a similar survey of Italian collections. He found that after the Neolithic period, the frequency of male cranial trauma increases markedly over that of females, and by the Iron age, trauma of all kinds was much more common among males than females (Robb 1997). Robb concludes that these injury patterns are not a direct result of violence in warfare; instead, he attributes them to the development of gender roles that prescribed violent behavior for males and reinforced a sexual division of labor in which women were not expected to perform activities considered heavy or dangerous, including warfare.

PREHISTORIC NATIVE AMERICAN VIOLENCE

It could be argued that these data suggesting a long history of mass killing, homicide, and male-dominated interpersonal violence in the Old World have little relevance to the question of the effects European contact had on patterns of Native American warfare and violence. After their arrival in the New World, Native Americans could have evolved their own, less-violent, culturally mediated systems for dispute resolution that diverged significantly from the pathological trajectory followed by Western societies. Fortunately, there are many large, well-studied, New World collections directly relevant to this issue.

The 9000-year-old Kennewick find, one of the earliest Native American skeletons, has a large leaf-shaped projectile point, probably propelled by a spear thrower, healed into the bone of his pelvis as well as a small, well-healed cranial fracture (Chatters 2000). Although it is conceivable that both of these injuries were accidental, interpersonal violence is a much more likely interpretation of the spear-thrower wound. Similar injuries, including embedded points and cranial injuries, have been found in other early Native American remains (Dickel et al 1988; J. Chatters, personal communication). These data suggest that the first Americans brought with them patterns of violence similar to those documented in contemporaneous Old World populations, and that those patterns persisted despite low population densities and the availability of vast expanses of uninhabited land.

Archaic period (ca. 6000–500 BC) skeletal collections from western Tennessee provide additional evidence of interpersonal violence among early New World populations. Embedded projectile points, cutmarks, and missing bones suggest that homicide, scalping, decapitation, and forearm-trophy taking were common practices among these early hunter-gatherers (Smith 1997). Out of 439 interments from the Kentucky Lake Reservoir sample, 10 individuals, all males, show evidence of warfare-related interpersonal violence, including 6 people, mostly from one site, with embedded projectile points. At one cemetery, 20.4% of the people show evidence of perimortem violence. This figure includes six people apparently killed in a massacre, whose bodies were haphazardly thrown into a mass grave.

The prevalence of wounds inflicted by clubs, spears, and arrows clearly shows that levels of prehistoric Native American violence varied both regionally and through time. This is consistent with ethnographic evidence of marked tribal differences in warfare patterns. Many of the tribes of central California, for example, practiced highly ritualized forms of combat, with special weapons and rules remunerating injured opponents, that minimized fatalities; others, such as the Mojave, are well known ethnographically for their cultural emphasis on lethal conflict (Kroeber 1925, McCorkle 1978, Stewart 1947).

Bioarchaeological studies of patterns of interpersonal violence among native Californians clearly show that such differences have considerable time depth. The low frequency of cranial injuries in prehistoric central Californians (2.7%–3.5% of adults affected) is different from the extremely high frequency seen in roughly

contemporaneous people living in the Santa Barbara Channel area, where 17% have antemortem cranial injuries (Jurmain & Bellifemine 1997, Lambert 1997, Walker & Thornton 2001). Patterns of violence seem to have varied even within a single region. For example, in the Santa Barbara Channel area, nonlethal cranial injuries are more common on the Channel Islands than on the mainland. This may be the result of a ritualized form of dispute resolution that evolved because conflict avoidance through population movement is not feasible for geographically circumscribed island populations (Walker 1989).

Levels of violence in the Santa Barbara Channel area varied significantly through time. Nonlethal cranial injuries and lethal projectile wounds gradually increased in frequency with the growth of the coastal population. Their frequency peaked during the Middle period and then appears to have declined somewhat thereafter (Lambert 1994, 1997; Walker et al 1996) (Figure 1). The age and sex distributions of people with fatal projectile point wounds is similar to that seen in modern homicide victims, with nearly 20% of the 15- to 26-year-old males having projectile point injuries (Lambert 1997, p. 96).

