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The Miles Method and Averbuch: Implications for Paleodemography

Brannon I. Jones
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a thesis written by Brannon I. Jones entitled "The Miles Method and Averbuch: Implications for Paleodemography." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

Lyle Konigsberg, Major Professor

We have read this thesis and recommend its acceptance:

Andrew Kramer, Lee Meadows Jantz

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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__Anne Mayhew______________
Vice Chancellor and
Dean of Graduate Studies

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THE MILES METHOD AND AVERBUCH: IMPLICATIONS FOR PALEODEMOGRAPHY

A Thesis
Presented for the
Masters of Arts
Degree
The University of Tennessee, Knoxville

Brannon I. Jones
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ABSTRACT

The production of age-at-death distributions is an essential element in paleodemography. Such distributions rely on accurate aging techniques, and the most reliable of these use teeth. The Miles method is an aging technique that uses the molars from the juvenile portion of a skeletal assemblage to determine a tooth wear rate that may be projected into adults in order to determine adult age. This technique has been found to be fairly accurate in modern humans, fossil groups, and nonhumans.

Many authors have used the Miles method to create age-at-death distributions, and Caspari and Lee (2004) use their distributions to determine a ratio of old adults to young adults for four fossil hominid groups. These authors then interpret the increase in the ratios through time as an increase in human longevity with time. However, many authors have argued that skeletal assemblages do not represent the living population that produced them, and therefore studies such as Caspari and Lee's are flawed.

The purpose of this study is to calculate a similar old to young adult ratio for Averbuch, a Mississippian site in Tennessee. The juvenile teeth are aged and assigned wear scores, and the timing of transition from one wear stage to the next is determined using transition analysis. Adult ages are then calculated, allowing a ratio of old to young adults to be established. This ratio is then compared to the Caspari and Lee ratios, and the difficulties in assuming that age-at-death distributions are the same as living population structures are discussed.

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CHAPTER 1: INTRODUCTION

The production of age-at-death distributions is an essential element in paleodemography, and these distributions rely on accurate ageing techniques. The most reliable of techniques utilize teeth because of how well they preserve. While juvenile age may be determined by dental development, adult age is generally determined using tooth wear. The problem with most methods relying on tooth wear is that they require checking dental age against skeletal age and are therefore not useful in assemblages where skeletal age markers are missing.

The Miles method, developed in 1963 by A. E. W. Miles, relies on the juvenile portions of skeletal assemblages to develop a tooth wear rate that may be projected onto the adult portion of the population in order to determine age. In order for the method to produce results, it must be assumed that juvenile age may be determined directly from dental development and that the tooth wear rate of juveniles remains constant into adulthood provided diet remains the same.

The method has been tested by several authors on such diverse groups as past human populations (Nowell, 1978; Helm and Prydso, 1979; Lovevjoy, 1985), modern living humans (Keiser et al., 1983), and nonhumans (Bramblett, 1969). All of these authors have found the method to be fairly accurate at estimating adult age. Due to this accuracy, the Miles method has been employed by numerous other authors to develop age-at-death distributions for various populations. Paleoanthropology in particular has found the Miles method to be useful because of the abundance of teeth found in fossil samples. Nearly all fossil hominin groups have been analyzed using the Miles method, including australopithecines (Mann, 1975), Neandertals (Wolpoff, 1979), and members of the genus *Homo* (Bermúdez de Castro et al., 2004). Each of these authors states that the age-at-death distributions created by their analyses likely do not reflect the actual living population that created each skeletal assemblage because of preservation biases.

Unlike the previous authors, the final goal for Caspari and Lee (2004) is not the age-at-death distributions themselves, but the interpretations that can be made from them. Caspari and Lee (2004) use the Miles method to assign ages to four different populations: australopithecines, early *Homo*, Neandertals, and early modern humans. From these ages, the authors create a ratio of old adults to young adults, called the OYratio, for each population. The increase in ratios through time is interpreted by Caspari and Lee (2004) to represent an increase in human longevity through time. However, as many authors have pointed out, skeletal assemblages do not represent the living population that produced them, and therefore studies such as Caspari and Lee's are flawed.

In order to support the argument that the study by Caspari and Lee (2004) is inaccurate, this study will create an old adult to young adult ratio for the Averbuch site of Tennessee which can then be compared to the previously mentioned ratios. The juvenile teeth from the site were previously aged using the method from Moorreess, Fanning, and Hunt (1963b), and all of the teeth were previously assigned wear scores according to Smith (1984). This data is used in a program called NPHASES2 (Konigsberg, 2003) which uses transition analysis to determine the timing of transition from one wear score to the next. The number of years it takes for a tooth to reach a certain wear score may then be added to the age of eruption of that tooth in order to determine adult age. Once adult ages have been determined, a ratio of old adults to young adults may be calculated.

