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With Malice Aforethought?

Reconsidering Evidence and Interpretations of Ventureño Chumash Violence

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By

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Dedication

Life is best organized as a series of daring ventures from a secure base.

- John Bowlby

I dedicate this work to Tom, Christian, and Suzanne - without whom I would not have dared this venture, and whose love, support, and encouragement made it possible.

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Abstract

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Any scientific inquiry should include the reassessment of existing ideas and schools of thought on the subject under examination. This must include the application of the most contemporary study methodologies available at the time. The iterative process of review, alteration, or rejection of hypotheses ensures that any new knowledge acquired is the result of a constant critical review process driven by the researcher. Older curated museum collections can provide vehicles for the critical review of original data because new methods of study developed over time can be applied to the older collections and

comparisons of the early and contemporary data can then be made. The conclusions drawn from newer investigations can challenge or affirm early work. This is the essence of the development of new understandings in anthropology.

Mortuary studies of Chumash skeletal remains conducted in the late 1960's and early 1970's have identified bone lesions that scholars have linked to acts of interpersonal violence. The osteological evidence and interpretations derived from these early analyses are old, and the methodologies used to collect and assess these data are outdated. Early conclusions about the nature and frequency of Chumash violence have been drawn from these early analyses, and continue to be applied to contemporary scholarship. As such, the Chumash have been described as being violent through much of their history.

My research examines what a contemporary bioarchaeological reassessment of Ventureño Chumash skeletal remains from four cemetery sites located within 10 miles of each other in the Santa Monica Mountains might reveal about the amount of interpersonal violence experienced by the Chumash over a 900-year timeframe. Utilizing non-invasive methods and new understandings of how violent acts manifest skeletally–derived from scholarship in biomechanics, and both physical and forensic anthropology, I provide new information about the types, frequency, and dynamics of violent interactions engaged in by the Ventureño Chumash over time. My reanalyses of these old collections reveals new information that challenges previously accepted conclusions about interpersonal violence at these sites and offers new interpretations of the evidence. I suggest that scholars should reconsider what role these remains should play in future efforts to characterize and interpret the nature of Ventureño Chumash violence.

Chapter 1 – Introduction

At the time of this writing, current events have been dominated by incidents of human interpersonal violence ranging from large scale terrorist attacks to individual cases of domestic violence. Debates rage in the United States about the rights and responsibilities of gun owners in a time of seemingly weekly mass shootings. Understanding and contextualizing human interpersonal violence has captured the interest of others beyond law enforcement officers and bureaucratic entities. Over the latter part of the last century, social scientists have begun a reassessment of the role violence has played in human social interactions that continues today (Milner et al. 1991, Keeley 1996, LeBlanc and Register 2003, Otterbein 2004, Cartwright 2008, Allen 2014).

Philosophers, theologians, anthropologists and other social scientists have long been interested in a number of aspects of violent human behavior. However, scholars have tended to use binary categorizations to frame these discussions. Is violent behavior in humans biologically driven, or culturally derived (Wrangham and Peterson 1996:63, Cartwright 2008, Fuentes 2009:101)? Can societies be termed "violent" or "peaceful" (Alström and Molnar 2012, Martin and Harrod 2014:116)? Is warfare a recent development in human history, arising at the time of the adoption of agriculture and increased social complexity (Ferguson 1992, Kelly 2000, Fry 2006), or has it always been a part of the human condition (Wrangham and Peterson 1996, Keely 1997, LeBlanc 1999, Otterbein 1999, LeBlanc and Register 2003, Pinker 2011)? Binary thinking presents problems when considering issues as complex as human behavior. These paired classifications are the "either-or's" that litter our intellectual and emotional landscapes. By establishing binaries, we provide ourselves with opportunities to self-soothe through the processes of naming and labeling, freeing us (for the moment) from the difficulty of managing ambiguity. As comforting as they are, binaries force us to place concepts, individuals, and ideologies into one of two categories, where they may not naturally fit. Particularly when considering interpersonal violence, binary thinking limits our choices, narrows our vision, and drastically limits our ability to more fully understand the complexities and nuances of this type of human behavior.

Violent behavior is difficult to grasp culturally and anthropologists have been hampered by evidentiary and interpretive problems. The political, social, and religious structures within social groups strongly influence the role violence plays in these cultures (Dye and Keel 2012). These factors influence how violence is understood within a culture and how it is expressed. Of equal importance is the degree to which these social structures influence the anthropologists who study violence. From the onset of European contact, inaccurate, ethnocentric, racist, and colonialist beliefs have unconsciously informed the identification of evidence of Native American indigenous violence and its interpretation (Fry 2006, Chacon and Mendoza 2007, Dye and Keel 2012). The use of new binaries is notable here. Rather than understanding violence as part of the human condition and examining the factors that influence or limit violent expression across cultures, new binaries have singled out indigenous cultures as employing violence inappropriately, ineffectively and to the extreme (Dye and Keel 2012). Indigenous warfare is labeled as "savage", "primitive" and "unorganized" while modern (Western) warfare is described as "effective", and having clear "objectives". Books and movies characterize Native Americans as wild, savage, and blood-thirsty, while settlers are identified as civilized and peaceful (Dye and Keel 2012:56).

In some ways, Native American conflict studies continue to be hampered by early works and persistent stereotyping. Dye and Keel (2012:58) note:

> Dramatic portrayals of indigenous warfare color and shape contemporary views of conflict and violence, and the ways in which indigenous people defended their culture, lives, property and territory. As a result of these earlier biased and inaccurate depictions, studies of Native American conflict – especially those dealing with feuding, homicides, trophy taking, violence, and warfare – are often met with misunderstanding and mixed reactions. The portrayal of Native American warfare, especially in novels and films, is still the subject of considerable controversy and discussion.

Anthropologists and others who study Native American cultures must be sensitive to the body of inaccurate and biased information that has accumulated over time regarding the use of violence and the meanings surrounding it. Scholars must be reflexive in their work, and regularly review what roles *they* play in Native American indigenous identity

creation (Buikstra and Gordon 1981, Haley and Wilcoxon 1997, Dye and Keel 2012). A critical aspect of this reflexivity is regularly reviewing old data sets to ensure that past conclusions remain valid and relevant. Collections of human skeletal remains provide important opportunities for reflexive review of evidence pertaining to interpersonal violence. Early studies of Native American remains were usually osteological in nature and focused primarily on identifying skeletal lesions and making assumptions about their cause. Today, new theoretical approaches, contemporary methods, and knowledge gained from work in other disciplines are available to apply to skeletal remains to frame new understandings of violence.

Bioarchaeology and Critical Theory provide important avenues for the use and reanalysis of human skeletal remains in the exploration of questions about human interpersonal violence. In 1976 Jane Buikstra outlined the parameters for a new multidisciplinary approach to anthropological research that permits the incorporation of osteology with paleopathology and demography, mortuary studies, gender and household studies, and nutritional research to create a richer, more multi-dimensional means of connecting the living and the dead (Buikstra and Beck 2006:xviii-xix). Bioarchaeology, as both an interdisciplinary approach and interpretive framework, has become an increasingly effective means of linking empirical data gleaned from skeletal remains with associated cultural elements to contextualize biocultural dynamics (Ortner 2006). Applying bioarchaeological analysis to skeletal remains and reanalyzing collections when new methods and techniques become available are two ways we can improve our current understanding of the causes and consequences of violent inter-personal behavior.

Postmodern Critical Theory offers a lens through which anthropologists can, through critique, challenge the existing order, and ultimately initiate change. This framework expands upon the application of bioarchaeological analysis, which is oriented more towards explaining or understanding phenomenon. Postmodern critical research rejects the idea that a scientific investigation is an "objective depiction of a stable other." (Lindlof and Taylor 2002:53). In its place, postmodern theorists have espoused “alternatives that encourage *reflection* [italics mine] about the 'politics and poetics' of their work” (Lindlof and Taylor 2002:53).

The concept of violence is emotionally charged and laden with meaning. Words are important, and claims that violence is endemic in a community, or is an integral part of a culture can have a negative impact on current and descendent communities and their identity. Bioarchaeologists must keep in mind the ever-changing nature of the discipline, and be willing to reflexively critique earlier conclusions and interpretations drawn from human remains. By using increasingly sophisticated approaches to skeletal evidentiary analysis as they become available, I believe it is possible to identify errors in evidence and rectify inaccurate interpretations of the skeletal signatures of violence. As bioarchaeologists, it is our ethical responsibility to do so.

My study focuses on the Ventureño Chumash, Native Americans who lived in the southern-most portion of the Chumash territory near present-day Malibu, California, and from whom have descended the federally-recognized Santa Inez Band of Chumash Indians. It has been theorized that violence among the Chumash was widespread (Walker 1989, Lambert 1994, Milner 2005, Gamble 2008) and that evidence of acts of extreme violence such as cannibalism, capital punishment and human sacrifice have been found among Ventureño Chumash remains (King 1982). Scholars have reported that mortuary evidence from several Ventureño Chumash sites exhibit signatures of violence (King 1982, Lambert 1994, Walker 1996, Gamble 2008). I have conducted bioarchaeological reanalyses of collections of mortuary remains from cemeteries located in the coastal foothills of the Santa Monica Mountains occupied by the Ventureño Chumash. My research provides information about the activities and behavior of the Ventureño Chumash, and compares the results of my reanalyses with earlier study results using these same collections. My study tests two hypotheses. Will reanalyses of older collections of Ventureño skeletal remains reveal new information about the dynamics of community interpersonal violence over time, and will this data be different from existing information and thus require scholars to consider new interpretations and conceptualizations of Chumash violence?

I believe it is important to reframe questions about Native American indigenous violence so that research efforts can move beyond binary categories of behavior such as “peaceful” or “violent”. These are reductionist and simplistic. To that end and using postmodern Critical Theory as my interpretive framework, my thesis attempts to illustrate

the value of reflexive reanalysis of skeletal remains, and to show what these new data reveal about our current understandings of violence in Ventureño Chumash communities. I also discuss problems of evidence and its interpretation identified from my reanalyses, and I critique the characterizations of Chumash violence that have resulted. My thesis concludes with suggested avenues of future research which focus on the reanalyses of older collections and integrates conflict studies with demographic, paleopathological, and bioarchaeological data to develop more nuanced understandings of Native American indigenous behavior and the intersubjective roles we as anthropologists continue to play in the creation of these understandings.

Chapter 2 – Theoretical Frameworks

A compelling interest in death is woven into the social fabric of all human groups. Societies make manifest the importance of death and the dead through the rituals, rites, symbols, and material culture associated with their mortuary behavior (Moore 2012). Social scientists and anthropologists in particular are exceptionally well positioned to try to understand the purpose and meaning of the cultural practice of death. As our understandings of human funerary practice and traditions have evolved, so too have the theoretical perspectives through which we frame these understandings. Early efforts by antiquarians, explorers and avocational archaeologists were limited to identifying and quantifying tombs, grave goods, and skeletal remains. Today the presence of large numbers of complex multi-disciplinary research projects point to a greater appreciation of the ways in which skeletal studies can inform our understandings of social behavior that had previously gone unrecognized (Larsen, 1997:1-2, 4). These studies require the application of new theoretical approaches. It is important to consider the use of frameworks that include the reflexive analysis of existing data sets. Reflexive analysis acknowledges that new methods, techniques, and knowledge that become available can be applied as fruitfully to old collections and data sets as to new or unstudied ones.

1. Early Theoretical Paradigms

Thomas Jefferson's interest in culture history and archaeology is well known. As a citizen scientist, he has been identified as the "father" of American archaeology as a result of the work he conducted in 1784 excavating burials from the Rivanna Mound near his home in Virginia (Buikstra and Beck 2006, Trigger 2006). Jefferson's work acknowledged the primacy of text and language as sources of knowledge over material culture. Material culture from the past, including mortuary relics and grave goods were collected, counted, and catalogued, but not viewed as important as language in developing a deeper understanding of Native American culture.

After Jefferson, a new focus in American Archaeology arose which placed science at the forefront of inquiry, and used it as a framework for understanding history. For example, in the quest to understand the origins of the New World and its indigenous peoples, individuals such as Samuel Morton (1799-1851) utilized measured cranial

capacity to "prove" that people were biologically different from one another and that race was anatomical (Buikstra and Gordon 1981, Buikstra and Beck 2006:8, 11).

With the publication on the eve of the American Civil War in 1859 of *On the Origin of Species* by Charles Darwin, a new evolutionary paradigm emerged which soon was applied by sociologists and historians to social problems as well. Understandings of Native Americans were framed in terms of their position upon a uni-directional evolutionary continuum. Although theories of evolution and natural selection provided a new more scientific framework for understanding human variation, American archaeology remained a practice of "culture history", or the practice of identifying, recording, and organizing aspects of culture and locating them temporally within the arc of societal history (Johnson 2010:18).

2. Mortuary Archaeology

In the early years of the 20th century, Alfred Kroeber, a student of Franz Boas, emerged as an eminent anthropologist and cultural historian with an abiding interest in Native Americans. He published a ground-breaking work in 1925 on indigenous tribes in California entitled the *Handbook of the Indians of California* (Moore 2012, Erickson and Murphy 2013:68). Two years later in 1927, Kroeber produced his short work *Disposal of the Dead* which scholars identify as one of the first published studies of North American mortuary archaeology (Emery 2011). Here, Kroeber attempted to make sense of the spatial and temporal distribution of Native American burials and cremations in California by comparing these mortuary customs to the social hierarchies and behaviors of the living members of these groups, and then expanding his studies cross-culturally and globally. He believed the variations he found could be attributed to social status, kinship affiliation, gender, age, or occupations which are dynamic and labile (Emery 2011). However, Kroeber felt it was not enough to merely identify these differences–they needed to be quantified and explained (Moore 2012). Kroeber also believed that theory-building within the area of mortuary practice can be problematic, particularly if researchers are seeking generalized laws or patterns that govern behavior, as these do not easily transfer across time and space (Moore 2012). Furthermore, it was imperative that researchers adopt an "emic" perspective that incorporates the material aspects of the

group, along with its historical and temporal context to develop a complete analysis of funerary behavior, its correlates and causalities (Kroeber 1927).

3. Processual and Post-Processual Mortuary Archaeology

Lewis Binford is often referred to as the leader of the "New Archaeology", which emerged in the 1960s to address the shortcomings seen in the culture historical approach to archaeology (Erickson and Murphy 2013:109). Binford emphasized the "comparative model" which utilized ethnographic inquiry to understand how material culture works as it exists in modern cultures (Erickson and Murphy 2013:109). He also stressed an empirical approach to archaeology, utilizing the scientific method to undertake research. Hypothesis formulation, and deductive reasoning derived from over-arching laws of behavior were hallmarks of this approach (Murphy 2010:50-54). Focusing on cultural processes, he rejected ideas of the influence of human agency on behavior, feeling that how humans act is determined by larger scientific laws which are immutable (Erickson and Murphy 2013:110).

Arthur Saxe's unpublished Ph.D. dissertation entitled *Social Dimensions of Mortuary Practices* (1970) presented eight hypotheses from which he tried to develop a cross-cultural framework for understanding the relationship between mortuary practices and social systems. His work utilized ethnographic research to try and link the mortuary practices within communities to the social status of the individual at death (Rakita et al. 2008:3, Buikstra et al. 2011:9). The use of ethnographic data obtained cross-culturally in conjunction with the testing of his eight hypotheses makes this work a classic example of processual mortuary archaeology (Murphy 2010:74-75). As a result of the work of Saxe and Binford, certain assumptions about mortuary behavior and its linkage to social organization became accepted doctrine. The "Saxe-Binford approach" holds that a generally proportional relationship exists between the social position held by a deceased individual and the type of mortuary behavior displayed at death. As a result, it would be expected that the amount of funerary goods associated with the burial, the amount of time taken to prepare the remains, and the effort expended in mourning and ceremonial behavior would be greater for those of higher status than lower (Rakita et al. 2008). There continue to be a large number of proponents of these connections between grave goods, burial position and placement and social hierarchies, in North American

indigenous archaeology today. This is particularly true among scholars of the native peoples of California (King 1969, 1982, King 1990, 2011:285, Erlandson 1999, Gamble et al. 2001, Hollimon 2001, Gamble 2008:201).

While Processual archaeology was clearly the dominant theoretical paradigm in use among American archaeologists in the latter half of the 20th century, it was not without its critics (Johnson 2010:80-81). The processual idea of examining skeletal remains from an osteological perspective without situating these individuals within the larger contexts of history and culture was rejected by a new wave of archaeologists called "contextualists" or "post-processualists". As championed by Ian Hodder, these scholars reject the purely scientific emphasis and rigidity of Binford's generalized "laws" (Erickson and Murphy 2013:124-125). While there is no single form of post-processual theory, there is strong agreement that human adaptation to an environment is not merely reactional, or the result of optimal strategy utilization (Johnson 2010:105). Agency in the form of choice, action, and resistance are critical components of the human experience. Hodder (1982:5) states that "adequate explanation of social systems and social change must involve the individuals' assessment and aims." From a mortuary perspective, rites, displays, and treatment of the body are acts perpetrated by the living for symbolic purposes, and represent a means of negotiating a number of power relationships (Rakita et al. 2008:7).

Post-processual thinkers argue that, no matter how exact the application of the scientific method to the problem at hand, true scientific objectivity is an illusion (Murphy 2010:105). The subjectivity of the researcher and interpreter must be recognized and understood as they exert influence on the results (Rakita et al. 2008:7, Preucel and Mrozowski 2010:555, Erickson and Murphy 2013:125-126). This idea extends beyond the researchers themselves to the ethnographic sources often used to explain human behavior. Lynn Gamble and colleagues (2001:186) caution that "using ethnographic analogy to reconstruct the behavior of prehistoric people is a hazardous adventure that can easily lead to interpretations that are little more than projections of the images we have of the ethnographic present onto earlier populations." One criticism of Hodder's post-processual approach to mortuary analysis is that there is little focus on the actual material remains of the deceased other than as "sources of symbolism" and there is a lack

of integration of osteological data into the larger contextualized story (Buikstra et al. 2011:11-13).

a. Bioarchaeology and Violence Studies

As larger skeletal collections became available for study, osteology was utilized more often in research efforts where attention was paid to skeletal remains as a means of understanding behavior. In 1976, the term "bioarchaeology" was first used by Jane Buikstra to describe an American subspecialty seen as expanding and integrating osteological analysis with other disciplines to address problems in health, genetics, mortuary and social behavior of past peoples (Larsen 1997:3, Buikstra and Beck 2006:xviii). She felt that the study of human remains in mortuary contexts could inform our understanding of human behavior to an important degree (Larsen 1997:4-5). As Buikstra and colleagues (2011:3) emphasize: "[…] a fundamental principle of bioarchaeology [is] the contextual interpretation of human remains. Understanding the culture and society of interest is indispensable when considering human remains and mortuary contexts, conversely the analysis of human remains is crucial to a holistic understanding of past societies." A multidisciplinary bioarchaeological approach is critical to answering questions about biological variation, health, and population movement (Buikstra et al. 2011:4).

The bioarchaeology of violence is an increasingly popular field of study that integrates data generated from skeletal remains with cultural interpretations of violent behavior (Martin and Anderson 2014). This provides for much more contextualized mortuary archaeology, and importantly, it integrates material culture and the bodies to which they are associated (Buikstra et al. 2011:13, 17). As a result, traditional understandings of the physical definitions of the body and cultural definitions of identity are challenged (Haley and Wilcoxon 1997, Buikstra et al. 2011:17).

Utilizing critique in conjunction with bioarchaeology can also assist in the exploration of how we as archaeologists construct and inadvertently manipulate the interpretation of social structure and human behavior (Haley and Wilcoxon 1997), and the study of violence offers a distinctive opportunity for such evaluation. In the past, anthropological thinking about violence has been hampered by narrow conceptualizations and imprecise definitions of terms. Interpersonal conflict, violence, aggression, hostility,

and warfare are ideas that are often conflated, illustrating a superficial understanding of the multi-dimensional nature of violent human behavior (Martin and Harrod 2014:116). However, recent scholarship has shed light on the complex socio-cultural nature of violence, which challenges previous simplistic frameworks. It is a phenomenon embedded in social systems that defies easy methods of study (Martin and Anderson 2014:12), and benefits particularly from interdisciplinary approaches and their critique.

Early thinking about violent human interaction focused on the construction of binary models to explain it. One of the more familiar is the peaceful-violent binary as argued by Rousseau and Hobbes. Each ascribed opposing roles for civilization and egalitarianism in the development of violence (Windschuttle 2003, Allen 2014). Depending on your view, over time, social groups either moved from peaceful to violent or violent to peaceful. The 1960s produced a sharp theoretical pendulum swing towards the views of Rousseau within the social sciences in general, which embraced the idea of a "peaceful past", where indigenous groups lived in harmony with each other and with their natural surroundings (LeBlanc and Register 2003, Allen 2014). In the United States, the romanticizing of the indigenous peoples of the New World coincided with progressive social upheaval in the 1960s and early 1970s. Despite clear evidence that indigenous people in North America had engaged in interpersonal conflict and warfare for centuries, these facts were downplayed in favor of a narrative of peaceful ecological and inter-personal coexistence (LeBlanc and Register 2003:xi, Dye and Keel 2012).

New discoveries in genetics, cognitive science and evolutionary biology in the latter part of the 20th century challenged this binary and sparked debate framed in a new one. Were expressions of violent human behavior innate or enculturated traits? Early skeletal remains presenting with evidence of violent trauma tended to support the idea that violence has always been with us (LeBlanc and Register 2003:59, Windschuttle 2003). However, a paucity of data from hunter-gatherer societies showing evidence of violent behavior made it more difficult to temporalize the development of human conflict. (http://www.nature.com/nature/journal/v529/n7586/full/nature16477.html).

The publication of Lawrence H. Keeley's work *War Before Civilization* in 1996 provided a watershed moment in conflict studies (LeBlanc and Register 2003, Allen and Jones 2014) by arguing that humans have always been warlike and conflict is an integral

part of the human condition (Windschuttle 2003). Therefore, conflict and aggression are human universals and the "peaceful past" is an illusion (Keeley 1996, Martin et al. 2012). Building upon Keeley's work, Steven LeBlanc and Katherine Register published *Constant Battles: The Myth of the Peaceful, Noble Savage* in 2003 arguing the long view of human conflict. They addressed a gap in Keeley's work by examining the incidence of conflict and violence among non-agricultural hunter-gather societies, finding that interpersonal violence is woven into the fabric of their lives in much the same manner as it is among agriculturists and state level societies (LeBlanc and Register 2003, Windschuttle 2003). A more recent work edited by Mark A. Allen and Terry L. Jones (2014) entitled *Violence and Warfare Among Hunter-Gatherers* includes a number of chapters whose authors further support this contention.

b. Critical Theory

The introduction of new research methodologies has made analyses of demographic data, skeletal and dental stress markers, stature information, and osteological lesions associated with violent encounters possible to conduct, which provide new levels of information and improved interpretations of the lifeways of past peoples. Critical theory provides a structure for addressing problems of evidence and interpretation in bioarchaeology by emphasizing the importance of reviewing and reassessing old data sets in light of new information and methodologies.

Historically, the Frankfurt School, or the philosophy of thought from which critical theory originated arose in Germany in the 1920s. Frankfurt School thought leaders included Max Horkheimer, Theodor Adorno, Herbert Marcuse, Leo Lowenthal, and Erich Fromm. Critical theory is an amalgam of Marxist and neo-psychoanalytic thought that evolved over the years to incorporate critiques of politics, economics, mass culture, colonialism and others (Johnson 2010:91, Corradetti 2011). Unlike traditional theoretical structures, critical theory rejects the idea that there is objective truth, or propositions that can be drawn from truths that are self-evident (Corradetti 2011:9). Max Horkheimer and his fellow theorists believed that "facts" or "objects" such as they are, are formulated as the result of the historical context of the object itself, *and* by the historical context of the observer (Corradetti 2011:9). For these theorists, the concepts of the objective observer and the impartiality of knowledge are illusions. Ideas are expressed in the form of

critique, where social systems are compared to standards of justice, which in turn stimulates social action. Adherents of critical theory do not espouse criticism just for its own sake, but as a catalyst for identifying and understanding discourses of power and creating avenues for social change. As Horkheimer (1982:244) states, the purpose of critical theory is "to liberate human beings from the circumstances that enslave them."

Several examples of the application of critical theory to problems in Native American archaeology are worth noting here. Jane E. Buikstra and Claire C. Gordon, in their work *The Study and Restudy of Human Skeletal Series: The Importance of Long-Term Curation* (1981), address an important issue in mortuary archaeology–the failure to regularly reanalyze old skeletal collections to challenge the validity of previously collected data and conclusions. The authors believe that through regular reflexive view of scientific work, archaeologists can identify and often rectify problems of evidence and interpretation. The authors cite the collection of over 900 skulls accumulated by Samuel Morton from 1830-1852 which he used to develop descriptions of the cranial morphology associated with different "races" in America. Because this collection of crania was so large, it provided an influential data set from which Morton could substantiate his ideas. After Morton's death, other scholars, using newer methodologies and additional cranial samples, re-analyzed his collection and came to different conclusions. As the authors state (Buikstra and Gordon 1981:450):

> […] the accumulation of additional comparative skeletal samples *and* restudy of the original Morton collection using new observational strategies caused other researchers to call into question Morton's conclusions […]. New knowledge is gained through the refinement of prior models.

Further supporting the importance of critical theory as a means of reflexively examining our work, the authors state that in a group of 84 museum skeletal collections, in which a previous scientific problem was restudied, 62% of the reanalyses produced conclusions that were different from the original, and 31% produced conclusions that were unclear. *Only 7%* of the original conclusions were upheld by the reanalyses (Buikstra and Gordon 1981:458-459). Buikstra and Gordon further emphasize the importance of applying new techniques to the study of older skeletal collections as they come available. They found

that "When new techniques were applied to reinvestigations of old problems, new conclusions were reached in 73.7% of the cases" (Buikstra and Gordon 1981:460). These results underscore the importance of continuously questioning results from older skeletal collections. They also support the idea that in the absence of objective truth, researchers must continuously reassess previous work as a means of identifying the ways in which the historical contexts of the skeletal remains and the researchers themselves influence the interpretation of data.

In their paper *Anthropology and the Making of Chumash Tradition*, Brian D. Haley and Larry R. Wilcoxon (1997) utilize critical theory to critique ways in which anthropologists have unwittingly inserted themselves into the process of negotiating Chumash identity formation and expression, creating "spurious traditions" as described by Handler and Linnekin (1984). The authors believe these are both conscious and unconscious processes. As a result, anthropologists have promoted the establishment of a new "Chumash Traditionalism" among contemporary tribal members, and attempted to link it to past Chumash behaviors and traditions to create a sense of cultural continuity over time, which they perceive to be missing. With no written language, interpretations of Chumash cultural traditions are passed down orally and can be lost. Haley and Wilcoxon (1997) contend that many areas of Chumash culture and history have been rewritten by anthropologists. These include the creation of the name "Chumashan" by John Wesley Powell based on language affiliation, determination by others of the boundaries of their land, and reinterpretation of the meaning of Point Conception and the cardinal direction West (Haley and Wilcoxon 1997).

Although anthropological interference in identity-making has many examples, the behavior is particularly noticeable among Native Americans throughout America and across time (Haley and Wilcoxon 1997). A particularly note-worthy example is the use of Native Americans to exemplify environmentalism and harmony with nature in the 1970s. This identity creation dovetailed with established conceptualizations of Native Americans at that time as part of the "peaceful past" (Haley and Wilcoxon 1997, Dye and Keel 2011). The Chumash suffer at the hands of anthropologists and CRM archaeologists who control the discourses of power.

David H. Dye and M. Franklin Keel (2011) critique the ethnocentric and stereotypical representation of violence among North American indigenous people in their chapter *The Portrayal of Native American Violence and Warfare: Who Speaks for the Past?* They explore the ways in which the media, arts, historical accounts, and ethnographies have objectified and dehumanized Native Americans by misinterpreting the role violence played in their societies. They also criticize the Left, and postmodern thinkers who avoid the topic of Native American violence altogether. The authors believe this to be a further act of dehumanization. Dye and Keel (2011:59) state that:

> [...] researchers who bring the past to the general public should accurately portray warfare within its cultural context, thus allowing erroneous positions to be addressed and corrected.

I will be re-analyzing four old cemetery collections of Native American skeletal remains for my thesis and will use critical theory as the framework to critique the evidence and interpretations derived from the bioarchaeological reanalyses of these cemetery collections first reviewed over 50 years ago. Reflexive analysis of our own research and the work of others must be an essential part of the work of archaeology. By doing so, we can work to acknowledge mistakes and make corrections to existing understandings of Native American peoples that can potentially be injurious to their histories and identities.

Chapter 3 – Statement of the Research Problem and Hypotheses

In the last 35 years, bioarchaeology has emerged as a subfield well positioned to make important contributions to our understanding of human behavior (Larsen 1997:4-5). With its emphasis on research design and subsequent implementation through the application of multiple interdisciplinary lines of evidence, bioarchaeology stands at the forefront of efforts to make nuanced inferences about the meanings of human skeletal remains in a bio-cultural context (Larsen 1997:5, Buikstra and Beck 2006:xviii, Martin and Anderson 2014:3). Areas of interest to bioarchaeologists continue to evolve including nutrition and disease, social organization and its impact on health, gender issues, paleopathology, and demographics (Larsen 1997:4, Buikstra and Beck 2006:xviii). Anthropologists have utilized human skeletal remains to identify and interpret the types and frequency of interpersonal acts of violence among Native American populations in North America (Walker 1989, Larsen 1997:109, Kuckelman et al. 2002, Martin and Harrod 2014, Martin 2016). Collaboration with complementary sub-fields such as forensic anthropology and other disciplines outside of anthropology has produced important insights into the reasons violence may occur and how trauma and conflict manifest on the human skeleton (Martin and Anderson 2014:4). Even so, violence as a human behavior is comprised of both biological and cultural components, and therefore it is a construct that defies easy understanding and interpretation, and there is large room for error.

In their studies of the causes and the varied dimensional effects of violence, researchers have been hampered by problems of evidence and its interpretation. Specifically, some problems of evidence have arisen when scholars attempt to draw inferences about human aggression by merely quantifying and reporting the types and frequencies of skeletal indicators of violence without context (Buikstra and Beck 2006:xviii, Martin 2016). Other problems of evidence have arisen when studies are conducted on small sample sizes derived from single collections, or on data sets created by combining skeletal samples from multiple collections, disparate regions, or ethnic groups (Larsen 1997:119-120). Studies conducted by archaeologists unfamiliar with osteological and forensic techniques, without access to advanced interpretive

methodologies or clear standards for lesion identification, can further contribute to evidentiary difficulties (Larsen 1997:109-110). In addition to these issues there have been problems in the interpretation of what constitutes violence (Martin and Anderson 2014:12). Sampling biases as described above make inferences regarding the incidence and frequency of violent encounters problematic. Another critical interpretive dilemma arises when data derived from skeletal remains studied years ago continue to be used, without routinely reassessing these collections when new information and methodologies become available. As a result of this lack of reflexivity, early inaccurate perceptions about the amount and type of interpersonal violence experienced by communities remain unchallenged (Buikstra and Gordon 1981, Martin and Anderson 2014:10). This perpetuates erroneous understandings of culture.

Older collections of Ventureño Chumash skeletal remains that have yet to be repatriated provide an opportunity to perform a study to determine whether these problems of evidence and interpretation are present in association with these assemblages. Some of these collections were last analyzed many years ago. The osteological evidence derived from these early analyses is old, and the methodologies used to collect and assess these data are outdated. Conclusions about the nature and frequency of Chumash violence have been drawn from these early analyses, and continue to be applied to contemporary scholarship. As such, the Chumash have been described as being violent through much of their history (Walker 1989, Erlandson 1999, Milner 2005, Gamble 2008); and that conflict among the Chumash at the time of Spanish Contact was "rife" (Gamble 2008:249). My research asks what would a contemporary reexamination of Ventureño Chumash skeletal remains contained in cemetery sites reveal about the amount of interpersonal violence experienced by the Chumash. Two hypotheses form the basis of my research:

Hypotheses:

1. Reanalyses of human skeletal remains from Ventureño Chumash cemeteries utilized in different time periods will reveal new information about the types, frequency, and dynamics of violent interactions engaged in by the Ventureño Chumash over time.
2. Reanalyses of collections of Ventureño skeletal remains that have not been studied recently will generate new data that will be different from the earlier data and will thus require new interpretations of the amount and meaning of interpersonal violence in this group. A possible outcome of my research is that scholars will reconsider what role these remains might play in more accurately conceptualizing and interpreting Ventureño Chumash violence.

Chapter 4 – Research Design

1. Overview of the Chumash

The name "Chumash" has been applied to those indigenous peoples occupying the region which covers portions of present-day southern Central California. Settlements extended from present-day San Luis Obispo in the northwest to Topanga Canyon in the southeast. To the north, the Chumash occupied land extending into the San Joaquin Valley, and to the south, they inhabited the coastal region including the northern Santa Barbara Channel Islands (Kennett 2005, Gamble 2008, King 2011:16). Radiocarbon dating of unearthed archaeological material shows that ancestors of the Chumash have inhabited portions of this area continuously since at least 11,000 BC (Erlandson 1999, Erlandson et al. 2007). The population was devastated by disease and other factors associated with Spanish Contact and Missionization after 1542 AD. The name Chumash is still used currently as an "ethnic designation" (King 2011:16) by descendants of the Chumash who still occupy this area today. Descendent communities include members of the federally-recognized Santa Ynez Band of Chumash Indians and at least five non-federally recognized Chumash communities (McLendon and Johnson 1999:viii).

Juan Cabrillo documented the first European contact with the Chumash in 1542 AD. For the next 227 years, the Chumash remained relatively isolated from Spanish incursion until the expedition of Gaspar de Portolá in 1769, which began a period of increased European contact. This led to the establishment of six Spanish Missions within and near Chumash territory during the period 1772–1804 AD (McLendon and Johnson 1999:v). At the time of Portolá's expedition the Chumash were estimated by King (2011) to have numbered approximately 15,000 to 25,000 total residents. By 1810, less than 2,800 Chumash remained alive, in large part due to the ravages of disease and the hard labor demanded by the colonizers. High infant mortality further impacted population maintenance (McLendon and Johnson 1999:v).

Chester D. King (1990) established a chronology for the indigenous peoples of the Santa Barbara Channel Region, which divides their history into three general periods based on shell bead and ornamentation typology (Gamble 2008:50). Each period is further divided into smaller temporal periods. These have been generally substantiated

by stratigraphic analysis and radiocarbon dating. The Early Period begins in approximately 5500 BC, the Middle Period in 600 BC and the Late Period in 1150 AD, with the overall chronology ending in 1804 AD. Others, such as Arnold (1992), Lambert (1994) and Kennett (2005) have developed their own chronologies, following King's Early, Middle, and Late Period format, and have made some alterations. Kennett's work (2005) applied calibrated radiocarbon dating to his chronology to fine-tune the timeframes (Gamble 2008:6-7).

The subsistence patterns of the Chumash can be understood from evidence contained in the archaeological record. These are supported by ethnohistorical accounts. These data reveal that the diet of the Chumash included a rich array of pinnipeds, fish, shellfish, and other marine life, with the Guadalupe fur seal and the California sea lion being of high value (King 1990:52, Gamble 2008:6). They were skilled fishermen and fished from plank canoes as well as from the shoreline. Using poles, hand-lines, nets, and harpoons, an extensive variety of fish were caught. Hooks and harpoon points were fashioned from shell and bone (King 1990:49-50). These aquatic foods were complemented by small game, birds, nuts, seeds, greens and tubers. In particular, acorns accounted for a significant portion of gathered foods, and were an important part of the over-winter diet (King 1990:52, Gamble 2008:153).

The word "Chumash" represents a group of languages spoken by the residents of this geographic region. Ethnographic work done by John Harrington shows that he grouped these languages together as "Chumash" because he found them to be linguistically similar to other neighboring dialects (Callaghan 1991, McLendon and Johnson 1999). The use of the name "Chumash" to describe the indigenous peoples of the area is therefore a post-colonial construction. As such, the Chumash never referred to themselves by this name pre- or proto-historically (McLendon and Johnson 1999:v, 7). A. L. Kroeber used the term "tribe" to describe them in his 1925 work *Handbook of American Indians*, and in doing so conflated political organization with linguistic similarity. At the time of Spanish colonization in the area, there were an estimated 150 settlements speaking Chumash languages, trading, and intermarrying. However, there is little evidence that these settlements were linked to larger, organized political units (McLendon and Johnson 1999:v, 6), although Linda King (1969) suggests that the Chumash may have had

regional chiefs, with influence over larger geographical areas. Gamble (2008:62) believes that some settlements were organized (loosely) into federations that were led by "paramount chiefs." In these circumstances, one of the settlements in the federation would be considered primary.

The Chumash have been categorized as "complex hunter-gatherers" which refers to sociopolitical complexity involving differentiation in status, chiefs with power over others–particularly economically, and whose subsistence patterns are not based on agriculture (Arnold 1992). Ames and Maschner (1999:25-29) provide further detailed definitions for complex hunter-gatherer groups. Their discussion of settlement patterns that involve sedentary living in formalized settlements is congruent with the Chumash experience (Gamble 2008:12). There has been ongoing debate between scholars regarding the point at which Chumash socio-economic activity brought them to the level of chiefdom (Arnold and Green 2002, Gamble et al. 2002). Arnold (1992) and Kennett and Kennett (2000) believe that the development of chiefdoms coincided with environmental upheaval in the period 1200–1300 AD, while King (1990) and Gamble (2008:9-10) believe it occurred earlier. While there is also some debate regarding whether the Chumash attained the level of simple or complex chiefdom, it is clear that the Chumash were organized at the chiefdom level several hundred years before Spanish contact (Gamble 2008:10). Chester King (1990) notes that Linda King (1969) synthesized information taken from J. P. Harrington's notes and others, with her own excavation data from the Medea Creek cemetery to "substantiate the ethnohistoric picture of a hierarchically-ordered complex society in which political position as well as wealth was inherited but in which people could also obtain wealth by participation in the economic system" (King 1990:46). There was a social hierarchy as well, and significant prestige was associated with higher levels of society (Gamble 2008:277).

The basic Chumash socio-political unit was a named-town or village. Chiefs or "*wot*" were found in each Chumash village. Those in this inherited position performed a variety of functions, including food distribution and the maintenance of stored food as a buffer against environmental inconsistency (Gamble 2008:58-59). Chiefs belonged to the *'antap* society, which was an elite group responsible for ritual performance and festival organization (King 1969, 1982, King 1990:56, Gamble 2008:277). Larger villages had

more than one chief. There were other specialized positions within Chumash society, including those responsible for healing, burying the dead, building canoes, and manufacturing a wide array of goods for local use and trade (Hudson et al. 1978, King 1990:56-59, Gamble 2008:58-59, 276-277). Members of highly-ranked Chumash families intermarried with other highly-ranked families regionally, which assisted in solidifying trade networks and political alliances (Gamble 2008:10, 264-265). Intermarriage also took place with other social groups along territorial borders.

The work of this thesis centers upon the Ventureño Chumash. Ventureño was spoken from present-day Ventura to the west along the coast to Topanga Canyon in the east and extending northward into the mountainous interior of the territory. The eastern edge of the territory occupied by the Chumash lay adjacent to the area occupied by the Gabrieliño-Tongva and Tataviam. Figure 1 illustrates the location of the different language groups, with the location of the Ventureño Chumash being indicated.

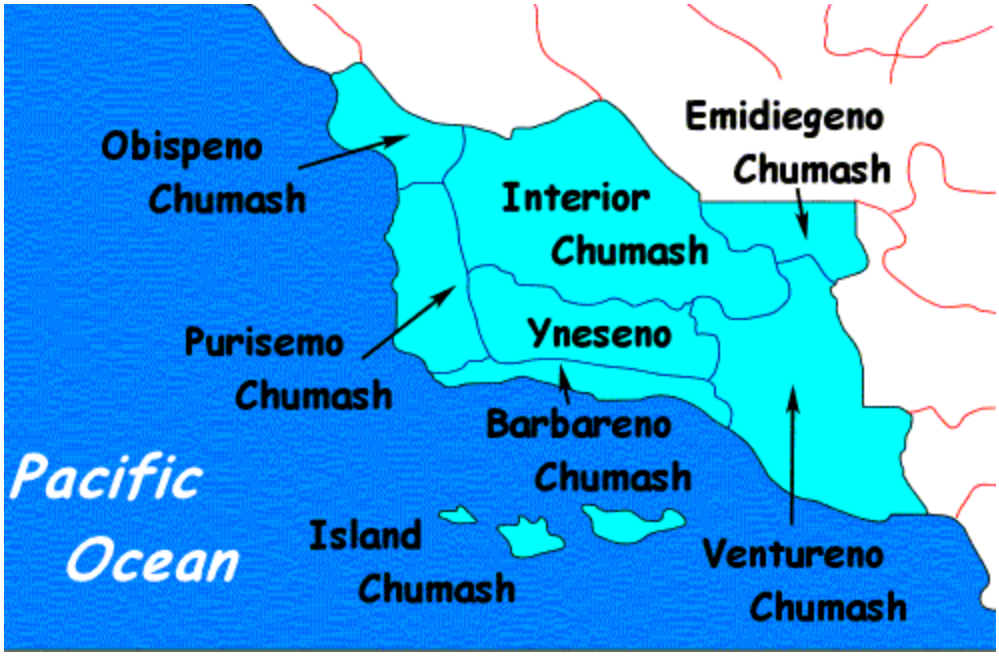


Figure 1: Location of Chumash Language Groups
Source: http://www.bsahighadventure.org/indian_lore/chumash.gif

2. Chumash Mortuary Rituals and Practices

The Chumash had clearly established mortuary rituals and practices for use in handling the dead. Permanent villages contained cemeteries defined as special demarcated areas for the placement of deceased individuals. The use of cemeteries by the Chumash has been documented as occurring for centuries (King 1990, Hollimon 2001). Areas set aside for the purposeful placement of the dead have been used by the Chumash at sites in Santa Barbara dated to Chester King's (1990) Early period, which extended from 5500 BC to approximately 600 BC (Lambert 1994, Hollimon 2001:48, Gamble 2008:116).