Although the causes of the exceptionally high rates of Middle period violence are undoubtedly complex, with many different cultural, historical, and ecological dimensions, there is strong evidence that resource stress was a significant factor. Paleopathological data show that living conditions declined markedly at the end of the Middle period in the Channel Island area (Lambert 1993, Walker & Lambert 1989). This was a time of climatic instability and drought-induced increases in competition over resources throughout the western United States (Jones et al 1999, Walker & Lambert 1989). Throughout California there is archaeological evidence of population movement, reorganization of trade networks, and increased warfare during the Middle period (Moratto & Fredrickson 1984, pp. 213–14, 564; Walker & Lambert 1989).

Another potentially significant variable is the introduction of the bow and arrow, which began to replace spears and spear throwers in warfare throughout California beginning around AD 500 (Moratto & Fredrickson 1984). The bow and arrow has a greater killing distance than the spear thrower and is well suited for use in raiding and ambush attacks. Its introduction would have created a short-term disequilibrium in offensive capabilities and consequent social disruptions, comparable to those seen among modern tribal societies with the introduction of firearms (e.g., Mathew 1996).

Bioarchaeological studies of warfare and violence in late prehistoric period Native American communities in the eastern United States show inter- and infraregional variation in levels of violence, similar to those documented in California (Kuemin Drews 2001, Smith 2001). At some sites, there is little or no evidence of interpersonal violence, whereas at others, a significant proportion of the burials appear to be those of homicide victims. For example, an analysis of 264 burials from an Oneota cemetery in Illinois dating to about AD 1300 suggest that chronic warfare caused at least one third of all adult deaths (Milner et al 1991).

Data from other fourteenth-century sites show that this was a time of extreme violence. Excavations at Crow Creek, a large palisaded village site on the Missouri River, uncovered the remains of at least 486 victims of a mass killing dating to AD 1325 (Willey & Emerson 1993). The bones of men, women, and children are present, and nearly 95% of the intact skulls bear scalping marks. Many of these victims were decapitated and dismembered. The conclusion that this massacre was a result of intervillage warfare is reinforced by ongoing research that has produced evidence of similar massacres at two fourteenth-century villages within striking range of Crow Creek (Pringle 1998).

CONCLUSIONS

What have we learned from bioarchaeological studies of these hapless victims of ancient violence? The first, and perhaps most painful, lesson is one of human equality. Everywhere we probe into the history of our species we find evidence of a similar pattern of behavior: People have always been capable of both kindness and extreme cruelty. The search for an earlier, less-violent way to organize our social affairs has been fruitless. All the evidence suggests that peaceful periods have always been punctuated by episodes of warfare and violence. As far as we know, there are no forms of social organization, modes of production, or environmental settings that remain free from interpersonal violence for long.

On the other hand, the many obvious differences between patterns of modern and ancient violence should be of considerable theoretical interest to anthropologists. The technologies we have created to maim and kill each other have gradually advanced from stones and spears, which required intimate physical contact between the assailant and the victim, to modern depersonalized killing techniques, in which unwitting victims appear as illuminated pixels on computer screens. This ability to kill at a distance has greatly transformed the demography of warfare; the ritualized battles of the past in which young men slaughtered young men are being replaced by rooms full of technicians of both sexes trained in "surgical bombing" and "target neutralization." Unfortunately, as the many victims of modern warfare well know, none of this has appreciably reduced the toll of death and human suffering that warfare still takes.