The OY ratio of the Averbuch site, a modern human population, is most similar to the OY ratio from Caspari and Lee's (2004) Neandertal population. If these authors are actually measuring longevity, then members of the same taxonomic should have similar OY ratios. Hawkes and O'Connell (2005), using life history variables, and Konigsberg and Herrmann (in press), using statistical arguments, have also shown that the conclusions drawn by Caspari and Lee (2004) are flawed.

Even though the conclusions of the 2004 study may not be accurate, this does not mean that the Miles method is inherently flawed. The method does have several benefits over other aging techniques, including the fact that it does not require a reference sample and may be applied to any skeletal assemblage with juvenile individuals. Overall, the Miles method is a useful in paleodemographic studies; however, as with any aging technique, research questions much still be framed around age-at-death distributions that do not represent the actual populations structure.

CHAPTER 2: LITERATURE REVIEW

The ability to age skeletal material is imperative for many types of research in biological anthropology. Forensic anthropology depends on the accuracy of a biological profile, including age, to identify the remains of individuals. Paleodemography demands an accurate age-at-death distribution of a skeletal sample before further analyses can be performed. Current paleodemographic research debates the accuracy of how well a skeletal assemblage represents the living population it comes from, and declarations such as the Rostock protocol that call for the entire age-at-death distribution of a skeletal assemblage prior to the aging of any individual (Hoppa and Vaupel, 2002) have made accurate ageing techniques that can be applied directly to an assemblage crucial to further research.

Determining the age of skeletal remains requires the assumption that osteological changes occur in an irreversible sequence (Boldsen et al., 2002). From birth until early adulthood, the changes that occur are due to the growth and development of the skeleton. Aging methods employed during development include measuring long bone length (Stewart, 1979), epiphyseal union (Buikstra and Ubelaker, 1994), and dental development and eruption. Once development is complete, skeletal materials begin to wear and degenerate. Cranial suture closure (Meindl and Lovejoy, 1985; Buikstra and Ubelaker, 1994), changes in the sternal end of ribs (Iscan et al., 1984 and 1985), the pubic symphyses (Todd, 1920; Brooks and Suchey, 1990) and the auricular surface (Lovejoy et al., 1985b) of the os coxae, and tooth wear are commonly used to age adult individuals. While all of these methods have their advantages, in an archaeological context it is beneficial to rely on aging methods employing the dentition because teeth preserve better than bone.

Numerous studies have examined both dental development to age children and dental attrition to age adults. One of the first comprehensive chronologies of tooth calcification is that by Schour and Massler (1941); however it is applicable only to white children. A similar calcification schedule for "non-white" populations has been compiled by Ubelaker (1989) based on 16 different studies by various authors. Neither one of these studies takes sex differences into account. Hunt and Gleiser (1955) make use of the schedule of calcification by Schour and Massler in order to determine the sex of preadolescent children. By comparing tooth development to skeletal development, the sex can be determined because the corresponding standards will agree for one sex and not the other. All of these schedules determine age by comparing the dentition to charts containing sequential pictures of the entire dentition.

Moorrees, Fanning, and Hunt (1963a and 1963b) have created maturity scales for the deciduous mandibular canine and molars as well as the permanent maxillary incisors and all eight permanent mandibular teeth. These scales are created by scoring each tooth by degree of crown or root development, and finding the percentage of children in a population at each age that have reached a certain stage. The percentages are converted into normal deviates and the ages are converted to logarithms of conception age which are then converted to chronological age with plus and minus one and two standard deviations. Boys and girls have separate maturity scales, and age is determined by averaging the ages given from different teeth. If sex is unknown, then the ages given for male and female on each tooth must also be averaged.

Another method of aging the dentition is to create an overall maturity score by quantifying and adding scores from each tooth. This method is used by Demirjian, Goldstein, and Tanner (1973) and is based on the Tanner et al. study (1962) in which each bone of the hand and wrist is given a developmental score, the scores are added together, and this total is converted into an age. Demirijian et al. (1973) give the seven left mandibular teeth a score based on the different stages of permanent tooth formation. These scores are added together and the total score is compared to a centile chart developed for the particular population being studied.