Human remains were buried underground, with the Ventureño Chumash holding a wake and burial five days after death (Hollimon 2001:44). Crespí in his journals of 1769 and 1770 provides highly detailed descriptions of Chumash cemeteries and funeral rituals. In one of these he notes that sexes were separated upon burial, with different cemeteries for holding men and women (Gamble et al. 2001:190-191, Gamble 2008:117). However, Gamble et al. (2001, 2002) refute this, and many researchers have noted an extensive number of Chumash cemeteries in which the sexes were mixed (King 1969, 1982, Bickford 1982, Martz 1984, Lambert 1994, Walker 1996, 2001, Gamble et al. 2001).

Chumash mortuary practices indicate that deferential status among the living was carried on in death. This is illustrated by differences in burial depth and the distribution and quantity of grave goods found associated with the burials. The higher the status, the more elaborate the burial appears to be (King 1969, 1982, Gamble et al. 2001, Hollimon 2001).

The role of "undertaker" was carried out by an *'aqi* who was a ritual specialist entrusted with performing the proper rituals to ensure safe passage to the afterlife (Hollimon 2001). The *'aqi* was paid by the deceased person's family according to the number of baskets of soil removed in the burial process. Thus, deeper burials cost more than shallow ones (King 1969, Gamble et al. 2001). Grave goods in the form of beads, stone tools, projectile points, baskets, mats, and other items were placed in the graves by loved ones (Kennett 2005:127). While it could be inferred that these items found with remains belonged to the dead individual, Hollimon's (2001) research shows poor

congruence between the biological sex of the dead person and the gender associated with specific items as noted in ethnographic descriptions of their use. For example, fishhooks and projectile points, which are often associated with traditionally male activities, were found equally in both male and female burials. Hollimon points out that "the deceased's property was burned and burial accompaniments were belongings of the dead person's *loved ones* not the property of the deceased" (Hollimon 2001:51–italics mine). Gamble et al. (2001:194) further caution that utilitarian objects found in burials at the Malibu site should not be assumed to have had a purpose in assisting the individual after death, and may have a significance that is unrelated to their use in life.

It was not a customary Chumash practice to cremate the dead. It is rare to find cremated Chumash remains in the cemeteries near Santa Barbara. King (1982:57-58) notes that a few cremated remains have been found at the Las Virgenes site in the Santa Monica Mountains (CA-LAn-229). Cremation was the custom of the Gabrieliño/Tongva to the east (King 1982), which may account for the finds at Las Virgenes, an area close to the border with the Chumash. The personal belongings of the Chumash dead were burned, although this practice differed in parts of Chumash territory (King 1969). Hollimon (2001) notes that the purpose of this practice may have been to eliminate the person's effects so that the soul would have no reason to return to repossess them. Burning of personal effects also took place at official mourning ceremonies which were held every several years, and hosted by the village chief. The personal effects of those who had died during the time since the last ceremony were burned (Green 2001, Hollimon 2001:45). This took place in a large pit dug for the purpose, and afterwards, was filled with dirt. I found no evidence that burning associated with the periodic mourning ceremony took place at individual gravesites.

Bodies were placed in the ground primarily in either a loosely or tightly flexed position on either side, with the hands up near the face or chest (Galdikas-Brindamour 1970). Kennett (2005:127) states that flexed burials were common in the Southern California area and had been found in early Native American burials in a cemetery on Santa Catalina Island in the early Holocene. Erlandson (1999) notes that Middle to early Late Holocene Chumash burials also contained elaborate grave goods. The deceased were oriented in the ground in a variety of directions (Galdikas-Brindamour 1970), with

west predominating (Haley and Wilcoxon 1999, Green 2001). The Chumash reused cemetery space, rather than expanding the size of the cemetery to accommodate new interments. Existing burials were disinterred, the bones collected and re-placed in the ground as the fresh burial was being refilled (Bickford 1982:6, Hudson and Blackburn 1986:70). This practice extended into the Late Period (Gamble et al. 2001), and accounts for significant numbers of disassociated skeletal elements found at a number of Chumash cemeteries.

There appears for the most part to be considerable continuity in the mortuary behavior of the Chumash over time and space. Even when faced with existential threats brought on by Spanish contact, their mortuary rituals exhibited little change (Green 2001). The archaeological record provides evidence of consistent behavior with regard to Chumash burial practices that extended over centuries.

3. Site Selection Criteria

The selection of sites for use in this study was a critical component of its formulation. I developed a number of criteria to guide the site selection and screening process for my research. The first criterion was to draw my collections from as small a geographical area as possible. This minimizes differences in climate, diet, and range topography experienced by individuals living at these sites. Second, I wished to use mainland sites exclusively, rather than mix island and mainland sites. This eliminates biases in the results that may stem from peculiarities in subsistence and social patterns unique to island living. Third, and perhaps the most difficult, I wished to select collections that were temporally contiguous, which would permit the examination of skeletal patterns of violence over an uninterrupted stretch of time. I believe this builds a stronger case for my inferences regarding changes in the types and frequency of skeletal trauma linked to violence over time. Fourth, I hoped to be able to utilize collections housed and curated at the same facility. This ensures that similar housing and curation methods have been applied to all collections. Additionally, associated inventory and analysis of the remains potentially would have been conducted and documented by the same staff members.

Application of these criteria led to the selection of four collections of skeletal remains from cemeteries located in three Ventureño Chumash sites within 10 miles of

each other in the coastal Santa Monica Mountains of California. Figure 2 illustrates the general location of these sites (bordered in red) within the larger Chumash territory.

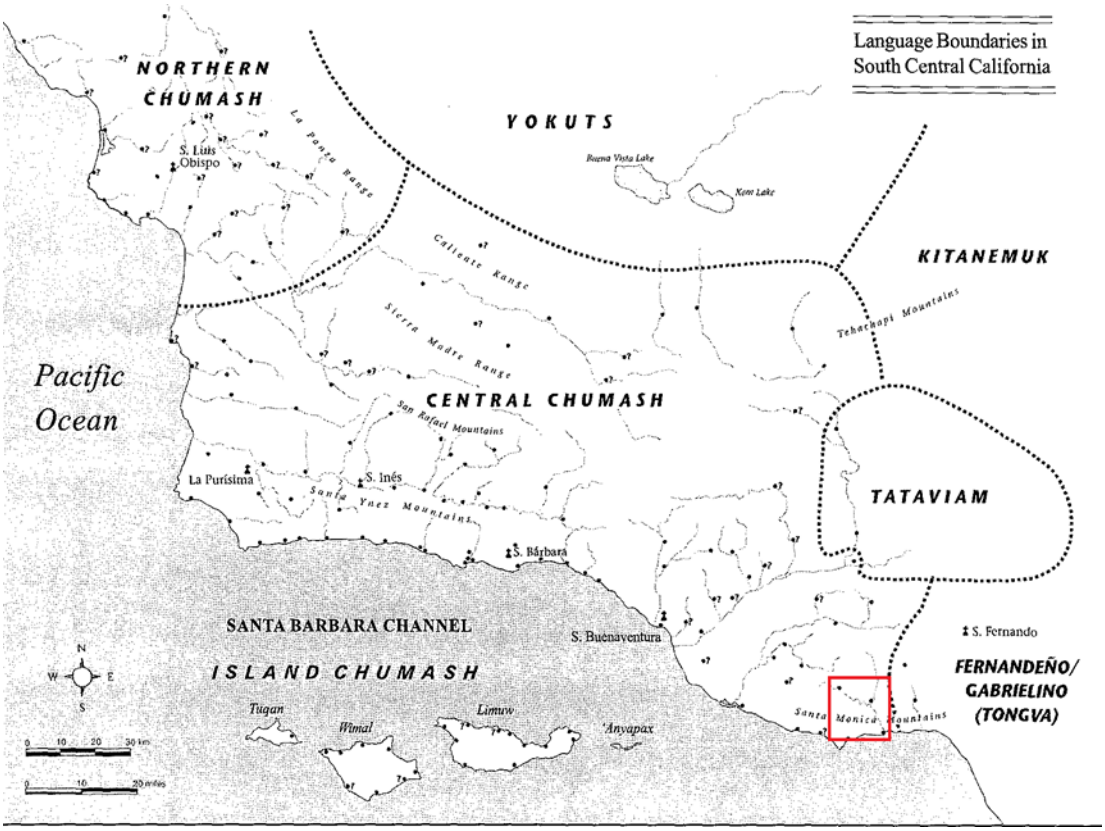


Figure 2: Map of Chumash Territory and Location of Ventureño Chumash Sites Studies in this Work
(Modified from McLendon and Johnson 1999:23)

These collections of mortuary remains contiguously represent the time period 900 AD to 1805 AD, and are housed at the Fowler Museum at UCLA Archaeology Collections Facility. The earliest remains come from a cemetery at the Ventureño village of Humaliwo (present day Malibu) utilized from 900 AD – 1150 AD, which places it in Chester King's (1990) Chumash Middle Period, Phase 5. The remains and associated material culture from this cemetery are curated as CA-LAn-264 Accession 573. Scholars have referred to this cemetery as the "Malibu Prehistoric cemetery" in previous works. It will be identified in this study as the "Malibu Middle Period 5 cemetery." The second cemetery comes from a site near the present-day Mulholland Highway which was utilized by the Ventureño Chumash from 1200 AD – 1500 AD. Remains and associated material

culture are curated at the Fowler as CA-LAn-246 Accession 396. In this study, this site will be referred to as the "Mulholland cemetery." The largest collection comes from a cemetery on Medea Creek utilized from 1500 AD – 1785 AD. Remains and material culture associated with this site are curated as CA-LAn-243 Accession 494. This site will be referred to as the "Medea Creek cemetery." The final collection comes from a second cemetery used at the Humaliwo (Malibu) site described above from 1785 AD – 1805 AD. This cemetery assemblage is identified as CA-LAn-264 Accession 572 located at the opposite end of the village of Humaliwo from the Malibu Middle Period 5 cemetery. Scholars have referred to this cemetery as the "Malibu Historic cemetery." For the purposes of my study it will be referred to as the "Malibu Historic Period cemetery." Figure 3 provides a more detailed view of these sites in relation to each other.

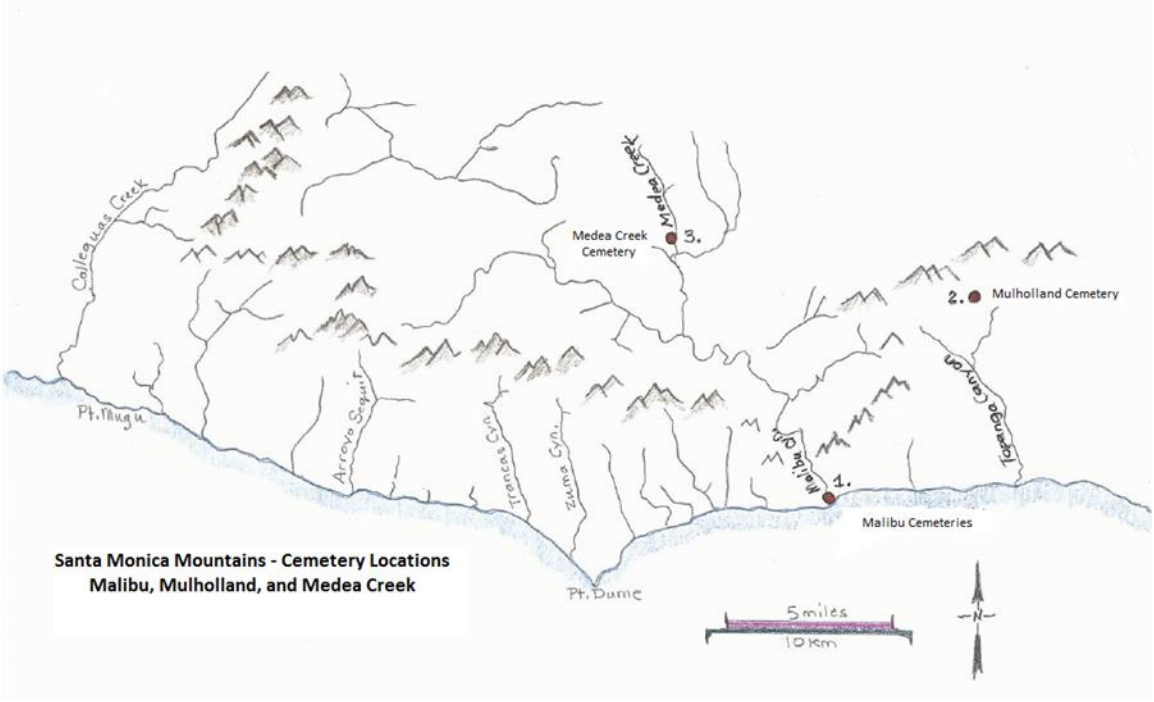


Figure 3: Relative Locations of Ventureño Chumash Cemetery Sites Used in the Present Study
(Two Malibu Cemeteries, Mulholland, and Medea Creek)

4. Site Descriptions

a. Malibu Middle Period 5 (900 AD – 1150 AD)

The site containing the Middle Period 5 cemetery at Humaliwo is a coastal archaeological site located in present-day Malibu, California. Humaliwo is a Ventureño Chumash place name meaning "the surf sounds loudly" (McCall and Perry 1996, King 2011:164). It lies to the east of Malibu Lagoon, where Malibu Creek empties into the Pacific Ocean. Fresh water was readily available for settlement residents from Malibu Creek. The area provided a wide variety of foods for subsistence, including fish and other marine life, small game, plants, seeds, and nuts. Dental analyses of residents during this time-frame confirm a large amount of grit in the foods that were consumed (Douglass and Stanton 2010).

The Humaliwo site has been utilized at least since the beginning of Chester King's (1990) Middle Period which he estimates to have begun between 600 BC – 200 BC. Occupation continued up through European contact (Douglass and Stanton 2010). Humaliwo was a Ventureño Chumash social, political and economic center. Trade between other villages both inside and outside the Chumash sphere of influence was an important component of life for residents of this village (King 1982, Gamble et al. 2001, Gamble 2008:264-265). Extensive kinship ties through marriage were established with inland villages as well as with the Western Gabrieliño/Tongva who occupied adjacent territory to the east of the village (King 1982, McLendon and Johnson 1999:78-79).

The Malibu Middle Period 5 cemetery on this site was excavated as a salvage project in a period extending from 1972–1975 under the direction of Clement Meighan. The excavation effort utilized members of the UCLA Archaeological Survey and several UCLA archaeological field classes (Bickford 1982, Douglas and Stanton 2010). The overall site CA-LAn-264 has been divided into five different areas based on chronology. Area 1 contains the Malibu Historic Period cemetery and human remains are catalogued under Accession 572. This is the fourth cemetery covered in this research and further details regarding it are discussed later in this section. Areas 2, 3, and 4 are middens and contain three Middle Period burials (300 AD – 700 AD), which are not included in my research as they are not associated with either cemetery and they fall outside the

chronological range of this study. Artifacts retrieved from these three areas have been dated from 800 BC to 1550 AD. Area 5 contains the Malibu Middle Period 5 cemetery. Remains from this location have been dated from 900 AD to 1150 AD through artifact associations and shell bead typology (King 1990).

b. Mulholland (1200 AD – 1500 AD)

The Mulholland site encompasses the remains of a village and an associated cemetery. It is located on the northern side of the Santa Monica Mountains approximately 10 miles from the Pacific Coast and present-day Malibu (Galdikas-Brindamour 1970). This location would have been covered by chaparral, tall grasses, and sage at the time of its occupation. Live oaks and other large trees would have been prominent features of the landscape. The area was bordered by arroyos, and fresh water came from one, and possibly two springs that provided water year-round (Galdikas-Brindamour 1970). Research indicates that the village at Mulholland was occupied by various residents at various times throughout the year and multiple activities took place there. Artifacts found at the site indicate that trade with neighboring sites was occurring, but whether trade was the primary reason for the existence of the village cannot be stated with certainty (Galdikas-Brindamour 1970). Radiocarbon dates confirm a temporal range for use of this site from 1200 AD to 1500 AD.

A salvage excavation of this site was directed by Alex Apostolides of the UCLA Archaeological Survey in the second half of 1963. Excavation was prompted by the fact that the site was to be destroyed for the development of multiple housing units. The site was well known by looters and pothunters, and damage to artifacts and human remains occurred on a regular basis (Galdikas-Brindamour 1970). Because it was believed that the site was going to be destroyed by bulldozers in the very near future, the excavation was hastily performed and did not conform to standards of practice at the time. Only a portion of the cemetery was excavated. Animal activity in the form of extensive rodent and gopher burrows had caused displacement of artifacts and remains. This made performing any stratigraphic analyses difficult (Galdikas-Brindamour 1970). Galdikas-Brindamour (1970:124-125) goes on to state:

> The excavation history of LAn-246 constitutes a classic case history of the efforts of a few dedicated archaeologists attempting to recover data in a legitimate

> and systematic manner while being hampered by unchecked vandalism and looting of the site on one hand and public indifference to this pothunting on the other. […] Further, not only did such vandals sink random potholes in all areas to such an extent that the site resembled an old minefield […] but they consistently potted the pits […] knocking down sidewalls, feverishly tearing out parts of burials and scattering less attractive artifacts […] all over the site.

c. Medea Creek (1500 AD – 1785 AD)

The site CA-LAn-243 containing the Medea Creek cemetery and its associated village is located in the Santa Monica Mountains near present-day Agoura, CA. This inland Chumash site is approximately 9 miles northwest of the coastal village of Humaliwo (Green 2001:321, Gamble 2008:211). The cemetery is located approximately 300 yards north of the village which it served. The location of the village of Medea Creek allowed residents to take advantage of fresh water sources from the creek itself, the larger Malibu Creek into which it runs, and the marine resources of the estuary and Pacific Ocean only 9 miles away through the Santa Monica Mountains. Aspects of the landscape at the time of occupation would have been similar to that found at Mulholland and would include chaparral, drought-tolerant shrubs and coastal sage, along with large trees and flora that would have flourished in a hilly Mediterranean climate. Although specific population figures for the Medea Creek village over the term of its occupation are not available, it was a sedentary village at the periphery of the Chumash occupational area (King 1969, 1982). Intermarriage between the Chumash and Gabrieliño/Tongva took place with the border location of this village certainly facilitating this practice. The village of Medea Creek (as was Mulholland) was perhaps a peripheral village that acted as a satellite village to Humaliwo, whose coastal location and large size made it a more likely trading center (Galdikas-Brindamour 1970, Gamble 2008:264-265). In April, 1770 AD Father Juan Crespí, who was a member of Gaspar de Portolá's expedition, noted the presence of a village on Medea Creek containing twelve thatched huts (McLendon and Johnson 1999). His journal entry provides an idea of the population of Medea Creek village just prior to the abandonment of the cemetery in 1785.

The excavation of the cemetery began in April, 1966 after work crews uncovered human skeletal remains as they began work on the construction of a shopping center at the location. The UCLA Archaeological Survey hastily organized a voluntary excavation team to preserve the remains before the construction project obliterated the cemetery. Two UCLA undergraduate students, Linda Barbey King and Linda Hasten, supervised the excavation crew. As Linda King (1982:39-40) notes in her dissertation:

> Medea Creek Cemetery was excavated under less than ideal circumstances. Bone measurements were not taken in the field because physical anthropologists were not available and it was not generally the usual contemporary procedure. There was a high turnover of the crew due, in part, to the long, hard working conditions, particularly in the hot summer […]. Vandalism was a constant threat, especially during week days when the excavations were left unguarded […]. Numerous rodents, attracted to the soft soil of the cemetery, scattered artifacts and small bones throughout the matrix of the site. Unfortunately, it was often difficult to discriminate between rearrangements of bones and artifacts by animals and those produced by human activity.

After the excavation was completed in December 1966, the remnants of the cemetery were paved over to create parking for the Agoura Meadows Shopping Center, located at the intersection of Kanan Road and Thousand Oaks Boulevard in Agoura (King 1982:48).

d. Malibu Historic Period (1785 AD – 1805 AD)

As noted previously, the Humaliwo (Malibu) site CA-LAn-264 contains two cemeteries. The earlier Malibu Middle Period 5 cemetery is located *south* of present-day Pacific Coast Highway. The later Historic Period cemetery is located to the *north* of Pacific Coast Highway and occupies a space approximately 35 feet by 45 feet in size (Bickford 1982:4). As also noted earlier, the Malibu site is located on a sandy beach with access to fresh water from Malibu Creek. While access to a variety of marine animals, fish, small game and plants for subsistence remained from earlier periods, the diet of the Chumash had changed substantially by the Historic Period. Land was cleared to support the establishment of "rancherías" and farming operations supervised by the Spanish.

This resulted in the degradation of the natural habitat which led to less reliance on fishing, hunting and gathering, and a greater dependence upon cultivated foods, such as corn and fruit (Bickford 1982:2, Walker et al. 1996, Douglas and Stanton 2010). Habitat loss forced increased interactions between the Chumash population of Malibu and the Missions San Buenaventura and San Fernando some 30 and 20 miles away respectively. This contact exposed these native people quickly to infection and their general health declined (Douglas and Stanton 2010).

The Historic Period cemetery on this site was utilized for a very short time from 1785 AD to 1805 AD. This was a tumultuous period for the Chumash at Malibu as the effects of Spanish occupation were acutely felt, despite their isolated location (Gamble 2008:269, Douglas and Stanton 2010). It has been suggested that those buried in this cemetery chose to remain outside the Mission system (Bickford 1982) rather than be buried in the consecrated ground at the Missions that was reserved for the converted.

This cemetery was excavated in 1972 in four phases by Nelson Leonard and Christopher Donnan, with assistance from Chester King. Dating of this cemetery was accomplished through analysis of the extensive numbers of glass trade beads, ceramic, glass, and metal fragments found at the site. Many of the burials in the Mission Period cemetery were disinterred in poor condition and with dissociated skeletal elements. Bickford (1982:6-7) notes:

> The Chumash custom of digging up old burials in order to make room for new ones, then replacing the bones in the burial pits as they were being refilled frequently made it difficult to identify position and orientation […]. Several disassociated skulls were recovered. Whether their placement was deliberate or an incidental result of reburial is not known.

These two Malibu cemeteries were used at two different periods. Malibu Middle Period 5 cemetery was used from 900 AD – 1150 AD, while the Malibu Historic cemetery was used for a short time from 1785 AD – 1805 AD. There was therefore a 600-year time span between the uses of the two cemeteries. The burial locations were found in two discrete areas of the large village of Humaliwo. Gamble et al. (2001:188) state "At Malibu, in contrast, artifact associations show that there is little or no mixing of

prehistoric and historic burials. These temporally discrete cemeteries make it possible to compare mortuary practices […]." Because there is no commingling of remains between cemeteries, their inclusion in my data set offers an exceptional opportunity to draw inferences about skeletal remains of individuals living in the same settlement area yet separated by a significant time period.

5. Sample Creation Criteria

After the selection of the sites, I established criteria for the creation of samples of skeletal remains from each cemetery for re-examination and analysis. I created my samples from each cemetery population described above. Each sample contains only remains that can be determined with confidence to be from individuals 15 years or older. In addition to adults, I have purposefully included those aged at death between 15 and 19 years old. Because my research analyzes skeletal evidence of violent encounters, the inclusion of this sub-adult age cohort enhances the rigor of this study as members of this age group, and particularly the males, are likely to have been either perpetrators or victims of violence. To exclude them would have the potential to bias my results.

I required that each individual be represented by a minimum of three long bones for inclusion in the samples. Most have many more. Single osseous elements representing entire individuals do not provide enough information from which to draw inferences. Multiple long bones provide additional context concerning the overall skeletal condition of the individual, and increase the opportunity for constellations of skeletal injuries to be identified that are known to be associated with violent encounters. I drew a single sample from each cemetery, creating four cemetery samples representing a contiguous time frame spanning 900 years. I required that the minimum size of each sample be 30 individuals for statistical purposes. However, all the samples I created exceed this criterion (see Chapter 6).

6. Skeletal Signatures of Violence

Scholars have recognized that skeletal injuries occurring as a result of interpersonal violence can provide valuable information as to the nature and frequency of violent occurrences within and between social groups (Walker 1989, 2001, Larsen 1997:119, Martin and Anderson 2014). The process of recognizing osteological evidence of violent encounters in samples of skeletal remains is not a precise one. It is hampered by several

factors, including 1) difficulties in distinguishing between purposefully-inflicted and accidental injuries (Larsen 1997:109), 2) the influence of poor excavation technique on preservation of skeletal elements (Milner et al. 2000) and their spatial distribution as well as associated context, and 3) the impact of looters (Gold 2004:110, Jackes 2014). While acknowledging these difficulties, bioarchaeologists utilize skeletal markers of traumatic injury as one means of beginning the process of identifying pathologies associated with violent encounters. However, in the majority of cases, the presence of isolated signatures of trauma cannot, in and of themselves, confirm that a violent encounter occurred. Additional lines of contextual evidence are required to more confidently confirm that interpersonal violence took place (Martin and Anderson 2014). These lines of evidence take many forms. For example, violent acts may require several signatures to be in place *in combination* to support a conclusion of violent intent (Smith 1996, Larsen 1997:110-113, Jackes 2014). Skeletal lesions may be required to have specific shapes and locations to allow for inferences of violence (Walker 1989). Bioarchaeologists and osteologists cannot confirm that violent acts took place by simply counting lesions that "look like" they may have been caused by the premeditated use of weaponry or force (Milner et al. 2000, Martin and Harrod 2014).

Walker (2001) provides a definition of violent injury and distinguishes it from accidental injury in a bioarchaeological context. Violent injuries are "skeletal injuries for which there is strong circumstantial evidence of malevolent intent" (Walker 2001:576). For example, skeletal injuries such as those caused by embedded projectile points would meet this definition. He urges scholars to "reserve the term accidental injury for cases lacking such clear evidence of malevolent intent" (Walker 2001:576). These are the definition of violent injury and its distinction from accidental injury I use for my thesis. These definitions of terms lead to a conclusion that violent activity should not be assumed. Care should be taken to understand the contextual evidence associated with the injury to further corroborate conclusions and to reflexively review assumptions about what might constitute violence from our cultural perspective. Violent activity should not be the first explanation offered to identify the source of a skeletal lesion. Violence should be an alternative explanation.

The literature shows that a number of specific skeletal markers are used as evidence to indicate violent injury in Native American populations. Noting "the enormous variation in skeletal evidence of conflict in past populations", Larsen (1997:120) lists a number of these markers, citing numerous scholars who have used them. These include arrow wounds, decapitation, cut marks, mutilation such as scalping, parry fractures of the forearm, and depressed cranial fractures (Larsen 1997:119-121). Milner (2005) also identifies a number of markers used to exemplify violent trauma in North America. These consist of projectile point injuries, slicing and chopping trauma, perimortem cranial and post-cranial blunt force trauma, incisions which result in disarticulation, and scalping. Andrushko et al. (2005) hypothesize that cut marks on distal humeri found in prehistoric Central California Native American populations are markers indicating dismemberment and trophy-taking. Walker (1989) describes healed depressed cranial fractures as a signature of violence among indigenous peoples of prehistoric Southern California. Whyte (2001) identifies burning of human bones as a signature of violence that can occur as part of the practice of cannibalism, human sacrifice, and torture.

For this thesis, I will utilize seven skeletal markers of interpersonal violence to inform my analysis of four samples drawn from Ventureño Chumash cemeteries. These are burning, cut marks, healed cranio-facial fractures, healed post-cranial fractures, peri-mortem fractures, projectile point injuries, and dismemberment.

a. Burning

Humans have used and manipulated fire for thousands of years. Cremation or the ritualized burning of human remains has been and continues to be a cultural practice among many societies around the world (White 1992, Whyte 2001). Native American societies in California have associated burning with mortuary practice in a variety of ways, including cremation of the body, burning of the possessions of the deceased and pre-internment grave-pit burning (King 1969, 1982, Grant 1978:513, Hollimon 2001). Fire has also been used by a variety of cultures in situations of ritualized violence, such as suicide, murder, and human sacrifice (Whyte 2001, Devlin and Herrmann 2013, Imaizumi 2015). Fire contributes to the practice of human cannibalism by providing a means of cooking human flesh (Turner and Turner 1992, 1999). Human interaction with fire can also be unintentional, as in the cases of accidents and wildfire. Fire presents

several challenges to physical anthropologists in archaeological sites, including distinguishing the source of the fire damage, determining whether its cause was purposeful, ritualized, or accidental, and most basically confirming whether the bone is human or faunal (Buikstra and Ubelaker 1994:95, Whyte 2001).

Fire and heat have a significant impact on human bone, altering it, and at high enough temperatures, destroying it. Forensic anthropologists have done extensive work on thermal bone alteration to better understand these processes of modification and destruction (Dirkmaat 2002). Early work in studies of the effect of fire on human remains was not done by forensic specialists but by archaeologists interested in cremation practices (Baby 1954, Symes et al. 2008).

When human bone is heated, it progresses through a series of physical alterations. Baby (1954) conducted one of the first studies to look at the changes that occur to human bone when cremated. He examined Native American remains from the Hopewell culture, indigenous people living in the Ohio Valley during the Middle Woodland Period (300 BC – 300 AD). He identifies three basic classifications of burned bone that he labels "non-incinerated", "incompletely incinerated", and "completely incinerated" based upon surface morphology and bone color. Baby (1954) concludes that the most important factors contributing to the changes seen in bone are the proximity of the bone to the source of the fire and the length of exposure to it. Subsequent work by others expands upon Baby's observations to note that bone color and surface morphology are also impacted by the condition of the bone at the time of cremation. Fresh, fleshed bone reacts differently than dry, skeletonized bone (Binford 1963, Buikstra and Ubelaker 1994:95-96, Whyte 2001, Devlin and Herrmann 2013, Imaizumi 2015). Further contributing to changes in bone color is the temperature of the fire. When exposed to increasing temperature, bone will change in color from beige to brown, dark brown, blue, grey, and white. White bone is considered calcined and occurs at temperatures exceeding 1200°F (Buikstra and Ubelaker 1994:95, Devlin and Herrmann 2013, Imaizumi 2015).

Whyte (2001) established criteria to assist excavators in identifying cremated human remains in the field. Elements indicating human cremation include 1) calcined bone elements, 2) long bone fragments with cracks, longitudinal splits and some warping, 3) fragments that display no evidence of perimortem fracture of fresh bone, 4) ethno-

historical data regarding cremation available for cross-reference, 5) bone discovery in a burial context, 6) the presence of an urn, or jar containing bone dust and calcined fragments.

Building upon this early work, Symes and colleagues (2008) conducted studies of prehistoric Native American cremations from Hopewell and Adena sites in the Upper and Lower Mississippi River area. They identified seven fracture patterns and forms of warping which have been used to create standardized cremation signatures on both fleshed and defleshed bones (Symes et al. 2008). Curved transverse fractures and warping indicate cremation of fleshed bone. Longitudinal fractures with splintering rather than warping indicate cremation of dry, defleshed bone (Whyte 2001, Symes et al. 2008:42-43, Thomson 2008, Ulquim 2015).

There are also burn signatures that can be observed on human bone that are not related to cremation, but could be associated with violence such as cannibalism. These include signs of perimortem fracture of fresh bone with marrow extraction (White 1992), and bone burned after disarticulation during the cooking process (Turner and Turner 1999). Turner and Turner (1999) believe that in a cannibalized bone assemblage, between 2% and 35% of the bone elements should show evidence of burning. White et al. (2012:467) believe that "burning of the bone associated with roasting is often concentrated on the subcutaneous surfaces of bones such as the cranium, mandible, and tibia." In addition to burning, other signatures will be present such as cut marks which are not destroyed by fire.

Burned bone can also be the result of raiding or attacks on villages where individuals are trapped in burning homes. Members of the Portolá expedition conducted overland in 1769 in Southern California noted several incidents where burning associated with violent activity occurred in Chumash communities when a village was raided, its inhabitants killed and the village was subsequently burned to the ground (Grant 1978:513). Gamble notes that Crespí's journal, written in 1769, identifies five villages burned by the Chumash (Gamble 2008:259) which suggests the Chumash used fire aggressively against others.

I have included burning as a skeletal signature of a possible violent inter-personal encounter. For my research, evidence of burning includes any fire-induced marking of

skeletal remains ranging from surface discoloration to calcination and ash-production, as well as warping, cracking, and shattering of bone due to exposure to fire. Evidence discussed above will be used to identify and differentiate burned elements resulting from violent encounters and those with another etiology in the analysis of my samples. Based on these works, I have established criteria to apply to examples of burned bone I find in my samples. Burned bone existing in isolation with no other skeletal or contextual evidence of possible violence, and remains determined to be examples of cremation after the application of Whyte's (2001) criteria will be eliminated as exemplifying violent encounters. However, burned bone that is associated with cut marks on the long bones, neurocranium and splanchnocranium, and at major joints and points of articulation, burned bone associated with evidence of cooking, and bone identified as fresh at the time of its burning will be considered examples of skeletal remains that suggest a violent origin.

b. Cut Marks

Modifications to bone in the form of cut marks can be observed on human skeletal remains. Cut marks on bone can result from both human and non-human activity and occur for a variety of reasons (White et al. 2012:464). Researchers have documented examples of cut marks on Native American skeletal remains that appear to have been created accidentally (Larsen 1997:109, Smith 1997, Milner et al. 2000), purposefully (Buikstra and Ubelaker 1994:98, Walker 1996, 2001, Larsen 1997:120-121, Novak and Kollmann 2000, Milner 2005, Martin and Harrod 2014) and in some cases, ritually (Larsen 1997:136-137, Andrushko et al. 2005, Eerkens et al. 2016).

There are several modifications to human bone that are not caused by human activity but resemble cut marks. These marks are created by post-depositional taphonomic processes. Carnivore and rodent activity such as gnawing, trampling and dragging create a variety of different types of cut-like marks on bone and have a significant impact on both element preservation and association (Larsen 1997:109, Smith 1997, White et al. 2012:464). Other types of bioturbation that can cause marks resembling cuts include the movement of water and ice, ground pressure, rock falls, and plant roots (Buikstra and Ubelaker 1994:103, White et al. 2012:462-463).

Human activity can produce cut-like modifications to human skeletal remains both inadvertently and purposefully. Examples include inadvertent damage by looters and during excavation by picks, trowels, and small tools, and damage occurring as part of the cleaning and curation process (Milner et al. 2000, White et al. 2012:468). Additionally, mortuary rituals and practices such as secondary deposit resulting from reuse of existing burial sites can cause unintended damage to bone resembling cut marks (Gamble et al. 2001, White et al. 2012:466). Cut marks on bone that occur intentionally are almost always associated with violence. They can result from altercations with bladed, blunt, or pointed weapons and projectiles, and ritual behaviors such as dismemberment, cannibalism, mutilation, and trophy-taking in the form of scalping (Smith 1995, Larsen 1997:120-121, Andrushko et al. 2005, White et al. 2012:466-468).

Discerning how and why cut marks may appear on human skeletal remains is a difficult task (White et al. 2012:466) but a critical one. A number of studies have been conducted to develop a better understanding of the "signatures" left by tools, weapons, teeth and post-depositional taphonomic processes on bone to assist in identifying the sources of these marks. The following discussion reviews the distinctive characteristics of cut-like bone modifications found in archaeological collections as derived from these studies.

The patterns of marks made on bone by canids and rodents are discreet and have been identified among collections of Native and North American skeletal remains. Haglund (1992), Milner et al. (2000), and White and Folkens (2005:57) show that bones can be chewed through by rodents, which is confirmed by the presence of bone fragments in their burrows. Klippel and Synstelien (2007) conducted a study in which they documented the marks made by rats and squirrels on human bone. They note that the chisel-shaped upper incisors of rats create paired parallel tracks, and the squirrel teeth make parallel, flat-bottomed grooves on human bone, which are distinctive and identifiable. White et al. (2012:464) describe carnivorous animal damage to human bone as being characterized by "pitting, scoring and puncturing of the bone surface." They go on to state that "The chisel edge of the rodent incisor is used to shave away the surface bone, producing a distinctive, fan-shaped pattern of regular, shallow, parallel or subparallel, flat-bottomed grooves that are usually concentrated on the projecting surface

of the bones" (White et al. 2012:464). White et al. (2012:464-465) also state that the lack of striae found in rodent teeth marks are also important identifying markers. Dogs, wolves, and coyotes produce marks on bone that can be clearly distinguished from rodent activity (Haglund 1992, 1997). Canids create distinctive crushing injuries to trabecular bone at the ends of large long bones in the attempt to extract bone marrow (Buikstra and Ubelaker 1994:98, Haglund 1997, White et al. 2012:464). These take the form of round puncture marks or complete destruction of the bone (White and Folkens 2005). Other forms of bioturbation caused by plant roots can create distinctive tracks on bone that are branched and reminiscent of vessel grooves. These marks are caused by acid secreted by the plant which also can make the grooves whiter than the rest of the bone (White and Folkens 2005:57). The grooves are rounded and do not display a distinctive "V" shape seen in sharper cuts (White et al. 2012:468). With older roots, the grooves can be deep and semi-circular and appear in a random pattern (Turner et al. 2013:75). Plant root marks can appear in a variety of shapes and sizes and can be confused with pathological lesions (Buikstra and Ubelaker 1994:97, Turner et al. 2013). Finally, exposure of bone to long periods of moving water can shear sections of bone away in a manner that resembles damage from a wide blade (White et al. 2012:463, Elizabeth Miller, Ph.D., personal communication 2015).

Cut marks caused by spades, trowels, and other digging tools during excavation and cleaning can create unintentional longitudinal cuts on bone that can be confused with cut marks created by violent acts (Milner et al. 2000, Walker 2001). Buikstra and Ubelaker (1994:99) state that the color of the bone at the base of the cut can be helpful in providing a relative timeframe for determining when the damage may have occurred. Excavation tools leave marks that are lighter in color than the surrounding bone, particularly on older skeletal material that has been buried for a long time (Walker 2001). Additionally, trowels, spades, and shovels make cut marks that are wider than cuts made by stone tools and metal weaponry (Milner et al. 2000). Looters can be highly destructive to dry bone by punching large holes in cranial elements and cutting long bones completely in two in the hasty search for artifacts (Galdikas-Brindamour 1970).

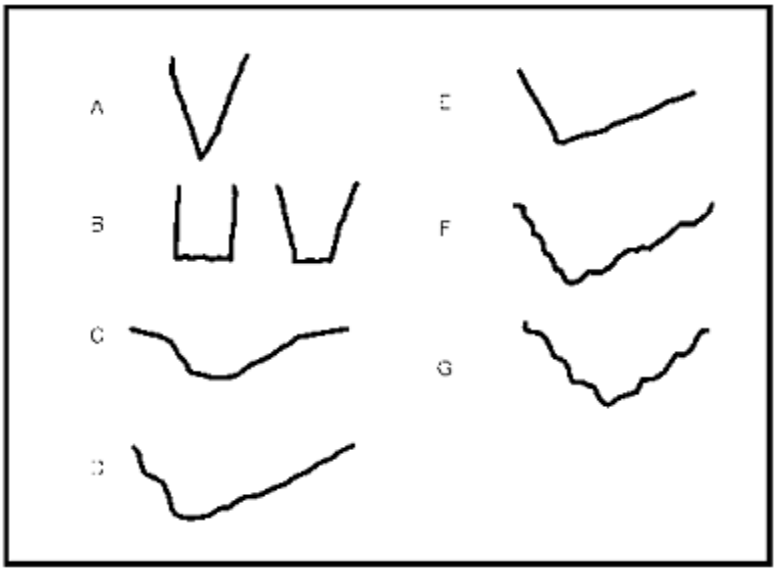
Mortuary rituals and funerary practices can lead to marks being found on bone. In instances where burials are flexed, bound, or forced into small holes, bones can incur

cuts, scratches, and fractures (Duday and Guillon 2006, White et al. 2012:466-467). As described in Chapter 4, Section 2, the practice of some Native American tribes of re-using burial space and burying sets of remains one on top of the other can lead to cut marks occurring during both primary burials and secondary deposits. Cut marks can also occur as a result of de-fleshing prior to cremation (Buikstra and Ubelaker 1994:98, White and Folkens 2005:57).