Modern urban environments have proven to be an ideal refuge for the persistence of old patterns of male-dominated violence in the form of gang warfare and armed robberies. The social anonymity and isolation of modern urban life has also created opportunities for new forms of violence that, as far as we know, did not exist in the past. Although "serial killers" who delighted in murdering other people undoubtedly existed in the past, their careers are likely to have been abruptly terminated by execution if they were foolish enough to redirect their homicidal urges closer to home and away from the socially sanctioned killing of outlaws and dehumanized "others."

The "battered-child syndrome" is a similar example of a modern pattern of violence that lacks a clear ancient analog. This is a severe form of physical abuse in which parents chronically beat their young children, often until death. Like serial killing, the battered child syndrome seems, at least in part, to be a product of the lack of surveillance and weakened social control associated with modern urban anonymity. Such abusive behavior leaves clear skeletal stigmata that my colleagues and I have looked for in vain in many large prehistoric skeletal series (Walker 1997, 2001a) (Figures 4 and 7). It seems likely that treating children in this way was simply impossible in earlier societies. When people lived in large kin-based groups, where every action was publicly scrutinized and privacy unheard of, the repeated abuse of infants in this way would inevitably elicit intervention from relatives.

A final lesson from our violent past is the complexity that is apparent in its causes. First, arguing over the extent to which nature or nurture is responsible for cross-cultural regularities, such as the apparent long-standing dominance of males as perpetrators and victims of violent acts, is a sterile exercise. The question makes no more sense than arguing about whether the length or the width of a rectangle makes a greater contribution to its area (Petrinovich 2000). We are products of both our biological and cultural heritages, and their contributions are, for all practical purposes, inseparable. Proponents of simplistic materialist/ecological models that reduce warfare to competition over land and food will find little comfort in the evidence for frequent violent conflicts among earliest immigrants to the New World. These people lived at low densities and had ample opportunity to avoid violence by moving away from it but apparently were unable to do so. On the other hand, explanations that myopically focus on the quest for prestige, mates, or gender-based "binaristic" thinking (Cooke 1996) as prime movers of violence are equally suspect.

One sobering pattern that emerges from a survey of past violence is the close relationship repeatedly seen between large-scale outbreaks of violence and climatic instabilities. Crop failures and a greatly diminished zone of arable land induced by climate cooling during the fourteenth century have been suggested as stimulants for the warfare and mass killing documented at Crow Creek. Similar climatically induced conflicts appear to have occurred on the Colorado Plateau and other areas of the western United States (Jones et al 1999, LeBlanc 1999). Many of us are fortunate enough to live comfortably in culturally buffered environments, where modern climatic perturbations do not perceptibly interfere with our food supply or plunge us into the dangerous world of drought-induced warfare and civil unrest. This shows the fallacy of making simplistic equations between climatic change and warfare. However, we know from paleoenvironmental records that major climatic fluctuations on a scale unheard of during recent times are a fact of the earth's history. Dealing with the violent potential of such a worldwide climatic catastrophe is a challenge future generations surely will face.

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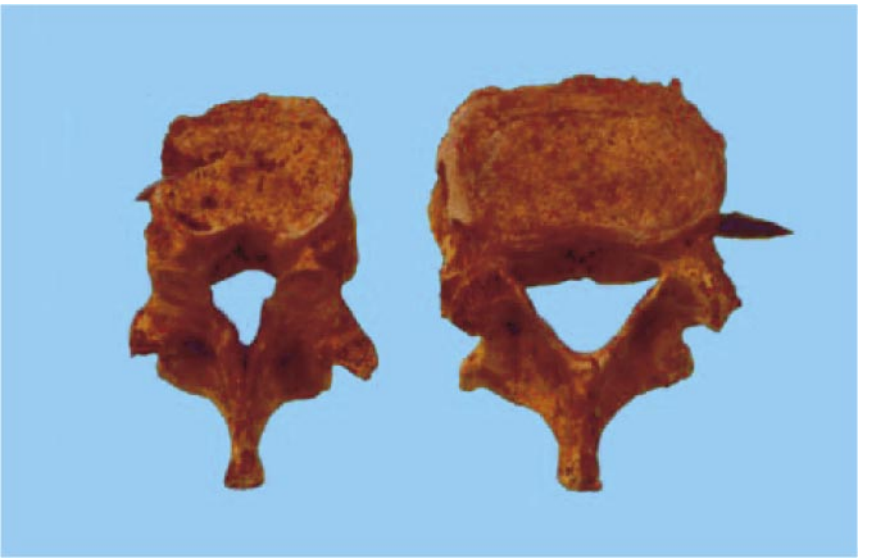