There are also multiple methods of aging the dentition from tooth wear. Attrition is important not only for aging, but also for determining the diet and food preparation methods of past populations (Smith, 1984; Hinton, 1984) and for understanding how the teeth were used as tools (Molnar, 1972). Many approaches have been taken to analyzing tooth wear. One of the simplest methods is to assign a score to each tooth based on the amount of wear (Molnar, 1972; Brothwell, 1981). These methods require checking dental age against skeletal markers for age, and wear scores are only applicable to populations with similar diet and lifestyle. Molleson and Cohen (1990) demonstrate how under-aging occurs when using dental attrition stages. By using mechanical abrasion to replicate the attrition stages defined by Brothwell (1981) they show that each stage does not represent equal amounts of wear, nor does each stage represent equal levels of attrition on different teeth. The longer duration of latter stages as compared to earlier stages also contributes to the under-aging of older individuals.

Other authors (Scott, 1979a; Dreier, 1994) have expanded upon this method by breaking the molars into four quadrants and scoring each one separately. Looking at quadrants separately allows variability in the data to be assessed and produces smaller confidence intervals for ages. Scott's method looks at not only the amount of dentine exposed, as Molnar (1971) does, but also the amount of remaining enamel because this is what determines the amount of functional life left in a tooth. Many other methods for aging the adult dentition from tooth wear also exist, including multiple regression analysis (Walker et al., 1991), molar crown height (Mays et al.. 1995), principal axis method (Benfer and Edwards, 1991; Scott, 1979b), and moire contourography (Mayhall and Kageyama, 1997).

Another popular method of aging from the dentition is known as the Miles method. This method, developed by A. E. W. Miles, uses the dentitions of immature individuals to determine a rate of wear that can then be projected into adulthood to estimate age (Miles, 1962, 1963, and 2001). Several assumptions must be made in order for the Miles method to work. First of all, it must be assumed that the actual age at death of juveniles may be determined from dental development in all populations including prehistoric ones. Secondly, the rate of wear found in juveniles must be assumed to remain constant into adulthood provided that diet remains the same. Tooth loss would, however, speed up wear in the remaining teeth. This second assumption makes since when given the fact that different diets cause different amounts and types of tooth wear. As Molnar explains, “differences in the abrasiveness of the various materials chewed – and also, perhaps, in the kind of chewing motion required to reduce these materials – should cause distinctive wear patterns to appear on the dental arches of different populations” (1972:514). If the diet of a population is dramatically different for juveniles and adults, then the tooth wear rate for juveniles and adults may be different.

With these assumptions in place, Miles describes his method using 190 individuals from an Anglo-Saxon burial site at Breedon-on-the-Hill in Leicestershire. Half of these individuals have complete or nearly complete dentitions, and 38 of these have immature dentitions. The ages of the juveniles are determined using Schour and Massler (1941) and Hunt and Gleiser (1955). This group is considered the "known age" group and consists of juveniles up to about the age of 18 years. Of the "known age" individuals, 32 have at least their first molar erupted, which occurs at the age of 6 years, and can be used to determine wear rate. These 32 individuals are then lined up in order of increasing wear on the molars, and the functional age of the first and second molars is observed. The functional age is the length of time that the tooth has been functioning in the mouth. Therefore, the first molar of an 18 year old will have a functional age of 12 years and the second molar will have a functional age of 6 years assuming that the first and second molars erupt at the ages of 6 and 12, respectively (Smith, 1991).

The next step in the Miles method is to select the skulls with only a small amount of wear on the third molars, making them not much older than the "known age" group. The functional age of the second and third molars in these skulls is compared to the first and second molars in the series of immature individuals, projecting the "known age" group forward another six years. This new group is known as the baseline group, and in Miles' original study consisted of 38 individuals aged 6 to 24 years. The functional age of the first molar is now represented up to 18 years, the second molar exhibits up to 12 years of functional age, and the third molar shows 6 years of functional wear. At this point, Miles points out that a gradient of wear exists between the three molars, meaning that the second and third molars wear at a slower rate than the first molar. He subjectively expresses the gradient as 6:6.5:7, meaning that the amount of wear that a first molar gets in 6 years is equal to what a second molar would get in 6.5 years and a third molar would get in 7 years. Therefore, 12 years of functional age on a first molar would equal 13 and 14 years of functional age for the second and third molars, respectively.