A variety of cut marks and their associated locations can be indicative of violent encounters and violent ritual acts. These are cuts made by humans using tools or weapons. They are characterized as very straight, fine, linear marks which in cross-section often appear "V" shaped (Turner et al. 2013:75, White and Folkens 2005:60). Examples include cranio-facial cut marks seen on primarily the frontal bone above the orbits, the parietal bones, the mandible and facial bones which are indicative of scalping or facial flaying (Larsen 1997:121, Graver et al. 2002). Cut marks found on the ascending rami of the mandible may indicate mandibular disarticulation or that facial mutilation in the form of a tongue incision may have occurred (Larsen 1997:124). Novak and Kollmann (2000) identify peri-mortem mandibular cut marks as appearing regularly at the muscle attachments of the gonial angle, ramus, and corpus in several Native American skeletal remains from the Southwest. Cut marks in association with dismemberment injuries are often found in groups and present on the ends of long bones forming major joints, where the joint has been disarticulated and flesh removed (Turner and Turner 1992, Novak and Kollmannn 2000, Graver et al. 2002). Long bone articulation surfaces are not the only areas where separation of these elements can take place. Cut marks on ribs that correspond to the dismemberment of the rib cage have been noted in a number of North American sites (Novak and Kollmannn 2000). Signatures of decapitation and throat cutting can present as cut marks seen on the cervical vertebrae, particularly C1 and C2 as well as significant damage to the foramen magnum (Larsen 1997:121, Novak and Kollmannn 2000).

Cut marks create different physical signatures on bone depending upon the type of instrument used. Cut marks occur as a result of slicing using a long stroke perpendicular against the grain of the surface being cut (White and Folkens 2005:60). Greenfield (2006) conducted a study utilizing an experimental anthropology approach to recreate the

types of cut marks made to bone by a variety of instruments including stone tools resulting in the identification of six different shapes of cut marks (figure 4).



A: Sharp, flat-edged metal blade; B: Dull, flat-edged metal blade; C: Saw blade; D: Chipped stone side scraper; E: Chipped stone blade unmodified; F: Chipped stone blade unifacial retouch; G: Chipped stone blade bifacial retouch

Figure 4: Cross-section Profiles of Characteristic Metal and Stone Tool Cut Marks (after Greenfield 2006:152)

These shapes are important, because they can assist bioarchaeologists in determining what type of edge might have been used to make the cut mark. These edge shapes were determined by scanning electron microscopy. The tool was drawn across the bone surface with the same pressure in the same direction, and held at the same angle. The same hand was also used to draw the tool across the bone (Greenfield 2006). The shapes created by uniface and biface stone blades and scrapers are of particular interest because these types of tools were used by Native American populations in California. The Chumash used chert and obsidian to fashion knives, choppers and scrapers and to make spear and arrow heads (Gamble 2008:258-259). No sources have identified the use of metal blades by the Chumash prior to Spanish contact.

I have included cut marks on bone as a skeletal signature of a possible violent interpersonal encounter. For my research, evidence of cut marks includes any linear modification or sharp-edged defect to green bone made through the use of an edged tool

or object, such as stone, glass, or metal. The presence of cut marks alone is not conclusive proof that the individual was involved in a violent encounter. Cut marks made post-mortem on dry bone, cuts meeting the criteria described above as made by rodents and canids, cut marks found in isolation and with associated contextual evidence suggesting the cause to be related to funerary ritual, or cut marks not shown to meet the criteria for those made by stone or obsidian will be eliminated. However, cut marks suggesting a stone or obsidian etiology found on the cranium, particularly on the frontal and parietal bones, the mandible or at the junction of the cervical vertebrae and skull on green bone will be retained as lesions suggesting a violent origin. In addition, multiple cut marks on joints at the point of articulation will be retained.

c. Healed Cranio-facial Fractures

Injuries to the human head and face that are both lethal and sub-lethal can be identified on the human skeleton. Generally, cranio-facial trauma resulting in fracture is caused by a blow to the head or face resulting from an accident, interpersonal violence, self-inflicted injury due to ritual self-mutilation (Walker 1989) or suicide. Researchers have identified a number of cases of both healed (sub-lethal) and lethal cranio-facial trauma in skeletal remains from Native American populations in California and the American Southwest (e.g. Walker 1989, Lambert 1994, 1997, Smith 1996, Larsen 1997:129-130, Novak and Kollmannn 2000, Walker 2001, Baustian et al. 2012, Martin and Harrod 2014, Martin 2016). The work of these scholars has also attempted to determine the proximate causes of this trauma.

The patterns of healed cranio-facial fractures are distinctive. Examples of non-lethal cranial vault trauma include healed linear, depressed, comminuted, and penetrating fractures of the cranial vault (Thomas 1984, White et al. 2012, Martin and Harrod 2014). Linear fractures of the cranium present as thin lines, while comminuted fractures of the skull create a radiating pattern from the point of impact (Kroman et al. 2011). Both linear and comminuted fractures are usually the result of contact with a wide surface, such as a rock ledge or curb (Martin and Harrod 2014). Healed cranial depression fractures present as shallow indentations on the surface of the cranial bone that may extend into the brain cavity, and are usually the result of contact with a narrow object like a club or bat (Martin and Harrod 2014). The depression in the bone is usually round or ovoid, and can take on

the shape of the object or instrument that caused the trauma (Walker 1989). In some cases, fracture lines around the border of the depression remain (Walker 1989). However, the healing process does not eliminate the depression, which remains as a permanent indicator of trauma (Walker 1989, Baustian et al. 2012). Penetrating fractures of the skull and face are caused by crushing blows or falls from a great height, which cause pieces of fractured bone to penetrate the brain or facial structures (Kroman et al. 2011).

Non-lethal facial trauma also presents in distinctive patterns and presents as healed partial and complete fractures of the facial bones, especially the nasal bones, zygomatics, maxillae, and mandible (Walker 1989, Baustian et al. 2012, Martin and Harrod 2014). Broken nasal bones are the most common type of facial fracture, due to the central prominence of the nose on the face. Nasal fractures can be linear, comminuted (shattered), or depressed, when a portion of the nasal bone is bent inwards into the nasal cavity (Thiagarajan and Ulaganathan 2013). Usually, it is the lower third of the nasal bones that are fractured as they are less supported than the upper two thirds of the bone, which articulate with the maxillae and frontal bone (Thiagarajan and Ulaganathan 2013).

Most head injuries that occur today are the result of car accidents, falls, and sports injuries (Walker 1989). These result in specific types of injury to the head and face. Car accidents crush the forehead and face when contact is made with the windshield, and steering wheel. While vehicle crashes were not a risk to prehistoric Native Americans in California, accidental cranial fractures resulting from falls or rock-falls were. Fallen rocks and other objects create a particular injury pattern that includes fractures in a variety of irregular shapes that occur randomly on the cranial surface (Walker 1989).

Researchers have recognized that cranio-facial fractures found in Native American skeletal assemblages can be evidence that the individual in question may have participated in a violent encounter (Walker 1989, 2001, Lambert 1994, 1997, Larsen 1997:119, Baustian et al. 2012, Martin and Harrod 2014, Pilloud et al. 2014). Acts of violence are not always lethal. Patterns of interpersonal violence can, and often do, stop short of resulting in the death of a participant (Lambert 1997, Larsen 1997:130). As a result, the presence of healed cranio-facial trauma can provide important evidence

concerning the temporal nature of violence in a particular social group (Baustian et al. 2012, Martin and Harrod 2014).

Healed cranio-facial fractures can be differentiated from peri-mortem injury or post-mortem damage because evidence of healing, such as callousing and bone remodeling, can be confidently observed on healed bone (Larsen 1997:110, Walker 2001). Peri-mortem injury and post-mortem damage to the head and face are difficult to differentiate from each other due to the lack of bone remodeling that would indicate healing (Larsen 1997:110, Walker 2001).

Walker (1987, 1989, 2001) and Lambert (1994, 1997) have researched violence in the Santa Barbara Channel area, utilizing healed cranial depression fractures as an important signature of violent activity. Their findings show that the shape and location of these lesions provide a means of linking the presence of these lesions to violent activity. Walker (1989) and Lambert (1997) note that healed cranial depression fractures associated with violence among the Chumash have definitive circular or elliptical shapes which are consistent with the studded clubs used as weapons by the neighboring Gabrieliño Indians. Pilloud et al. (2014) in their study of indigenous Central Californians found that cranial depression fractures with a violent etiology are found primarily on the frontal and parietal bones. Walker (1989) concurs with this finding. Figure 5 provides examples of cranial depression fractures associated with violence.

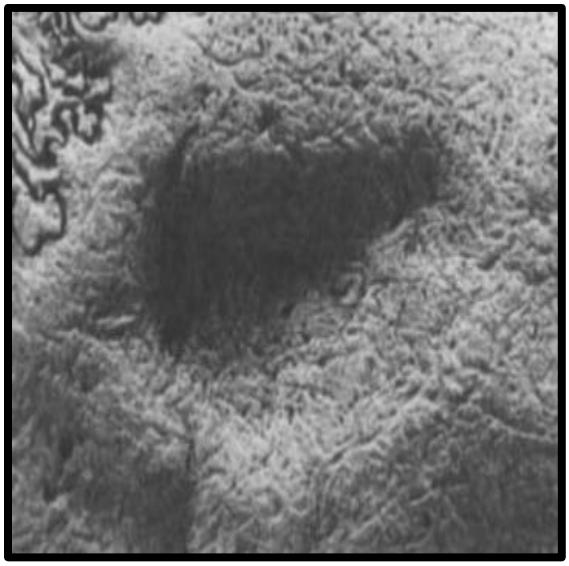


Figure 5: Cranial Depression Fractures Resulting from Violent Encounters
(After Walker 1989:315)

Building upon the established work of others, healed cranio-facial fractures are included as a skeletal signature of possible violent activity in this study. I define healed cranio-facial fractures as any fracture of the braincase or face occurring ante-mortem that shows evidence of callous formation, or bone remodeling that indicates the presence of a healing response. Healed depression fractures of the cranial vault which occur individually, in a variety of indefinite shapes, and not concentrated on any bone, will be considered an accidental fracture and excluded as an example of violence from my study. Following Walker (1989) and Lambert (1994), cranial depression fractures of a distinctly round or ovoid shape found on the frontal or parietal bones will be included as evidence of interpersonal violence. Healed fractures of the nasal bones, zygomatics, and of the mandible are likely to be indicative of a violent encounter (Lovell 1997). This is a result of fighting face to face with weapons or without (Walker 1989). These will also be included as evidence of interpersonal violence if found in my samples.

d. Healed Post-cranial Fractures

Most simply defined, a bone fracture is a partial or complete break in bone continuity (Lovell 1997), and represents but one type of traumatic injury that can be observed on human skeletal remains. Occasionally, bone fractures can result in death – most

commonly cervical fractures and those involving cranial elements. However, the majority of individual bone fractures do not result in death, and bone is returned to normal function through the process of healing.

The healing of human bone fractures is a physiological process that restores form and function to the injured bone. Successful bone healing proceeds through phases. Some researchers note five stages of healing which consist of: 1) hematoma formation, 2) cellular proliferation, 3) callus formation, 4) consolidation, and 5) remodeling (Lovell 1997:145). Others, such as Kalfas (2001) and Roberts and Manchester (2005:90) identify three stages:1) the inflammatory stage, 2) the repair stage, and 3) the remodeling stage, which incorporate the five phases of healing noted by Lovell (1997) and others. The inflammatory stage begins immediately after injury with hematoma formation. Cellular proliferation occurs when macrophages, lymphocytes, and other cells enter the bone and begin the process of establishing vascular and granular tissues. In the repair stage, a collagen matrix is created and mineralized. Subsequent ossification creates a bony enlargement, or callous around the fracture site. The final remodeling stage involves the physiological remodeling and shaping of the broken bones to bring them back towards their original strength and shape. Load-bearing activity acts to further strengthen the bone, and assists in final remodeling. Cancellous or trabecular bone heals more quickly than tubular or compact bone because the mesh structure provides greater surface area for contact between broken elements (Lovell 1997). Young bone heals more readily than older bone, but the healing process is rarely less than six weeks, and can take up to six months or longer, depending upon the quality of reduction and stabilization of the injured area, the type of bone involved, and the complexity of the fracture (Lovell 1997, Kalfas 2001).

Researchers and clinicians have grouped post-cranial fractures into a number of types based upon the mechanism of injury. Lovell (1997) states that direct trauma to bone – defined as bone breakage at the point of impact – causes four general types of fracture. These are 1) transverse, 2) penetrating, 3) comminuted, and 4) crush fractures (Figure 6).

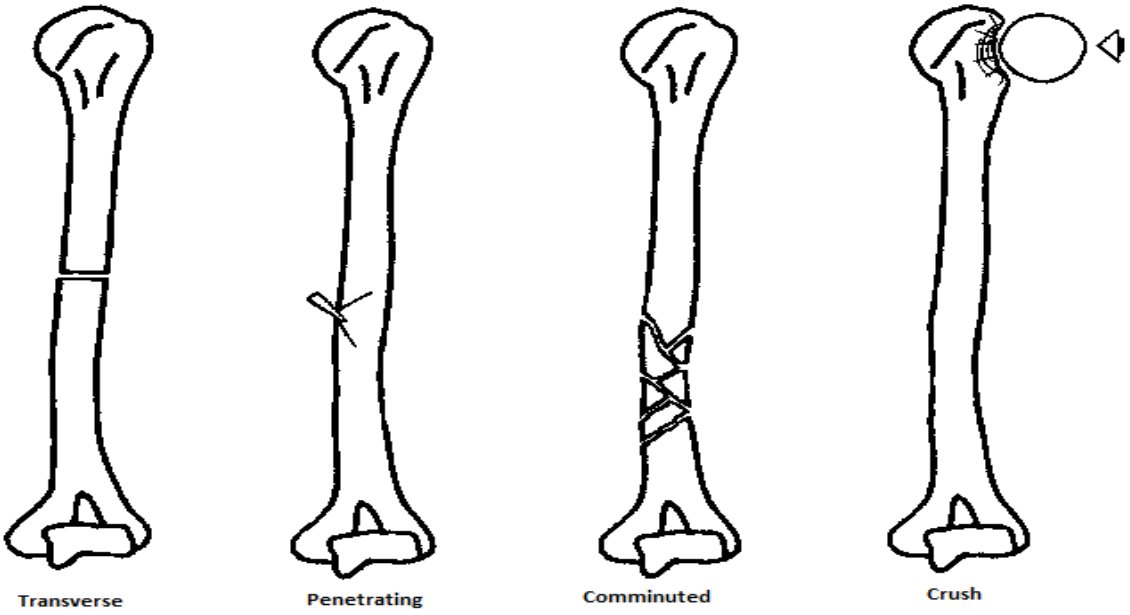


Figure 6: Types of Fractures Resulting from Direct Trauma
(After Lovell 1997:142)

Indirect trauma consists of injury occurring away from the point of impact which creates six types of fracture. These are 1) oblique, 2) spiral, 3) greenstick, 4) greenstick compression, 5) impaction, and 6) avulsion (Lovell 1997, Figure 7).

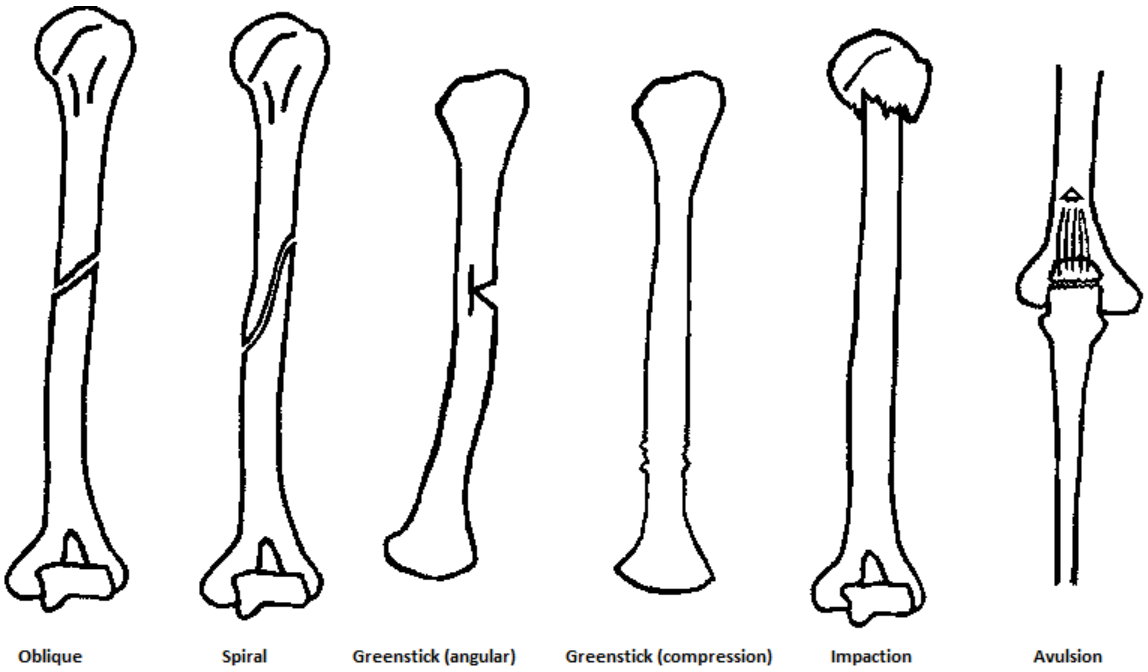


Figure 7: Types of Fractures Resulting from Indirect Trauma
(After Lovell 1997:143)

Fractures can also occur as a result of disease processes within the body that weaken or destroy bone architecture. Examples of these processes include tuberculosis, osteoporosis, bone tumors, treponematosis, syphilis, leprosy, and osteomyelitis (Larsen 1997:93-95, Roberts and Manchester 2005:90). Repeated use of skeletal elements can result in micro fractures, which lead to a larger stress fracture, or a burst fracture of the vertebra. After healing, stress and burst fractures are extremely difficult to detect in the archaeological record, even with X-rays, because they leave little osteological evidence (Roberts and Manchester 2005:90).

The causes of post-cranial fractures can be difficult to differentiate (Larsen 1997:109). In archaeological settings, confusion can arise regarding when the injury took place (ante-, peri-, or post-mortem) and whether the fracture was sustained as a result of human behavior – either accidentally or purposefully (Larsen 1997:109). As a result, it is critical to apply multiple lines of corroborative and contextual evidence to an osteological analysis of bone fractures in any attempt to identify the cause of a lesion (Larsen 1997:159-160, Lovell 1997, Jurmain 2001, Walker 2001, Martin and Harrod 2014, Martin 2016). While the *causes* of post-cranial fractures can be challenging to identify,

fractures themselves, particularly healed ones, are found often in archaeological settings and are relatively simple to diagnose (Jurmain 2001). As a result, researchers have conducted extensive studies of post-cranial fracture prevalence in a variety of populations. Of particular interest for my research are studies conducted on Native American remains from populations in North America, many of which examine the role interpersonal violence may have played in causing the fracture (Walker 1989, Lambert 1994, Smith 1996, Lovell 1997, Milner et al. 2000, Jurmain 2001, Walker 2001, Pearson and Buikstra 2006, Martin et al. 2012, Martin and Harrod 2014, Martin 2016).

It appears that certain types, locations, and combinations of post-cranial fractures are more likely to result from accidental causes and others are more apt to result from interpersonal violence (Smith 1996, Larsen 1997:110-112, 119-121, Jurmain 2001, Martin and Harrod 2014). Lovell (1997) and others have examined paleopathological trauma and provide insight into fracture typology by location and the likelihood of its cause. The following summarizes these data.

Fractures to the axial skeleton are often observed archaeologically. Vertebral fractures arise primarily from indirect trauma, stress, or infection (Lovell 1997). These can take the form of compression fractures with associated osteoarthritic lesions (Pearson and Buikstra 2006), burst fractures, and Schmorl's nodes (Lovell 1997). They are primarily the result of heavy labor, genetics, or exposure to infectious pathogens (Larsen 1997:175-176). Although rare, direct trauma to the vertebra as a result of violence can be seen as a fracture to a spinous process or vertebral body resulting from a blow, fall, or projectile injury. Fractures to the superior articular surfaces of the C2 vertebra may indicate strangulation (Lovell 1997). Rib fractures are very common, with the majority of rib fractures resulting from a fall or a blow (Roberts and Manchester 2005:105). Ribs 5-9 are the most frequently broken. Breaks in ribs 1 and 2 require high forces that often result in significant damage to other skeletal structures, particularly the head and neck, which can be seen archaeologically (Lovell 1997). Clavicular fractures are common as well, particularly in younger individuals. They are primarily the result of a fall, either on the point of the shoulder, or on an outstretched hand (Larsen 1997:110, Lovell 1997, Roberts and Manchester 2005:105). Without proper reduction and surgery, fractures of the clavicle rarely heal in alignment (Lovell 1997) making them easier to identify in

archaeological settings. Fractures of the pelvis are uncommon in the archaeological record and depending upon the location can be life threatening. They can be caused by a fall on the hip from a height that drives the ball of the femur through the acetabulum, or a severe blow to the side at hip level (Lovell 1997:162, Roberts and Manchester 2005:104).

Fractures to the upper limbs can occur to all of the elements of the free part of the upper limb. Humeral fractures in adults usually involve the proximal portion and the diaphysis and are primarily the result of direct trauma to the bone from falls. Accidental falls on outstretched hands are indirect trauma that can jam the proximal end of the humerus into the humeral head, causing an impaction fracture (Lovell 1997). Older women with osteoporosis are also subject to humeral fractures (Roberts and Manchester 2005:105). In children, humeral fractures more commonly involve the distal end at the points of articulation with the proximal radius and ulna. These fractures often involve dislocation injuries at the elbow (Lovell 1997). Fractures of the radius are extremely common (Smith 1996), and Roberts and Manchester (2005:105) note that primarily the distal end is involved as a result of accidental falls onto an outstretched hand, or "FOOSH" fractures. When the distal end of the radius is displaced posteriorly in a fall it is called a Colles fracture (Larsen 1997:110). Lovell (1997:161) states: "Clinically it [the Colles fracture] is the most common of all fractures in adults over the age of 40, especially females, and is nearly always caused by the indirect trauma of a fall onto the hand." Fractures of the ulna are less common than the radius, and injuries to the middle third of the diaphysis have been commonly referred to in the literature as "parry" fractures, that occur when attempting to defend oneself from an attack (Larsen 1997:110-111, Lovell 1997, Jurmain 2001, Roberts and Manchester 2005). Thus, some ulnar fractures are associated with interpersonal violence (Larsen 1997: 110-111, Smith 1997, Jurmain 2001). Lovell (1997), Smith (1997), and Walker (2001) make the case that not all midshaft ulnar fractures are caused by interpersonal violence. Jurmain (2001:19) concurs, stating: "even when ulnar fractures are located midshaft, the cause is not clearly a result of aggression […]. It is thus not justifiable to assume that all (or even most) ulnar midshaft fractures relate to interpersonal aggression, especially in the absence of other corroboratory skeletal evidence." In many cases, this evidence takes the form of cranial, rib, and hand injuries occurring along with ulnar trauma (Smith 1996, Lovell

1997). The use of the term "parry fracture" pre-supposes that the cause of the fracture is interpersonal violence, when in most cases ulnar fractures are accidental. Jurmain (2001) believes that the term should be avoided as a paleo-epidemiological descriptor because it is confusing. I agree with his position and thus ulnar lesions will be referred to as ulnar trauma in my thesis.

Skeletal trauma in the form of fractures, both healed and peri-mortem are found on the elements of the lower limbs. Fractures of the femur at any point are serious injuries that take months to heal. Femurs broken at the neck or in the surrounding trochanteric area are seen occasionally in the archaeological record and are associated with falls (Larsen 1997:110), but these tend to be injuries experienced by the very old, or individuals with osteoporosis (Lovell 1997). Likewise, patellar fractures are usually direct fractures that are caused by a fall directly onto the kneecap or a sharp blow to the area. Due to the thickness of the bone, the injury is often a crack or comminuted fracture (Lovell 1997). Fractures of the tibia and fibula, particularly those located in the distal portions of both bones, are also associated primarily with accidental injury (Larsen 1997:110). Lovell (1997) notes that trauma to the bones that form the ankle is more common than any other skeletal injury except to the radius in the clinical setting. These fractures occur primarily as the result of accidents from twisting injuries on uneven terrain, jumping from a significant height, or falls.

As a result of the prior research conducted by other scholars, healed post-cranial fractures are included as a skeletal signature of possible violent activity in this study. Judd (2002) has summarized the characteristics of healed long-bone fractures described by the authors I have mentioned in this section, to create three criteria to describe the presence of a healed fracture of a skeletal element. These are: 1) The formation of an osseous callus at the site of the healed trauma, 2) angular misalignment or deformation of a skeletal element even if an osseous callous is not present, and 3) blunt and sealed ends of broken bones indicating the presence of a non-union. Lovell (1997:145) adds an additional criterion which is "the uniform presence of stains from water, soil, or vegetation on broken and adjacent bone surfaces." I define healed post-cranial fractures as any fracture of any skeletal element other than the braincase or face occurring ante-mortem that shows evidence of the four criteria noted above. Evidence of healed post-

cranial fractures found in my samples that occur in isolation without corroborating evidence of traumatic injury will be considered an accidental fracture and excluded from my study. Following Smith (1997) and Jurmain (2001), ulnar trauma without associated cranio-facial trauma will also be considered accidental and eliminated from my study. If healed ulnar and cranio-facial traumas occur together, these lesions will be considered the result of interpersonal violence.

e. Peri-mortem Fractures

Peri-mortem trauma includes injuries that occur at or around the time of death (Larsen 1997:110, White and Folkens 2005:50). A number of causes of these types of injuries have been identified by researchers in New World skeletal assemblages, and particularly in Native American prehistoric populations. Peri-mortem fractures can result from assault to skeletal elements that are unintentional, ritualistic, or intentional and linked to violence. As an example of unintentional peri-mortem fractures, White and Folkens (2005:50) note that these can occur right after death when a body is placed for burial in a very small hole or crypt and the act causes bones to break. The identification and elimination of witches in Puebloan societies was considered to be both a ritualized and obligatory act perpetrated to protect the population from the effect of malevolent forces. Witches were considered non-persons, merely spirits inhabiting a body. The spirit of a witch could not use a broken and disarticulated body, so peri-mortem fracturing was used as a means of defending against witchcraft (Palkovich 2012).

Violent interactions appear to be the cause of a number of peri-mortem fractures recorded by researchers in Native American skeletal assemblages. One of the most thoroughly studied collections of skeletal remains is that from Mancos Canyon (White 1992, Larsen 1997: 134). Evidence of peri-mortem fractures caused by human activity include crush fractures, longitudinal long bone fracturing, fractures at articulation points, and splintering of bone which appear to have been associated with anthropophagy (White 1992, 2000, Larsen 1997:134, Turner and Turner 1999, Novak and Kollmannn 2000). At prehistoric Norris Farms located in the Midwest, 33% of the skeletal remains presented with unhealed trauma indicative of violent death. Injuries included peri-mortem fractures to the crania, evidence of decapitation on the cervical vertebrae, and fractures at disarticulation points (Larsen 1997:122, Novak and Kollmannn 2000). Walker (1989)

and Lambert (1994) have also collected data on a large number of peri-mortem fractures observed that resulted from indigenous violence in the Santa Barbara Channel area of California.

Peri-mortem fractures can be difficult to differentiate from post-mortem fractures or bone modifications that result from site formation processes or excavation damage (Walker 2001). In skeletal assemblages, it is not always possible to determine if an injury was responsible for a death, or was inflicted after death (Walker 2001). However, for proper skeletal trauma analysis, it is vitally important to attempt to differentiate between peri-mortem fractures and post-mortem modifications (Moraitis et al. 2008).

Researchers have discovered specific attributes that can assist in assessing when a fracture may have occurred (Walker 2001, Moraitis et al. 2008). For example, an important piece of evidence pointing to either post-mortem or peri-mortem fracture is the lack of osteogenic reaction seen at the site of the injury (Walker 2001, Moraitis et al. 2008). Simply put, this is a lack of healing response. Although the healing process begins the instant an injury occurs, an osseous response that is macroscopically detectable starts later (Walker 2001).

Fracture patterning provides additional evidence that can indicate if the fracture happened before, after, or at the time of death (Walker 2001, Moraitis et al. 2008). A fracture pattern refers to the overall shape of the fracture on the bone. A particular peri-mortem pattern that presents on live or green bone is the butterfly fracture (Moraitis et al. 2008). An additional example is the pattern seen after blunt force trauma to the skull. Peri-mortem skull fractures begin at the point of impact and radiate outward. A very sharp blow to the back of the head therefore can cause severe injuries to the face due to the force of energy dissipation (Moraitis et al. 2008, Kroman et al. 2011). A skull with a brain still intact that is hit with a blunt force will often exhibit a fracture pattern reminiscent of a spider web, with radiating fractures transected by concentric fracture circles (Kroman et al. 2011). Fracture patterns change when the bone is dry, or the lack of brain tissue no longer provides resistance to trauma forces (Moraitis et al. 2008, White et al. 2012).

Bone color and edge morphology provide additional insights into when an unhealed fracture may have occurred (Moraitis et al. 2008, White et al. 2012). Perimortem

fractures of fresh bone can include tell-tale breakaway notches (Walker 2001). The surface color of a fresh bone fracture is homogenous with the cortical bone on the outside, and the surface tends to be smooth (Moraitis et al. 2008). The angles of peri-mortem fractures are acute or obtuse, and the loading point is clear (Wieberg and Wescott 2008). Post-mortem fractures or bone modifications due to taphonomic processes or excavation damage present with characteristics associated with dry bone fractures. Desiccation and collagen loss that occur after death make dry bone brittle (Walker 2001, Moraitis et al. 2008, Wieberg and Wescott 2008, Kroman et al. 2011). The surface color of the fracture is different from the external cortical bone, and is usually lighter in color. The surface of dry bone fractures tends to be rough, and fractures tend to occur at right angles, with edges that are irregular and blunt. It is often not clear where the point of impact occurred (Ubelaker 1995, Sauer 1998, Walker 2001, Moraitis et al. 2008, Wieberg and Wescott 2008, White et al. 2012). Post-mortem cranial fractures tend to be long and linear (Kroman et al. 2011).

Based on extensive research done by other scholars associating peri-mortem fractures with acts of interpersonal violence, I have included peri-mortem fractures as a skeletal signature of possible violent activity in this study. Following Moraitis et al. (2008), Wieberg and Wescott (2008), and White et al. (2012), I define these as skeletal fractures which show no signs of osseous remodeling. There is no obvious difference between the color of the fracture edge and the exterior cortical bone. The bone surface is smooth and the fracture angles are jagged and acute or obtuse. Fractures in isolation that appear to have occurred in the peri-mortem period will be assessed for the likelihood of unintentional breakage, such as that occurring during burial, and be eliminated from my study. Possible peri-mortem fractures that are associated with projectile point injuries, cut marks, cranial fractures that are radiating from a point of impact with concentric fractures, or with additional confirmatory contextual evidence of a violent causation will be included as evidence of interpersonal violence if found in my samples.

f. Projectile Point Injuries

The mounted Plains Indian warrior attacking terrified settlers with a shower of arrows is a central and unfortunate trope of Native American culture. Children learn early the association between Indians and arrowheads, and they continue to be considered prized artifacts when discovered. However, the term "arrowhead" should be used when referring to one type of hafted point used in conjunction with a shaft to create a missile weapon (Bell 1980). Projectile points come in an array of sizes and shapes depending upon the intended use of the projectile, the material from which it is made, and the stylistic preferences of the culture responsible for making them (Bell 1980).

Common Native American projectile points are generally divided into two groups – the atlatl dart and spear point, and the arrow point. Atlatl darts and spear points are larger and wider than arrow points. The hafting area or the area to which the point is attached to the shaft is at least 10 mm wide. The shaft is heavy and made of wood (Bell 1980). The points are long, generally between 35 and 100 mm in length. Atlatl darts are used in conjunction with an atlatl which is a launching device that allows the thrower to achieve far greater distance and force than would be achieved by throwing the projectile using one's arm alone. Arrow points are smaller than darts and spear points and weigh considerably less. They also have a much smaller hafting area as they are mounted on a much thinner, fletched arrow shaft (Bell 1980). Prior to European contact, both groups of projectile points were fashioned with stone or glass tips. These were made of chert, flint, other sedimentary rocks, and obsidian. Prior to ~ 200 AD these weapons predominated for hunting and warfare (Kennett et al. 2013). After European contact, metal points were incorporated into the armamentarium.

Atlatl darts and spear points recovered from archaeological sites have been dated to Paleoindian times in the Oklahoma area (Bell 1980). Darts and spears were used in the Great Basin during the Paleoindian period 11,000 BC to 6500 BC (Morgan and Bettinger 2012). However, confirmatory radiocarbon dates are rare. Great Basin indigenous reliance on the hunting of fauna using darts and spears intensified during the Middle Archaic, beginning around 2500 BC (Morgan and Bettinger 2012). While there is debate about the timing of the introduction of the bow and arrow in North America, it is clear that the technology arrived on this continent several thousand years after its origination in

Asia around 2000 BC (Reed and Geib 2013). The technology spread East to West, arriving in the American Southwest between 100–400 AD (Reed and Geib 2013), and moving to California by 500 AD (Kennett et al. 2013). Evidence of bow and arrow use in the Santa Barbara Channel area among the Chumash Indians has been dated to between 650 AD and 900 AD, and among indigenous groups living in Central and Northern California from 900–1100 AD (Kennett et al. 2013). This is evidence of a rather slow spread of the technology within California once it arrived. There is clear evidence that atlatl darts and spears continued to be used along with bows and arrows, and were not eliminated by the new technology (Kennett et al. 2013). This perhaps contributed to the slow spread of bow and arrow use in California.

Projectile point injuries are almost invariably the result of interpersonal conflict (Lambert 1997, Larsen 1997:119, Milner 2005). In some cases, these injuries can be identified by the actual presence of the projectile point in part or completely in a skeletal element. Other injuries appear as small holes in the bone or small linear defects where the point may have entered the bone but did not stick. Violent activity must be inferred from this evidence (Lambert 1997). Sometimes, arrow tips only nick bone and leave a mark that is unidentifiable, or is mistaken for another cause (Lambert 1997, Milner 2005). Research is further hampered by the fact that not all projectile point injuries can be identified in the archaeological record. The point can damage soft tissue only and leave no evidence, or the point can come out when the shaft is removed (Lambert 1997). The presence of projectile points within a burial site with no corresponding skeletal injuries must be evaluated contextually as projectile points associated with skeletal remains may result from mortuary practice and not be indicative of a violent encounter (Lambert 1997, Gamble et al. 2001, Hollimon 2001, Milner 2005).

It is clear from research presented here that projectile point injuries have a very high likelihood of resulting from a violent interpersonal conflict. As a result, I include projectile point injuries in my research as a possible signature of violent behavior. I define these injuries as skeletal lesions likely to have been caused by contact with dart, spear or arrow points of any size made of stone, glass, or metal. These include: 1) lesions where all or a portion of the point is embedded in bone, 2) holes, nicks, or linear marks on bone of a size and shape that a) conform to injuries made by projectile points, b) are in

association with contextual evidence such as burial or excavation notes indicating the presence of a point at or near the injury site. If these lesions are found in my samples, they will be included as evidence of a violent encounter. Projectile points identified as found in or near a skeletal assemblage with no corresponding evidence of skeletal trauma or corroborating contextual evidence will not be considered evidence of violence. Those individuals will be eliminated from my study.

g. Dismemberment

Dismemberment is a process of human skeletal modification which involves the intentional removal or separation of human body part(s) by another person (Rajs et al. 1998, Kahana et al. 2010, Seidel and Fulginiti 2014). Seidel and Fulginiti (2014), in following Kahana and colleagues (2010), further divide dismemberments into localized and generalized cases. Localized dismemberments involve separation of the head and/or hands from the body. Generalized dismemberments include separation of the head and limbs, bi-sections of the torso, disarticulation at the main joints between skeletal parts (e.g. between the arm and the forearm), and diaphyseal bi-sections of the long bones.

Although dismemberment is thought of as a purposeful human activity that can be part of a violent interaction, this is not always the case. Taphonomic processes can act on skeletal remains in ways that mimic dismemberment and are unintentional and non-violent. Additionally, dismemberment has been known to occur as part of an intentional *and* non-violent interaction in association with some funerary practices. Although this is not the case for the Chumash, this behavior has been identified in Northern California indigenous groups as ancestor veneration (Eerkens et al. 2016). For the purpose of differentiation in this discussion, I label unintentional, non-violent separation of skeletal elements as disarticulation. As noted earlier in the section dedicated to cut marks, disarticulation can be caused by carnivore and rodent activity, where elements are pulled apart and dragged to another location (Larsen 1997:109, Smith 1997, Pokines and Tersigni-Tarrant 2013). In these cases, tooth marks are very often present on the disarticulated elements to confirm this possibility. Likewise, the movement of water and ice, earthquakes, and other forms of bioturbation can cause the inadvertent separation of skeletal elements (Buikstra and Ubelaker 1994:103, White et al. 2012:462-463). The original position of the body and the forces of gravity have an effect on the displacement

of skeletal elements inside the body during decomposition (Duday and Guillon 2006). As ligaments loosen and soft tissues decay, the bones shift position considerably, even in burials that are completely undisturbed before disinterment (Duday and Guillon 2006). In their detailed work on the impact of decomposition on the skeletonized body, Duday and Guillon (2006) chronical specific observations of bone displacement due to gravitational forces and body placement. In supine burials, for example, they note the rib cage may collapse and flatten as the sternum falls. However, this is not systematic for all burials. If the hands have been placed on the chest at the time of burial, the bones of the hands can be found within the thoracic cavity. Bodies placed in a flexed position will have the ribs on the side the body is placed observed to be in a fixed position during skeletonization, but the other side of the rib cage may collapse towards the ground. Decomposition has an important effect on vertebral elements as well. When the ligaments and tissue connecting them decompose, the vertebrae become separated from each other. When a body is lying in a supine position in a grave, container, or crypt that is undisturbed, the elements may remain in alignment. However, bodies that are flexed upon burial, such as the majority of Chumash burials (King 1982, Green 2001, Gamble 2008), become naturally disarticulated at some point along the lower thoracic or lumbar vertebrae after decomposition is complete (Duday and Guillon 2006). These burials present upon skeletonization with vertebrae that are out of alignment and appear "cut" or "severed" at the point of flex.

Native Americans reused cemetery space – burying individuals one above the other, and evidence of several individuals in a single burial space are commonplace (Bickford 1982, King 1982). Skeletonized individuals would be removed from the ground, and the bones grouped together, then re-buried after the new burial was placed (Bickford 1982, King 1982). These remains will appear as disarticulated upon excavation. Additionally, ancestor veneration is a noted practice in pre-contact California. Eerkens et al. (2016) argue that additional isolated crania found in graves, or headless burials may be examples of disarticulations in the service of ancestor veneration, rather than evidence of violent dismemberment.

Further contextual evidence must be in place to suggest a violent encounter when disarticulated skeletal elements are observed. When there is no pattern in the type of

body part missing from the skeletal assemblage, a lack of other missing body parts, a lack of cut marks, percussion or crushing injuries on skeletal elements, or no other signatures of violence found at the site, it can be inferred that these disarticulations occurred in a non-violent context.

Purposeful dismemberment of skeletal elements by violent human activity can occur and researchers have noted a number of cases among Native Americans in the west. Victims of violent encounters may be dismembered by the victors as a display of dominance or for socio-political reasons such as social control (Larsen 1997:121-122, Hurlbut 2000). Dismemberment may take place as a precursor to anthropophagy. Cannibalism can take place as part of ritual behavior, or out of necessity due to threat of starvation or other unknown reasons (White 1992, Larsen 1997:134). Separation of arms, hands, and heads can occur as part of trophy-taking behavior (Andrushko et al. 2005). Dismemberment provides an important way to combat witchcraft by destroying the physical body which is seen as container of evil (Palkovich 2012).