Figure 1 Vertebrae with embedded arrow points from a prehistoric homicide victim from a southern California site (Ven-110). The trajectories of the arrows indicate that someone standing behind her shot this woman in the back.

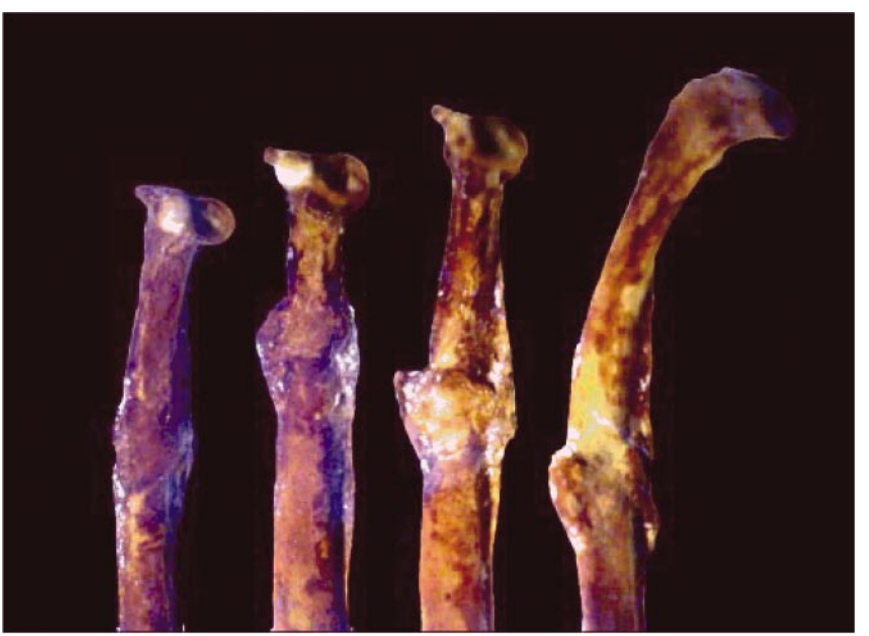

Figure 3 Well-healed fracture calluses on the ribs of a modern American woman who was chronically beaten by her husband and eventually killed by him.