Using the baseline and the gradient of wear, the age can be assessed in older groups of individuals. Each time, a group of skulls that looks only slightly older than those already aged are compared to the baseline. Three age calculations are done: the third molar of the unknown is compared to the second molar of the baseline group, the third molar of the unknown is compared to the first molar of the baseline group, and the second molar of the unknown is compared to the first molar of the baseline group. These three ages are then averaged to arrive at an age for the unknown. By subsequently looking at older and older groups, the baseline is extended by about 6 years at a time. It should be noted that until the age of thirty, the unknowns are being compared directly to the baseline group, whereas after the age of thirty, the comparisons are done on groups progressively further and further from the baseline. This makes the system decrease in reliability with increasing age.

Miles (1963) is able to age 73 skulls in his series up to the age of about 45-50 years. After this, tooth loss due to extreme wear, abscesses, or disease make comparison difficult. It is possible to go back with individuals of varying ages with incomplete dentitions and compare them to the series in order to estimate an age. This leads to a total of 157 aged individuals based on tooth wear rates projected from childhood. In his 2001 study, Miles reassesses the older age categories, stating that attention should be paid to antemortem tooth loss and atrophy of the alveolar border, which may indicate an age much older than 50 years. He says that the same basic method should be followed, but that the upper end of the age scale can be extended and left open as opposed to capping it at a certain age.

The Miles method has been tested and used in a variety of studies. One of the first is by Nowell (1978). He uses the Tepe Hissar I-III dental sample from Iran dating to about 4000 B.C. The sample consists of 268 individuals, 139 of which have both upper and lower dentitions. Of these, 120 are adults and 19 are immature individuals. Nowell states that it is important to have at least 20 immature individuals between the age of 6 and 19 that can be aged from dental development alone. In his study he first assigns ages to the mandibles and the maxillae independently, then reassigns ages to 20 randomly selected maxillae and mandibles in order to check reliability in assigning ages. Additionally, all pubic bones that belong to those aged by the Miles method are assigned ages. No significant differences are found between mandibles and maxillae, between original age and reassigned age, or between dental age and pubic age. Although he points out that the comparison of dental and pubic age estimates are conservative because of the difficulty in positively assigning both as being from one individual, Nowell concludes that the Miles method is a valid method for aging skeletal populations.

Helm and Prydso (1979) use the Miles method to age Medieval Danes. They dismiss the *a priori* assumption that the first, second, and third molars erupt at 6, 12, and 18 years of age, respectively, saying that it may lead to erroneous ages if the chronology of tooth emergence is not the same for Medieval Danes as for present day people. Instead, they determine the age of dental development from the total number of erupted permanent teeth, regardless of type. The Miles method is used to determine rates of wear on the molars, but percentage frequency distributions are used to determine the age at which the stages of wear occur. Helm and Prydso claim that the upper limit on the "known age" group should be 11 years instead of 18 years because of the extreme variability of the third molar, and that the chronology of tooth emergence varies by population. However, they do state that age-at-death assessments using this method are accurate for the age range of 5-30 years, with decreasing accuracy to about the age of 40.

The Miles method has also been tested by Kieser, Preston, and Evans (1983) by comparing the determined age with the actual age of 202 living Lengua Indians from the Chaco area of Paraguay. The Lengua Indians show a high-attrition, low-caries rate, and their ages are known from community records. Kieser and colleagues compare the ages from both mandibular casts and maxillary casts to the known ages from the group, and find that the casts and actual ages have a high degree of equality. There is an increasing unreliability with age, but not so unreliable as to be statistically significant. The authors explain the value of this method over microscopic methods of aging lies in the fact that the Miles method is non-destructive.

Lovejoy (1985) also finds the Miles method to be fairly accurate at determining the ages of adult skeletal material. He uses the Libben site, an ancient Amerindian population consisting of 332 skulls, 132 of which are immature. Lovejoy compares the ages from the Miles method to four other age markers including the pubis, the auricular surface, cranial sutures, and radiography of the proximal femur. He finds that dental ages relate quite well to even the best of the other aging techniques, namely the pubic symphysis. In another study, Lovejoy et al. (1985a) use the same four indicators of age and compares them to dental wear. The sample in this study consists of 512 individuals from the Hamman-Todd Anatomy Department Collection whose ages are known. The authors state that the single best indicator for determining age is tooth wear because of the low level of bias and the fact that “age determination standards can be established from the population being analyzed and therefore require no external standards from any other population” (Lovejoy et al., 1985a:11). While subadults are generally used in the Miles method, the Hamman-Todd collection has no subadult individuals. Lovejoy and colleagues instead judge a wear rate from the adult sample only and still find the dental wear estimates to have high accuracy.