Purposefully dismembered human remains present as a part of a constellation of evidence that extends beyond the simple discovery of separated skeletal elements bones, or those in unnatural positions. These combinations of bone modifications are important to understand as they create a general signature for use in distinguishing intentional violent dismemberments from taphonomic or non-violent disarticulations (Hurlbut 2000). Novak and Kollmannn (2000) note dismemberment as one of the first steps in peri-mortem processing of bones in preparation for consumption. The articular surfaces of the bones of the major joints of the long bones show evidence of cut marks and other processing scars. In addition to the cut marks, elements can show evidence of thermal activity, or a burnishing of the ends of bone segments called “pot polish” as a result of tumbling in a cooking pot. Andrushko et al. (2005) describe the combination of evidence found in a prehistoric California cemetery collection that supports their contention that trophy-taking occurred. These include the same missing elements in a number of male burials (in this case radii and ulnae), associated cut marks on the articular surfaces of their distal humeri, and evidence of other peri-mortem trauma such as cranial depression fractures, imbedded projectile points, and ante-mortem healed post-cranial fractures. The radii found outside of the burials provide evidence that subsequent drilling and polishing

modifications took place. Hurlbut (2000) discusses the taking of heads as trophies, which can be indicated by the presence of heads in collections without post-cranial skeletal remains or vice versa, cut marks on the cervical vertebrae, particularly the atlas and axis, and cut marks on the foramen magnum (Hurlbut 2000). The peri-mortem cut marks that researchers note in association with purposeful dismemberment are specific. Completely transected bones may show uneven striae where several peri-mortem attempts have been made to sever the bone (Seidel and Fulginiti 2014). Breakaway spurs are evidence of the bone being snapped to complete the break started by the cutting instrument. False start marks indicate where initial attempts at severing the bone may have occurred (Seidel and Fulginiti 2014). Evidence of dismemberment can be further supported by finding that the remains of these victims were left unburied for a period of time, or were buried in a disorganized way and without intention (Larsen 1997:124). This is particularly indicative in societies whose mortuary rituals include burial in cemeteries, or where fear of witchcraft is high. Disorganized burial is therefore unusual and highly suspect (Palkovich 2012).

I include dismemberment as a signature of violence in my research. Following Kahana et al. (2010) and Seidel and Fulginiti (2014), I define dismemberment as the intentional separation or removal of body parts by another individual as part of an act of violence. I define disarticulation as the unintentional or taphonomic separation of body parts, which may be the result of human or natural processes. Disarticulated remains found with evidence of carnivore or rodent activity, or evidence of movement as a result of natural taphonomic processes will be eliminated from further consideration as evidence of violence when they have no other physical or contextual evidence to categorize them otherwise. Vertebral elements found disarticulated at points of flex in a flexed burial without evidence of cut marks, percussion marks, projectile point injuries or other of my aforementioned signatures of violence will also be eliminated from my study as evidence of violence. Skeletal elements observed in jars, pots, or other containers in a burial context will be eliminated from the study unless there is confirming contextual evidence of violence that clearly distinguishes these disarticulated elements from ancestor veneration, such as cut or percussion marks at the point of severance, *and* other skeletal elements in the burial presenting with signatures of violence. Dismembered elements

will be retained in the study if these show evidence of further bone modification, such as polishing, puncturing, or carving to indicate trophy taking. Dismembered elements will be retained as evidence of a violent encounter if they exhibit peri-mortem cut marks, crush marks, percussion pits at articular surfaces on joints, or pot-polish. Additional skeletal evidence of interpersonal violence associated with the severed remains will further strengthen the argument for their retention in my study.

Chapter 5 – Previous Research on the Selected Collections

My research is not the first to be conducted on skeletal remains found at the Malibu Mission Period 5, Mulholland, Medea Creek, and Malibu Historic cemetery sites. Other scholars have studied these collections, and some publications have resulted from their efforts. The foci of these studies vary and they are not always bioarchaeological in nature. In the course of their work, several of these authors have identified individuals whose skeletal remains they believe show evidence of trauma stemming from violent encounters. In this section I provide summaries of these findings organized by cemetery. The details of these burials can then be compared to the results of my research on the same skeletal assemblages which I present in Chapter 6.

1. Malibu Middle Period 5 (900 AD – 1150 AD)

Data from the Malibu Middle Period 5 cemetery have been included in several publications since the original excavation of the remains took place. As discussed in Chapter 4, Section 4(a), the site containing the Middle Period 5 cemetery at Humaliwo is a coastal archaeological site located in present-day Malibu, California. It was occupied continuously for approximately 900 years from 900 AD to 1805 AD, and contains two cemeteries. The first was utilized from 900 AD to 1150 AD and contains only burials from that time period. The second cemetery was used at the end of the occupation period from 1785 AD to 1805 AD and contains only remains from this time period. Radiocarbon dating and artifact typology support the contention that no commingling of remains from the two cemeteries occurred (King 1990, Gamble et al. 2001). As a result, previous studies of the Malibu Middle Period 5 cemetery tend to be comparative in nature with the other cemetery at the site.

One of the most frequently cited studies on this cemetery has been published by Phillip L. Walker, Francine J. Drayer, and Susan Keer Siefkin (1996) and is entitled *Malibu Human Skeletal Remains: A Bioarchaeological Analysis*. The comparative frequencies of skeletal lesions and traumatic injuries as indicators of health and levels of interpersonal violence from the Malibu cemeteries are the primary focus of this study.

Walker et al. (1996) believe that the Chumash during King's (1990) Middle Period 5 were under significant stress from the effects of climate change resulting from the

Medieval Climatic Anomaly (MCA), which impacted subsistence patterns at the time. This idea had been advanced earlier by Lambert (1994) and Stine (1994) and supported later by Kennett (2005) and Jones and Schwitalla (2008). Gamble (2005) disagrees and hypothesizes that the Chumash as marine hunter gatherers were agentive and resourceful in creating buffers to avoid environmental crises, but the skeletal evidence provided by Walker et al. (1996) in this study indicate noticeable levels of bone infections, chronic conditions, and traumatic lesions they associate with violence during this time.

The excavation notes indicate that 90 burials were disinterred originally from the early Malibu cemetery. Appendix XIII of Walker et al.'s (1996) report provides burial descriptions by burial number for 190 burials however. This number includes everyone they believe to have been excavated from the cemetery which indicates that there are more burials in the cemetery than the excavators originally thought. Walker and colleagues (1996) identified additional individuals buried in graves believed to hold single burials. Along with osteobiographical data for each burial identified, the authors' Appendix itemizes specific incidences of chronic, infectious, and traumatic lesions observed, along with taphonomic disturbances noted. The numbering system used by Walker and colleagues for each burial in this study was developed at the University of California, Santa Barbara. When these remains were subsequently curated at the Fowler Museum, a new burial numbering system was used, so that it is not readily apparent which burial at the Fowler is being referenced in Walker et al.'s (1996) work. The authors state that "Fractured bones are common in the [Malibu] Middle period material and rare in the material from the Historic period cemetery" (Walker et al. 1996:25). Furthermore, the authors identify 13 individuals – eight of them males presenting with cranial injuries in the Malibu Middle Period 5 cemetery, as opposed to none in the later cemetery. As I have discussed earlier in this thesis, cranial fractures, both healed and peri-mortem, are considered to be signatures of possible violent interactions.

A later comparative analysis of the Malibu cemeteries was published by Lynn H. Gamble, Phillip L. Walker, and Glenn S. Russell in 2001 and entitled *An Integrative Approach to Mortuary Analysis: Social and Symbolic Dimensions of Chumash Burial Practices.* This work contains data gained from a comparative study of burial practices at both Malibu cemeteries to answer questions about the timing of the rise of Chumash

chiefdoms. This paper is congruent with Walker's earlier work outlined above, but adds an additional discussion of possible genetic relationships gained from assessment of the skeletal remains and their associated material culture. The authors state that the earlier cemetery was not completely excavated initially, but that the later Historic Period cemetery was. They also provide detailed information about the grave goods included with each burial, including bifaces, stone effigies, beads, stone pipes, and charms. No mention is made of the presence of projectile points from either atlatl darts or arrows, or injuries associated with these latter two in these collections.

Other authors utilize data derived from the Malibu Middle Period 5 cemetery to support arguments about aspects of Chumash culture. These include studies on social organization (Martz 1984, Gamble 2008), and climate (Lambert 1994, Raab 2004, Jones and Schwitalla 2008, Douglas and Stanton 2010). These studies do not include additional osteological reanalyses of the remains.

2. Mulholland (1200 AD – 1500 AD)

One previous report has been published on the Mulholland site. This is a site report written by Biruté Galdikas-Brindamour entitled *Trade and Subsistence at Mulholland: A Site Report on LAn-246.* It was published in the Archaeological Survey Annual Report of the Department of Anthropology at UCLA in 1970. According to the author, analyses of the faunal assemblages and artifacts found at the site were conducted to test two hypotheses – that the Mulholland site was a sedentary village, and that its existence depended upon coastal trade. She notes that rodent activity and the daily presence of pothunters and looters during the excavation work had significantly harmed the site. Furthermore, haste was required to complete the work, which meant that provenience and other data were not collected for many artifacts. This site had been known to "collectors" of Native American artifacts for years and had been repeatedly looted, meaning that a large number of artifacts were not in place, and burial disturbance was ubiquitous. While not the focus of the report, the author does provide information regarding the condition and descriptions of the skeletal elements found, orientation of each body, and the associated grave goods for each burial. Determinations of sex and estimations of age were made using Robert Sussman's *Skeletal Analysis for the Archaeologist* (Sussman 1965). Galdikas-

Brindamour (1970) states clearly that only a portion of the burials at the cemetery were recoverable and that the entire cemetery was not disinterred. As a result, the MNI presented here by Galdikas-Brindamour is significantly underestimated. A discussion of the differences in cemetery population can be found in Chapter 6, Section 3 (a) (ii) of this thesis. The excavation revealed a minimum number of 25 individuals buried at the cemetery site, of which 22 were disinterred by the UCLA team, two were returned by looters, and one child cremation was uncovered by construction activity. All non-cremated remains were found flexed, with a variety of head orientations from West to North to East including those directions in between these cardinal directions. No cemetery burial was found to be oriented between 91° and 269°. There are a total of 18 adults and sub-adults (estimated to be 15-19 years old) at the time of death identified as being interred in the cemetery. Table 1 presents the demographic dimensions of Mulholland as presented by Galdikas-Brindamour (1970).

Table 1: Dimensions of Sex and Age of the Individuals ≥15 Years of Age-at-Death from Mulholland Cemetery (1200 AD – 1500 AD) According to Galdikas-Brindamour (1970)

SEX	n	%
Total	**18**	**100.0%**
Males	8	44.4%
Females	6	33.3%
Unknown	4	22.3%

AGE-AT-DEATH	n	%
Total	**18**	**100.0%**
15-19	6	33.3%
20-34	6	33.3%
35-49	3	16.6%
50+	0	0.0%
Unknown	3	16.7%

Galdikas-Brindamour (1970) in Table 1 of her report does note instances where, in her opinion, the remains present with one of the signatures of violence discussed in

Chapter 4, Section 7 of my study. Burial 11 is of a male estimated when disinterred to have been 30+ years old at death. Shells, beads, a carbonized seed core, and an asphaltum basketry impression were found with the remains. In addition, the burial also contained a "projectile point facing inwards between ribs." Burial 12 contains the remains of a male estimated to be 25+ years old at death with a partially healed skull trephination lesion, and "dismembered leg bones." Burial 13 is of a male estimated to be 30+ years old at death, with no associated grave goods, and "with feet and hands missing." Burial 17 is a male of unknown age-at-death. Only a few shell beads are associated with these remains and the "hands and feet missing." Burial 22, a sub-adult judged to be between 15-19 years old at the time of death has a polished deer cannon bone and a quartzite blade associated with the remains. The placement of the blade is not indicated (Galdikas-Brindamour 1970: Table 1). The report does state that "Cutting the hands and feet was a typical mutilation ethnographically recorded for the Chumash" (Galdikas-Brindamour 1970:136). However, no references are given for this statement. There has been no subsequent publication or reanalysis of the skeletal remains in this collection since 1970.

3. Medea Creek (1500 AD – 1785 AD)

Two publications are available that present data specifically taken from the skeletal assemblage associated with the Medea Creek cemetery (King 1969, 1982). There are also others that reference the collection and note that the skeletal remains provide evidence that some of these individuals were involved in violent encounters (Martz 1984, Walker 1989, Gamble 2008). The earliest paper presenting data derived from excavations of the Medea Creek cemetery was published in 1969 by Linda B. King, one of the lead excavators involved in the Medea Creek site recovery effort. This work is entitled *The Medea Creek Cemetery (LAn-243): An Investigation of Social Organization from Mortuary Practice* and can be found in the Archaeological Survey Annual Report of the Department of Anthropology at UCLA 1969. Using variability in the age, sex, body depth, position, and orientation of the burials at Medea Creek, along with differences in associated grave good frequency and typology, King (1969) hypothesizes that these differences resulted from the burial of individuals of different social rankings in the cemetery. King's unpublished UCLA doctoral dissertation, entitled *Medea Creek*

Cemetery: Late Inland Chumash Patterns of Social Organization, Exchange and Warfare, was completed thirteen years later in 1982. For this work, she expanded upon themes and data she collected for the 1969 paper to include information and observations about Chumash warfare as well. Both documents note that the cemetery had been looted and vandalized and that rodent and badger damage was extensive by the time excavation took place. Demographic information presented in 1969 on the skeletal assemblage found at Medea Creek was updated for the 1982 dissertation. Sex determinations and age-at-death estimations are derived from Sussman (1965) for both reports. These demographic dimensions as presented by King (1969, 1982) are provided in Table 2.

Table 2: Dimensions of Sex and Age of the Skeletal Assemblage from Medea Creek Cemetery (1500 AD – 1785 AD) According to King (1969, 1982)

	King (1969)	**King (1982)**
SEX	n	n
Total MNI	398-464	381
Males	49	16
Females	48	12
Unknown	301-367	353

AGE-AT-DEATH	n	n
Total MNI	398-464	381
Fetus		2
Infant		18
Child (0-12 years)	64	
Child		24
Youth (13-22 years)	32	
Young		8
Adult (23+ years)	147	
Adult		62
Non-child (13+ years)	46	
Unknown	109-175	266

In 1969, the minimum number of individuals in the cemetery is estimated by King to be between 398 and 464. Burial attributes noted in Appendix A of King's (1982) dissertation identify 381 burials. Only 97 of the total number of individuals could have

sex determined, with 49 believed to be male and 48, female (King 1969). King (1969) divides the age of the individuals in the cemetery into groups with a child being aged 0-12, a youth from 13-22, and an adult 23 or older. The last category is Non-child, which includes those whose age could not be determined beyond the fact that they were older than 12. The later dissertation (1982) utilizes different, non-standardized age categories, with two burials being of fetuses, 18 infants, 24 children, eight categorized as young and 62 as adults. Two hundred sixty-six are of unknown age-at-death.

In her first paper on Medea Creek, King (1969:62) notes three burials which she identifies as showing signs that they were "deviant individuals subjected to execution, war, raid, or murder victims from either Medea Creek Village or some other village." This is based on uncited ethnographic sources. King (1969:61-62) identifies Burials 330, 133, and 20 as "Three bodies at Medea Creek [that] were subjected to treatment that suggests a very special social identity. Each had a common cutting of the body, burning at the ends of the cut bones and on the parts of the bones covered by little flesh, and the presence of arrow points in the body." Conservatively, these three individuals represent 0.75% of the minimum number of individuals believed to be in the cemetery at the time of excavation.

King's (1982) dissertation presents more detailed information on the skeletal injuries found on four sets of skeletal remains at Medea Creek and the patterns of extreme violence they suggest to her. Of the estimated 381 primary and secondary burials now believed to be in the cemetery, three are noted as presenting "with arrow points, mutilations and partial burning [that] are evidence for patterned violence" (King 1982:xv). These are the three burials (330, 133 and 20) identified in the 1969 work. King (1982) also identifies Burial 73 as a possible victim of violence. She concludes that "The rate of death by violence at Medea Creek Cemetery was approximately one percent" (King 1982:153). She identifies six violent acts that could have caused the skeletal lesions she observes on the remains of these four victims including foul play, capital punishment, sacrifice, cannibalism, feuding or war, and political subjugation or punitive attack (King 1982:154). The border location of the Medea Creek site near land occupied by the Gabrieliño-Tongva is offered as one explanation for the evidence of extreme violence observed.

Other researchers have utilized King's (1969, 1982) data drawn from Medea Creek to support various arguments about the Chumash in addition to endemic violence. These include social structure, mortuary practices, and social complexity (Martz 1984, Walker 1989, Gamble et al. 2001, Green 2001, Hollimon 2001, Gamble 2008). It was believed that virtually all the cemetery was excavated by King and Hasten (Martz 1984).

In 2016, the Fowler Museum at UCLA completed extensive documentation on the Medea Creek remains in preparation for their repatriation to the descendent communities. The CA-LAn-243 Human Remains spreadsheet compiled by Fowler staff osteologists provides information on the provenience and description of all remains in the museum's possession as part of Accession 494. The minimum number of individuals (MNI) believed to have been recovered from this cemetery actually slightly exceeds 900 (Dr. Wendy Teeter, personal communication). This puts the cemetery population at *more than double* the number Linda King believed to be in the cemetery at the time of excavation. There have been no osteological re-analyses of the skeletal remains from Medea Creek published since King's dissertation was submitted in 1982.

4. Malibu Historic (1785 AD – 1805 AD)

There are several publications that include data derived from the skeletal assemblage associated with the Malibu Historic cemetery. As noted at the beginning of this section in the discussion of previous studies of the prehistoric cemetery at Malibu (Malibu Middle Period 5), the two cemeteries associated with this site are important to archaeologists because they are separated spatially and temporally with no mixing of interments. This provides scholars with a springboard for comparison across a variety of measures. Additionally, because the excavation was completed with osteology students and physical anthropologists on site, there are additional data sets available on the skeletal assemblages that have created opportunities for a wider range of inquiry.

Judy Suchey and colleagues participated in the original excavation of the Malibu Historic cemetery and published their *Analysis of Human Skeletal Material from Malibu, California (LAn-264)* in the Annual Reports of the University of California Archaeological Survey Volume 14 in 1972. This is the first report on the collection. It describes the techniques of excavation, *in situ* analyses, and provides basic osteobiographical information such as sex, age-at-death, and stature that have been

determined for each burial. Age-at-death estimations are derived primarily from age changes in the pubic symphysis and epiphyseal union (or non-union). Cranial suture closure and dental attrition data are used to confirm gross age ranges (Suchey et al. 1972:47). Sex determinations are arrived at using length and morphology of the innominate primarily, and cranial morphology, long bone length, and overall skeletal robusticity secondarily (Suchey et al. 1972:47). The collection includes 136 individuals, 105 of whom are adults, with 31 identified as sub-adult. There appears to be a significantly larger percentage of males or those probably male than females or those probably female in the adults for whom an identification could be made (44.5% vs. 19.7%). However, sex could not be determined for over a third of those analyzed (35.8%). Suchey et al. (1972) report the dimensions of estimated age-at-death and sex determinations by categories for the individuals disinterred in the original cemetery excavation. Not all the individuals in the total cemetery population of 136 were analyzed for each dimension. Sex determinations were attempted on 81 of the 105 adults in the population. Age-at-death estimations were attempted on 109 of the 136 individuals in the cemetery population. The authors also chose to use age categories that were not mutually exclusive. These data are presented in Table 3.

Table 3: Dimensions of Sex and Age of the Individuals from Malibu Historic Cemetery (1785 AD – 1805 AD) According to Suchey et al. (1972)

SEX	n	%
Total Cemetery Population	**136**	**-**
Total Adults Analyzed for Sex	**81**	**100.0%**
Males	19	23.5%
Probable Males	17	21.0%
Females	9	11.1%
Probable Females	7	8.6%
Unknown	29	35.8%

AGE-AT-DEATH	n	%
Total Cemetery Population	**136**	**-**
Total Individuals Analyzed for Age-at-Death	**109**	**100.0%**
Sub-Adults (fetal - <18)	25	22.9%
18-25	9	8.3%
18-35	8	7.3%
Over 25	5	4.6%
Over 30	3	2.7%
Over 35	4	3.7%
Unknown	55	50.5%

Suchey et al.'s (1972) analysis of 26 adults with at least one complete long bone usable for stature assessment indicates that male stature of those interred ranges between 5'1" and 5'8 ½" with a mean of 5'5". Female stature ranges from 4'7" to 5'3", with a mean of 4'11". Pathologies found are described in detail and identified when possible. The authors emphasize the poor state of preservation of the skeletal elements disinterred, especially their fragmentary nature. Eighty-two percent of the burials show evidence of taphonomic processes such as rodent damage and disinterment with reburial to make room for later interments. Only one healed post-cranial fracture (humerus) is observed, and no examples of violent death – defined as imbedded projectile points or cranial depression fractures – are identified in the collection.

Virginia Bickford's Master's thesis entitled *European Artifacts from a Chumash Cemetery CA-LAn-264* was completed in 1982 and provides another assessment of this cemetery. Using the cemetery remains and associated grave goods, Bickford analyzes

actuarial data from the cemetery and identifies European artifacts found to attempt to reconstruct the history of the village of Humaliwo from the time of Spanish Contact to the eradication of the village (Bickford 1982:1-2). She also focuses on the apparent unequal distribution of burials by sex in the cemetery. Bickford states that 136 individuals were disinterred from this cemetery, with 99 being adults aged-at-death to be 18+ years, six are youths aged-at-death to be 12-20 years old, and 31 are judged to be sub-adults aged-at-death to be 0-12. Further age-at-death breakdowns for the sub-adult group are presented citing specifically the data of Suchey et al. (1972:45-49) as the source of these numbers rather than personal reanalysis.

Bickford (1982) identifies four pieces of weaponry of Spanish origin included in four burials from this cemetery. These include pieces of a Spanish sword, a metal gunlock used to anchor the hammer mechanism of the gun, a metal piece used to protect the butt of a pistol, and a pistol stock. The pistol stock had been repurposed as a container or vessel. The burials associated with these items do not present with evidence that these weapons had been causative of trauma. Bickford (1982) does not identify any trauma caused by violence associated with the remains in this collection. While this is consistent with Suchey et al.'s (1972) results, the focus of Bickford's work is not bioarchaeological.

As noted in the earlier discussion of previous research on the Malibu Middle Period 5 cemetery collection, the work of Phillip L. Walker, Francine J. Drayer, and Susan Keer Siefkin provides an important contribution to studies of both Malibu cemeteries. In their 1996 report entitled *Malibu Human Skeletal Remains: A Bioarchaeological Analysis*, the authors conduct a bioarchaeological review to compare the skeletal remains from both Malibu cemeteries to determine overall lesion typology and frequency, with further consideration given to lesions associated with violence. Overall health and occupational status are discussed as well, with infectious lesions and chronic conditions such as osteoarthritis noted and contextualized. Walker et al. (1996) point out that the Chumash during the early Historic period were under significant stress from the rapid cultural change resulting from Spanish colonization of the area and subsequent establishment of permanent Missions. Furthermore, contact with the Spanish exacerbated the spread of disease.

Walker et al. (1996) also note that the preservation of skeletal elements in the Malibu Historic cemetery is poor. Bioturbation and the effects of Chumash reburial practices create significant sampling problems when comparing data from other cemeteries. The cemetery was only used for 35 years before being abandoned. With the establishment of the Missions, some Chumash left the village at Malibu to live and work at the Missions, changing the demographic distribution of those remaining. Young families and women tended to leave the village first for mission work which in the authors' view potentially created a cemetery population of older and more likely male inhabitants. The authors state that the frequency of traumatic injuries is significantly *lower* in the Malibu Historic cemetery than in the earlier Malibu Middle Period 5 cemetery skeletal assemblages, despite the fact that both populations were under stress. Healed fractures are rare, with the authors identifying only four individuals presenting with at a total of six healed fractures. Two are male and two are female. Walker et al. (1996) find no cases of healed cranial depression fractures found in the Malibu Historic collection, and no cases of projectile point injuries.

Lynn H. Gamble, Phillip L. Walker, and Glenn S. Russell's (2001) published work *An Integrative Approach to Mortuary Analysis: Social and Symbolic Dimensions of Chumash Burial Practices* contains data gained from a comparative study of burial practices at both Malibu cemeteries to explore when simple chiefdoms may have arisen among the Chumash. It includes bioarchaeological data on health status, activity patterns and genetic relationships gained from assessment of the skeletal remains. The authors state that a reanalysis of the excavation and burial notes associated with the Malibu Historic cemetery identifies 140 burials there. This differs slightly from the 136 noted by Suchey et al. (1972). Gamble et al. (2001) concur with others (Suchey et al. 1972, Bickford 1982, Walker 1996) that the skeletal remains are poorly preserved and many are fragmentary in nature. As a result, Gamble and colleagues only include 112 burials from the Malibu Historic cemetery in their analysis. While this work makes inferences about health and activity patterns identified in the Malibu Historic remains, the focus of the work is to understand the social importance of burial ritual and symbolism. There is no data regarding skeletal trauma noted on the remains, or a discussion of conflict among the Chumash.

There are other publications which utilize the original excavation data, or data obtained by others noted above from this collection to draw inferences about a variety of aspects of Chumash life. Patricia Martz's (1984) doctoral dissertation entitled *Social Dimensions of Chumash Mortuary Populations in the Santa Monica Mountains Region* focuses upon the differential mortuary rituals and practices in relation to societal rank. As with King's (1969) work on Medea Creek, Martz uses burial depth, orientation, position, grave good frequency and typology to make comparative inferences across a number of Chumash villages in the region. Citing Suchey et al. (1972), Martz notes that in the Malibu Historic Cemetery collection there is no skeletal evidence of violence or cremation. As with the Medea Creek remains, Martz did not conduct a new bioarchaeological reanalysis of the remains from the Malibu Historic cemetery. John Douglass and Patrick Stanton in their 2010 work *Living during a Difficult Time: A Comparison of Ethnohistoric, Bioarchaeological, and Archaeological Data during the Mission Period, Southern California* compare the available Malibu Historic cemetery data with ethnohistorical records of Spanish populations in the area to look at health trends and interaction patterns of these populations. For this work, they did not conduct a reanalysis of the skeletal remains. None of these authors identifies skeletal remains presenting with evidence of traumatic lesions or signatures of violent interactions in the Malibu Historic cemetery skeletal assemblage.

Chapter 6 – Results: Skeletal Evidence of Violence

1. Location of the Research

I conducted all my assessments of the physical remains, from the four cemeteries and their associated documentation, at the UCLA Fowler Museum of Cultural History Archaeological Collections Facility. The Curator of Archaeology at this facility is Wendy G. Teeter, Ph.D., under whose direction these collections have been maintained since 1997. I obtained permission from Dr. Teeter and the Santa Ynez Band of Chumash Indians to conduct a non-destructive reanalysis of the skeletal remains contained in the four cemeteries previously described in Chapter 4, Section 5. In accordance with tribal wishes, no invasive testing of any kind has been performed on these remains, nor have any X-rays or other imaging studies been performed.

Utilizing collections that are housed at the same facility offers the advantage of consistency in handling, care, inventory, and analysis. The same staff members, trained in the same manner, prepared Skeletal Information Sheets for each collection, which were subsequently complemented by Buikstra and Ubelaker's (1994) Inventory Recording Forms. The staff also used the same criteria for determining sex, estimating age-at-death, and identifying skeletal pathologies.

2. The Data Collection Process

My research was conducted from January 2015 through August 2016 on the samples created, as described in Chapter 4, Section 4, during multiple visits to the UCLA Fowler Museum of Cultural History Archaeological Collections Facility. I conducted my research in two phases. Phase 1 of the process began with a complete review of 1) any excavation notes or descriptions prepared by the individuals who completed the original excavations when available, 2) any photographs of burials taken at the time of disinterment, and 3) the Skeletal Information Sheets prepared by staff osteologists at the UCLA Fowler Museum of Cultural History Archaeological Collections Facility for each burial as part of the curation process. These sheets are prepared for each individual within a burial location beginning with site, accession, and burial numbers. Both age-at-death estimation and sex determination are determined by assessing a number of data points. The age-at-death estimation provided is based upon using sutural, epiphyseal,

dental, auricular, and pubic symphysis data, depending upon the elements present in the burial. Age-at-death estimations using the pubic symphysis are made using both the Todd and Suchey-Brooks Scoring Systems as outlined in standards presented by Buikstra and Ubelaker (1994:22-23). Sex determinations result from observations made of the os coxae and cranium as well as measurements of the femoral head and bi-zygomatic diameter. The features of the ventral arc ridge, ischio-pubic ramus ridge, sciatic notch and pre-auricular sulcus of the os coxae if present are scored on various scales and a determination of sex is made. For the cranium, the size and morphology of the supra-orbital ridges, orbital margins, mastoid processes, mental eminence and nuchal crest are observed and scored following Buikstra and Ubelaker (1994:16-21). While sexual dimorphism among humans occurs, dimorphic variation is wide and reliance on estimating age and sex by this means is a problematic endeavor, particularly if the remains come from a variety of human groups (Buikstra and Ubelaker 1994:16). It should be noted that a large number of skeletal remains from indigenous Native Americans from Southern Central California have been examined and catalogued at the Fowler, and staff osteologists are familiar with the morphological variation of these populations. However, age-at-death estimation and sex determination made without additional corroborating evidence should be considered speculative rather than definitive.

The Skeletal Information Sheets also provide information on the number of skeletal elements present, siding of each element where applicable, along with elemental condition and state of completeness. Dental information is provided as well. Each sheet also provides space for remarks and notes where any pathological lesions or indications of trauma, unusual morphology or conditions encountered upon examination could be noted. These proved very helpful in guiding my observations of the skeletal elements of each burial in my samples. I collected data on a large number of skeletal and dental pathologies beyond those that are associated with interpersonal violence. However, the scope of this thesis prevents analysis of the non-conflict related pathology I encountered. A sample Skeletal Information Sheet is provided in Appendix F.

I created Excel® spreadsheets for each cemetery site where I entered the osteobiographical data on those individuals who qualified for inclusion in my samples. Data collected included Burial number, the exact location of the remains in the cemetery

(when known), maturation, sex, portion of the skeleton from which the element originated, the element observed, its side where applicable, a description of the element and notations regarding the pathology observed. I then assigned a pathology code to each skeletal lesion or incidence of trauma I found to facilitate sorting of the data. In Phase 1, lesions that appeared to be evidence for one of the seven skeletal signatures of violence outlined in Chapter 5 Section 7 were simply identified and recorded.

In Phase 2 of my research, I performed a macroscopic osteological analysis of the skeletal remains to identify the presence and type of any pathological lesions present. This also served to confirm the accuracy of the Skeletal Information Sheets in terms of the quantification and identification of the remains on hand. The Skeletal Information Sheets proved to be a highly accurate source of information on each burial. They confirmed that the elements in these collections that are recorded as being held by the Archaeological Collections Facility have been retained and preserved without disturbance.

Additional insight and analysis of the collections studied were provided to me by Dr. Elizabeth Miller, a faculty member in the Anthropology Department at California State University, Los Angeles, and the Consulting Anthropologist to the Los Angeles County Department of Medical Examiner/Coroner. She reviewed specific examples from these collections to further inform my analyses of violent pathology and to provide additional insight when identification was unclear. Her expertise was an invaluable addition to my research.

In the following sections, I present the results of my two-phased research. I focus on the differential and comparative incidence of seven markers of violent interpersonal encounters identified and described in Chapter 4 Section 7, which include: burning, cut marks, healed cranio-facial fractures, healed post-cranial fractures, peri-mortem fractures, projectile point injuries, and dismemberment injuries. Incidences noted for each marker are further broken down by age and sex.

3. Data Presentation by Site

a. Demographic Dimensions by Site

Utilizing the age-at-death estimation and sex determination of each individual in my samples, I grouped them into the following age categories following Buikstra and

Ubelaker (1994): Sub-adults consist of those from 15-19 years old, Young Adults are those from 20-34 years old, Middle Adults include those from 35-49 years old, and Older Adults are anyone 50 and older.

i. Malibu Middle Period 5 (900 AD – 1150 AD)

Temporally, these skeletal remains are the earliest sample included in my research. The sample size from this site contains 92 adults. Twenty-eight are identified as male representing 30.4% of the sample, 33 are identified as female representing 35.9% of the sample, with the remaining 31 being of unknown sex, and representing 33.7%. Thus, the sample contains roughly a third male, a third female and a third unknown (Table 4).

Table 4: Dimensions of Sex and Age of the Sample from the Skeletal Assemblage at Malibu Middle Period 5 (900 AD – 1150 AD)

SEX	n	%
Total	**92**	**100.0%**
Males	28	30.4%
Females	33	35.9%
Unknown	31	33.7%

AGE-AT-DEATH	n	%
Total	**92**	**100.0%**
15-19	9	9.8%
20-34	12	13.0%
35-49	13	14.1%
50+	11	12.0%
Unknown	47	51.1%

Estimation of the ages of these adults at the time of death provides a less-clear picture of the composition of this sample as the age-at-death of 47 or over half (51.1%) of the individuals in the sample could not be confidently estimated. Nine (representing 9.8% of the sample) are identified as aged 15-19 years old. Twelve are identified as 20-34 years old, representing 13.0%, and 13 or 14.1% are identified as 35-49 years old. Eleven individuals representing 12.0% are considered to have been over the age of 50 at the time of death.

ii. Mulholland (1200 AD – 1500 AD)

My sample from the Mulholland cemetery temporally follows Malibu Middle Period 5. Table 5 shows that the sample is made up of 39 individuals, of whom 10 (25.6%) are male, six (15.4%) are female, and 23 or 59% are of undetermined sex. The breakdown of age-at-death estimations for this sample includes one individual estimated to be 15-19 years old (2.6%). Eight individuals each are believed to be aged 20-34 years and aged 35-49 for 20.5% each at the time of death. No one 50 or older is contained in the sample (0%). However, 22 individuals representing over half of the sample (56.4%) are of an age-at-death that could not be estimated.

It should be noted that my sample of individuals contains 39 individuals, which is considerably more than Galdikas-Brindamour (1970) noted to be contained in the entire cemetery at the time of its excavation. As discussed in Chapter 5, Section 2a, when excavated, the cemetery was thought to contain 25 burials, of which 22 were disinterred. In a subsequent review of the remains performed by the osteology team at the Fowler, the minimum number of individuals in this cemetery is determined to be over 90. This increase can be attributed in part to the fact that unlike the Fowler team, the original excavators were volunteers with no expertise or interest in human bone identification. Many were "reformed looters" working in extreme haste (Galdikas-Brindamour 1970).

Table 5: Dimensions of Sex and Age of the Sample from the Skeletal Assemblage at Mulholland (1200 AD – 1500 AD)

SEX	n	%
Total	**39**	**100.0%**
Males	10	25.6%
Females	6	15.4%
Unknown	23	59.0%

AGE-AT-DEATH	n	%
Total	**39**	**100.0%**
15-19	1	2.6%
20-34	8	20.5%
35-49	8	20.5%
50+	0	0.0%
Unknown	22	56.4%

iii. Medea Creek (1500 AD – 1785 AD)

This cemetery is the largest of the four I have analyzed and therefore provides the largest sample for my research – 524 individuals (Table 6). Eighty-nine or 17% are determined to be male, 94 or 17.9% are female and 341, representing almost two-thirds of the sample (65.1%), are of an undetermined sex. In this sample, the age-at-death could not be estimated for more than 90%, or 473 of the individuals. Six or 1.1% are aged at death as 15 to19 years old, with six aged at death to be 20 to 34 (1.1%). Thirty-four are estimated to be aged at death as 35-49 years old (6.5%) and five, or 1% are estimated to be 50 years or older. The fragmentary state of the remains in this sample often made it impossible to assess the multiple dimorphic features of the os coxae and skull required to confidently determining sex, the age-related changes to the pubic symphysis, auricular surface of the ilium, and the cranial sutures needed to more precisely assess age at death.

Table 6: Dimensions of Sex and Age of the Sample from the Skeletal Assemblage at Medea Creek Cemetery (1500 AD – 1785 AD)

SEX	n	%
Total	**524**	**100.0%**
Males	89	17.0%
Females	94	17.9%
Unknown	341	65.1%

AGE-AT-DEATH	n	%
Total	**524**	**100.0%**
15-19	6	1.1%
20-34	6	1.1%
35-49	34	6.5%
50+	5	1.0%
Unknown	473	90.3%

iv. Malibu Historic (1785 AD – 1805 AD)

The most recent sample used in this study comes from the Malibu Historic cemetery. The sample consists of 93 adults (Table 7). Twenty-two or 23.7% are identified as male, and 15 or 16.1% are female. As with Medea Creek, almost two-thirds or 56 individuals, representing 60.2% of the sample, are of an undetermined sex. Age-at-death in this sample is difficult to estimate. Three individuals or 3.2% are aged at death to be 15-19

years old, seven or 7.5% are estimated to be 20-34 years old at the time of death, five or 5.4% are aged 35-49, and three or 3.2% are estimated to have been over 50 at the time of their deaths. Over three quarters of the sample are of indeterminate age, representing 75 individuals or 80.7% of these adults.

Table 7: Dimensions of Sex and Age of the Sample from the Skeletal Assemblage at Malibu Historic Cemetery (1785 AD – 1805 AD)

SEX	n	%
Total	**93**	**100.0%**
Males	22	23.7%
Females	15	16.1%
Unknown	56	60.2%

AGE-AT-DEATH	n	%
Total	**93**	**100.0%**
15-19	3	3.2%
20-34	7	7.5%
35-49	5	5.4%
50+	3	3.2%
Unknown	75	80.7%

v. Dimensions of Sex and Age-at-death for Combined Samples

When all the samples are combined (Table 8), the total number of individuals included is 748. Of these, 149 (19.9%) are male and 148 (19.8%) are female. The remaining 451 (60.3%) individuals are of an undetermined sex. The Malibu Middle Period 5 sample represents 12.3% of this total, with Mulholland, Medea Creek, and Malibu Historic Period representing 5.2%, 70.7%, and 12.4% respectively. The large sample from Medea Creek accounts for almost three-quarters of the total sample size. In terms of age-at-death, 82.5% of the individuals in the total sample were of an age upon death that could not be determined and only 17.5% of the total sample could be associated with a specific age-at-death. Due to the fact that the majority of the individuals in each sample are of unknown sex and age-at-death, interpretations of the evidence for violence in the samples based on these variables will be necessarily limited.

Table 8: Dimensions of Sex and Age of the Samples from All Cemeteries Combined (900 AD – 1805 AD)

SEX	n	%
Total	748	**100.0%**
Males	149	19.9%
Females	148	19.8%
Unknown	451	60.3%

AGE-AT-DEATH	n	%
Total	748	**100.0%**
15-19	19	2.5%
20-34	33	4.5%
35-49	60	8.0%
50+	19	2.5%
Unknown	617	82.5%

b. Pathological Dimensions by Site

As previously described, in the first phase of my work, I reviewed the remains and associated burial records and the previously gathered data from each site sample and simply recorded the type and frequency of the skeletal pathologies I initially identified as potential skeletal markers of violent encounters. In the second phase of my analysis, I re-examined the skeletal remains of the individuals showing any of the seven signatures of violence to confirm my impressions and determine how likely it was that the lesions presented occurred as a result of violent interactions. This involved analyzing and contextualizing the demographic data, excavation notes and photographs, the lesion's location, type, and the presence of associated potential violent lesions in the same individual. Data from both phases of my work are presented here by cemetery site.

i. Malibu Middle Period 5 (900 AD – 1150 AD)

In my first phase review of the 92 individuals in the sample from this cemetery, there were 14 adults who displayed a total of 16 examples of trauma *potentially* associated with violence. Thus, 15.2% or over 1 in 7 individuals in this sample presented with at least one possible signature of violence initially. Table 9 presents the first phase data for this sample which includes age, sex, and pathological typology observed.

Table 9: First Phase Dimension of Observed Lesions Possibly Associated with Violence in the Malibu Middle Period 5 Skeletal Assemblage

Malibu Middle Period 900 AD - 1150 AD	Individual Sample		Cut Marks		Healed Cranio-Facial Fracture		Healed Post-Cranial Fracture		Projectile Point Injury	
	n	%	n	%	n	%	n	%	n	%
SUB-ADULTS/ADULTS	92	100.0%	2	2.2%	7	7.6%	6	6.5%	1	1.1%
Males	28	30.4%	2		6		4		1	
Females	33	35.9%	0		1		2		0	
Unknown	31	33.7%	0		0		0		0	
15-19 years	9	9.8%	0		0		0		0	
20-34 years	12	13.0%	0		1		3		1	
35-49 years	13	14.1%	2		4		0		0	
50+ years	11	12.0%	0		1		3		0	
Unknown	47	51.1%	0		1		0		0	

Table 9 includes only the categories of pathology for which there are incidences in the sample.

There are no individuals presenting with evidence of burning, peri-mortem fractures, or signs of dismemberment in this sample. Two males, both estimated to be aged 35-49 years at death show evidence of skeletal cut marks, representing 2.2% of the sample. Seven individuals present with healed cranio-facial fractures. Six are male and one female, and all are 20 years or older at the time of death. These represent 7.6% of the sample. Six burials consisting of four males and two females making up 6.5% of the sample have healed post-cranial fractures. Three are estimated to be 20-34 years old and three are estimated to be 50 or older at the time of death. One male between 20 and 34 years old at death or 1.1% of the sample has evidence of a projectile point injury. Of the 14 adults initially showing signatures of violence in this sample, there are none of unknown sex and only one of unknown age-at-death. Eleven of these 14, or 78.6%, are male. Only three or 21.4% are female. No sub-adults present with a possible signature of violence.