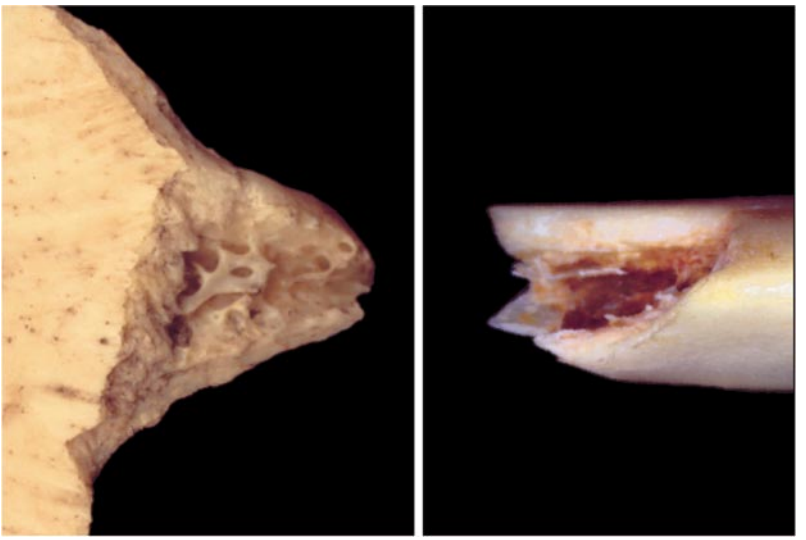

Figure 4 Perimortem fractures. (*Left*) Fracture in the base of the skull of a woman who received massive cranial trauma when she was hit by a railroad train. Note oblique angle of fracture. (*Right*) Perimortem fracture in the shaft of an infants leg bone (tibia) received during a fatal beating. The helical shape of this spiral fracture is typical of child abuse cases.

Figure 5 Postmortem fracture in the shaft of a femur that occurred long after death. Note that the bone fractured at right angles to the surface instead of obliquely. The parallel lines in the fractured surface (*upper left*) are from rodent gnawing (*bottom inset*: enlargement of this area). The superimposition of the tooth marks upon an old break shows that the gnawing occurred long after death.

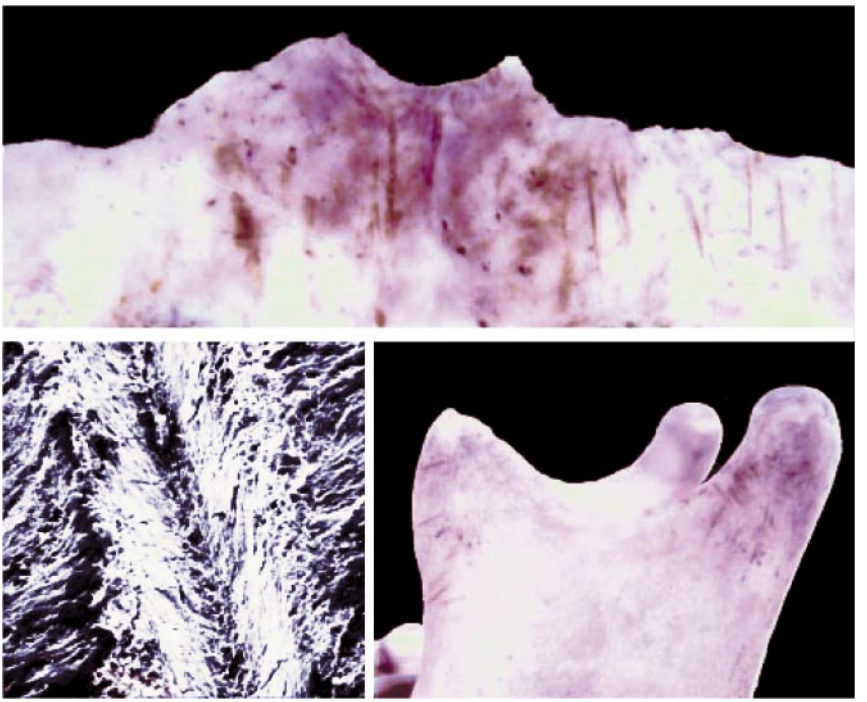

Figure 6 Cutmarks in bones from Saunaktuk, the site of an Inuit massacre in the Canadian arctic. (*Top*) Vertical lines are decapitation cutmarks in the base of the skull of a child. The facture line at the top was made with a heavy bladed tool, which was used to chop off the back of the childs head. This was probably done after decapitation. (*Lower right*) Cutmarks on the mandible of an adult from the same site in areas of muscle attachment. (*Lower left*) Scanning electron microscope image of one of the cutmarks showing a straight-sided groove typical of those made by metal tools.

Figure 7 Area of subperiosteal new bone formation on the fibula of a child who was chronically beaten and eventually killed by her parents. Plaques of new bone such as this form through calcification of blood that accumulates in traumatized areas under the connective tissue sheath that covers bones. The well-defined margins and porosities indicate that the injury was in the process of healing at the time of death.

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