The Miles method has also been found to be useful in nonhumans. Tooth wear is a common method of aging animals, and has traditionally been done in cattle, sheep, goats, and pigs using stages defined by the pattern formed by dentine exposure (Payne, 1973; Grant, 1982). Bramblett (1969) uses the Miles method as one way to describe the level of maturation of dry skeletal material from Darajani baboons. Dental eruption, cranial suture closure, postcranial epiphyseal union, and body weight are also used in this study. Bramblett used the Miles method to arrange the skulls into a series with increasing functional ages on the molars. Using tooth development, the "known age" group consists of first molars with up to five functional years of wear and second molars with up to three and one-half functional years of wear. The functional age of molars in older individuals is determined by projecting wear from the "known age" group forward, just as in humans. Despite the fact that baboons have different wear patterns than humans, Bramblett shows that dental attrition is just as useful as cranial suture closure and epiphyseal union in aging mature baboons.

Since several authors have reported the Miles method to be an accurate aging technique, it has become widely used, particularly in paleoanthropology. Mann (1975) applies the method to South African Australopithecines, focusing on the functional age of teeth in order to age the specimens. He uses 6, 12, and 18 years as the ages of eruption for the first, second, and third molar, respectively. However, it may not be appropriate for him to assume a developmental pattern for australopithecines that is the same as modern humans. In order to determine actual ages for fossil groups, it is important to use developmental standards that are applicable to those groups. Smith (1986, 1994) looks at fossil groups including *A. afarensis*, *A. africanus*, *A. robustus*, *A. boisei*, *H. habilis* and early *H. erectus*. For each specimen, she plots the individual teeth on two separate charts, one showing human permanent dental development and one showing pongid permanent dental development. These charts show the ages at which the individual teeth go through crown formation, root formation and eruption for each species. By plotting the individual teeth from one specimen, it is possible to determine which schedule, either human or pongid, the specimen most closely resembles. The tighter age range that the teeth fall into, the more likely the fossil is to have developed on that schedule.

Using this technique for 21 fossil specimens, Smith (1986) shows that *A. afarensis*, *A. africanus*, and *H. habilis* develop in a manner similar to pongids, while *A. robustus* and *A. boisei* develop on a schedule somewhere between humans and pongids. Only one *Homo erectus* fossil is analyzed in this study, and the results are inconclusive. Smith's 1994 study looks at additional specimens using the same technique, which she calls "central tendency discrimination." The conclusions for this study agree with the 1986 study, but add that archaic *Homo sapiens*, including Neandertals, and *Homo erectus* seem to pattern closely with the human schedule of development. Using Smith's conclusions, the assumption used by Mann (1975) that South African australopithecines could be aged using modern human standards is incorrect.

Even though modern human developmental standards are applied to australopithecines by Mann, his methodology may still be recounted. Mann makes a few assumptions in addition to those stated by Miles (1963). First, because he is dealing with fragmented fossils, Mann has many individual teeth in his sample. He assumes that each of these isolated teeth at one time had an occlusal partner. Secondly, Mann assumes uniform wear in all of the australopithecine individuals even though the sample represents multiple sites. Mann also does away with the wear gradient that Miles (1963) describes, stating that "those molar teeth with the same functional age exhibited comparable wear, regardless of their position in the tooth row" (Mann, 1975:51). With these assumptions in place, the australopithecine samples are aged and grouped into five year intervals.

All fossil remains from Swartkrans, Kromdraai, Taung, Makapansgat, and Sterkfontein are aged with the Miles method. Mann ages each site separately and ages the maxillae and mandibles independently within each site. He explains that, especially in the Swartkrans sample with 156 aged fossils, some of the maxillae and mandibles are most likely from the same individual. While the total number of individuals in each five year age interval is probably inflated because individuals are represented more than once, Mann states that the relative percentage of individuals in each age category is a reasonable estimate.

Mann finds that the mean age at death at Swartkrans is 17.2 years, and the mean age of death at both Makapansgat and Sterkfontein is 22.2 years. While the difference in these two is not statistically significant, Mann points out that the higher mean age at death for Makapansgat and Sterkfontein may represent an adaptive trait of *Australopithecus africanus* over *Australopithecus robustus*, represented by the Swartkrans material. However, he also points out that the difference could also be due to preservation differences. Mann concludes that there is no way to determine if the skeletal sample is representative of the actual australopithecine population it represents, and it does not seem to be completely accurate since there are no fossils under two years of age. Therefore he stresses that the age distribution represents the skeletal sample and not the living population. Additionally, Mann concludes that another weakness of the study is that there are very few skeletal elements that can be used to age individuals in order to bolster the dental ages. This, combined with the fact that some individuals are aged solely on the functional age of an isolated tooth, calls the accuracy of the age structure into question.