The Phase 2 re-analysis was then performed on the elements containing the suspected evidence of violent encounters. I have summarized these findings below. Additional photographs and detailed information regarding the description and analyses of each lesion supporting my Phase 2 determinations for the Malibu Middle Period 5 skeletal assemblage can be found in Appendix A. Burial 49, a male aged at death at between 35 and 49 years old has cut marks on the right parietal. The interiors of the cuts are dark in

color, perhaps from long interment in dark colored soil. It is not possible to discern the shape of the cuts (V or U shaped) and their depth could not be estimated. One was much thinner than the other. It cannot be determined whether these cuts were peri-mortem, although the cuts themselves could not have produced a fatal injury. As discussed in Chapter 4, Section 6(b) and (g), cut marks that occur as a result of violence occur most often as peri-mortem injuries and as one of a constellation of injuries that occur in conjunction with dismemberment, butchery, scalping, or violent death. Scalping injuries are, on occasion, survivable, which theoretically would result in cut marks on the affected bone showing signs of healing. These cuts can be seen most often on the frontal bone and the left or right parietals (depending upon the dominant hand of the scalper), but they present as horizontal cuts on the bone. These noted in Burial 49 are vertical. There are a number of reasonable alternative explanations for these cut marks, including taphonomic processes or injury during secondary burial. Burial 5 contains the healed fracture of the distal left radius sustained by an adult male, 50 years or older at the time of death. This appears to be a Colles fracture of the radius. Distal radial fractures are the most common form of arm fracture and very often occur as the result of an accidental fall on an outstretched hand, particularly in children and the elderly (Nellans et al. 2012). Another male, Burial 28.1 estimated to be aged 20-34 at death, has a healed fracture of the lateral left patella with no other associated lesion of the tibia or femur. A third male, Burial 46, an adult 20-34 years old at death with a healed fracture of the right radial diaphysis presented with no additional evidence of skeletal injury to the arm. Burial 52 is of a female over the age of 50 at the time of death presenting with a healed fracture of the right ulnar diaphysis approximately two-thirds of the distance to the distal end of the ulna. Another female aged at death as over 50, Burial 64, has a healed mid-diaphysis fracture of the left ulna. Some fractures of the ulnar diaphysis can result from the defensive use of the forearm to protect the head and face in an aggressive encounter and are described as “parry fractures” (Larsen 1997:111). In some cases, both the ulna and the radius are affected. However, there are a variety of causes of forearm fracture, but clinicians report that accidents are the most frequent cause of this injury, regardless of position (Smith 1996). Additionally, healed parry fractures of the ulna and in some cases the radius are associated with the presence of healed cranio-facial trauma in the same

individual (Smith 1996). Smith's (1996) work on parry fractures in Late Archaic Native American females supports her contention that ulnar fractures in the absence of significant cranial trauma are the likely result of accidents. In these females in my sample, these lesions occur in isolation, with no evidence of cranial or facial trauma.

Each of the six individuals described above have single types of lesions in isolation with no associated injuries or contextualizing evidence. These injuries cannot conclusively be considered to have occurred as a result of violence. Therefore, data regarding these six individuals from this sample will not be considered further. Table 10 presents the data on the remaining lesions in the sample.

Table 10: Second Phase Dimension of Observed Lesions Likely Associated with Violence in the Malibu Middle Period 5 Skeletal Assemblage

Malibu Middle Period 5 900 AD - 1150 AD	Individual Sample		Cut Marks		Healed Cranio-Facial Fracture		Healed Post-Cranial Fracture		Projectile Point Injury	
	n	%	n	%	n	%	n	%	n	%
SUB-ADULTS/ADULTS	92	100.0%	1	1.1%	7	7.6%	1	1.1%	1	1.1%
Males	28	30.4%	2		6		1		1	
Females	33	35.9%	0		1		0		0	
Unknown	31	33.7%	0		0		0		0	
15-19 years	9	9.8%	0		0		0		0	
20-34 years	12	13.0%	0		1		1		1	
35-49 years	13	14.1%	2		4		0		0	
50+ years	11	12.0%	0		1		0		0	
Unknown	47	51.1%	0		1		0		0	

Table 10 includes only the categories of pathology for which there are incidences in the sample.

After second phase review, eight individuals with ten incidences of trauma likely associated with violence remain. Thus, 8.7% of the individuals in this cemetery sample have lesions that cannot be excluded from those caused by violent interactions. Summaries of my findings are presented here, with additional detail on each individual available in Appendix A.

Seven adults, six males and one female, have healed cranio-facial fractures. Burial 53 is of an older female above the age of 50 at death with a healed fracture of the right nasal bone resulting in a depressed deformation of the distal end of the bone. In addition, a portion of the healed frontal process is deformed and pushed posteriorly into the nasal aperture. Burial 49.1 is of a male 35-49 years old at the time of death with a healed right

nasal bone fracture similar to that seen in Burial 53. It has resulted in deformation. Healed nasal lesions such as these can result from blows to the nose which strike from the left side. This is suggestive of a blow received from the left hand of an attacker, or an instrument coming from the right of the person receiving the blow.

Healed cranial depression fractures can be seen in five males – Burial 26 of an unknown age-at-death, Burials 43.1 and 67 aged 20-34, and Burials 69 and 78 aged 35-49. These cranial fractures are of various shapes including round, ovoid, and rectangular and are consistent with wounds produced by weapons of the same shape. None of these fractures present in irregular shapes, which may be the result of falls on uneven surfaces or rock-fall. All the healed cranial depression fractures in these individuals are located on either the frontal or parietal bones. The locations of these injuries, along with the fact that they are all adult males at the time of death, are consistent with cranial injuries resulting from violent encounters observed by Walker (1989) among prehistoric Channel Island and mainland Santa Barbara area Native Americans. Walker (1989) found that depressed cranial fractures of this size and shape are found significantly more often in males than in females in this region and the number increases in frequency by middle age. Walker (1989:320) notes that there is a "low frequency of facial injuries among the Channel Island Indians", who are Chumash living on the Santa Barbara Channel Islands. The results from my inland sample are consistent with this view, as only 2.2% of the individuals are observed with facial injuries. Along with multiple depression fractures on the frontal bone of Burial 78, this individual also has a cut mark 22.01 mm in length on the left parietal bone. The source of this lesion very ambiguous. In consultation with other scholars, three at the Fowler believe it to be a cut mark, two others unaffiliated with the Fowler consider it to be a vascular imprint, and a another bioarchaeologist believes it could also be taphonomic but a cut mark could not be ruled out. Given the extensive head trauma this individual experienced, I have identified this as a cut-mark which cannot be eliminated as a result of a violent interaction (Photo in Appendix A).

Burial 1 is of an adult male aged at death at 20-34 years old who presents with two of the signatures of violence I have identified. There are four ribs which show evidence of healed fractures. It is not possible to determine whether all the ribs were broken at the same time. This same male also has evidence of projectile point injury to spinous

processes of two cervical vertebrae (C3 and C4) that have broken off. There is a hole present in the posterior portion of the body of the C3 vertebra that is consistent with projectile point injury. This is consistent with a notation in the excavation records that a blade was found next to the thoracic cavity in this location at the time of excavation. The blade is not part of the elements preserved at the Fowler and it is not possible to compare the blade to the hole to confirm that the wound was made by this blade.

ii. Mulholland (1200 AD – 1500 AD)

The sample drawn from the Mulholland cemetery contains 39 individuals. None presents with evidence of burning, cut marks, healed cranio-facial fractures, peri-mortem fractures, projectile point injuries, or signs of dismemberment. In my first phase analysis, two individuals, or 5.1%, present with skeletal signatures of possible violence in the form of post-cranial healed fractures. One is an adult of undetermined sex and age-at-death. The other is considered to be a male, with an age-at-death estimated to be between 20 and 34 years old. There are no females or sub-adults presenting with a possible signature of violence in this sample. These data are presented in Table 11.

Table 11: First Phase Dimensions of Observed Lesions Possibly Associated with Violence in the Mulholland Skeletal Assemblage

Mulholland 1200 AD - 1500 AD	**Individual Sample**		**Healed Post-Cranial Fracture**	
	n	**%**	**n**	**%**
SUB-ADULTS/ADULTS	39	100.0%	2	5.1%
Males	10	25.6%	1	
Females	6	15.4%	0	
Unknown	23	59.0%	1	
15-19 years	1	2.6%	0	
20-34 years	8	20.5%	1	
35-49 years	8	20.5%	0	
50+ years	0	0.0%	0	
Unknown	22	56.4%	1	

Table 11 includes only the categories of pathology for which there are incidences in the sample.

The Phase 2 re-analysis was then performed on the elements presenting the suspected evidence of violent encounters in the manner described for the previous cemetery. I have summarized these findings below. Detailed information regarding the description and analyses of each lesion supporting my Phase 2 determinations for the Mulholland skeletal assemblage can be found in Appendix B.

In the second phase of the analysis, Burial 8a, the adult of unknown sex and age-at-death, has a healed fracture of the midshaft of the left clavicle. No other trauma related to violent encounters is associated with this burial. Fractures of the clavicle are common, and are most often the result of trauma. Types of trauma include sports injuries, falls on outstretched hands, a blow to the shoulder, and traffic accidents. More than two-thirds of these injuries are to the clavicular diaphysis, and are often displaced fractures (Paladini et al. 2012). This healed fracture in Burial 8a is displaced. Burial 10.1, a male aged at death as 20-34 years, has a healed spiral fracture of the diaphysis of the distal right radius resulting in significant deformation. The interosseous border of the radius can be seen to be twisted in a spiral configuration. The bone was not properly reduced or set and thus it has healed out of alignment. Spiral fractures of the radius occur as the result of twisting, or improper torsion on the arm (Flaherty et al. 2014). This individual probably suffered significant disability in the arm as a result of this fracture that would have permanently limited its use. This injury occurred in isolation with no other trauma related to violence being observed. There is no other evidence associated with these burials to further contextualize these healed fractures. Without support from additional evidence, these injuries cannot be determined conclusively to have occurred as a result of violence. It should be considered that these fractures are more likely the result of falls or other accidental causes. Therefore, data regarding these two individuals from this sample will not be considered further. This means that no individuals (0.0%) from the Mulholland cemetery sample exhibit probable evidence of the seven signatures of violence used in my analysis.

iii. Medea Creek (1500 AD – 1785 AD)

The Medea Creek cemetery sample includes 524 individuals and is significantly larger than the other samples included in my research. In my first phase review of the remains, there were 29 individuals who exhibit at least one example of trauma that could

potentially have resulted from violent encounters. Several had more than one healed fracture. Two individuals had two different signatures of possible violence. These 29 individuals represent 5.5% of the total sample from Medea Creek.

The Phase 1 analysis revealed no individuals with peri-mortem fractures. Thirteen sets of remains (2.5%) show skeletal evidence of burning. Five are male, three are female and five are of an undetermined sex. Two of those with evidence of burning are estimated to have been between 35 and 49 years old at the time of death. The ages at death of the other eleven individuals could not be estimated. Three individuals (0.6%) showed evidence of cut marks – one male, one female, and one of undetermined sex. One is estimated to be 35-49 years at the time of death, and the ages of the other two at death could not be estimated. One burial representing 0.2% of the sample exhibits evidence of a healed cranio-facial fracture. This individual is of unknown sex and age-at-death. Eleven or 2.1% show evidence of healed post-cranial fractures. These included seven males, two females, and two of undetermined sex. Age-at-death of these individuals is estimated to be 15 to 19 years old for one, 35 to 49 years old for two, and 50 or older for one. Age-at-death for the remaining seven could not be estimated. Two males (0.4%) show possible evidence of projectile point injury. One is estimated to be 35 to 49 years old at the time of death and the age of the other male could not be estimated. One individual of undetermined sex and age-at-death shows evidence of dismemberment, representing 0.2% of the sample. Table 12 presents these data.

Table 12: First Phase Dimension of Observed Lesions Possibly Associated with Violence in the Medea Creek Skeletal Assemblage

Medea Creek 1500 AD - 1785 AD	Individual Sample		Burning		Cut Marks		Healed Cranio-Facial Fracture		Healed Post-Cranial Fracture		Projectile Point Injury		Dismemberment	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
SUB-ADULTS/ADULTS	524	100.0%	13	2.5%	3	0.6%	1	0.2%	11	2.1%	2	0.4%	1	0.2%
Males	89	17.0%	5		1		0		7		2		0	
Females	94	17.9%	3		1		0		2		0		0	
Unknown	341	65.1%	5		1		1		2		0		1	
15-19 years	6	1.1%	0		0		0		1		0		0	
20-34 years	6	1.1%	0		0		0		0		0		0	
35-49 years	34	6.5%	2		1		0		2		1		0	
50+ years	5	1.0%	0		0		0		1		0		0	
Unknown	473	90.3%	11		2		1		7		1		1	

Table 12 includes only the categories of pathology for which there are incidences in the sample.

The Phase 2 re-analysis was then performed on the elements associated with suspected evidence of violent encounters. I have summarized these findings below. Detailed information regarding the description and analyses of each lesion supporting my Phase 2 determinations for the Medea Creek skeletal assemblage can be found in Appendix C. The following subset of individuals each present with evidence of only a single lesion type associated with violent interactions.

Burial 7 is an adult of unknown sex and age-at-death who presents with a healed fracture of the first rib towards the sternal end. Neither ends of this bone can be observed. Fractures of the first rib are unusual, and can be predictors of other, severe trauma to the cranium, thorax, spine, and abdomen which are difficult to recognize immediately in the living patient (Richardson et al. 1975). Fractures of the first rib can lacerate the subclavian artery causing uncontrollable bleeding and death. However, they are unlikely to occur in isolation due to the protected nature of these two ribs' locations. Causes of first rib fractures included vehicle accidents, falls, and being hit by large objects, such as a falling tree. Specifically, cranial injuries are often associated with first rib fractures (Richardson et al. 1975). The remains associated with this burial did not show evidence of any other healed cranio-facial or post-cranial fractures to link with this healed rib.

Burial 23 is of an adult male of unknown age-at-death. This individual presents with frontal bone fragments that are burned, but not calcined. No other elements included in this burial are burned. Excavation notes written at the time of disinterment make no mention of any burned elements and note the level of skeletal preservation as good. A cause for the small number of burned cranial fragments cannot be immediately determined.

An adult male of unknown age-at-death (Burial 45) has a compression fracture of a thoracic vertebra accompanied by severe osteophytotic lipping of adjacent thoracic vertebrae. Rather than the direct result of violent activity, these lesions are associated with severe osteoarthritis, and are suggestive of a lifestyle which may have included heavy mechanical loading of the spine (Larsen 1997:170-171). These types of osteoarthritic injuries have been identified by scholars in other prehistoric Native

American populations in California and the Southwest (Bridges 1992, Larsen 1997:171, 2000:22, White et al. 2012:441-442).

Burial 63, an adult male estimated to be between 35-49 years of age at the time of death includes a left femur with cut marks near the lesser trochanter. These cut marks are determined to have been made post-mortem due to the color of the bone and fact that the cuts were made to dry, not fresh bone. Furthermore, the shape of the cuts suggests trowel damage occurring either at the time of excavation, or as the result of the activities of looters. There are also smooth grooves on the surface of the bone which track around the edge of the trochanter on both sides. Each of these is 1.23 mm wide made by the roots of plants that grew within these remains over time. The left clavicle also presents with similar post-mortem cut marks that also suggest excavation damage.

Burial 100 is of an adult female of unknown age-at-death presenting with a possible healed fracture of the first intermediate phalanx. The specimen is incomplete and there is some remodeling of the bone indicating healing. No other lesions are associated with this healed fracture, and the excavation notes indicate no other corroborative or contextual evidence to consider. It is unlikely that this healed fracture is the result of violence.

One adult of unknown sex and age-at-death (Burial 107a) presents with a bone fragment from an unidentified cranial location showing evidence of burning. The bone is burned on the surface but not burned through, or calcined. No other elements of this burial are burned, nor do the excavation notes make mention of burned elements associated with this interment. There is no evidence linking this burned fragment to violence.

Burial 127d is of an adult of unidentified sex and age-at-death who appears to have been cremated, as all the elements preserved show calcination, and a number of Whyte's (2001) established criteria for determining cremation are present. The excavation notes for this burial also arrive at the same finding at the time of disinterment and note it to be a cremation.

Burial 133a is determined to be an adult female but her age at the time of death could not be estimated. Some cranial elements show evidence of burning, yet others do not. There is no evidence of burning on the occipital or left temporal bones. A fragment of the frontal bone including a segment of the upper edge of the orbit also shows no

burning. However, a fragment of the right zygomatic is partially burned on the inside of the specimen. Other fragments that come from undetermined cranial bones show evidence of partial burning. There are no completely burned or calcined bones associated with this burial. It does not appear that this individual underwent cremation. There are no other skeletal lesions associated with this individual that may have resulted from a violent encounter, with the burned elements occurring in isolation.

Burial 312 is of another adult of unknown sex and age-at-death. This individual shows evidence of a fourth right metatarsal which is burned. No other burned human elements are found in this burial. King's excavation notes state that there are "cremated bones in [the] grave of unburned primary burial. Burned fragments clustered at side of grave at back" (King 1982:229). This suggested to King that perhaps cremated bones from another individual were grouped together towards the rear of Burial 312. These burned fragments subsequently have been determined to be faunal, not human. Regarding the fourth right metatarsal, it is not possible to state that this burned element occurred as a result of a violent act or even as part of a cremation.

Burial 336 is of an adult male estimated to be over the age of 50 at the time of death. There is evidence of a possible healed fracture near the head of the right femur. What appears to be a large osseous callous is present at the site of the original injury on the latero-posterior side at the level of the lesser trochanter. The size of this callous is 18.43 mm by 9.3 mm. The site of this injury is unusual and there are no other associated lesions with these remains. Another scholar who reviewed the photograph of this injury suggested to me other possibilities including a well-developed gluteal tuberosity or a third trochanter. The excavation notes provide no additional information. It is not possible to state the cause of this injury.

An adult female with an age-at-death estimate of 35-49 years is represented by Burial 346. There is evidence of a healed fracture of the right second rib. There also appears to be evidence of a bone infection that may have contributed to, or been associated with the fracture. There are no other lesions associated with this burial nor do the excavation notes provide additional relevant information regarding this burial that might link this injury to a violent encounter.

Burial 350 is of a male sub-adult estimated to be between 15 and 19 years old at the time of death. Two right ribs have been broken and healed. These ribs are among ribs 3-10, but evidence is not conclusive as to which of these they are. Rib fractures can result from direct contact in violent encounters. However, they can also occur as the result of falls, coughing, contact sporting activities, and rowing or paddling (Richardson et al. 1975). As with Burial 346 described above, these healed rib fractures are in isolation and no other corroborative or contextual evidence is available to link these injuries to violent encounters.

An adult male of unknown age-at-death is represented by Burial 357. These remains include a healed fracture of the left third metatarsal. The bone shows evidence of osseous remodeling consistent with a healed fracture. The excavation notes for this burial state that at the time of disinterment, the adult skeletal elements are mixed with the maxilla, mandible and long bones of a child. These notes also identify the presence of "two burned skull fragments" (King 1982:230) and characterize the burial as a cremation. It is not clear whether the excavators considered the adult's or the child's remains as cremated. My re-analysis found no evidence of cremation for the adult. The healed fracture of the left metatarsal occurs in isolation with no other associated lesions, and is not conclusively the result of a violent encounter.

Burial 375, an adult male of unknown age-at-death presents with multiple skeletal fragments burned black or calcined. There are several vertebral elements that are not burned, however. The excavation notes for this burial confirm the presence of evidence of cremated elements and state that this burial is located on top of Burial 385. King (1982:231) states that "four unburned, articulated vertebrae [were found] with scattered cremated bones. Reburied adult bones cover all." No other skeletal lesions are visible on these remains. The evidence suggests that the burned elements in this burial resulted from cremation.

Burial 380 is of an adult female of unknown age-at-death presenting with cranial fragments burned black in some areas, but not all the way through in others. Again, the excavation notes provide additional insight into what was observed during disinterment. The remains were located above Burial 267. Linda King categorized the burial as a partial cremation, stating that "Most of body [was] uncremated; much charcoal, ash;

black carbonized net scattered and between legs at pelvis; charred bone fragments throughout" (King 1982:231). The evidence is not conclusive as to the cause of the burned elements. However, it suggests that the skeletal elements may have undergone cremation, partial cremation, or were burned after death as a result of other causes.

An adult of unknown sex and age-at-death is contained in Burial 389a. Here there is also evidence of a number of unidentified cranial fragments that are burned, but not calcined. Other skeletal elements from this burial are not burned, however. The excavation notes also note no cremation and explain that this burial was on top of Burial 393 and that burned wood is in the grave. The impression of a burned plank is found parallel to the tibia of this individual (King 1982:232). King does not state whether this plank impression or the wood found along with the burial is from a *tomol*, or wood plank canoe built by specialized Chumash craftsmen and sometimes buried with their owners (Gamble 2008:209). However, the presence of the burned wood and plank impression along with burned cranial fragments suggest that the source of the burning could be related. These burned skeletal and non-skeletal elements occur in isolation with no clear relationship to violent behavior.

Burial 397 is of an adult individual of unknown sex and age-at-death. There are several unidentifiable vertebral fragments that are burned black. No other elements are burned nor show evidence of trauma. There is no other evidence that this individual was cremated after death. The excavation notes do not provide further information, as this burial number is unassigned by the archaeological team at the time of excavation. The number was subsequently assigned by the staff at the Fowler. There is no evidence to suggest that these burned vertebral elements are the result of violent activity.

An adult of unknown sex and age-at-death is contained in Burial 398a. There is skeletal evidence of cut marks on the right fifth metatarsal. These cuts clearly occurred post-mortem due to the nature and color of the bone as discussed in Chapter 4, Section 6(b). They are wider than those associated with obsidian or stone tools. These marks are consistent with either trowel damage incurring during excavation, or inadvertent damage done by looters. These are not the result of peri-mortem violence.

Burial 407 is of an adult male with an age-at-death that could not be estimated. This individual has elements of the left tibia and fibula showing partial and superficial burning

and some tibial shaft fragments burned black. At the time of excavation, this burial was characterized as a partial cremation and documented as such because of the presence of "fragments of burned femur, tibia, mandible, rib, etc." (King 1982:232). There is no other evidence available to confirm whether this burial represents a cremation, partial cremation, or the natural occurrence of wildfire, but the most likely scenario is the latter.

Burial 413 is of an adult female of unknown age-at-death. This individual has a right talus that shows cut marks. The color of the bone indicates that the cut marks are post-mortem cuts, and their dimensions and color indicate they resulted from excavation damage. Excavation notes indicate this burial was "very disturbed" (King 1982:230). These cut marks occur in isolation with no other lesions present on these remains indicating a possible violent encounter.

An adult female estimated to be aged-at-death between 35 and 49 years old is contained in Burial 424. This individual has all cranial bones, and the upper and lower limbs burned black. This burial number does not occur in Linda King's original excavation notes, so there is no information regarding the condition of these remains at the time of disinterment. There are no other lesions found on these skeletal remains, including those associated with violence. The extensively burned elements occur in isolation. It must be considered that this burial represents a partial cremation or extensive exposure to wildfire.

Burial 428a is of an individual of unknown sex and age-at-death. Cervical vertebral elements indicate the presence of a compression fracture of the cervical spine (C1-atlas) along with the presence of osteophytes. These two lesions in combination are indicative of severe osteoarthritis of the neck. This is suggestive of an individual who might have carried heavy loads and participated in heavy manual labor, but this cannot be assumed as there are other contributing factors to spinal osteoarthritis formation (Bridges 1992). This level of osteoarthritis is often associated with older individuals. However, the age of this individual at the time of death could not be estimated with confidence to corroborate this association.

Burial 448 presents a similar pattern of skeletal lesions. This adult male of unknown age-at-death also shows evidence of a compression fracture of the cervical spine in

conjunction with osteophytotic lesions indicative of the presence of osteoarthritis. This fracture did not occur as the result of a violent encounter.

These 23 individuals all have the aforementioned lesions that on first review could be considered possible evidence of violent interactions. However, they all occur in isolation, with no other associated lesions or contextual information to support a conclusion that these injuries *are* the result of violent encounters. There are other more plausible explanations for isolated lesions of the types described here, such as accidents, falls, osteoarthritis, or post-mortem damage caused by excavation and looting. Isolated burned elements cannot be assumed to come from violent activities. Further supporting evidence is required for this conclusion, and none is available for these individuals. Other more plausible explanations for the number of burned elements include cremation and post-mortem wildfire damage.

The remaining six burials identified in Phase 1 include injuries in combination, or unusual lesions for consideration, and are discussed below. Burial 17 contains an adult male estimated to be 35-49 years old at the time of death, with healed fractures of the left clavicle, left second rib, and a healed Colles fracture of the left radius. The healed clavicular fracture can be seen medial to the acromial end of the bone, where osseous remodeling is evident. The healed fracture of the second rib is located near the vertebral end of the bone. A poorly healed and misaligned Colles fracture of the distal end of the left radius is also present. The bone is twisted laterally and deformed. As previously discussed in the description of the Malibu Middle Period 5 collection, Colles fractures are fractures of the distal radius, causing deformation, usually posteriorly, to the wrist without proper reduction and healing. Distal radial fractures are the most common form of arm fracture (Nellans et al. 2012). These can be seen in those attempting to break a fall by extending their arms (Larsen 1997:110). This and other fractures of the distal bones of the forearm near their articulation with the carpal bones of the wrist are collectively referred to by orthopedic surgeons today as "FOOSH" fractures – those that result from "falling on an outstretched hand." Other concurrent skeletal lesions can be associated with falls, including clavicular fractures and some rib fractures (http://orthoinfo.aaos.org/topic.cfm?topic=a00072). Through macroanalysis only, it cannot be conclusively stated that these injuries all occurred at the same time. However,

given this combination of healed fractures of the clavicle, rib and distal radius, all on the left side, it is suggested that these injuries observed in Burial 17 are the result of a fall forward on the left side or a tumble from some height.

A male of unknown age-at-death is contained in Burial 111. There is a healed fracture of a lumbar vertebra with associated severe osteophytic buildup on the edges of the vertebral body. Further osteoarthritic lipping can be seen on several cervical vertebrae as well. The cause of the healed vertebral fracture cannot be determined, but this individual suffered from severe osteoarthritis of the cervical and lumbar spine. Again, this suggests that heavy lifting or extensive labor was a part of this person's lifeways. This could have contributed to the fracture but is not necessarily causative (Bridges 1992). This individual also has a healed fracture of one rib. While these are multiple lesions in one individual, a healed fracture of a single rib in conjunction with osteoarthritic lipping and a healed fracture of a lumbar vertebra is more suggestive of osteoporosis or even infection than injuries acquired through interpersonal violence. The original excavation notes did not note these injuries nor was additional information provided that could further contextualize them.

Burial 445 is a case of particular interest. The burial is of an adult of unknown sex whose age-at-death could not be estimated. Within this burial site is a stone jar that contains the skeletal remains of a hand. Analysis of the hand shows it to be the complete left hand of an adult. The hand does not appear to belong to the adult that constitutes Burial 445. This is suggested by the presence of elements of both right and left hands outside of the jar. No pathological lesions are noted on the hand, nor are any cut marks present on any of the carpal bones. Without invasive testing, it is not possible to confirm whether this hand is from a local individual, or a relative of the other individual in the same grave. As noted in Chapter 4, Section 6(g), dismemberment of body parts can occur for several reasons and is characterized by several distinct skeletal markers. Following Kahana and colleagues (2010), this hand in the jar would be considered a localized dismemberment, in which a skeletal portion, limited in size, has been separated from the body. Dismemberments can be considered trophy-taking when certain conditions are met, such as multiple instances of the same part(s) being dismembered at the same time as a consequence of intergroup violence, multiple cut marks at the points

of separation, and other contextual evidence of violence within the group (Andrushko et al. 1997, Smith 1997, Eerkens et al. 2016). In contrast, this severed adult hand in the jar in this cemetery is unique to this collection and to the other collections studied here from this same general location. There is not a documented history of trophy-taking or purposeful localized dismemberment among the Ventureño Chumash. There is no evidence of an incident of inter-group violence involving the village at Medea Creek that may have caused trophies from a number of individuals to have been taken. The carpal bones of the hand do not show evidence of any cut marks. In short, the criteria for basing a conclusion of trophy-taking as a reason for the hand to be placed in the jar have not been met. Jelmer Eerkens and colleagues (2016) propose that localized dismemberment of heads in pre-contact Central California could signify ancestor veneration rather than trophy-taking. This possibility should be considered prior to concluding that this is a violence-related dismemberment. As a result, it is not possible to conclude with certainty that this severed hand resulted from peri-mortem or early post-mortem violence and it is conservatively noted here as a localized non-violent disarticulation.

The preceding descriptions cover 26 individuals with 29 incidences of the seven signatures of violence found in the Medea Creek Cemetery. These occurred either in isolation or in combination. From the analysis performed on the remains, burial records, and other contextual information provided above and in Appendix C, I believe these injuries cannot conclusively be considered to have occurred as a result of violent interpersonal behavior. Therefore, data regarding these 26 individuals from this sample will not be considered further. Table 13 presents the data on the remaining lesions in the sample.

Table 13: Second Phase Dimension of Observed Lesions Likely Associated with Violence in the Medea Creek Skeletal Assemblage

Medea Creek 1500 AD - 1785 AD	Individual Sample		Healed Cranio-Facial Fracture		Projectile Point Injury	
	n	%	n	%	n	%
SUB-ADULTS/ADULTS	524	100.0%	1	0.2%	2	0.4%
Males	89	17.0%	0		2	
Females	94	17.9%	0		0	
Unknown	341	65.1%	1		0	
15-19 years	6	1.1%	0		0	
20-34 years	6	1.1%	0		0	
35-49 years	34	6.5%	0		1	
50+ years	5	1.0%	0		0	
Unknown	473	90.3%	1		1	

Table 13 includes only the categories of pathology for which there are incidences in the second phase review.

After second phase review, three individuals with two types of trauma likely associated with violence remain. Summaries of my findings are presented here regarding these three individuals, with additional detail on each individual available in Appendix C.

Burial 20 is that of an adult male whose age-at-death could not be estimated. The right side of this individual's cranium is burned, as are the right ulna and portions of the right femur. The right femur is not intact, as it was sawed in two with a section removed sometime after disinterment in 1966 and prior to 1989. A thoracic vertebra has an ovoid hole that is a likely projectile point implant mark. There is also a notation from Dr. King that there is an "Arrow in vertebra; mutilated victim?" (King 1982:216). This relates to the finding of a projectile point in the vertebra at the time of disinterment as well. The excavation notes written at the time of disinterment for this burial categorize it as a partial cremation but the evidence does not support this, as there are very few burned elements and the burning is very superficial. Importantly, it appears to have occurred post-mortem. There is no direct or contextual evidence to link the burned elements to the projectile point injury. While it is likely that this individual suffered from an arrow wound which is clearly a violent interaction, it does not appear that this individual was

burned as a part of that encounter. This burial is retained as containing a skeletal example of interpersonal violence.

Burial 270 presents the only healed cranio-facial fracture found in this sample. This is an individual of unknown age-at-death and sex presenting with a single healed cranial depression fracture of the frontal bone. The lesion is a small, round depression and is similar in size and shape to those described by Walker (1989) as associated with prehistoric Southern California Native American violence. Furthermore, its location on the frontal bone is consistent with Walker's (1989) findings that these types of violence-related depression fractures often occur on the frontal and parietal bones. This lesion is in isolation, so a fall or perhaps an injury from a falling rock could be considered as its source. However, the size, shape, and location of this lesion are not consistent with falling or rock injuries, and more consistent with blunt force trauma from an implement. This injury appears to be associated with some sort of violent interaction and thus is retained in the sample. The burial notes do not mention this lesion at all.

Burial 330 is of an individual determined to be an adult male estimated to be between 35 and 49 years old at the time of death. This individual's state of preservation is good and many elements are present for examination. Evidence of superficial burning can be found on some of the elements in this burial. Some of the rib shaft fragments are burned, as are a distal left tibial fragment, the proximal half of the left ulna, the left and right tali, calcanei, and cuboids. There is no evidence of calcined bone. The burial notes indicate that this individual underwent a partial cremation. However, there is little evidence to support this contention, or distinguish this burning from that which may have been caused by wildfire. This individual also appears to have suffered a projectile point injury to the fourth cervical vertebra (C4), which is mentioned in the excavation notes provided by King as a projectile point injury to the neck (King 1982:151, 229). This injury consists of a hole in the center of the vertebral body. The projectile points associated with this burial are missing from this collection and thus could not be reviewed. However, the projectile points are identified by King as two dark chert Concave Base Type 3 projectile points, and one Concave Base Type 4. The tips of each were missing and the Type 4 was reported to have been broken transversely prior to discovery and

disinterment of these remains (King 1982:151). This individual has also been retained as a probable skeletal example of violence.

In summary, of the 29 individuals in this sample that presented with one or more of the seven signatures of possible violent interaction, only three appear to have lesions that are likely the result of violence. Out of a total sample size of 524 adults and sub-adults from the Medea Creek cemetery, only 3, representing 0.6% of the sample, show evidence of lesions associated with violence.

iv. Medea Creek - Review of King's Initial Evidence for Violence

As described in Chapter 5, Sec. 3, Linda King's (1969, 1982) works describing the excavation of the cemetery remains, associated grave goods, and material culture within the Medea Creek site contain the only detailed data available. No other re-analyses of the skeletal remains from Medea Creek have been conducted since King's work 50 years ago.

Also in Chapter 5, Sec. 3 of this thesis, I introduce King's findings regarding the four individuals observed to have lesions that support her claims that extreme violence took place at or near Medea Creek (King 1982:154).

It is in Chapter 7 of her dissertation that Dr. King (1982) presents evidence gleaned from the 1966 exhumation and examination of the Medea Creek skeletal remains under her direction. Her interpretations of this evidence provide the basis for statements made in her dissertation that specific patterns of extreme violence existed within the Medea Creek Village (King 1982:147):

> Evidence for violence at Medea Creek consists of three burials which were found with arrow points, mutilations of the limbs and torso, and partial burning. A fourth body contained points, but was too poorly perserved [sic] to show cuts if they ever existed. These individuals could have been the victims of warfare, foul play, capital punishment, or other cause.

King further states that individuals were found to have been dismembered and burned, and notes a number of headless bodies. She considers these four individuals to be the minimum number of victims of violence contained at Medea Creek (King 1982:152):

> At least three, and possibly more, individuals from the Medea Creek village cemetery were shot with arrows, cut in half and/or had extremities removed, and burned to varying degrees. Other cases may have gone unrecognized for a variety of reasons: poor preservation of bone, or removal of points before internment.
>
> The four examples described here should be considered a minimum number for individuals who suffered violent death and mutilation at Medea. They comprise about 1% of the population as a whole.

King (1982:153-154) identifies six (6) possible "causes of violence" at Medea Creek, which should perhaps be more properly categorized as possible explanations for the skeletal evidence of trauma that she observes. These include:

1. Foul play: unintentional murder, vengeance, etc.
2. Capital punishment
3. Sacrifice: a sanctioned ritual act.
4. Cannibalism: as an end in itself, without further implications such as war or sacrifice
5. Feuding or war: surprise
6. Political subjugations or punitive attack.

Burials 20, 73, 133, and 330 are those cited as presenting "evidence of violence" (King 1982:147). Burials 160, 412 and 413 are noted by King as very poorly preserved, yet could possibly yield evidence of skeletal trauma due to violence (King 1982:152).

In addition to the re-analysis of my cemetery samples described previously in this Chapter, I carefully reviewed each observation noted by Dr. King for these four burials (Burials 20, 73, 133, and 330) and subsequently attempted to confirm the presence of each lesion in question and her assessment of its cause. Then, Dr. Elizabeth Miller from the Los Angeles County Coroner's Office reviewed the skeletal remains and Dr. King's initial conclusions. The results of these analyses are summarized below. Detailed information on the results of these reviews are included in Appendix C.

Burial 20 – King's Excavation Notes and Assessment

King believes the individual representing Burial 20 to be of a male over 17 years of age and buried shallowly. King notes disarticulated ribs, a femur, small skull fragments

and miscellaneous pieces. A projectile point is noted as being found imbedded in a thoracic vertebra. The projectile point was recovered at the time of excavation but the tip was not. Burned elements include the outer surfaces of cranial fragments, the end of the femur, and vertebral processes. She believes that the body was burned after it was cut, but with the flesh still in place King (1982:147-148). According to King, the evidence of cutting and burning seen in these remains, Burials 133 and 330 "suggest the possibility that they were cooked and eaten" (King 1982:158).

Burial 20 – My Reanalysis and Reassessment Results

The sex of the individual is determined to be probably male, but no more precise age than adult could be determined following standards put forth by Buikstra and Ubelaker (1994). Photographs of the burial site were helpful in developing my impressions. All the vertebral elements are not entirely aligned, with five thoracic vertebrae aligned but lying at approximately a 45° angle to the right of four lumbar vertebrae. No projectile point is visible in the photograph, however one thoracic and one lumbar vertebra show possible defects resulting from projectile point injury. Burned bone fragments are also visible including the distal end of the broken femur.

Upon physical examination, there are no cut marks visible on any of the vertebrae indicating purposeful generalized dismemberment as described by Kahana et al. (2010). One of the thoracic vertebrae had a small hole on the anterior side of the body of the element consistent with the point at which a projectile point might have entered the bone. Of the burned elements, three occipital fragments are burned, but the broken femur and vertebral processes show only superficial scorching. The remains were skeletonized prior to burning, contrary to King's observation. Overall, the pattern of burning is inconsistent with guidelines developed by Whyte (2001) to identify complete and partial cremations in the field. There is no suggestion that these remains contain the constellation of evidence identified by White (1992) and Turner and Turner (1999) as being required to conclude that this individual was cannibalized.

Several defects in the bones of Burial 20 can be seen that were *not* noted in Dr. King's analysis but are summarized here. The right femur presents with an ovoid hole that is evidence of an osteoid osteoma, and not a bone injury relating to a violent encounter. There is no sign of infection or bone remodeling. There are cut marks in the

bone below the ovoid hole which are the result of trowel damage, not disarticulation. There is also evidence of bioturbation in the form of rodent damage to the femur.

I conclude that after re-analysis of the skeletal remains of this individual, the evidence indicates that he was injured or perhaps killed by a projectile point. The exact cause of death cannot be determined. This individual was not purposefully cut in two, nor was the body purposefully burned as part of a violent interaction. There is no evidence that this individual was cannibalized.

Burial 73 – King's Excavation Notes and Assessment

This individual is estimated to be an adolescent 12-15 years old at the time of death, and of undetermined sex. As with Burial 20, this burial was on top of another located below it. Dr. King (1982:148-149) notes two point fragments in the thoracic area and lower back. These points were recovered at the time of excavation, but are no longer part of the collection. It is not clear from the text whether these elements had entered bone or were just in those anatomical areas. She observes that "the ends of the extremities were missing, but this cannot be considered definite evidence of cutting because poorly preserved burials are frequently missing these parts" (King 1982:148-149). The body was noted to be found in a flexed position on the right side with a head orientation of 225°, which are not aberrant for this cemetery population.

Burial 73 – My Reanalysis and Reassessment

Excavation photographs reveal the position of the body to be as described by Dr. King. Age of the individual is determined to be between 12 and 15 years old following Buikstra and Ubelaker (1994). The age estimation is arrived at using, among other points, epiphyseal fusion information available from the remains. There is strong consistency in the lack of epiphyseal fusion in the tibia, acetabulum and ulna to support the age estimation provided here. No conclusive evidence is available to determine the sex of the individual, which is usually the case in sub-adults.

There is no evidence of any projectile points in-situ, or any visible evidence of skeletal injury caused by these points in the photographs. There is no evidence of projectile point injury to any of the vertebral elements or the rib shaft present. The points are missing from the collection and thus cannot be analyzed. There is one left second metacarpal shaft and proximal end present, but the rest of the hands and feet are not

present. There are no cut marks or signs of disarticulation on this metacarpal, the distal radius, or ulna associated with the extremities.

Several lesions associated with the bones of Burial 73 can be seen that were *not* noted in Dr. King's analysis but are summarized here. The distal ends of the radius and ulna present are broken (not cut) and show evidence of extensive amounts of rodent gnawing. Teeth associated with this burial reveal the eruption of M_1 and M_2, which is consistent with the age-at-death estimation for this individual. However, these molars exhibit severe dental caries – an amount highly unlikely for an individual in this age range. While this is not impossible, it should be considered contextual evidence of health difficulties that may have contributed to an early death.

Despite King's belief that this individual is a victim of extreme violence, re-analysis of these skeletal remains does not indicate any conclusive evidence of violent interactions. I believe her counter - suggestion that the missing extremities are the result of poor preservation. I would also add that rodent activity contributed to the dissociated elements.

Burial 133 – King's Excavation Notes and Assessment

The individual associated with Burial 133 was determined at the time of excavation to be an adult of an age-at-death that could not be determined. King provides extensive notes on this burial indicating that the body was cut in two at the chest, the right femur cut above the knee and missing its distal end, and multiple elements heaped together in a pile. In addition, the tibia and fibula are burnt, loose bones out of position, and the fragment of a projectile point is in the left rib cage area. There is evidence of gopher disturbance. King concludes that this individual died as a result of being shot with a projectile point in the chest, then mutilated by being cut in two, the legs removed above the knees, one arm cut off and the head cremated (King 1982:149-150). In addition, this individual was then "cut and eaten" (King 1982:158). She observes that this individual was buried oriented to the East, with this being the only burial in the cemetery found to be buried this way. She concludes that this deviant burial orientation for this cemetery supports the idea that this individual may have suffered an extremely violent death.

Burial 133 – My Reanalysis and Reassessment

A photograph taken of Burial 133 upon excavation reveals remains that are incomplete and consistent with King's description of general orientation and some of the features present. Following Buikstra and Ubelaker (1994), the age of this individual could not be estimated beyond being an adult. The sex is determined to be female. The sacrum and lumbar vertebrae L5, and T11 and T12 are well aligned in their anatomical positions. Orientation is at approximately 75° rather than cardinal East (90°). Partially burned bone fragments can be seen at the level of L4 and L5 above the remains of the left os coxae. Lying at an angle sloping away to the left from T11 and T12 are several long bones which appear to be ribs and possibly a clavicle. It appears from the photograph that at least two individuals are co-mingled in this grave site (and maybe more) as there are a minimum of three femora present. No fractured elements of a projectile point could be seen in the photograph. There does appear to be a triangular notch at the midpoint of a femoral diaphysis.

The physical re-examination of the remains of Burial 133 shows that there is conclusive evidence that at least two adult individuals are interred at this site. This is supported by Fowler curation documents identifying two individuals in this burial site, each with a right femur. The projectile point is missing from the collection, nor present in the photograph, yet the excavation notes state it existed and was found in the rib cage area. There are no projectile point injuries to the ribs and vertebral elements present, and because only the lower half of the body is present in the photo, there is no area that would constitute where the "chest" King (1982:150) describes would be. There are no cut marks on T11 – the point at which King notes that body "was cut in two" (King 1982:150). There are no cut marks observed on any rib elements or fragments reviewed. This is of importance because cutting a body in two at T11 is likely to damage the left and right tenth ribs. It is unclear what King means when she notes "the legs [were] removed above the knees" (King 1892:150). She did not describe the nature of the removal – blade cut through bone, disarticulation at the hip, or other means. The photograph shows one of the three femora with a flat end. Physical examination of the femora shows no evidence of cut marks above the distal condyles. King notes that at least one arm was cut off, but details of which arm or bones provide evidence for this

observation are not provided. There are no cut marks observed on the elements of the humeri, radii, or ulnae preserved in this burial. Cranial fragments and elements of the right foot are burned but not calcined.

Dr. King's assertions that one individual in Burial 133 was killed by a projectile point, mutilated, and partially cremated cannot be supported by the osteological evidence. While it is certainly possible that this individual suffered a projectile point injury that affected only soft tissue, there is no evidence of purposeful dismemberment or disarticulation, mutilation or other acts of extreme violence. Furthermore, there is no evidence to support the contention that this individual was cannibalized.

Burial 330 – King's Excavation Notes and Assessment

At the time of excavation, King concluded that this individual was male and approximately 25-35 years old at the time of death. She notes the excellent condition of the skeletal remains upon excavation which she attributes to the burial depth and the sand in which it was placed (King 1982:151). Two projectile points are identified in the neck region and one in the upper back. King characterizes a large crack on the right side of the skull as the result of a blow. The body is noted as cut in two at the waist, the legs removed above the knees and the extremities cut off at the points of articulation. The chest is observed to have been opened and the ribs dislodged, and parts of the body are burned. King (1982:158) states that "The image of Burial 330 with its chest cut open, flayed and burned suggests a comparison with the Meso-American practice of sacrifice by ripping the heart out of the chest." She concludes that this individual is a victim of sacrifice and cannibalism.

Burial 330 – My Reanalysis and Reassessment

A photograph of the burial taken at the time of excavation shows the remains are in good condition and elemental placement is consistent with King's description. This individual is determined to be an adult male approximately 35-49 years old following Buikstra and Ubelaker's (1994) standards. The distinctive crack on the right side of the skull is extensive, linear, and clearly visible in the photograph. The skeletal elements in this burial appear to be folded upon themselves in a very tight flex, with the skull cocked to the right and slightly posteriorly to facilitate accommodation in a small hole. No projectile points are evident in the photograph. Some burning is evident, although

because the photograph is black and white, it is difficult to determine burned elements from earth-stained elements. However, the distal end of the right clavicle clearly appears burned, as do unidentified elements in the photograph that have fallen into the thoracic cavity. Distal portions of the right femur and ulna appear to be broken off.

My physical examination of the remains reveals a lesion on the fourth cervical vertebra (C4) that could be the result of the projectile point impact that was noted by King in the neck region. The projectile points are missing from this collection and thus could not be reviewed. There are no unhealed depression fractures or radiating fractures from a blow or point of impact along the fracture line of the skull to indicate a peri-mortem blow to the head. There are no cut marks visible at the point of vertebral separation. As Duday and Guillon (2006) describe, the natural effects of decomposition on a flexed body can produce a skeleton that appears to be cut in two in this manner. The ends of the shafts of the femora are found to be broken, not cut or crushed. The distal ends of the right and left radii and ulnae are broken, not cut or crushed. There is clear evidence of rodent activity. The ribs are disarticulated but it is unclear what King means when she says "the chest was opened" (King 1982:151) or "flayed" (King 1982:158), so further interpretation in this regard cannot be made.

There are other lesions and pathology observed on these remains that King does not note. There is lipping on the lumbar and thoracic vertebrae indicative of osteoarthritis. The right calcaneus presents with a portion that appears to be sheared away as a result of post-mortem water damage. Some of the rib shaft fragments are shallowly burned, as are a distal left tibial fragment, the proximal half of the left ulna, the left and right tali, calcanei, and cuboids.

This individual is likely to have suffered a projectile injury to the neck, which could have been fatal. However, observations made by Dr. King in the initial assessment of these remains do not support a conclusion that this individual suffered from acts of extreme violence such as human sacrifice or cannibalism that Dr. King identifies as possibilities.

Other Possible Victims of Violence – King's Excavation and Assessment

King notes that Burials 160, 412, and 413 could also be possible victims of violence because Burials 160 and 413 had projectile points in their graves (King 1982:152).

Burial 412 was found with large knife in association with the remains that King believes may have been the cause of death (King 1982:152-153).

Following Buikstra and Ubelaker (1994), these latter four individuals could only be determined to be adults. However sufficient information is available to determine that Burials 160 and 413 are females and Burial 412 is male.

King provides details in the Appendix of her dissertation regarding these four burials than are different than the text. The knife found in the grave site of Burial 412 is described not as "in" the body, but as found under the ankle. Burial 413 is described as "very disturbed: reburial over primary" (King 1982:232 Appendix A), while Burial 160 is said to contain a "point tip at chest; two points at bottom of grave" (King 1982:222, Appendix A). No points or point tips are in the collection, nor are there any skeletal lesions associated with projectile points. There is no evidence that these individuals suffered injuries or death from violent encounters.

King uses the Appendix section of her dissertation to provide additional data on each burial disinterred as part of her excavation efforts. In particular, the "Comments" section provides additional data that is not covered in other parts of the burial attributes section of Appendix A. I reanalyzed these data, and found 24 adult burials that are described as displaying skeletal evidence of potentially violent activity. The language used to describe these is similar to the language used to describe the four burials identified as victims of extreme violence in her dissertation. Yet, these burials are not identified or described in the textual portion of the dissertation as being victims of extreme violence. Table 14 provides a summary of the burials and the attributes associated with them that could be linked to violence as identified from King's (1982) Appendix A. For comparison, I have included the four burials that King (1982) has specifically identified as possible victims of extreme violence. These are shaded in blue for identification purposes.

Table 14: Adult Burials Described in Linda King's (1982) Dissertation Appendix as Associated with Violence in the Medea Creek Cemetery

Burial	Sex	Age-at-Death	Burning	Comments
20	M?	17+	Partial cremation	Arrow in vertebra: mutilated victim? See text.
57	F?	30+	None	Cut by grave of Burial 84
73	Unknown	12-15	None	Two points (in chest, mid-lower back.) Ornaments at face, chest
84	M	35+	None	Cuts through 86, probably later than 88. Arms loose flex.
86	Unknown	23+	Charcoal in grave	Missing below waist. Cut by 84? On right side
100	Unknown	23+	None	Primary burial with extra skull, long bones
108	Unknown	23+	None	Fine knife at chin
110g	Unknown	Adult	None	Cut by grave of 102 or 127
121	Unknown	23+	None	Staddles C/E line: missing below waist
124	M	25+	Burned seeds	Head in mortar, mass of *Calandrinia* seeds below stomach
128	M?	23+	None	Missing above chest
133	Unknown	Adult	Yes	Mutilated victim? See detailed description in Warfare, Chapter 3
143	Unknown	23+	None	Bundle of longbones? Not clearly articulated.
159	Unknown	17-22	None	Legs slightly to left. At feet pit lined with rotten organic matter.
160	Unknown	Unknown	None	Point tip at chest: Two points at bottom of grave.
192	Unknown	Adult	None	Head and chest only
193	M	23+	None	Over 439. Only bones from waist up present
219	Unknown	25+	None	Missing above waist. Over 439, under 207
275	Unknown	17-22	None	Head missing
277	F?	23+	None	Head out of position - moved?
280	Unknown	23+	None	Head missing. Under 281
327	Unknown	23+	None	Arms, legs present only. Under 314, 321.
330	M	25-35	Partial cremation	Mutilated victim? See Warfare.
338	Unknown	15-18	Seeds	Head very disturbed - no mandible, out of position
350	M?	17-22	Charcoal in grave	Cut by 114?
367	Unknown	25+	None	Dug into by 361's grave
403	M	17-22	None	On back, legs to sides. Double burial with 405?
412	M	23+	None	Knife under ankle, not in body. Missing above waist.

= identified by King (1982) as a victim of extreme violence

It is not clear why these burials are described in the Appendix of her work in a similar manner to those highlighted in her text as being examples of those who were victims of extreme violence. The details provided in the text for these four include notations of missing extremities, bodies cut in two, elements missing, and point tips and points in graves. No additional details regarding these additional burials are provided to the reader to differentiate them from the four burials whose wounds are described in detail and about which their causes are hypothesized.

v. Malibu Historic Period (1785 AD – 1850 AD)

The sample drawn from the Malibu Historic Period cemetery includes 93 individuals. In the first phase analysis, none shows evidence of cut marks, healed cranio-facial or healed post-cranial fractures, peri-mortem fractures, projectile point injuries, or evidence

of dismemberment. Three individuals representing 3.2% of the sample present with evidence of burning (Table 15).

Table 15: First Phase Dimension of Observed Lesions Likely Associated with Violence in the Malibu Historic Cemetery

Malibu Historic Period 1785 AD - 1805 AD	Individual Sample		Burning	
	n	%	n	%
SUB-ADULTS/ADULTS	93	100.0%	3	3.2%
Males	22	23.7%	0	
Females	15	16.1%	1	
Unknown	56	60.2%	2	
15-19 years	3	3.2%	0	
20-34 years	7	7.5%	0	
35-49 years	5	5.4%	0	
50+ years	3	3.2%	0	
Unknown	75	80.7%	3	

Table 15 includes only the categories of pathology for which there are incidences in the sample.

In Phase 2, these individuals were examined in the same manner as described for the previous cemetery samples. I have summarized these findings below. Additional detailed information regarding the description and analyses of lesions supporting my Phase 2 determinations for the Malibu Historic Period skeletal assemblage can be found in Appendix D.

Burial 1 is of an adult female of undetermined age-at-death. Thirteen neuro-cranial fragments that could not be further identified are burned black and through, while four other cranial fragments are scorched. Nine are not burned at all. The sacrum shows partial scorching that occurred post-mortem. Other skeletal elements present in this burial show no evidence of burning. These include a mandible with teeth in situ, thoracic and lumbar vertebrae, and complete left os coxae. Upon excavation, this burial was found at a depth of 18 inches below the soil surface. This constitutes either a very shallow burial, or one where its elements had been previously disturbed or exposed. This

burial is not consistent with a cremation as the burned remains do not satisfy all of Whyte's (2001) criteria for the possibility of a cremated burial discussed in Chapter 4, Section 6(a). Rather, the partial burning of the cranium and scorching of the sacrum are more consistent with exposure of these elements to wildfire post-mortem.

Burial 38 is that of an adult of unknown sex and age-at-death. Included are 102 unidentified burned cranial fragments, of which 14 are calcined, and 88 burned black. These are the only elements in this burial that show evidence of burning. This burial was discovered approximately 29 inches below ground and appears to be another shallow burial or one where these elements had been previously disturbed or exposed.

Burial 912 is also of an adult of unknown sex and age-at-death. Provenience information within the cemetery and burial depth are unknown for this individual. Two fragments of the proximal end of the femur (side unknown) are calcined. No other elements show evidence of burning.

As with the first burial in this sample, the burned skeletal elements here do not satisfy all of Whyte's (2001) criteria for the possibility of a cremated burial either. While there is calcined bone present and it is within a burial context, the long bone fragments do not show evidence of cracks, longitudinal splits or warping. There are no urns, jars, or bone dust noted in association with these burials. While burning of skeletal remains constitutes a signature of violent interactions, the burned bone in these three burials occurs in isolation, with no other signatures of violence associated with them, such as peri-mortem fractures, projectile point injuries, or cut marks indicative of dismemberment or mutilation. Without support from additional evidence, the remains in these three burials cannot confidently be determined to be evidence of violent interactions. Therefore, they have been eliminated from the analysis. As a result, no individuals from the Malibu Historic Period cemetery sample exhibit probable evidence of the seven signatures of violence used in my analysis.

c. Comparisons: Incidences of Violence-related Traumatic Lesions Across all Cemeteries

After the completion of the second phase analysis on all the cemeteries, these data can now be compared across all samples. After the reanalysis, 8.7% of the individuals in the Malibu Middle Period 5 cemetery sample present with likely skeletal evidence of

violence. This sample contained the largest number of individuals with skeletal lesions likely associated with violence of all the cemetery samples analyzed. After reanalysis, the Mulholland cemetery sample contains no remains presenting with any of the seven signatures of violence. In the Medea Creek cemetery, 0.6% of the sample demonstrates evidence of skeletal trauma likely due to violence after the second phase. The Malibu Historic Period cemetery sample also contains no remains with skeletal lesions linked to violent behavior after reanalysis. Figure 8 presents the percentages by cemetery arranged chronologically.

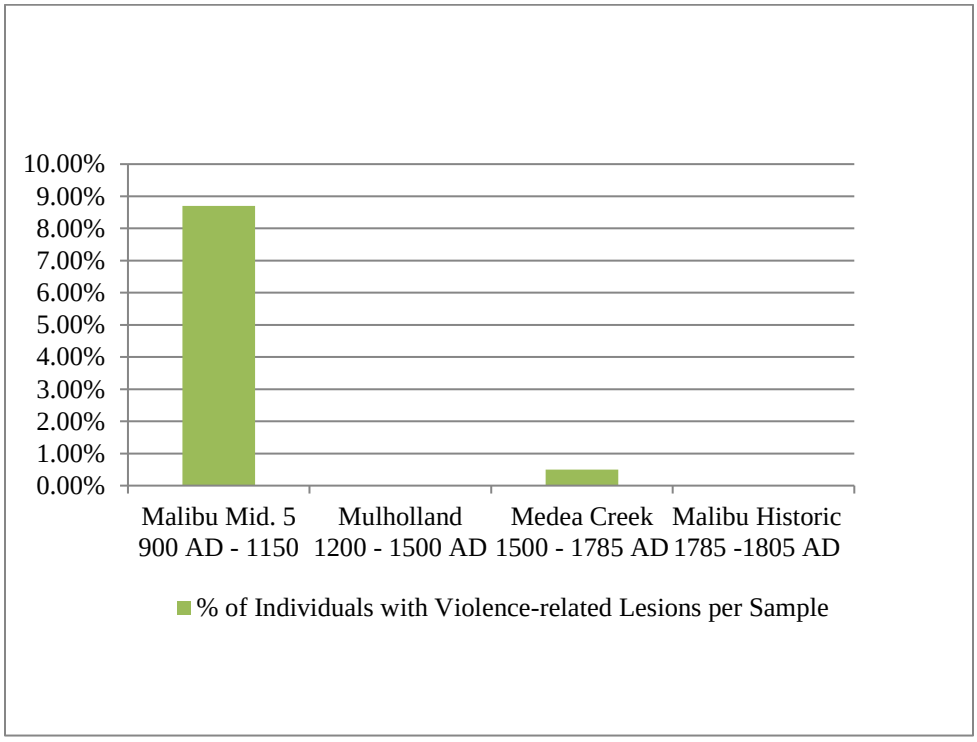


Figure 8: Comparison of Observed Lesions Likely Associated with Violence - All Cemeteries over Time

These data demonstrate that the percentage of individuals in each sample that present with skeletal lesions that are likely linked to interpersonal violence decreases over time from 8.7% in the earliest period (900 AD to 1150 AD) to none (0.0%) in the latest period (1785 AD to 1805 AD). This decrease is a marked one from 1200 AD to the Historic Period.

A number of two-sample *t*-tests between proportions were performed to determine whether there is a statistically significant difference between cemetery samples with

respect to the percent of individuals having skeletal lesions associated with violent activity. Table 16 provides the results of these *t*-tests.

Table 16: Results of Comparative *t*-Tests Between Proportions of Samples from Each of the Four Cemeteries

	Malibu Middle Period 5			Mulholland			Medea Creek			Malibu Historic		
	t-stat	df	*p*	*t*-stat	df	*p*	*t*-stat	df	*p*	*t*-stat	df	*p*
Malibu Middle Period 5				1.901	129	0.0595	5.572	614	0.0000	2.908	183	0.0041
Mulholland	1.901	129	0.0595				0.443	561	0.6582	0	0	0
Medea Creek	5.572	614	0.0000	0.443	561	0.6582				0.683	615	0.4946
Malibu Historic	2.908	183	0.0041	0	0	0	0.683	615	0.4946			

= p value <.05 indicating statistically significant difference.

There is a statistically significant difference between the percentage of violence-related lesions found on the remains in the Malibu Middle Period 5 sample when compared to the Medea Creek cemetery sample at the .05 critical alpha level (t = 5.572, df = 614, p = 0.0000), and the Malibu Historic cemetery sample (t = 2.908, df = 183, p = 0.0041). In both these cases, the Malibu Middle Period 5 cemetery sample contained more violence-related lesions. When Malibu Middle Period 5 cemetery was compared to the Mulholland cemetery, the results were not statistically significant at the .05 critical alpha level, but barely so (t = 1.901, df = 129, p = 0.0595).

The *t*-statistics were not significant at the .05 critical alpha level for the remaining combinations of cemetery samples, Mulholland and Medea Creek, and Malibu Historic and Medea Creek. These are also demonstrated in Table 16.

Statistically speaking, these data show that the number of skeletal lesions associated with violence found in the Malibu Middle Period 5 sample were significantly larger than the number found in almost all the other cemetery samples. Although the p value for Mulholland when compared to Malibu Middle Period 5 is not statistically significant (0.0595), I believe the small sample size analyzed from Mulholland (39) may contribute to this result since the Malibu Historic Period cemetery, with a sample size (93) that is almost two and a half times as large as the size of the Mulholland sample and the same number of lesions found at Mulholland (zero), does show a significant difference with the Malibu Middle Period 5 sample.

In summary, the Malibu Middle Period 5 sample, which comes from the earliest sets of remains dated 900 AD – 1150 AD contains more lesions associated with violence than the other three cemetery samples and this is statistically significant. This time period coincides with the occurrence of the Medieval Climatic Anomaly (MCA), a paleo-environmental event dating from 800 AD to 1350 AD, which is believed to have contributed to the development of changes in sea temperature and an extended period of extreme drought in California and the West at the time (Stine 1994).

Chapter 7 – Discussion

My reanalysis of samples of the skeletal remains from the Malibu Middle Period 5, Mulholland, Medea Creek, and Malibu Historic Period cemeteries provide data from which it is possible to both support and refute the observations and interpretations of previous researchers regarding these collections. Furthermore, these data provide an important springboard for discussion.

1. Problems of Evidence

There are a number of taphonomic problems of evidence that can be identified by reviewing the skeletal data derived from the samples I have drawn from each of these cemeteries. These include bone modifications resulting from physical agents such as water, the movement of earth, the effects of gravity, and fire. In addition, these remains reveal modification by non-human biological agents such as tree roots, carnivores, and rodents. There is also evidence of unintentional human modification to bone in the form of excavation damage, and looting. Additionally, these remains also show evidence that invasive modifications were made to bone by scientists in service to scholarship. The results of these studies are unknown. These problems of evidence have impacted interpretations of data drawn from these collections. While some of these problems were observed by the initial excavators as the remains were disinterred, not all were identified and certainly the effects of these problems were not well understood, or appreciated.

a. Taphonomic Problems

i. Poor preservation

Poor preservation and incomplete sets of skeletal remains are critical issues at each of these sites. While each cemetery sample contains some individuals whose state of preservation is good or excellent, the majority of the remains in each cemetery are in fair to poor condition. This is important, because unequal levels of preservation created situations across all the sites in which some burials were near complete, and others were so fragmented as to make it impossible to determine if the individual was an adult or not. Additionally, in a number of cases poor preservation contributed to difficulty in matching skeletal elements to individuals to create a complete skeleton. The composition of the soil at the Malibu Historic cemetery contains heavy clay. This factor and other effects of

bioturbation as noted below, negatively impact the overall quality of skeletal preservation at this site (Walker et al. 1996, Gamble et al. 2001). The remains found at the Middle Period 5 portion of the Malibu village are better preserved due to deeper burial depth and a larger percentage of sand in the soil, both of which aid in preservation (Walker et al. 1996). The presence of incomplete sets of remains and their poor preservation throughout most of the Mulholland cemetery are well documented by Galdikas-Brindamour (1970). Certain areas of the Medea Creek cemetery contain remains with preservation ranging from excellent to poor. As with Malibu, this is due in part to differences in the sand/clay composition of the soil and burial depth (King 1969).

ii. Post-depositional Processes/Bioturbation

Other taphonomic problems of evidence can be seen in the remains analyzed in my research. These include a number of examples of different post-depositional processes observed on the samples. Bioturbation in the form of damage caused by rodents, badgers, and other carnivores is extensive in all four cemeteries. This damage can be seen as tooth marks on the ends of long bones, and elements that are incomplete due to gnawing. There is evidence of small bones that have been broken in the search for marrow. An additional effect of bioturbation is the relocation of skeletal remains. Animal activity causes the movement of elements directly to animal burrows, or scatters them across the landscape, which inadvertently commingles remains. There are very few complete sets of remains in any of the four cemetery samples. Extensive bone scatter and commingled remains were noted as present at all four sites at the time of excavation (King 1969, 1982, Galdikas-Brindamour 1970, Suchey et al. 1972, Bickford 1982, Walker et al. 1996, Gamble et al. 2001). Although researchers have previously noted the presence of bioturbation, again my research shows that the extent of the problem was poorly appreciated. In some cases, skeletal elements have been misrepresented as “cut” at the extremities, or burials have been noted as “missing extremities” when in fact they show clear evidence of damage or relocation created by animals.

Water damage to skeletal remains can be observed at the Medea Creek cemetery which was not noted by other researchers. Over time, creek overflow during the rainy season and natural changes in the course of the creek caused water contact with some remains. This type of damage is reasonable to expect at this location as King (1982)

notes that Medea Creek formed one of the boundaries of the cemetery. Water contact separated skeletal elements and created modifications to bone that have been misinterpreted as evidence of a violent encounter. Damage that appears on the calcaneus of the remains of one individual at Medea Creek (Burial 330) is consistent with damage that occurs when a bone is sliced by continuous exposure to moving water (Miller, personal communication 2015).

iii. Looting

Looting was a serious taphonomic problem which took place for periods of time at all four sites before their excavation. At Mulholland and Medea Creek, looting continued during the process of excavation itself. These sites were well known to artifact collectors and clear evidence of prior looting behavior, in the form of potholes, was observed by the excavation teams working there (King 1969, 1982, Galdikas-Brindamour 1970). Linda King (1969, 1982), as lead excavator for the Medea Creek site, acknowledges that constant looting of the site caused evidentiary problems of missing, damaged, and commingled remains. While the problem of looting was initially identified as notable, I believe the integrity of these sites was compromised to a far greater degree than was originally appreciated. Worthy of discussion here is the taphonomic bias introduced into an archaeological setting by looters and their activities, and the impact of this bias on violence studies. Looters do not remove objects from all grave sites, and sites they do plunder, are not plundered equally. Looters are usually looking for specific objects, such as pots, baskets, beads, weapons, projectile points, and sometimes skulls. Graves that do not have these objects readily apparent are often left alone. However, those that do are often cleaned out. It must be considered that material evidence supporting projectile point injuries, or cut marks caused by blades associated with the samples from these cemeteries has been compromised by looting activity. Points and darts were likely looted from these sites prior to the original excavations. The effects of looting can be seen in my reanalysis of remains of individuals suspected of being involved in violent interactions. Additionally, none of the projectile points associated with suspected injuries remains in these collections, although several were found initially. This makes it impossible to test whether a bone lesion could have been caused by a particular projectile point, and whether the associations made upon excavation are accurate.

iv. Wildfire

Evidence of fire as another post-depositional process warrants discussion here. The taphonomic effects of fire on human skeletal remains have been virtually ignored by early investigators of these cemetery collections. Fire damage to bone can be observed in two of the four cemetery samples I examined. There is no evidence of burned bone in the Malibu Middle Period 5 and the Mulholland cemetery samples. However, burned bone is found among the remains at Medea Creek and the Malibu Historic cemeteries. Thirteen or 2.5% of the individuals in the Medea Creek sample present with burned bone. Upon analysis, two, and possibly three of these, show evidence of either being partially or completely cremated after death. The remaining ten present with bone that is scorched, or burned superficially, without calcination. At the Malibu Historic cemetery, the three individuals with evidence of burned bone (representing 3.2% of the sample) show no evidence of cremation. Conclusions drawn about the causes of the burned bone in previous research has been limited to cremation or burning as part of the processes of body desecration or cannibalism. However, my research reveals that no sets of remains from either cemetery show evidence of burning as a part of a violent interaction, desecration or cannibalism. Given that cremation was not a regular part of Chumash mortuary ritual, attributing a large number of findings of burned bone to cremation is problematic and requires consideration of other alternatives. Other causes of fire damage to bone, such as wildfire, must be considered as a post-depositional source of the burned bone. This alternative has not been presented as a possibility in earlier studies. Wildfire has been a consistent component of the environment of the Santa Monica Mountains due to Santa Ana wind conditions that funnel hot winds down through the canyons, particularly in autumn. Errors in the identification of wildfire as a contributory factor leading to the burning of bone are evident in the early analyses of remains from the Medea Creek and Malibu Historic cemeteries. The analyses done by King (1969, 1982) on the Medea Creek cemetery remains did not include the possibility of wildfire as the source of the burned bone found at excavation, focusing only on cremation and violent behavior as causative. Without consideration of other possible causes, the interpretation of this data is skewed towards a conclusion that a number of incidences of burning linked to violence occurred at these two cemeteries.

The variety of taphonomic problems described here can, in part, explain the differences in the minimum numbers of individuals (MNI) stated to be interred in each cemetery. As I have shown, the MNI has grown for each cemetery over time, beginning with the number believed to be buried at each site by the original excavation teams, continuing with later reviews by other researchers and culminating with the final assessments by the Fowler Museum team in preparation for repatriation. To conform to NAGPRA requirements regarding the respectful return of human remains, all the bones found in these sites were thoroughly reviewed by the Fowler Museum team. Bags of bone fragments initially labeled as faunal by the excavators were subsequently determined to contain a significant number of human bone elements. This early evidentiary misidentification during excavation was an important factor contributing to the early MNI totals. In the case of the largest cemetery, Medea Creek, the MNI is now over 900, which is more than double the number initially believed by the original excavators to be buried in this cemetery. New techniques and standards applied to these collections have greatly improved our confidence in the size of the populations in each cemetery. However, it is clear that the total number of individuals that were originally buried at each location will never be known with certainty. These problems create important and under-examined problems of evidence that impact the credibility of quantitative analyses that use "occurrences as a percentage of individuals in the population" as a measure. These factors must be considered in the development of conclusions about these collections.

b. Excavation and Curation

i. Damage Caused by Human Activity

Each of the four cemeteries I have investigated for my research was excavated between 1963 and 1975. Mulholland was the first uncovered in 1963 and Medea Creek followed in 1966. Excavations of the two cemeteries at Malibu were completed during the period 1972-1975. There is evidence that human activity created excavation bias at all four cemeteries. As described earlier in Chapter 4, Section 4 of this work, the Malibu Middle Period 5 site was excavated as a salvage project. Bulldozing activity initially uncovered and damaged artifacts and remains, which initiated the start of the project (Bickford 1982). Thus, it was known from the start that some of the skeletal remains had

been damaged in the process of disinterment. However, this damage was not identified as such at the time. As previously detailed, initial excavation efforts at Mulholland and Medea Creek were hastily conducted because of impending construction activity that threatened the destruction of the locations. Human activity caused further post-mortem damage and co-mingling of remains at these sites. As identified in Chapter 6, Section 3, my samples contain quite a few examples illustrating that earlier studies confused the effects of natural bioturbation with human-induced signatures of violence. Haste and lack of contemporary excavation methodologies led to unintentional damage and misidentification of lesions in some cases (Arnold and Green 2002). Among these include cut marks on bone caused by trowels and shovels, tree root damage assessed as osseous cut marks, and a shovel blow that caused an extensive post-mortem fracture to the skull that was misidentified as a blow caused by a violent encounter.

ii. Inconsistent Excavation Methodologies

The Malibu Historic Period cemetery was excavated by a different group of archaeologists than those who undertook the Middle Period 5 cemetery on the same site (Walker et al. 1996). Each excavator at Malibu used their own excavation methodologies, hampering comparisons within this site. The Malibu Historic Period cemetery excavation was conducted by more experienced archaeologists, and physical anthropologists were on site at the time. In addition, determinations of sex, age-at-death, stature, and other parameters were conducted at this site, using more contemporary methodologies than used at the earlier excavations at Mulholland and Medea Creek (Suchey et al. 1972). These remains were removed from these cemeteries over 40 years ago.

Early excavation record keeping was often guided by expediency (Arnold and Green 2002). No standard practice existed for the treatment and subsequent care and cataloging of Native American human remains immediately after excavation until the passage of NAGPRA in 1990. This legislation shed light on the need for standard procedures for the professional and compassionate treatment of human remains prior to repatriation. Prior to 1990, remains from these collections were moved from place to place, or borrowed for study and not returned (Wendy G. Teeter, Ph.D. 2015, personal communication).

Institutions that borrowed remains assigned new catalogue and burial numbers to them, making confirmation of the return of some of the items difficult.

Destructive biomechanical testing of the diaphyses of multiple femora, particularly in the Medea Creek collection, resulted in missing lower limb portions. This testing was performed under the direction of individuals at UCLA not associated with the Fowler Museum. These remains are no longer part of the remains at the Fowler, and no results of this testing have been published. Therefore, it is impossible to determine if they may have contained evidence relevant to my research.

c. Chumash Burial Customs

i. Reuse of Burial Space

As discussed in Chapter 4, Section 2 of my research, the Chumash had specific rituals and practices associated with the treatment of the dead. These included the use of permanent, separate cemeteries for the placement of the dead (Hollimon 2001, Gamble 2008). One of these rituals involved reusing cemetery space, rather than increasing the size of the cemetery to accommodate additional burials. When a new burial site was required, existing burials were disinterred, the bones collected and re-placed in the ground as the fresh burial was being refilled (Bickford 1982:6, Hudson and Blackburn 1986:70, Gamble et al. 2001). Scholars have identified this practice as contributing to the significant numbers of disassociated skeletal elements found at a number of Chumash cemeteries (Bickford 1982, Walker 1996). This practice makes it extremely difficult to discern if disarticulated remains discovered result from this burial custom or are the result of other processes such as interpersonal violence.

ii. Flexed Burials

Another documented Chumash mortuary practice involves burying the dead in a flexed position (King 1969, 1982, Galdikas-Brindamour 1970, Haley and Wilcoxon 1999, Green 2001, Hollimon 2001, Kennett 2005:127, Gamble 2008). Bodies that are flexed upon burial become naturally disarticulated at the point of flexion on the lower thoracic or lumbar vertebrae after decomposition is complete (Duday and Guillon 2006). Upon skeletonization, these burials present with vertebrae that appear “cut” or “severed” at the point of flex. In the Medea Creek cemetery, King (1982:149-151) claims that several individuals had been “cut in two.” However, given the osteological and

contextual evidence available, it is likely that these conclusions are misinterpretations of these data. It is not possible to ascertain whether these individuals have been cut into pieces purposefully, or as is more likely, have become disarticulated because of decomposition in a flexed position or as a result of other non-violent means of disarticulation noted above.

2. Problems of Interpretation

In addition to the taphonomic problems of evidence that my reanalysis has revealed, there are also problems of data interpretation that have come to light in my reanalyses. These include inaccurate inferences about populations drawn from incomplete demographic data, and problems in identifying and sourcing skeletal lesions found within the remains from these four cemeteries.

a. Demographic Problems

At the time of the initial excavations, the sex and age-at-death of many of the individuals interred in these cemeteries could not be determined. The initial attempts by the excavators and others to determine the sex and age-at-death for all these individuals were done using different criteria and standards. These standards were developed long ago and are based on understandings of skeletal morphology that are outdated today. Robert Sussman utilized his own standards, published in the UCLA Archaeological Survey Annual Report 1965, to determine the sex and age-at-death parameters initially for the remains at Medea Creek over a six-month period (King 1982:x). As presented in Table 2, King (1982) determined the minimum number of individuals in this cemetery *in total* to be between 398-464 individuals. Sussman's age-at-death estimations for this collection are very general, with categories that are not mutually exclusive. According to Sussman (King 1969), between 27.4% and 37.7% of those believed to be originally interred at Medea Creek had ages at death that could not be determined. My Medea Creek sample of 524, comprised only of sub-adults 15-19 years old and adults 20+ years at the time of death, is part of a cemetery population currently determined to be twice as large (900+) as originally estimated. These reassessments by the Fowler staff for sex determination and age-at-death estimations in preparation for repatriation to the Chumash utilize standards established by Buikstra and Ubelaker (1994). These more contemporary standards take into account multiple measurements of dimorphic dimensions and

comparative differences in skeletal morphology to reach a determination. As a result, some sets of remains determined to be of unknown sex upon excavation could now be categorized more confidently, thus improving the accuracy and precision of previous determinations in some cases. Despite these improvements, over half of the individuals in the Medea Creek cemetery sample are still determined to be of an unknown age-at-death.

The demographic re-assessment of the sample from the Mulholland cemetery revealed similar findings to Medea Creek in this regard. Sussman's (1965) standards were used to provide sex and age-at-death data for the original 18 adults disinterred from this cemetery. Subsequent re-analysis in preparation for repatriation revealed a significantly larger minimum number of individuals buried at Mulholland (39 vs. 90+) than previously believed. Application of the Buikstra and Ubelaker (1994) standards increased the number of individuals whose age-at-death and sex could be confidently estimated, improving accuracy and precision of the demographic parameters of this sample.

As previously noted, the excavation of the two Malibu cemeteries were directed by different individuals – Clement Meighan for the Middle Period 5 and Nelson Leonard and Christopher Donnan for the Historic Period. They were also conducted at different times – 1972-1975 for the former and 1971-1972 for the latter. With physical anthropologists and osteologists on site for the excavation of the Historic Period site, careful and extensive analyses of sex and age were conducted under the supervision of Judy Suchey and her students from California State University, Fullerton. However, these analyses depended upon the current standards of that time. Thus, Hurme's standards developed in 1948, 1949, and 1957 were used for sub-adult age estimates for tooth eruption (Suchey et al. 1972). Sex determinations of adults were conducted using Phenice's 1969 standards of pubis morphology and length (Suchey et al. 1972). McKern and Stewart's 1957 standards for determining the pubes of males, and Gilbert's 1972 standards for determining the pubes of females were also used (Suchey et al. 1972). My analysis used the contemporary Buikstra and Ubelaker (1994) standards, which interestingly incorporates standards developed later by Suchey-Brooks for sex determination (Brooks and Suchey 1990). The minimum number of individuals believed

to be interred at all four cemeteries increased after reanalysis and assessments prepared for repatriation. For the Middle Period 5 cemetery the original excavation notes identify 90 burials, where the Fowler repatriation data indicates that the MNI for this cemetery is actually 170. For Mulholland, early figures indicated 25 buried there vs. the more recent assessment of 110. King initially believed approximately 360-480 individuals were buried at Medea Creek vs. the 900+ most recently identified by the Fowler. The original minimum number of interments at the Malibu Historic Cemetery increased from 136 to 220 for the Malibu Historic Period cemetery after contemporary reanalysis.

While these data limit the ability to make many demographic or population inferences about these samples, it is possible to use the number of individuals of either unknown sex or unknown age in a collection as a general indicator of the relative quantity of the skeletal remains present and the quality of their preservation. Of the 92 individuals in my Malibu Middle Period 5 cemetery sample, one third (33.7%) were of undetermined sex. My sample for the Malibu Historic cemetery contained 93 individuals, of whom 60.2% could not have their sex determined. This difference is statistically significant at $p<.05$ (Appendix E). From the standpoint of age-at-death estimation, of the 92 individuals in my Malibu Middle Period 5 sample, 51.1% were of an age at death that could not be estimated. In my sample from the Malibu Historic cemetery, the number of individuals whose age at death could not be estimated was 80.7%. This difference is also statistically significant at $p<.05$ (Appendix E). These findings support the anecdotal observations of other researchers who compared the relative observed quality of preservation of remains from these two cemeteries and reported that the remains at Malibu Middle Period 5 cemetery appeared to be better preserved (Walker et al. 1996, Gamble et al. 2001).

As noted by Walker et al. (1996), different quantities of remains and the quality of their preservation impact the interpretation of evidence drawn from these remains. I believe that periodic reanalysis of these collections using contemporary methodologies can help scholars determine more confidently what inferences can and cannot be drawn from these data.

b. Problems in Trauma Identification

i. One-Phase vs. Two-Phase Analysis

Simply noting the presence of particular lesions associated with violence and counting the incidence rates of these lesions without re-examination and contextual analysis of the remains is problematic. This method makes it difficult to ascertain the true frequency and type of lesions related to violent encounters that may have been experienced by a particular community. For my thesis, I utilized a two-phase approach in trauma identification and analysis. The first phase provided an initial identification and quantification of possible examples of violence-related skeletal trauma. The second phase provided data derived from contemporary methods, burial records and photographs, all of which could be paired with the extensive scholarship on the interpretation of skeletal lesions that has been developed most recently by biological anthropologists, osteologists, and forensic anthropologists. In this phase, it was possible to integrate new contextual information on climate, geography, and new understandings of Ventureño Chumash social organization to draw my conclusions. By using this two-phase process, I observed that in all four samples included in my research, the number of lesions that initially appeared in Phase 1 to possibly result from violent encounters decreased after my second, more detailed analysis. Thus, conclusions drawn from only identifying and counting skeletal lesions that might be associated with violence, would *overstate* the amount of violence experienced in these communities.

ii. Mistakes in Trauma Identification

New scholarship since the time of the initial excavations of these four cemeteries has added significantly to our understanding of how certain acts of violence manifest skeletally. Sections 6 (a) through (g) in Chapter 4 of this thesis provide detailed information on these insights. Perhaps the best example of how far anthropologists have come in their understanding of violence-related skeletal trauma is in the identification of lesions associated with cannibalism. The presence of cut marks or disarticulated limbs alone is not sufficient to identify a victim of anthropophagy. We now understand that there is a constellation of evidence required to be present to confirm that cannibalism has taken place (Turner and Turner 1992, White 1992, Hurlbut 2000, Novak and Kollmann 2000). Additionally, anthropologists now understand that trophy-taking and ancestor

veneration are complex behaviors that also have their own signatures, and these can be confusing (Andrushko et al. 2005, Chacon and Dye 2007, Eerkens et al. 2016). New advances in biomechanics and fracture mechanics have made it possible to determine more confidently when a fracture occurred, minimizing the chances that cranial lesions that appear to be the result of blows will be confused with those occurring after death. Likewise, new information on the impact of cremation, ritual burning and mutilation through burning on bone have made it possible to more positively differentiate these behaviors from naturally occurring post-mortem burning.

As my data have shown, pairing this new information with contemporary bioarchaeological reanalysis of samples from these older collections have revealed a number of mistakes in trauma identification that occurred in the original assessments. These have been detailed in Chapter 6 of this thesis. The Mulholland and Medea Creek collections provide examples of a number of lesions that have been misidentified by the original excavators. I will summarize the errors in identification discussed previously here. At Mulholland, Galdikas-Brindamour (1970:134) notes in Table 1 that two burials (11 and 22) were found with an associated projectile point (Burial 11) and quartzite blade (Burial 22) indicative of violent interactions. No associated lesions can be seen, and these items are missing. Burials 13 and 17 are noted to have their hands and feet missing, yet subsequent reanalysis shows no evidence that this was purposeful or caused by human activity. Reanalysis of these burials show no indications that these individuals were the victims of violent encounters. At Medea Creek, individuals initially determined to have been "cut in two" (King 1982:149-151) were most likely disarticulated as the result of the decomposition of flexed burials or reburial as part of the reuse of the cemetery. Cut marks associated with another victim of violence are the result of trowel damage, not violence. Missing extremities presented as evidence of dismemberment are disarticulations which are the result of bone scatter and relocation caused by rodents, looters, or reburial practices. Cranial trauma identified as the cause of death is in fact the result of post-mortem shovel damage.