Even though Mann concludes that the Miles method alone may not provide the most accurate aging technique in fossil remains, it is perhaps still the best method for the fragmentary material available in fossil assemblages. Wolpoff (1979), following Mann (1975), also uses the Miles method to determine the age structure of the Krapina dental remains. The site, located in Krapina, Croatia, is a rock shelter from which 281 Neandertal teeth and tooth fragments are known. 90 of these teeth are still in jaws and 191 are isolated. Wolpoff estimates the number of individuals represented at the site to be between 75 and 82.

Before aging the Krapina dental remains, Wolpoff (1979) points out potential sources of error. He explains that while individual ages may have a significant amount of error due to eruption variation within a population, the age distribution data should be more accurate since just as many individuals will be overaged as underaged (Wolpoff, 1979:76). Another potential source of error is whether the wear pattern is uniform within the population, a problem that determines how well individual teeth may be compared to partial or complete dentitions in order to be aged. Wear patterns within a population are fairly consistent, but between-population variation "can be extreme" (Wolpoff, 1979:74). Such variation poses a potential problem since fossil assemblages likely represent multiple populations. However, this does not seem to be a problem in the Krapina sample, as Wolpoff shows that the pattern of wear seems uniform in the complete dentitions (Wolpoff, 1979:76). Trinkaus (1995) also recognizes the similarity in wear patterns across a sample of Neandertals that includes 206 individuals from 77 sites. The pattern is so uniform that Trinkaus develops "an approximate non-linear scale of Neandertal dental attrition through the adult decades" (Trinkaus, 1995:125). Due to this uniformity, Wolpoff determines the Miles method to be an accurate aging technique for the Krapina sample.

In aging the Neandertal dentitions, Wolpoff begins by assuming molar eruption ages of 6, 12, and 18 years, for the first, second, and third molar, respectively. He soon comes to realize that the third molar consistently gives ages of two to three years older than the first and second molars, and based on this observation, he concludes that the third molar more likely has an eruption age of 15 years in the Krapina sample (Wolpoff, 1979:79). Using this new data, Wolpoff completes his age distribution using the Miles method. No individuals are represented under three years of age, and the oldest individual is 27 years old. He compares this to the Libben site (Lovejoy, 1985) where 35% of the sample survived to age 30, and, after calculating the birth rate necessary to maintain a population with this age-at-death distribution, concludes that the Krapina remains do not represent a living population.

A similar situation is found in the Sima de los Huesos hominin assemblage from the Atapuerca site in Spain (Bermúdez de Castro et al., 2004). Of the more than 4,000 fossils that have been excavated from this site, there are 479 teeth, 109 of which are in alveoli and 370 of which are isolated. The authors of this study estimate an MNI of 28 and argue that these individuals represent members of the species *Homo heidelbergensis*. They also explain that data from the site suggests a dental development and eruption schedule similar to modern humans except in regards to M3. For this tooth, eruption seems to occur at about the age of 15, the same age that Wolpoff (1979) estimates. Therefore, modern human standards of dental development, with the exception of M3, are used to age the juvenile individuals.

Using the Miles method, Bermúdez de Castro and colleagues determine rates of tooth wear for the canines, premolars, and molars of juvenile individuals present in the sample and apply these rates to the adults to arrive at an age. They believe the system to be reliable for adults under 30 years of age with decreasing accuracy with increasing age. In order to make the system more reliable up to the age of 35 years, the authors also determine the tooth-wear rate of lower juvenile incisors. After determining ages, the age-at-death distribution is analyzed. It shows only 2.8% of deaths under the age of 10, 64.3% of deaths between the age of 10 and 20, 22.2% of deaths between the ages of 20 and 35, and only 10.7% of deaths over the age of 35. Because of the low number of child remains and the high number of young adult remains, this age-at-death distribution does not represent a normal attritional profile (Bermúdez de Castro et al., 2004:36).