The original assessments of some of the burials at Medea Creek include multiple incidences of misidentification and misinterpretation of the causes of the trauma observed. These data have led to further confusion about the types and severity of

violence experienced within this community. The specific victims of violence identified by King (1969, 1982) at Medea Creek are cases in point. King claims that these individuals appear to be victims of extreme violence in the forms of capital punishment, sacrifice, cannibalism or war. These are highly charged claims, which require multiple lines of evidence to support. They cannot be made lightly. I found no skeletal or contextual evidence of cannibalism, mutilation, capital punishment, or human sacrifice in any of these cemeteries, which cover a use-period of 900 years. It is highly unlikely that this type of extreme violence would manifest at only Medea Creek from 1500 AD to 1785 AD, with little evidence of other types of interpersonal violence during the same time period. It should be expected that in times of trouble or in a culture that values violence as a means of problem solving, that there would be a range of types of violence experienced by the residents. King (1982) acknowledges that only 1% of the cemetery population shows skeletal evidence of extreme violence. She points out no other examples of violence-related lesions in this cemetery population – no ulnar fractures, cranial depression fractures, or peri-mortem fractures. In a social group being victimized by cannibalism, mutilation, and human sacrifice, there would be significant disruptions of social order that would encourage violent behavior. Yet, virtually none was found. Adding further confusion is the fact that a number of burials were noted in the Appendix of King's (1982) dissertation as having similar skeletal lesions or missing elements as the four burials she specifies as examples of victims of extreme violence. It is not possible to discern what the rationale was for determining why there appears to be a difference in the way these burials were categorized. To support the case for the existence of endemic violence in this community, it would seem important to include all the evidence that might substantiate her argument. Yet this was not the case, and only these four burials were identified as exemplars of extreme violence.

As Phillip Walker (2001:584) notes: "First, it is fair to say that there has been a historical bias toward overreporting spectacular cases" in the study of violence in early societies. He attributes this to the fact that: "People seem to have a deep-seated fascination with violence, especially if the victim was a stranger…" (Walker 2001:584). It is my belief that King's conclusions regarding the nature of the violence experienced at Medea Creek are manifestations of a reporting bias in favor of the spectacular. The

implications of this rush to judgment are important, because it impairs our understanding of the history of human aggression in Chumash society. The use of the four burials at Medea Creek as exemplars of extreme societal violence conflates a case study approach to the scholarship of violence with a population assessment of human aggression. As Walker (2001) warned, this lack of population world view makes it impossible to accurately determine the extent of violence within a prehistoric society. However, King's conclusions were powerful at the time of their writing for two reasons. First, the case study approach to understanding population dynamics was the preferred framework for paleopathological analysis at the time of the excavation of Medea Creek (Walker 2001) and second, our understandings of North American indigenous violence were framed by the myth of the "pacified past", which assumed that the early peoples of this continent experienced harmonious inter-group relations and a peaceful co-existence with each other and the natural world (Keeley 1990, Allen 2014). Thus, the identification of skeletal remains at Medea Creek with evidence of the effects of extreme interpersonal violence utilized a preferred methodology to retrieve information that ran counter to the prevailing pacifist mythology. The resulting data proved to be of great interest to scholars of California's indigenous people.

3. Trends in Ventureño Chumash Regional Violence over Time

The initial assessments of the skeletal remains made by the excavators at Medea Creek have contributed greatly to the view that violence was commonplace among the Chumash (Walker 1989, Raab 2005, Gamble 2008). My reanalysis of the Medea Creek data provides no information to support this contention. My additional reanalysis of data from three other Ventureño Chumash sites within ten miles of each other and occupied serially provides a temporal framework to assist in the contextualizing of my findings at Medea Creek and to explore mortuary evidence of violent behavior on a regional basis over time.

There are 748 individuals in total included in this study when all the samples are combined. In total, there are 13 discrete incidents of trauma that have been identified as likely the result of interpersonal violence. Of the seven types of violence-related skeletal trauma identified and assessed, almost two-thirds (seven or 61.5%) of these lesions are healed cranio-facial fractures. Almost a quarter of the total number of lesions identified

(three or 23.1%) are projectile point injuries. One example each of cut marks and a healed post-cranial fracture accounting for 7.7% each of the trauma type total can be found in the combined cemetery sample. There were no examples of violence -related burning, peri-mortem fracture, or dismemberment. In some cases, more than one example of trauma can be found on the same individual, and the total number of individuals affected by at least one violence-related trauma is 11. The data show that the cemetery sample providing the largest number of cases of skeletal signatures of violence is from Malibu Middle Period 5 dated 900 AD – 1150 AD. The skeletal assemblage from this cemetery is also the earliest of my samples. These remains are also the best preserved. Eight individuals with ten incidences of trauma likely associated with violence (healed cranio-facial fracture, healed post-cranial fracture, cut marks, and projectile point injury) were identified among those in this cemetery sample representing 8.7% of the 92 individuals in the sample. The evidence from all the other cemetery samples I examined that are dated after this point revealed that few to none of the individuals had skeletal evidence of violence. At Medea Creek, three incidences of trauma likely associated with violence (cranio-facial fracture and projectile point injury) were observed, and only three of my sample of 524 individuals (0.6%) could be considered victims of violence. At both the Mulholland and the Malibu Historic cemetery no one could be considered a victim of violence. These data illustrate that among these four Ventureño Chumash villages, skeletal evidence of violence peaked in the period 900 AD – 1150 AD, and sharply declined afterwards to settle at a very low rate up through the beginning of the Spanish Mission period.

Much has been written about the negative effects of Spanish contact on indigenous populations, and on the Chumash in particular (Baker and Kealhofer 1996, Gamble 2008, Douglass and Stanton 2010). As a result, skeletal evidence of incidents of violence would be expected to be higher in the Malibu Historic Period cemetery sample. In fact, this is not the case in my sample, and it is supported by the findings of others (Walker 1996, Douglass and Stanton 2010). One explanation for this could be that the cemetery was used for a very short period. Tied to this is the possibility that many of the female Chumash in this area converted to Christianity and moved with their children to the Missions to work and live. (Bickford 1982, Douglass and Stanton 2010). Upon death,

they would not have been buried in the indigenous cemetery in Malibu, and injuries they may have suffered as a result of domestic violence would not be observed. However, another possibility must be considered. As Wood et al. (1992) described in their seminal work on the Osteological Paradox, remains in a cemetery do not provide a random sample of those who live in the community. They only provide a sample of those who died and were buried there. Many of the individuals in the Malibu Historic Period cemetery may have died of disease before they had a lethal or non-lethal violent encounters, and thus the lack of skeletal evidence of interpersonal violence does not prove that the community was free of violence.

So, what might account for the peak in the appearance of skeletal evidence of violence in the Malibu Middle Period 5 cemetery? The Ventureño Chumash utilized this cemetery from 900 AD to 1150 AD. This period coincides almost precisely with Scott Stine's (1994) determination of the dates of the first peak of the Medieval Climatic Anomaly, which he believes to have occurred from ~ 892 AD to ~ 1112 AD (a period of 220 years). Stine (1994) believes a second drought period occurred from 1209 AD to 1350 AD. Between these two drought periods were years of extreme wet weather, providing a 450-year period of oscillating hydroclimatic shifts and the resulting environmental impact (Stine 1994:549). Kennett and Kennett (2000) identify a similar phenomenon. The literature contains many studies linking periods of drought and extreme wet weather to resource stress and subsequent violence in the American West and Southwest (Walker 1986, 2001, Lambert 1994, 1997, Raab 2004, Jones and Schwitalla 2008, Palkovich 2012, Martin 2016). Stress-related violence can take the form of cannibalism if food runs out (Turner and Turner 1999), blunt force trauma and dismemberment to execute suspected witches (Palkovich 2012, Martin 2016), and healed cranial fractures resulting from domestic violence or intra-community feuding (Walker 1989). Although it is beyond the scope of this thesis, the data I collected on a variety of skeletal and dental markers of stress and health in my Malibu Middle Period 5 cemetery sample could be paired with the data presented here on skeletal signs of violence to further substantiate this idea.

Chapter 8 – Conclusions and Future Research

There are a number of conclusions that can be drawn from the data derived from my research on the Malibu Middle Period 5 (CA-LAn-264), Mulholland (CA-LAn-246), Medea Creek (CA-LAn-243), and Malibu Historic Period (CA-LAn-264) cemetery collections. I began my research by hypothesizing that a contemporary reanalysis of these collections of Ventureño Chumash skeletal remains would reveal new data about the types and frequency of violent interactions engaged in by the Ventureño Chumash over time. I applied contemporary standards and methodologies to the re-examination of these collections housed at the Fowler Museum at UCLA and compared my results to those presented in previous studies on these data sets. My results support this hypothesis. The application of new osteological methodologies by staff at the Fowler and my observations supported by recent scholarship provide new information as to the number of burials at each cemetery. All four cemetery populations are larger than had been originally estimated – some considerably. The use of Buikstra and Ubelaker's (1994) more contemporary standards regarding sex and ages-at-death made it possible to improve the accuracy of sex determinations and improve the precision of age-at-death estimations at each of the cemeteries.

A spate of inter-disciplinary scholarship is now available that provides new definitions and identification characteristics for skeletal trauma. New research in fracture mechanics and patterning, bone healing, heat-induced bone alternation, patterns of human decomposition, and weaponry design and utilization not available at the time of the original assessments could now be applied to these collections in the reanalysis. The data generated by my research confirms that a number of taphonomic, bioturbative, and human-induced bone modifications occurred that affected the skeletal remains in these collections. These were not all recognized or appreciated in the original investigations of these remains. Considerable excavation damage was observed in the form of cut-marks, cracks, and breakage. Generalized "rodent damage" was later determined to have been caused by rats, mice, gophers, canids and other carnivores through dental analysis of the bones involved. My investigations identified previously undiscovered evidence of water and tree root damage to the remains. The original excavation reports noted bone scatter

at all sites caused by looting, bioturbation, and Chumash re-burial practices. My recent reanalysis supports the initial identification of these causes of bone scatter. However, the impact of these activities was initially underestimated and now has been found to be more pervasive.

For this research, I also hypothesized that a contemporary reassessment of these four Ventureño Chumash cemetery collections would generate new data that would be different from data previously collected. If true, this would require new interpretations concerning the types and frequency of interpersonal violence among the Ventureño Chumash. As a result, scholars may have to reassess how these collections are used in support of arguments regarding Chumash violence. The evidence from my research clearly supports this hypothesis as well.

The skeletal evidence found by King (1969, 1982) at Medea Creek buttressed her belief that four individuals buried there were the victims of extreme violence, such as mutilation, capital punishment, human sacrifice, and cannibalism. Included in her evidence were purported incidences of bodies cut in two, disarticulated elements, missing extremities, projectile point injuries, crushed skulls, and burned bone. My reanalysis of these remains from Medea Creek reveal important differences and challenge her conclusions. My data show no evidence that these four, or *any* individuals buried at Medea Creek were victims of the extreme violence identified by King. Out of a sample size of 524 from this cemetery, I found only two individuals with evidence of projectile point injuries, and one with a cranial depression fracture for a total of 0.6% of the cemetery population sample. The vast majority of the earlier skeletal trauma linked to extreme violence is in fact the result of misidentification of the evidence and/or subsequent evidentiary misinterpretation. Bone lesions initially thought to be examples of dismemberment, mutilation, peri-mortem fracturing; human sacrifice, cannibalism, and burning were most likely the result of bioturbation, looting, excavation damage, Chumash re-burial practices, post-mortem wildfire and cremation damage. Finally, it remains unclear why King chose these four individuals to use as examples of extreme violence when other burials in her excavation notes are identified as having similar lesions, but are excluded as examples of violence.

My conclusions regarding the lack of evidence of victims of extreme violence at Medea Creek is further supported by data from the Malibu Middle Period 5, Mulholland, and Malibu Historic cemeteries. I found no skeletal or contextual evidence of cannibalism, mutilation, capital punishment, or human sacrifice in *any* of these cemeteries either, which cover a use-period of 900 years. As discussed earlier, it is highly unlikely that this type of extreme violence would manifest only at Medea Creek and with virtually no other evidence of interpersonal violence at this locale during the same time period. I believe that King's (1969, 1982) focus on only identifying examples of extreme violence is a case of a "bias toward the spectacular", or an early example of the journalistic adage "if it bleeds, it leads" - used to determine which types of stories are most newsworthy.

Data generated from my research illustrates that the percentage of individuals with skeletal lesions associated with violent acts in my cemetery samples decreased from a high point of 8.7% at Malibu Middle Period 5 cemetery used during the period 900 AD – 1150 AD to none (0.0%) at Malibu Historic cemetery used from 1785 AD – 1805 AD at the beginning of Spanish contact. I believe the higher rate at Malibu Middle Period 5 is a result of the environmental disruptions experienced from the Medieval Climatic Anomaly occurring at the time of this cemetery's use. The low rate at Malibu Historic cemetery is a result, I believe, of significant population disruptions due to the establishment of Spanish missions prior to the collapse of Chumash society, which impacted cemetery demographics. My data and conclusions are consistent with those presented by other scholars for these locations and time periods (Walker 1986, 2001, Lambert 1994, 1997, Raab 2004, Jones and Schwitalla 2008, Palkovich 2012, Martin 2016).

The data I have amassed from my research are specific to the Ventureño Chumash communities supported by these cemeteries. Spatially, they occupied a very small portion of the southeastern extremity of their range of activity. These communities are not proxies for the entire collection of language groups that comprise the Chumash. The evidence I have collected and the inferences drawn from it represent my research on the Ventureño Chumash alone. It would be hubris to assume that these data apply to the Chumash collective, and future researchers should refrain from doing so. I believe this to be a critical point. Scholars should avoid generalized conclusions about violence when

referring to social groups. Statements such as “violence is endemic”, “the tribe is warlike” or “violence was a part of everyday life” add little to our understanding of the types and frequency of interpersonal violence experienced by a group, and conflate small group interactions with those of larger entities, with whom there may be little congruence.

1. Future Research

A bioarchaeological investigation of a research question does not end with the completion of a study. The speed of current methodological innovation, coupled with the accessibility of new data interpretations mean that any inferences drawn from the scholarly community have a shortened life-span. I have utilized Critical Theory to frame my work, as I strongly believe it is the duty of scholars, and anthropologists in particular, to regularly review our own work along with the work of others to ensure that our assumptions do not become entrenched and our biases do not go unchallenged. My research was conducted with this in mind, and it is my hope that this work will act as a springboard for future research by myself and others.

The remains utilized in my research were repatriated to the Chumash in solemn ceremony in September 2016. My research constituted the last opportunity to physically observe these remains. However, I collected a large amount of data on a number of different skeletal pathologies identified in the course of researching violence-related lesions. Digitizing this data for ease of use, and analyzing the meanings of other skeletal pathologies in these collections is important research to complete. Data on stress-related lesions should be compared with the trauma data I have collected to draw inferences about Ventureño Chumash health status over time. It would also be of value to identify other collections of Chumash skeletal remains not yet repatriated and conduct analyses similar to mine on these. As emphasized by Buikstra and Gordon (1981), there is tremendous value in using old collections in the study of human skeletal remains to generate new knowledge. While acknowledging the reality of a “curation crisis” where collections are under-curated and languish unstudied for years, they point out the value of old collections from the standpoint of reflexive review. As new techniques and methods of study continue to become available, older collections can provide a wealth of comparative data which can be kept current with regular review and reassessment.

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Appendix A – Details/Photography - Malibu Middle Period 5 Cemetery Skeletal Assemblage

CA-LAn-264 Acc. 573 (900 AD – 1150 AD)

Review and Macro-analyses
Violent Pathology/Trauma - Phase 1

Burial #	Sex	Maturation	Age	Skeletal Portion	Element	Side	Description	Pathology/Trauma Noted
1	M	Adult	20-34	Axial Skeleton	Rib	R	1st Rib and Ribs 3-10	(4) healed fractures
1	M	Adult	20-34	Axial Skeleton	Vertebra	NA	Spinous processes	broken by stabbing - burial report
5	M	Adult	50+	Upper Limb	Radius	L	Distal end	healed fracture-new bone formation
26	M	Adult	U	Neurocranium	Parietal	R	small depression - squamous portion	trauma
28.1	M	Adult	20-34	Lower Limb	Patella	L	Lateral	healed fracture
43.1	M	Adult	30+	Neurocranium	Frontal	NA	(1) depression in upper portion	healed depression fracture
46	M	Adult	20-34	Upper Limb	Radius	R	Midshaft	healed fracture
49	M	Adult	35-49	Neurocranium	Parietal	R	Cut marks, large hole	trauma
49.1	M	Adult	35-49	Facial Skeleton	Nasal	R	Deformation due to fracture	healed nasal fracture
52	F	Adult	50+	Upper Limb	Ulna	R	Distal 2/3 diaphysis	healed fracture
53	F	Adult	50+	Facial Skeleton	Nasal	R	Deformation due to fracture	healed fracture
64	F	Adult	50+	Upper Limb	Ulna	L	Mid-diaphysis	possible healed fracture
67	M	Adult	20-30	Neurocranium	Frontal	NA	Right frontal depression	healed fracture/trauma
69	M	Adult	35+	Neurocranium	Parietal	R	Two distinct depressions	healed depression fracture
78	M	Adult	35+	Neurocranium	Parietal	L	Cut mark - 22.01 mm vertical	cut mark
78	M	Adult	35+	Neurocranium	Frontal	NA	Multiple depressions	depression fractures extending into LR parietals

Legend:

Burial Number: Assigned to each individual by Fowler for repatriation documents
Description: Description and location of pathological lesion
Pathology/Trauma: Assessment of pathology observed

Detailed information for each lesion identified in the table above is provided below. Burials are presented in numerical order for this cemetery sample.

BURIAL 1
Adult Male, Age-at-death 20-34 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Projectile point injury as a result of knifepoint.
   - Knife noted in burial notes to be present in bone at time of excavation
   - Knife is no longer available for study
   - Ovoid lesion present in posterior right side of C3 vertebra (dimensions: 9.42 mm long, 7.65 mm wide, 4.05 mm deep)
   - Spinous processes of C3 and C4 vertebrae are broken off

2. Four healed fractures on right ribs.
   - 1st rib and three others (ribs 3-10)
   - Osseous remodeling present along with slight misalignment – only one rib shown here

BURIAL 5
Adult Male, Age-at-death 20-34 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed post-cranial fracture of the distal end of the left radius.
   - The bone has healed out of alignment, with evidence of osseous remodeling at the site of the fracture above the ulnar notch
   - Width of remodeled bone: 19.71 mm
   - Location of injury and healing pattern consistent with fall on an outstretched hand

BURIAL 26
Adult Male, Age-at-death undetermined
Skeletal Integrity: Incomplete
Preservation: Average

1. Healed large cranial depression fracture located on right parietal bone.
   - Lesion located 33.78 mm below sagittal suture
   - Slightly ovoid lesion is 17.96 mm long and 15.71 mm wide

BURIAL 28.1
Adult Male, Age-at-death 20-34 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed fracture of the left postero-lateral patella.
    - Length of fracture line: 5.09 mm

Antero-Superior View

Postero-Superior View

BURIAL 43.1
Adult Male, Age-at-death 30+ years old
Skeletal Integrity: Incomplete
Preservation: Fair

1. Healed cranial depression fracture of the frontal bone.
   - Lesion is circular and 5.00 mm in diameter
   - Lesion location is 29.97 mm anterior to the coronal suture on frontal bone

BURIAL 46
Adult Male, Age-at-death 20-34 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed fracture of the right radial diaphysis at midshaft.
   - Evidence of bone remodeling
   - Bone thickness increase at points of healing
   - Right radial diaphysis is thicker at midshaft than left in comparison
   - Fracture well reduced and healing occurred without deformation

BURIAL 49:
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Cut mark #1 on the right parietal.
   - Vertical cut on right parietal = 9.38 mm in length, 1.73 mm wide at widest point

Cut mark #1

2. Cut mark #2 on the right parietal.
   - Vertical cut on right parietal =14.85 mm in length, 0.85 mm wide at widest point
   - Cut mark #2 is much thinner than #1

Cut mark #2

BURIAL 49.1
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Fair post-cranial, Good cranial

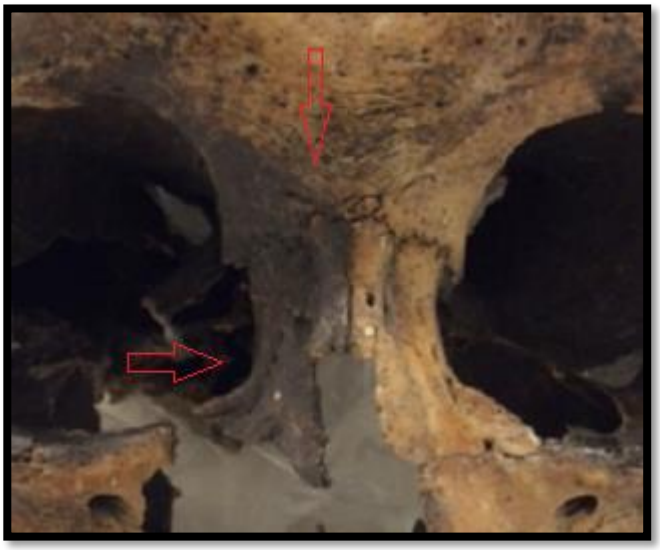
1. Healed fractures of the right nasal bone and frontal process of right maxilla.
   - Distal portion of healed right nasal bone is deformed and presses medially
   - Portion of the healed frontal process is deformed and pressed medially into the nasal aperture

BURIAL 52
Adult Female, Age-at-death 50+ years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed fracture of the distal portion of the diaphysis of the right ulna.
   - Evidence of bone remodeling and osseous callus
   - Bone thickness increase at points of healing
   - Distal portion of right ulnar diaphysis is thicker than left in comparison
   - Fracture well reduced and healing occurred without gross deformation

BURIAL 53
Adult Female, Age-at-death 50+ years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed fractures of the right nasal bone and frontal process of right maxilla.
    - Portion of the healed frontal process is deformed and pushed posteriorly into the nasal aperture



BURIAL 64
Adult Female, Age-at-death 50+ years old
Skeletal Integrity: Incomplete
Preservation: Good

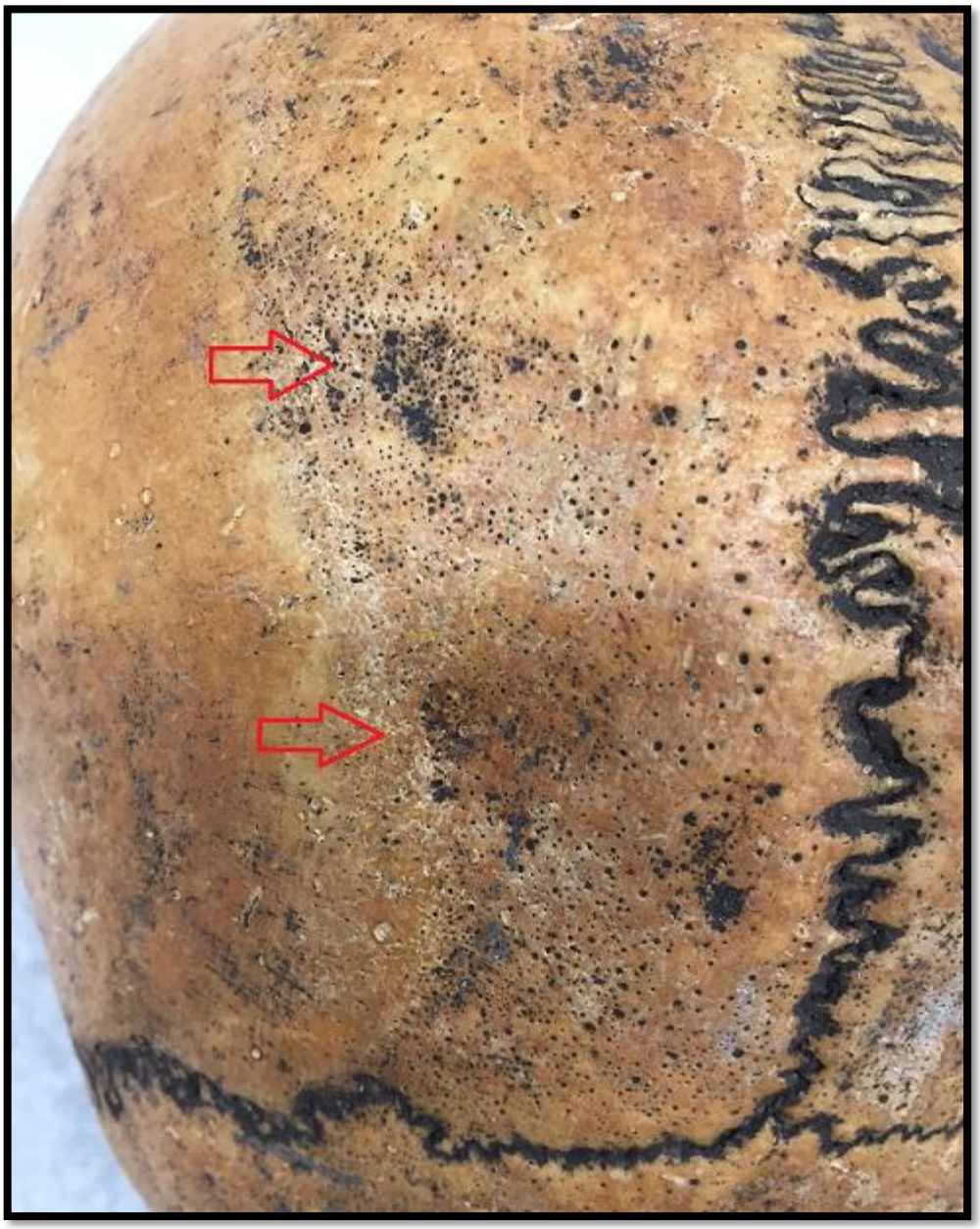
1. Healed fracture of the left ulnar diaphysis at midshaft
    - Small osseous callus causing slight widening of the bone shaft
    - No misalignment
    - Image similar to lesion in Burial 52 except smaller, at midshaft, and on the left side

BURIAL 67
Adult Male, Age-at-death 20-34 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed cranial depression fracture of the frontal bone.
   - Depression fracture round in shape and 14.45 mm in diameter
   - Lesion located 20.05 mm anterior to coronal suture and 26.05 mm to the right of the frontal midline

BURIAL 69
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Nearly Complete
Preservation: Good

1. Two healed cranial depression fractures on the right parietal bone.
   - Cranial depression fracture #1 is round, 8.04 mm in diameter indicated by the upper arrow
   - Cranial depression fracture #2 is rectangular, 12.45 mm long and 8.01 mm wide indicated by the lower arrow



BURIAL 78
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Possible cut mark on left parietal bone.
   - Lesion runs coronally on the parietal bone
   - Lesion is 22.01 mm and 1.30 mm at widest point
   - Base of lesion is 11.00 mm above the left temporal squama
   - Source of this lesion very ambiguous. In consultation with other scholars, three believe it to be a cut mark, two consider it to be a vascular imprint, one believes it could also be taphonomical, but a cut mark could not be ruled out.
   - In my analysis, I decided to be conservative and identify this lesion as a cut mark

2. Multiple healed cranial depression fractures on frontal bone, as well as the left and right parietals.

Frontal and parietal bone healed depression fractures

Appendix B – Details/Photography - Mulholland Cemetery Skeletal Assemblage

CA-LAn 246 Accession 396 (1200 AD – 1500 AD)

Review and Macro-analyses
Violent Pathology/Trauma - Phase 1

Burial #	Sex	Maturation	Age	Skeletal Portion	Element	Side	Description	Pathology/Trauma Noted
8a	U	Adult	U	Upper Limb	Clavicle	L	broken and healed	healed fracture
10.1	M	Adult	20-34	Upper Limb	Radius	R	broken and healed	healed fracture

Legend:

Burial Number: assigned to each individual by Fowler for repatriation documents
Description: description and location of pathological lesion
Pathology/Trauma: assessment of pathology observed

BURIAL 8a
Adult Sex and Age-at-death undetermined
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed fracture of the left clavicle.
   - Fracture occurred in the diaphysis of the clavicle
   - Fracture displaced, illustrating poor alignment and bone shape after healing
   - Bone remodeling noted in area of fracture

Enlargement of area of remodeling and misalignment

BURIAL 10.1
Adult Male, Age-at-death 20-34 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Healed spiral fracture of the right radius.
   - Interosseous border sharply curves to right (top red arrow on figure below), diaphysis is displaced ~ 20°
   - Entire distal portion of the radius is displaced ~ 90° (bottom red arrow)
   - Osseous remodeling visible at site of fracture

Appendix C – Details/Photography - Medea Creek Cemetery Skeletal Assemblage

CA-LAn 243 Accession 494 (1500 AD – 1785 AD)

Review and Macroanalyses
Violent Pathology/Trauma - Phase 1

Individual	Burial #	Sex	Maturation	Age	Skeletal Portion	Element	Side	Description	Pathology/Trauma Noted
7	7	U	Adult	U	Axial Skeleton	Rib	U	1st sternal end	healed fracture
17	17	M	Adult	35-49	Upper Limb	Radius	L	Distal	broken and poorly healed - Colles fracture
	17				Axial Skeleton	Rib	L	2nd - vertebral end	healed fracture
	17				Upper Limb	Clavicle	L	Bone remodeled	healed fracture
20	20	M	Adult	U	Neurocranium	Crania	R	Right side	post-mortem burns, R ulna, R femur-osteoma hole
	20				Axial Skeleton	Vertebra	NA	Thoracic	possible projectile point implant mark
23	23	M	Adult	U	Neurocranium	Frontal	NA	Fragments	burned
45	45	M	Adult	U	Axial Skeleton	Vertebra	NA	Thoracic	compression fracture, severe lipping
63	63	M	Adult	35-49	Lower Limb	Femur	L	Near trochanter	CM trowel damage +L. clavicle distal midshaft
100	100	F	Adult	U	Unidentified	Phalanx	R	1st intermediate	pathological - Healed fracture
107a	107a	U	Adult	U	Neurocranium	Crania	U	Fragment	burned
111	111	M	Adult	U	Axial Skeleton	Vertebra	NA	Cervical/Lumbar	severe lipping; (1) broken/healed
	111				Axial Skeleton	Ribs	U	2nd rib ?	(1) broken and healed; (1) pathological
127d	127d	U	Adult	U	Skeleton	All	NA		burned - cremation
133a	133a	F	Adult	U	Neurocranium	Cranium	U	Fragments	burned - see King notes on this Burial
270	270	U	Adult	U	Neurocranium	Frontal	NA		healed cranial depression fracture
312	312	U	Adult	U	Lower Limb	Metatarsal	R	4th	metatarsal burned, (1) bag burned bones faunal
330	330	M	Adult	35-49	Lower Limb	Tibia	L		burn marks +RL calc/tali + L maxilla
	330				Axial Skeleton	Vertebra	NA	Cervical	possible PPI mark-C4
336	336	M	Adult	50+	Lower Limb	Femur	R	Proximal shaft	healed injury - Enlarged area
346	346	F	Adult	35-49	Axial Skeleton	Rib	R	2nd	pathological - infection, possible break
350	350	M	Sub-Adult	15-19	Axial Skeleton	Rib	R	(2) ribs 3-10	healed fractures
357	357	M	Adult	U	Lower Limb	Metatarsal	L	3rd	broken and healed
375	375	M	Adult	U	Skeleton	All	U	Burned black	multiple burned bone fragments - cremation
380	380	F	Adult	U	Skeleton			Burned black	some bones have burned areas
389a	389a	U	Adult	U	Neurocranium	Cranium	U	Fragments	burned
397	397	U	Adult	U	Axial Skeleton	Vertebra	NA	Fragments	burned black
398a	398a	U	Adult	U	Lower Limb	Metatarsal	R	5th	cut marks - trowel damage?
407	407	M	Adult	U	Lower Limb	Tibia	L	Shaft fragments	burned black, areas of tib/fib show superficial burns
413	413	F	Adult	U	Lower Limb	Talus	R		sliced - excavation damage/ King notes knife
424	424	F	Adult	35-49	Skeleton		NA	Cranial bones, limbs	burned black but not calcined
428a	428a	U	Adult	U	Axial Skeleton	Vertebra	NA	C1 (atlas) fragments	severe osteophytes w/ compression fracture
445	445	U	Adult	U	Upper Limb	Hand	L	Complete hand	disarticulated and placed in a jar
448	448	M	Adult	U	Axial Skeleton	Vertebra	NA	Cervical	compression fracture

Legend:

Burial Number: Assigned to each individual by Fowler for repatriation documents
Description: Description and location of pathological lesion
Pathology/Trauma: Assessment of pathology observed

Detailed information for each lesion identified in the table above is provided below. Burials are presented in numerical order for this cemetery sample.

BURIAL 7
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete due to vandals
Preservation: Poor

1. Healed post-cranial fracture of the first rib toward the sternal end.
   a. Both ends of the rib cannot be observed
   - The bone has healed out of alignment, with evidence of osseous remodeling at the site of the fracture
   - Deformation of rib curvature is evident
   - Healed fracture in isolation

BURIAL 17
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Fair

1. Healed post-cranial Colles fracture of the distal portion of the left radius.
   - The radial styloid process is flattened (red arrow, left image)
   - "Wrinkling" of bone is evident, portion of the bone distal to the fracture having over-ridden bone proximal to fracture to create a misalignment (right image)
   - Significant distortion of carpal articular surface compared to right radius (bottom)

2. Healed post-cranial fracture of the 2nd rib towards the vertebral end.
   - Extensive osseous remodeling of the bone lateral to the tubercle
   - Bone alignment appears to have been maintained

3. Healed post-cranial fracture of the left clavicle.
   - Osseous remodeling of the bone causing increased thickness seen at the acromial end of the clavicle
   - Bone alignment appears to have been maintained
   - Fracture line visible in this photo occurred post-mortem. Pieces fitted together for photo, and provides no evidence for this discussion

BURIAL 20
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

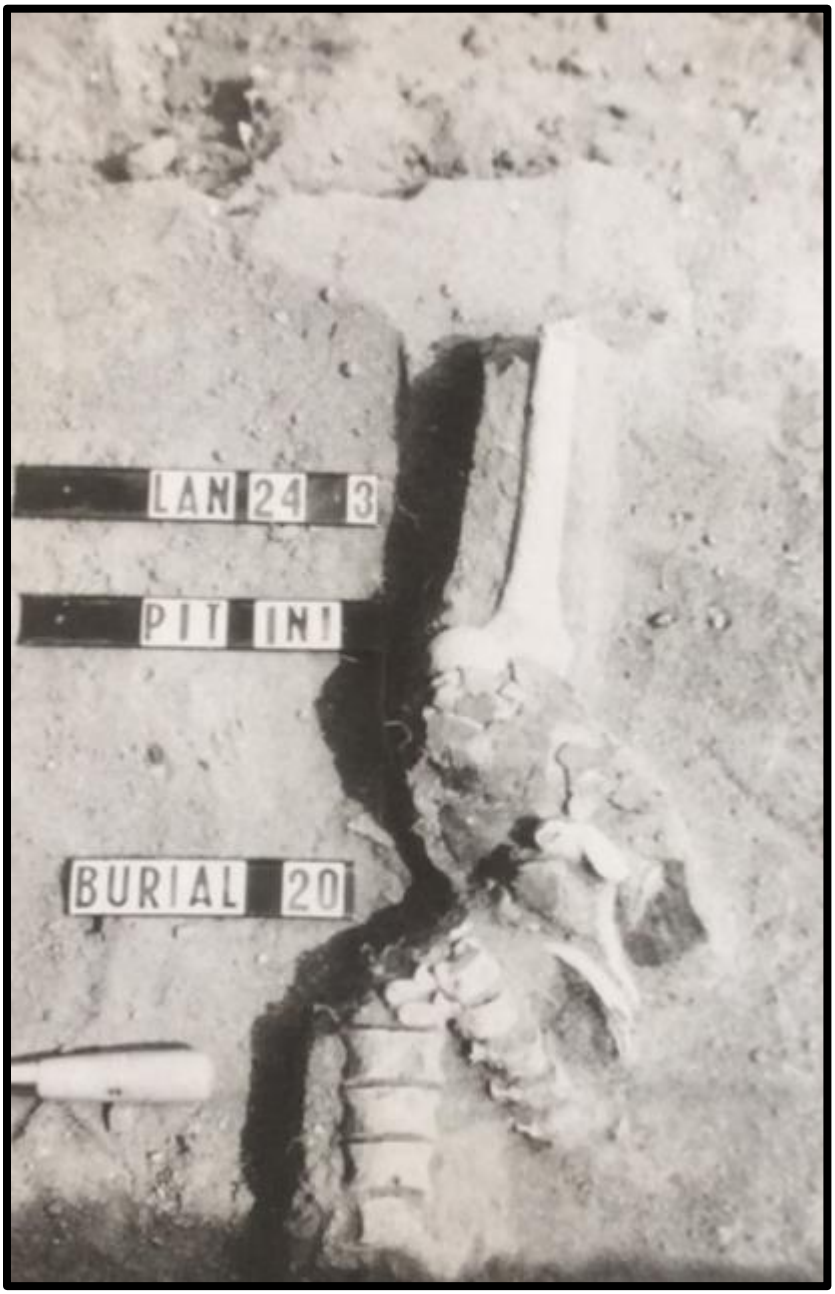
1. Right femur.
   - Superficial burning on the end of the right femur
   - Broken at midshaft
   - Bone distal end broken post-mortem, indicated by color differences, dry, brittle bone
   - Evidence of osteoma present on medial side of shaft. Ovoid lesion is 9.07 mm tall and 7.28 mm wide


Posterior view


Medial view

2. Thoracic vertebra shows evidence of possible projectile point injury.
   - Ovoid lesion present on anterior side of the vertebral body
   - Lesion is 9.07 mm tall by 7.28 mm wide
   - Size of lesion suggests an arrow point
   - Unusual anterior position of bone lesion suggests arrow passed directly through the chest without deflection from sternum or ribs to lodge in this manner

3. Photograph of Burial 20 taken at the time of excavation
    - No evidence of cut marks on any vertebral elements can be seen in this photograph
    - No projectile point visible in photograph
    - Femoral end broken, not cut



Burial 20 – King's Excavation Notes / Assessment – Evidence of Extreme Violence

Burial 20 is located in Unit 1N1 East Lobe of the Cemetery, buried at a depth of 71 centimeters (~ 28 inches) from the surface, and oriented towards the West. The remains were located above those of other individuals, and because of its somewhat shallow burial, King believes this indicates it was a later burial. She believes the remains to be of a male over 17 years of age. King (1982:147-148) notes:

> This burial consists of disarticulated bones (one femur, ribs, small skull fragments, and miscellaneous pieces). A projectile point was found embedded in a thoracic vertebra. Charring appears on the outer surfaces of the skull fragments, the end of the broken femur, and on the processes on the back of the vertebrae. This pattern of burning indicated the body was burned after it was cut, but with the flesh still on. The burial appears to represent a partial cremation which took place at another location, as there was no evidence of fire in the burial pit itself.

The projectile point was identified by King as a Concave Based Type 3 arrow point constructed from chalcedony, with the tip and one of the barbs broken (King 1982:148). The projectile point was recovered at the time of excavation but the tip was not.

Burial 20 – My Re-analysis and Re-assessment – Projectile Point Victim

Photographs of the burial site reveal remains that are incomplete and in poor condition. The elemental types found and their locations are consistent with Dr. King's description of them. All the vertebral elements were not entirely aligned. Five (5) thoracic vertebrae were aligned but were lying at approximately a 45° angle to the right of four (4) lumbar vertebrae. No projectile point is visible in the photograph, however small defects that look to be round holes can be seen in one thoracic and one lumbar vertebra. Some burned bone fragments are also visible including the distal end of the broken femur. The sex of the individual is determined to be probably male following Buikstra and Ubelaker (1994) due to overall postcranial robusticity and a right femoral head diameter of 45 mm. Union of the epiphyses of the femoral head, greater and lesser trochanters indicate an adult, but no more precise age for this individual could be determined.

The remains of Burial 20 were reviewed on two additional occasions by me and Dr. Elizabeth Miller to confirm whether the osteological evidence observed by Dr. King is consistent with the hypothesis that this individual was the victim of violence. Although the burial was found with the vertebral column disarticulated between the thoracic and lumbar vertebrae, there are no cut marks visible on any of the vertebrae indicating peri-mortem or early post-mortem purposeful disarticulation or dismemberment. One of the thoracic vertebrae had a small hole on the anterior side of the body of the element. This could be the point at which a projectile point entered the bone. Unfortunately, the projectile point is missing from this collection and therefore could not be analyzed, nor paired with the vertebral remains to determine if it caused this bone lesion. If this hole was caused by a projectile point, it would have entered the individual from the front, passing between the ribs and avoiding the sternum before lodging into the vertebra.

Evidence of burning can be seen on these remains as Dr. King noted. Three occipital fragments are calcined, but the broken distal end of the femoral diaphysis and the vertebral processes show only surface burning. The remains were skeletonized prior to burning, contrary to King's observation. This pattern of burning is inconsistent with partial cremation. An alternative hypothesis for the source of these burn patterns includes a brush fire that went over the cemetery well after internment when the bones were skeletonized. This is consistent with Dr. King's notation that this burial was shallow, which could have exposed the remains to fire over time.

Several defects in the bones of Burial 20 can be seen that were not noted in Dr. King's analysis but are detailed here. The right femur of Burial 20 presents with an ovoid hole 11.33 mm in length and 2.11 mm deep. Dr. Miller believes it to be evidence of an osteoid osteoma, and not a bone injury relating to a violent encounter. There is no sign of infection or bone remodeling. Two parallel cut marks in the bone below the ovoid hole are the result of trowel damage, not disarticulation. There is evidence of rodent damage to the femur.

BURIAL 23
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Poor

1. Frontal bone above the right orbit and the nasal aperture.
   - Burned black, but superficially
   - Area measures 28.69 mm from tip of red arrow to bottom of burned area with a width of 15.82 mm
   - The neurocranial elements of this burial are poorly preserved

BURIAL 45
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

1. Portion of a thoracic vertebra presenting with evidence of compression fracture
   - Severe lipping in evidence due to osteophytic buildup
   - Vertebral element compressed and distorted. Red arrows indicate articular surface for orientation

BURIAL 63
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Left femur.
   - All elements proximal to the nutrient foramen are well preserved
   - Smooth white grooves tracking around edge of trochanter and across the femoral neck on both sides
   - Large grooves indicated by red arrows are 1.23 mm wide
   - Grooves indicate post-mortem root damage. Bone color confirms damage occurred after death

Magnification of grooves at the base of the lesser trochanter

2. Clavicle – superior view midshaft.
   - Large cut mark 9.10 mm long and 4.25 mm wide indicated by left arrow
   - Shallow bone modifications seen medial to large cut mark (right arrow)
   - Exposed bone in both areas white in color
   - Parallel striations in area indicated by the right arrow caused by rodent gnawing

BURIAL 73
Sub-Adult sex unknown, Age-at-death 12-15 years old
Skeletal Integrity: Incomplete
Preservation: Poor

1. Photograph of Burial 73 taken at time of excavation.
   - King (1969, 1982) claims this individual a victim of extreme violence
   - Distal portions of left and right tibiae (red arrows) show evidence of post-mortem breakage
   - No evidence of purposeful removal of feet or hands
   - Vertebral elements out of alignment but show no obvious evidence of cut marks or purposeful midsection separation (green arrow)
   - No signatures of violence found on the skeletal elements present in this burial

Burial 73 – King's Excavation Notes / Assessment – Evidence of Extreme Violence

Burial 73 is located in Unit 1N2 East Lobe of the cemetery, buried at a depth of 136 centimeters (~ 54 inches) from the surface in a flexed position on the right side and oriented at 225°. The individual was believed to be an adolescent 12-15 years old, sex undetermined. As with Burial 20, this burial was on top of another located below it, but buried over twice as deeply. King (1982:148-149) notes:

> This poorly preserved body contained two point fragments, one in the thoracic region and the other in the lower back. The body was positioned normally in a loose flex, oriented to the southwest. The ends of the extremities were missing, but this cannot be considered definite evidence of cutting because poorly preserved burials are frequently missing these parts.

The projectile point found in the thoracic area was identified by King as a Concave Base Projectile Point Type 5 made of Grimes Canyon fused shale, with one corner of its base broken and the piece missing. The arrow point found in the lower back was stated to be made of an un-typed light grey Grimes Canyon fused shale. These points were recovered at the time of excavation.

Burial 73 – My Re-analysis and Re-assessment

Excavation photographs reveal the position of the body to be as described by Dr. King but there is no evidence of the projectile points in-situ, or any visible evidence of skeletal injury caused by these points in the photographs. Age of the individual is determined to be between the ages of 12 and 15 years following Buikstra and Ubelaker (1994) and utilizing lack of epiphyseal fusion in three locations. There is no conclusive evidence of the sex of the individual.

As with Burial 20 these remains were re-examined by Dr. Elizabeth Miller and me. There is no evidence of projectile point injury to any of the vertebral elements or the rib shafts present. The points are missing from the collection and thus cannot be analyzed. There is one left second metacarpal shaft and proximal end present, but the rest of the hands and feet are not present. There are no cut marks or signs of disarticulation on this metacarpal, the distal radius or ulna.

BURIAL 100
Adult Female, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

1. Right proximal hallucal phalanx.
    - Deformation of head of phalanx resulting from healed fracture


Plantar (inferior view)


Dorsal (superior view)

BURIAL 107a
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

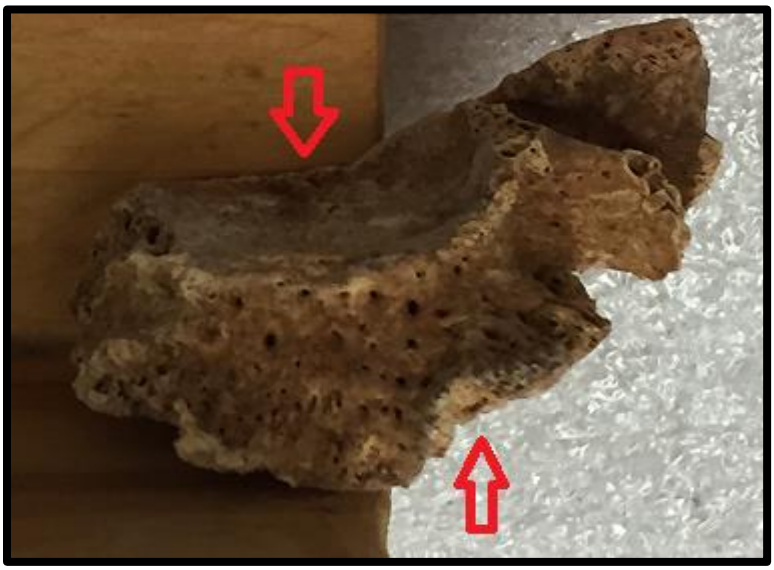
1. Burned cranial fragment.
   - Superficial scorching of the outer surface of the bone
   - Bone burned post-mortem

BURIAL 111
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

1. Lumbar vertebral elements.
   - Severe osteophytic buildup and lipping of the lumbar vertebrae indicative of osteoarthritis (green arrow)
   - Pronounced concavity on both sides of the vertebral body resulting from compression (red arrows)

Example of Lumbar vertebra

2. Cervical vertebral elements.
    - Severe osteophytic buildup and lipping of the cervical vertebrae indicative of osteoarthritis (lower red arrow)
    - Pronounced concavity on the superior surface of the vertebral body resulting from compression (upper red arrow)
    - Extensive distortion of vertebral body as result of compression



Example of Cervical vertebra

3. Healed 2nd(?) rib fracture.
    - Large osseous callous at the site of healed fracture (red arrow)
    - Possible pathological bone response of unknown etiology (green arrow)

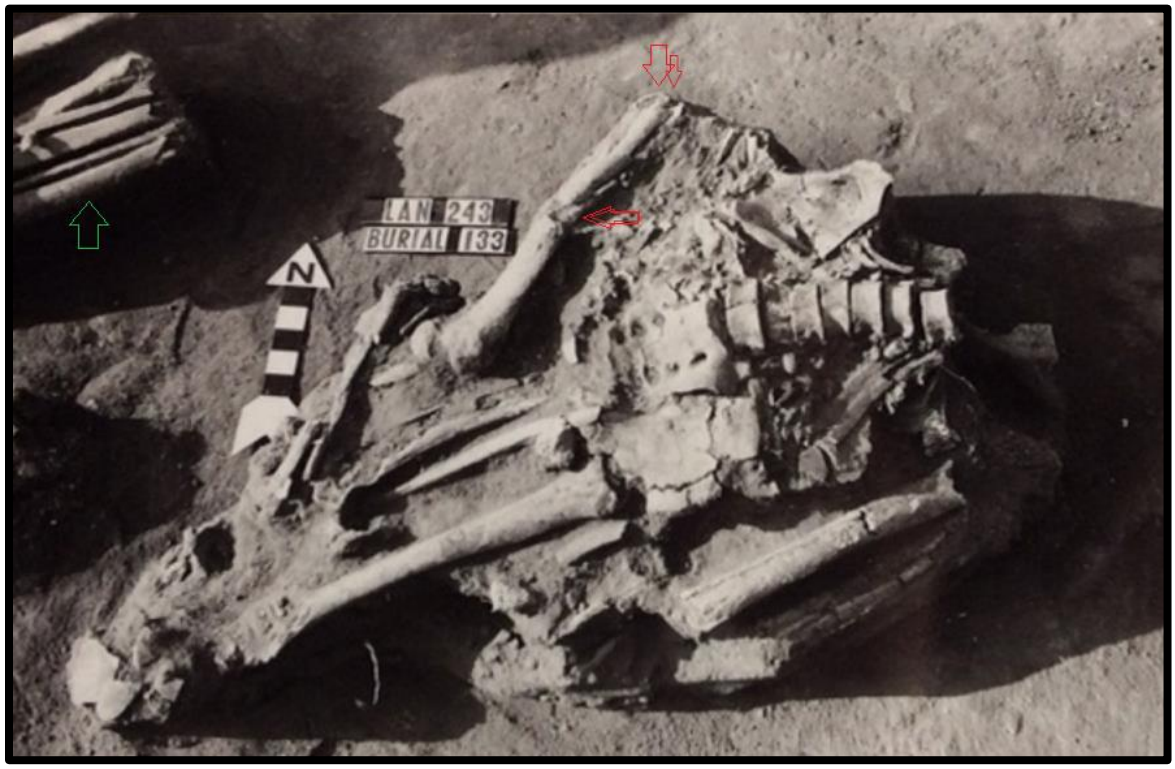
BURIAL 127d
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Poor

1. Bone fragments calcined.
   - All skeletal elements of this burial are calcined
   - Remains are consistent with cremation

BURIAL 133a
Adult Female, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

1. Cranial bone fragments.
    - Evidence of scorching
    - Cross-sectional view indicates bone burned post-mortem

2. Photograph of Burial 133a taken at time of excavation.
   - King (1969, 1982) claims this individual a victim of extreme violence
   - Distal portion of left femur (red arrows) is broken, not cut. Breaks are similar to the ends of most of the bones excavated from this burial
   - There is evidence of post-mortem breakage and rodent gnawing
   - No obvious photographic evidence of purposeful removal of feet or hands
   - Lumbar vertebral elements in alignment along with T11 and T12. The rest of thoracic vertebrae are missing
   - No obvious photographic evidence of cut marks or purposeful separation on T11
   - Multiple femora present indicating more than one individual in this grave
   - Notch in left femur next to identification sign (red arrow) is the result of post-mortem excavation damage
   - Organized bone pile in upper left corner (green arrow) suggests multiple uses of this burial site over time



BURIAL 270
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Poor

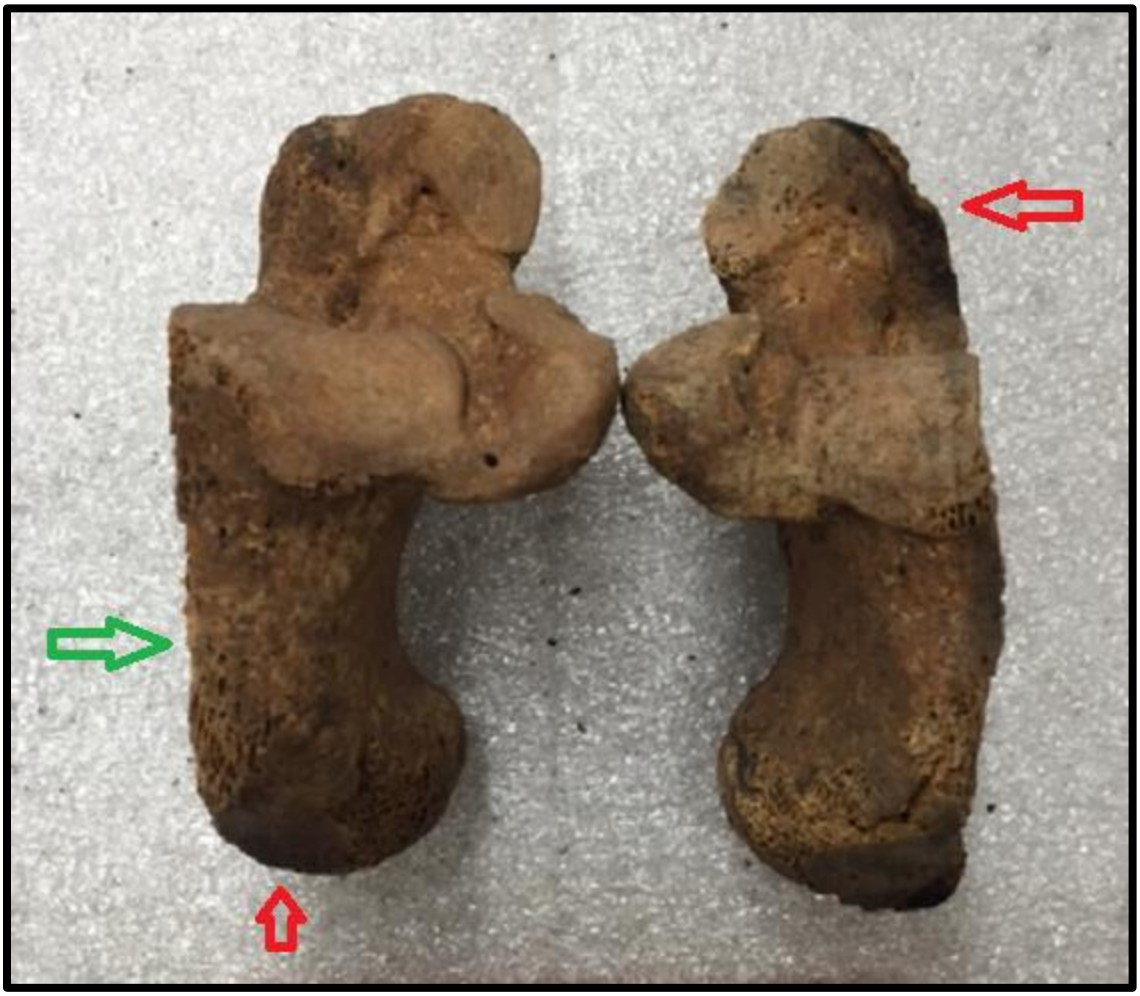
1. Healed cranial depression fracture on frontal bone.
    - Large crack transecting element occurred post-mortem, and did not result from blow to the head
    - Healed fracture is circular in shape measuring coronally 8.75 mm and sagittally 8.75 mm through the center
    - Circular shape is likely caused by a purposeful blow from a man-made weapon with a circular hitting surface

BURIAL 312
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

1. Burned right 4th metatarsal.
   - No other burned elements confirmed to be associated with this burial
   - The excavation notes for this burial note that there are "cremated bones in [the] grave of unburned primary burial. Burned fragments clustered at side of grave at back" (King 1982:229). These burned fragments are in fact faunal, not human

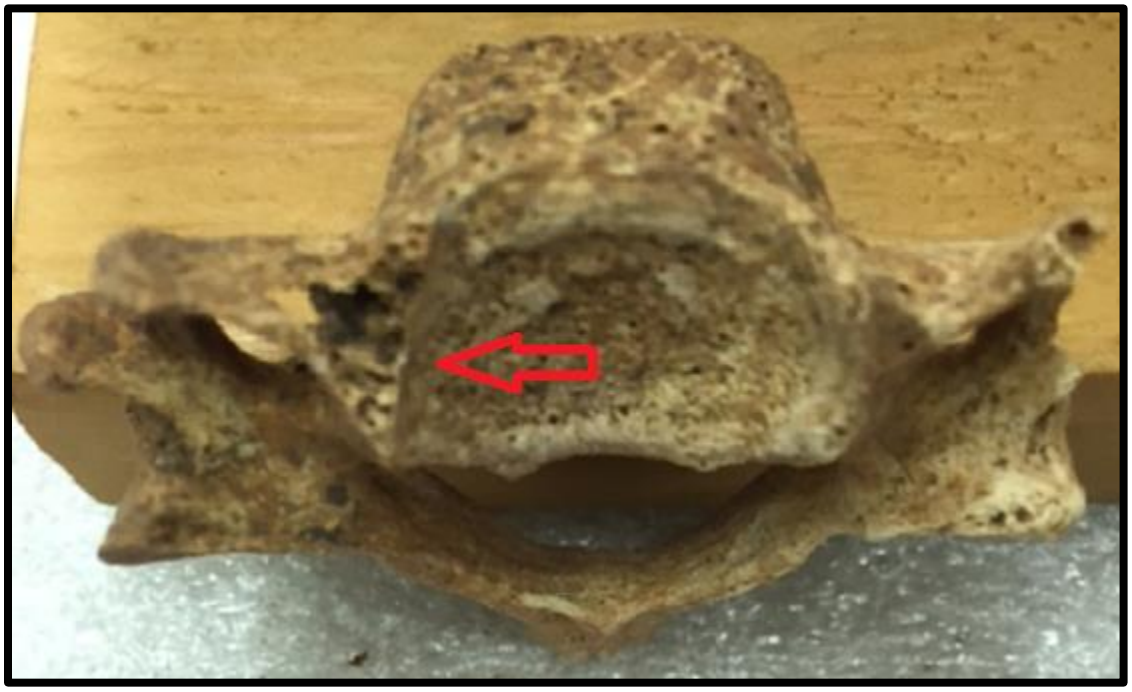
BURIAL 330
Adult Male, Age-at-death 35-49 years old
Skeletal Integrity: Nearly complete
Preservation: Good

1. Calcanei.
   - Scorching observed on both left and right calcanei (red arrows). Similar scorching also found on both tali and the left maxilla
   - Shearing of a portion of the left calcaneal tuberosity is evident (green arrow) – perhaps as a result of water damage. Not the result of purposeful human activity



Left and right calcanei (superior view)

2. 4th Cervical vertebra.
   - Wedge in the shape of an inverted isosceles triangle missing from portion of the vertebral body. Top side of triangle = 4.78 mm, left and right sides of the triangle each 7.16 mm
   - Site of possible projectile point wound



3 Broken sections of cranium.

- Large crack is extensive and runs horizontally from the sphenoid-parietal-temporal junction on through the occipital partially around the back of the cranium
- No radial fractures from a point of impact, or connecting fractures from radial fractures creating a “spider web” appearance
- No depression at the point of impact
- Edges of fractured bone white and dry indicating post-mortem fracture or excavation damage

4. Photograph of Burial 330 taken at time of excavation.
    - King (1969, 1982) claims this individual a victim of extreme violence
    - Distal portion of femora are broken, not cut. Breaks are similar to the ends of most of the bones excavated from this burial
    - There is evidence of post-mortem breakage and rodent gnawing
    - Burial hole appears to be too small to accommodate individual without wedging remains in the space
    - Upper body elements, particularly the right arm, appear undisturbed from time of initial flexed burial. Lower body elements are jumbled and disturbed
    - No evidence of cut marks or purposeful separation at any vertebral element
    - Post-mortem cranial fracture clearly evident
    - Burning noted by King not clearly evident
    - Projectile points noted by King are not evident

Burial 330 – King's Excavation Notes / Assessment – Evidence of Extreme Violence

Burial 330 is located in Unit 2N5 West Lobe toward the northwest end of the cemetery, buried deeply at 127 centimeters (~ 50 inches) from the surface and oriented West at 280°. King notes the excellent condition of the skeletal remains upon excavation which she attributed to the burial depth and the clean sand in which it was placed (King 1982:151). The individual was flexed and lying on the left side and determined by King to be male and approximately 25-35 years old. King (1982:151-152) states:

> There were two projectile points in the neck region and one in the upper back. A large distinctive crack on the right side of the head may have been the result of a blow, although there is no depression fracture. The body was cut in two at the waist (between the third and fourth lumbar vertebrae), the legs were removed above the knees, and the hands and feet cut off at the joints. The chest was opened and the ribs dislodged from articulated position. The body was burned enough to char where the bones were exposed by cuts – the ends of the femora, the cut vertebrae, and the ends of the ribs. Parts of the skull and iliac crest were also burned in places were the bone was near the surface of the skin.

The projectile points are identified by King as (2) dark chert Concave Base Type 3 projectile points, and (1) Concave Base Type 4. The tips of each were missing and the Type 4 was broken transversely prior to discovery (King 1982:151).

Burial 330 – My Re-analysis and Re-assessment

A photograph of the burial taken at the time of excavation shows an individual flexed and on the left side. The remains are in good condition and elemental placement is consistent with King's description. The distinctive crack noted by King on the right side of the skull is extensive and runs horizontally from the sphenoid-parietal-temporal junction on through the occipital partially around the back of the skull. The skeletal elements in this burial appear to be folded upon themselves in a very tight flex, with the skull cocked to the right side and slightly posteriorly so that it is almost touching the right scapula and the top of the right humeral head. This appears to be a placement made to facilitate accommodation in a small hole. No projectile points are evident in the photograph. Some burning is evident, although because the photograph is black and white, it is difficult to determine burned elements from earth-stained elements. However,

the distal end of the right clavicle clearly appears burned, as do unidentified elements in the photograph that have fallen into the thoracic cavity. The distal portion of the right femur and the distal portion of the right ulna appear to be broken off.

This individual is determined to be an adult male approximately 35-49 years old following Buikstra and Ubelaker (1994) using the Todd Pubic Symphysis Scoring System. Sex determination was made, again following Buikstra and Ubelaker's (1994) standards, utilizing comparisons of ten (10) dimorphic features of the skull and os coxae (Buikstra and Ubelaker 1994:16-20).

Dr. Elizabeth Miller and I reviewed the remains of Burial 330 to determine if Dr. King's assertions that this individual was a victim of violence consisting of severe head trauma, projectile point injury, mutilation, and dismemberment could be confirmed by the osteological evidence. The projectile points are missing from this collection and thus could not be reviewed. There is a lesion on the fourth cervical vertebra (C4) that could be the result of the projectile point impact noted by King in the neck region. There is lipping on the lumbar and thoracic vertebrae indicative of osteoarthritis. There are no depression fractures or radiating fractures from a blow or point of impact along the fracture line of the skull. There are no cut marks visible on the third and fourth lumbar vertebrae (L3 and L4) at the point of vertebral separation. The distal portions of the femora are not present but ends of the shafts are broken, not cut nor crushed. The distal portions of the right and left radii and ulnae are missing, but again, the ends of these shafts are broken, not cut or crushed. Although not noted by King, the right calcaneus presents with a portion that appears to be sheared away. The ribs are disarticulated but it is unclear what King means when she says "the chest was opened" (King 1982:151). Some of the rib shaft fragments are burned, as are a distal left tibial fragment, the proximal half of the left ulna, the left and right tali, calcanei, and cuboids.

BURIAL 336
Adult Male, Age-at-death 50 years or older
Skeletal Integrity: Incomplete
Preservation: Good

1. Right Femur – proximal end.
   - Raised ovoid lesion – possible osseous callous indicating healed injury? Other possibilities include a well-developed gluteal tuberosity or a third trochanter.
   - Postero-lateral side at level of the lesser trochanter (red arrows)
   - 18.43 mm long and 9.33 mm wide

BURIAL 346
Adult Female, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Good

1. Right rib fragment – mid-section 2nd rib.
   - Raised osseous callous indicated by red box in photo
   - Alignment of rib retained
   - Possible healed rib fracture or site of infection

BURIAL 350
Sub-Adult Male, Age-at-death 15-19 years old
Skeletal Integrity: Incomplete
Preservation: Fair

1. Two right ribs – ribs 3-10.
   - Osseous callous at the site of healed fracture, with deformation (red arrow, top photo)
   - Large osseous callous at the site of healed fracture (red box, bottom photo)

BURIAL 357
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

1. Left 3rd metatarsal.
   - Proximal end of metatarsal above the surface that articulates with the intermediate cuneiform presents with area of deformation and osseous callous (red arrow)
   - Deformation and callous indicative of healed fracture

BURIAL 375
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Very Poor

1. Multiple skeletal elements burned black and calcined.
    - King excavation notes identify this burial as a cremation

Examples of the multiple calcined elements of this burial

BURIAL 380
Adult Female, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Poor

1. Burned cranial fragments and charred post-cranial fragments.
   - Cranial fragments burned black in some areas, but not all the way through in others
   - The remains were located above Burial 267
   - Linda King categorized the burial as a partial cremation, stating that "Most of body [was] uncremated; much charcoal, ash; black carbonized net scattered and between legs at pelvis; charred bone fragments throughout" (King 1982:231)
   - The evidence is not conclusive as to the cause of the burned elements
   - Skeletal elements may have undergone cremation, partial cremation, or were burned after death as a result of other causes

Photos unavailable for this burial.

BURIAL 389a
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

1. Neurocranial fragments.
   - A number of unidentified neurocranial fragments observed
   - Evidence of burning to black
   - Other skeletal elements in this burial show no burning

BURIAL 397
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

1. Unidentifiable vertebral fragments that are burned black.
    - No other elements are burned nor show evidence of trauma
    - There is no other evidence that this individual was cremated after death
    - The excavation notes do not provide further information, as this burial number is unassigned by the archaeological team at the time of excavation
    - There is no evidence to suggest that these burned vertebral elements are the result of violent activity

Photograph unavailable for this burial

BURIAL 398a
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Poor

1. Right 5th metatarsal.
   - Small diagonal lesion located in the center of the diaphysis of the right 5th metatarsal (red arrow)
   - Linear lesion contains no striations indicative of tooth marks
   - Lesion is too wide for a blade or point to have made
   - Modification to bone occurred post-mortem, confirmed by white color
   - Lesion suggests possibility of trowel damage during excavation

BURIAL 407
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

1. Tibial shaft fragments burned black.
   - Siding for tibia cannot be determined from fragments present
   - Elements of the left tibia and fibula show partial and superficial burning
   - Some tibial shaft fragments burned black
   - At the time of excavation, burial characterized as a partial cremation and documented as such because of the presence of "fragments of burned femur, tibia, mandible, rib, etc." (King 1982:232)
   - There is no other evidence available to confirm whether this burial represents a cremation, partial cremation, or the natural occurrence of wildfire, but the most likely scenario is the latter

Photographs unavailable for this burial.

BURIAL 413
Adult Female, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Poor

1. Right talus with cut marks.
    - Color and condition of bone (pale and dry) suggest cuts occurred post-mortem
    - Depth and width suggest shovel damage during excavation
    - Excavation notes indicate this burial was "very disturbed" (King 1982:230)

Photograph unavailable for this burial

BURIAL 424
Adult Female, Age-at-death 35-49 years old
Skeletal Integrity: Incomplete
Preservation: Fair

1. All cranial bones in this burial.
   - Cranial fragments burned black
   - Other bones of the upper and lower limbs are also burned black, but not calcined
   - Remaining elements of this burial show no evidence of burning
   - Condition of the remains suggests partial cremation or extensive wildfire damage

BURIAL 428a
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

1. Cervical vertebral fragment.
    - Element is a C1 or atlas
    - Compression and deformation of the vertebral body
    - Osteophytic buildup on edge of superior surface of the vertebral body
    - Indicates compression fracture
    - Presence of extensive osteoarthritis of the cervical spine

BURIAL 445
Adult, Sex and Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Good

1. Complete adult left hand.
   - Hand located in a stone jar near the head of the individual buried at this site
   - The hand does not appear to belong to the adult that constitutes Burial 445. This is suggested by the presence of elements of both right and left hands outside of the jar
   - No pathological lesions are noted
   - No cut marks present on any of the carpal bones
   - It is not possible to confirm whether this hand is from a local individual, or a relative of the other individual in the same grave – tribe does not permit invasive testing

BURIAL 448
Adult Male, Age-at-death unknown
Skeletal Integrity: Incomplete
Preservation: Fair

1. Cervical vertebra.
   - Distortion and compression of vertebral body
   - Indicative of compression fracture
   - Uneven lower edge of vertebral body suggests presence of osteophytes associated with osteoarthritis of the cervical spine

Other Possible Victims of Violence – King's Excavation and Assessment

King notes that Burials 160, 412, and 413 could also be possible victims of violence because Burials 160 and 413 "had the tiny tips of Grimes Canyon fused shale points in their graves" (King 1982:152), and Burial 412 was found with "a large dark brown chert knife (10.5 cm long) rested on the pelvis under the right flexed leg and it may have caused the death (King 1982:152-153).

Following Buikstra and Ubelaker (1994), the ages of these individuals could only be determined to be Adult. However, sufficient information could be provided by utilizing Buikstra and Ubelaker's (1994) standard comparisons of ten (10) dimorphic features of the skull and os coxae (Buikstra and Ubelaker 1994:16-20) to determine that Burials 160 and 413 are females and Burial 412 is male.

King notes in the Appendix of her dissertation that Burial 412 had the "knife under ankle, not in body" and that Burial 413 was "very disturbed: reburial over primary" (King 1982:232, Appendix A), while Burial 160 contained a "point tip at chest; two points at bottom of grave" (King 1982:222, Appendix A). The descriptions of the position of the knife differ in these two accounts. No points or point tips are in the collection, nor are there any skeletal lesions associated with projectile points. I found no evidence that any of these individuals could be considered victims of violent encounters.

Appendix D – Details/Photography - Malibu Historic Cemetery Assemblage

CA-LAn Accession 572 – Malibu Historic

Review and Macroanalysis
Violent Pathology/Trauma
Phase 1

Burial #	Sex	Maturation	Age	Skeletal Portion	Element	Side	Description	Pathology/Trauma Noted
1	F	Adult	U	Neurocranium	Cranial Vault	U	fragments	(4) scorched; (13) black
1	F	Adult	U	Axial Skeleton	Sacrum	NA	almost complete	scorched
38	U	Adult	U	Neurocranium	Cranial Vault	U	(102) fragments	(14) calcined; (88) black
912	U	Adult	U	Lower Limb	Femur	U	(2) prox. fragments	calcined

Legend:

Burial Number: Assigned to each individual by Fowler for repatriation documents
Description: Description and location of pathological lesion
Pathology/Trauma: Assessment of pathology observed

Detailed information for each lesion identified in the table above is provided below. Burials are presented in numerical order for this cemetery sample.

BURIAL 1
Adult Female, Age-at-death undetermined
Skeletal Integrity: Incomplete
Preservation: Good

1. Burned skeletal elements.
   - Thirteen cranial fragments burned black, four scorched, and nine with no evidence of burning. Photo 1 shows examples of each condition. Red arrow indicates example of fragment burned black
   - Sacrum shows evidence of post-mortem scorching. Red arrow (Photo 2) indicates area of unburned dry bone
   - Left os coxae shows no evidence of burning despite proximity to sacrum (Photo 3)

Photo 1: Examples of cranial fragments

Photo 2: Sacrum in posterior view

Photo 3: Left os coxae, lateral view

BURIAL 38
Adult, Sex and Age-at-death undetermined
Skeletal Integrity: Incomplete
Preservation: Very Poor

1. Burned skeletal elements.
   - 88 cranial fragments burned black, 14 calcined
   - Other skeletal elements in this burial are not burned

BURIAL 912
Adult, Sex and Age-at-death undetermined
Skeletal Integrity: Incomplete
Preservation: Very Poor

1. Burned skeletal elements.
    - Fragments of femur calcined, unable to side bone
    - Cranial fragments calcined
    - Other elements associated with burial are not burned

Example of a calcined petrous fragment

Appendix E – Details - All Cemetery Samples Combined

1. Comparison of Individuals of Undetermined Sex and Age-at-Death

	Malibu Middle 5 My Sample	Mulholland My Sample	Medea Creek My Sample	Malibu Historic My Sample
N Total	92	39	524	93
N Sex Unknown	31	23	341	56
% Sex Unknown	33.7%	59.0%	65.1%	60.2%
N Age Unknown	47	22	473	75
% Age Unknown	51.1%	56.4%	90.3%	80.7%

2. Comparison of Those of Undetermined Sex from Samples from the Malibu Cemeteries: Two-tailed *t*-Test for Statistical Significance

	Malibu Middle Period 5 Cemetery vs. Malibu Historic Cemetery
***t*-stat**	3.611
df	183
p value	.0004

The difference between numbers of individuals whose sex is undetermined from samples taken from these two cemeteries is statistically significant at $p<.05$

3. Comparison of Those of Unknown Age-at-Death from Samples from the Malibu Cemeteries: Two-tailed *t*-Test for Statistical Significance

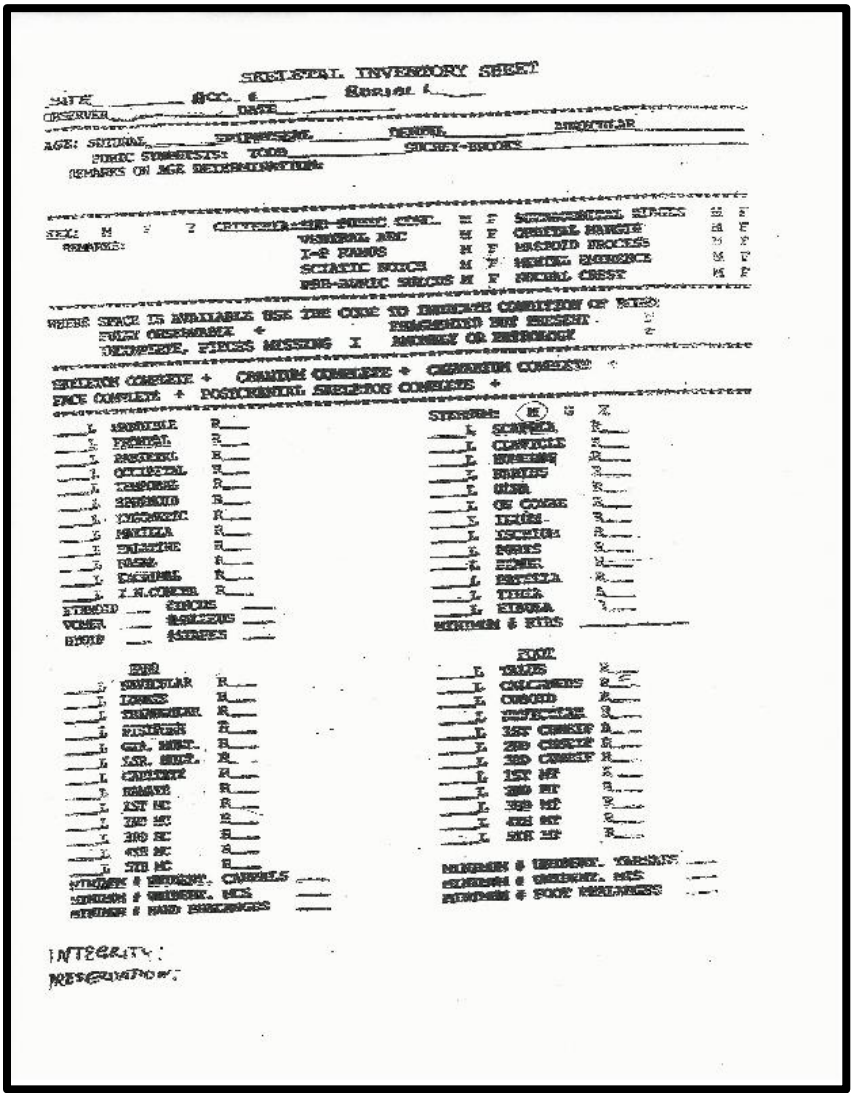
	Malibu Middle Period 5 Cemetery vs. Malibu Historic Cemetery
***t*-stat**	4.249
df	183
p value	.0000

The difference between numbers of individuals whose age-at-death cannot be estimated from samples taken from these two cemeteries is statistically significant at $p<.05$.

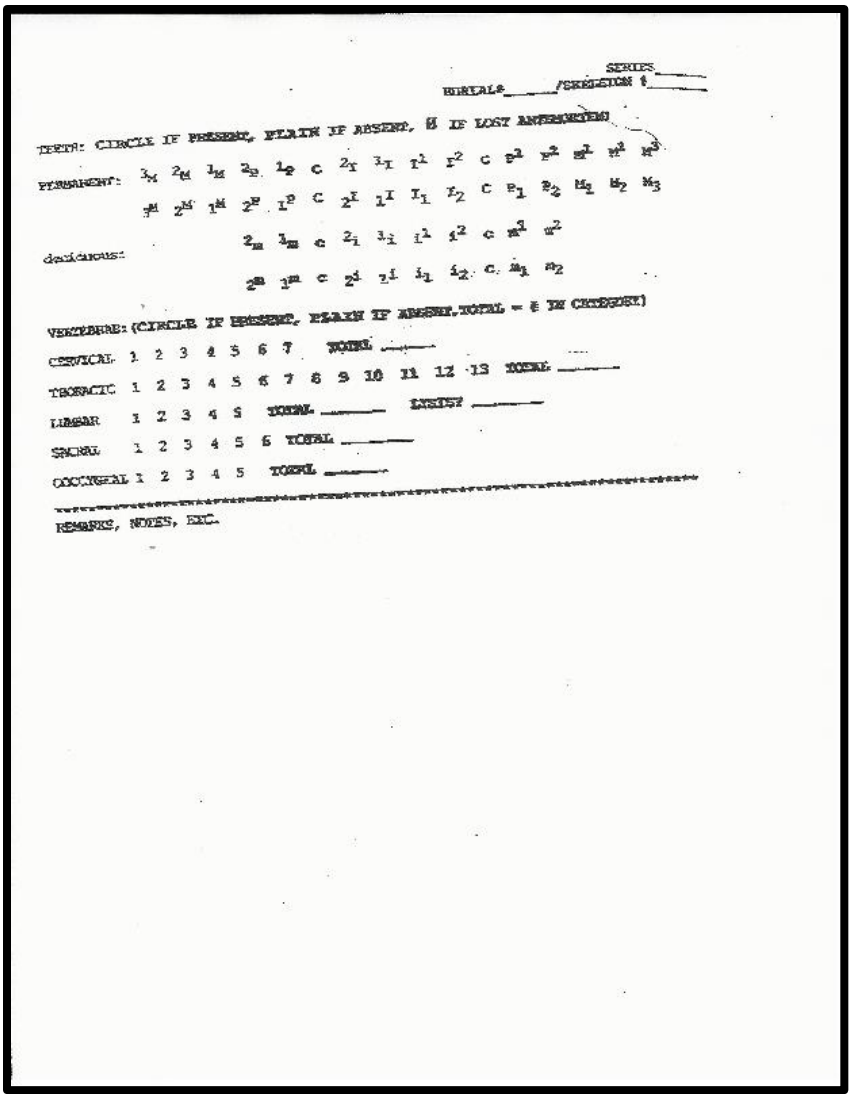
Appendix F – Example of Fowler Skeletal Information Sheet

Skeletal Information Sheets were developed by the osteology staff at the Fowler Museum to identify and catalogue each bone and fragment for each accession number in their collection. The sheets also provide room for extensive note taking on each element observed. These Skeletal Information Sheets have since been replaced by the more extensive and detailed Inventory Recording Forms developed by Buikstra and Ubelaker (1994), and presented as Attachments 1-29 in their work *Standards for Data Collection From Human Skeletal Remains, Arkansas Archaeological Survey Research Series #4.* I included both data sources developed for each burial in my research.

The two-page form below is a copy of a blank Skeletal Information Sheet for review. Examples of Attachments 1-29 can be found in Buikstra and Ubelaker's volume referenced above.


SKELETAL INVENTORY SHEET

Page 1 of Original Fowler Skeletal Information Sheet



SERIES _____

BURIAL# _____ /SKELETON # _____

TEETH: CIRCLE IF PRESENT, PLAIN IF ABSENT, Ø IF LOST ANTEMORTEM

PERMANENT: 3_M 2_M 1_M 2_P 1_P C 2_I 3_I 1^1 I^2 C P^1 P^2 M^1 M^2 M^3

3^M 2^M 1^M 2^P 1^P C 2^I 1^I I_1 I_2 C P_1 P_2 M_1 M_2 M_3

deciduous: 2_m 1_m c 2_i 1_i i^1 i^2 c m^1 m^2

2^m 1^m c 2^i 1^i i_1 i_2 c m_1 m_2

VERTEBRAE: (CIRCLE IF PRESENT, PLAIN IF ABSENT, TOTAL = # IN CATEGORY)

CERVICAL 1 2 3 4 5 6 7 TOTAL _____

THORACIC 1 2 3 4 5 6 7 8 9 10 11 12 13 TOTAL _____

LUMBAR 1 2 3 4 5 TOTAL _____ LUMBS? _____

SACRAL 1 2 3 4 5 6 TOTAL _____

COCCYGEAL 1 2 3 4 5 TOTAL _____

REMARKS, NOTES, ETC.

Page 2 of Original Fowler Skeletal Information Sheet