As with the Krapina remains (Wolpoff, 1979), the accumulation of Sima de los Huesos remains from Atapuerca may be due to catastrophe. Bocquet-Appel and Arsuaga (1999) analyze the data from both sites in order to determine what could have caused these age distributions. The authors point out that the Miles method, unlike other aging methods, does not depend upon a reference sample and therefore creates its own calibration. Additionally, they state that the method appears to be "reasonably accurate" for juveniles and young adults (Bocquet-Appel and Arsuaga, 1999:329). The age-at-death distributions for Krapina and Atapuerca are statistically compared to other demographic distributions from populations with no access to immunization programs, and they are found to be significantly different. Therefore, it is accepted that these distributions represent some sort of catastrophe. The samples are then compared with the expected age-at-death distributions for two types of catastrophes, shortage and epidemic, and neither one fits. It is therefore unclear exactly what may have caused these accumulations, but Bermúdez de Castro and colleagues (2004) state that the presence of a handaxe with the Atapuerca remains makes a natural catastrophe without human intervention unlikely.

In questioning why the two types of catastrophic profiles do not match the Krapina or Atapuerca profiles, Boucquet-Appel and Arsuaga (1999) suggest a reevaluation of the Miles method. They claim that the Keiser et al. (1983) study that looks at living Lengua Indians lacks clear descriptions and should include individuals older than the 56 year upper age limit. Bocquet-Appel and Arsuaga (1999) believe that the relationship between dental wear rate and chronological age may be curvilinear instead of the assumed linear relationship. If so, then older age groups, such as 40-60 year olds, would have tooth wear not much greater than young age groups, such as 25-40 year olds. Although such a relationship may hold true, the authors conclude that recalibrating the Krapina and Atapuerca samples may not greatly increase the number of individuals over 40 years.

Caspari and Lee (2004) take their analysis one step further than simply producing age-at-death distributions like the previous studies. They use the Miles method to age four groups of individuals: late australopithecines, Early and Middle Pleistocene *Homo*, Neandertals from Europe and Western Asia, and post-Neandertal Early Upper Paleolithic Europeans. The authors are testing whether these different groups show different patterns of longevity, and specifically, when in human evolution it became common for more individuals to reach older adulthood. They test this by determining the ratio in each group of older individuals (over 30 years) to younger individuals (between 15 and 30 years), giving what they call an OY (Old to Young) ratio. The age limits come from two ideas: first, that M3 erupts at the age of 15 years and is "representative of dental and reproductive maturation in fossil and some recent humans" (Caspari and Lee, 2004:10896); and second, that 30 years, being twice the reproductive age, is the age at which an individual could theoretically become a grandparent.

Caspari and Lee state that because their groups are categorical (old or young), a high level of resolution in aging is not necessary. Due to the fact that the Miles method has been tested and found to be reliable to at least the age of 30, and because the data are categorical, the authors believe that much of the inaccuracy in dental aging is avoided in their method. Caspari and Lee perform wear-based seriation on the four groups separately using a modern human eruption schedule except for the M3 eruption age at 15 years. They do point out that there is some debate about the applicability of a modern schedule to old groups, particularly australopithecines and early *Homo*, a debate also mentioned in the previous discussion of Mann (1975). However, the authors claim that their categorical data circumvents this problem because "the categories are independent of actual ages as long as hominid dental development is tied to physiological development, as it is in other primates" (Caspari and Lee, 2004:10896).

After classifying all of the fossil remains as either old or young, the OY ratios of the above groups are calculated and reported to be: australopithecines, 0.12; early *Homo*, 0.25; Neandertals, 0.39; and Early Upper Paleolithic Europeans, 2.08. The authors also test the null hypothesis of no difference in longevity between each group and find that the differences among all four groups are significant at the $P = 0.05$ level, refuting the null hypothesis (Caspari and Lee, 2004:10897). They believe that the data reflect changes in young adult mortality through time and not the effect of taphonomic forces on fossil remains. Caspari and Lee conclude that while longevity increases over the course of human evolution, it greatly increases for Early Upper Paleolithic Europeans. Additionally, the increase in longevity for early *Homo* over australopithecines is seen as support for the grandmother hypothesis (O'Connell et al., 1999), and the dramatic increase for early modern humans is proposed to be the biological underpinning of modern behavioral innovations.

Many other studies use the Miles method as a valid way to age adult skeletal remains, and in many cases it is the only method used to age the adult material. Using the dental wear rate calibrated from the juvenile part of an assemblage has been used in studies looking at such things as tuberculosis in Medieval skeletons (Mays et al., 2001), weaning age in a Medieval assemblage (Richards et al., 2002), the health status of 20th century South Africans (Steyn et al., 2002), the age of remains from Gough's Cave 1 (Trinkaus et al., 2003), and Neanderthal remains in Greece (Harvati et al., 2003).

The Miles method is useful in a variety of groups, including ancient, historic, and modern human groups, as well as nonhumans. However, just because the Miles method is useful in determining the age structure of a skeletal assemblage does not mean that the age structure is representative of the living population from which the assemblage derives. This is one of the primary problems in paleodemography. In this study, the Miles method will be used to age individuals from the Averbuch site, a Mississippian site located in central Tennessee. The ages of the adults in the Averbuch assemblage will then be used to calculate an OY ratio that may be compared to the Caspari and Lee (2004) groups. The problems with assuming that this ratio is equivalent to longevity will be discussed, along with other debates in paleodemography.

CHAPTER 3: MATERIALS AND METHODS

The Averbuch site (40DV60) is a late Mississippian site located in Davidson County, Tennessee, about nine kilometers northwest of Nashville. The site was occupied sometime between the thirteenth and fifteenth centuries A.D., probably for a duration of about 15 to 25 years based on wood analysis and the thinness and incomplete distribution of the midden. There are three cemeteries located around the village, and grave construction in all three consists of stone boxes, most of which are made of limestone. Excavation of the cemeteries took place during 1977 and 1978, and a total of 887 individuals were recovered. It is estimated that approximately 409 other individuals were not recovered due to either destruction or lack of time (Berryman, 1984).

Of the 887 excavated skeletons, only 761 had teeth and were used in this analysis. Of the 761 individuals, 254 were juveniles and were aged by Parvene Hamzavi and Samantha Hens using the dental development method from Moorrees, Fanning, and Hunt (1963b, see Table 1, Figure 1, and Figure 2). For single rooted teeth (incisors and canines), the initial cusp formation stage was dropped because it cannot be evaluated in skeletal remains. This leaves 12 stages of tooth development. For multiple rooted teeth (premolars and molars), the same initial cusp formation stage was dropped as well as the initial cleft formation stage. Not only is the latter stage hard to differentiate from the initial root formation stage, but by dropping the initial cleft formation stage, only 12 stages remain. Therefore, scoring for all teeth has the same number of stages and is consistent.

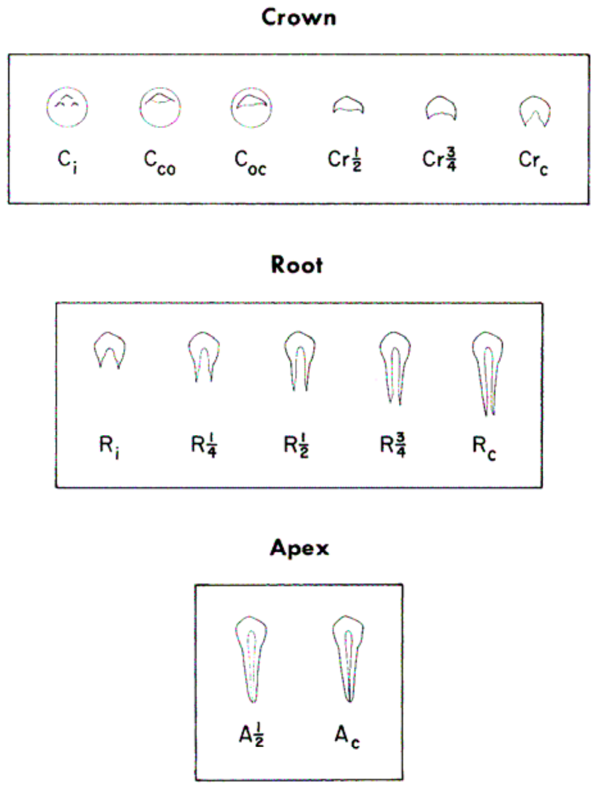

Figure 1 – Dental development of single rooted teeth, from Moorrees, Fanning, and Hunt (1963b).

Table 1 – Codes for Dental Development Stages

STAGE	SYMBOL
Initial Cusp Formation	C_i
Coalescence of Cusps	C_{CO}
Cusp Outline Complete	C_{OC}
Crown ½ Complete	$Cr._{1/2}$
Crown ¾ Complete	$Cr._{3/4}$
Crown Complete	$Cr._C$
Initial Root Formation	R_i
Initial Cleft Formation	$Cl._i$
Root Length ¼	$R_{1/4}$
Rooth Length ½	$R_{1/2}$
Root Length ¾	$R_{3/4}$
Root Length Complete	R_C
Apex ½ Closed	$A_{1/2}$
Apical Closure Complete	A_C

From Moorrees et al. (1963b)

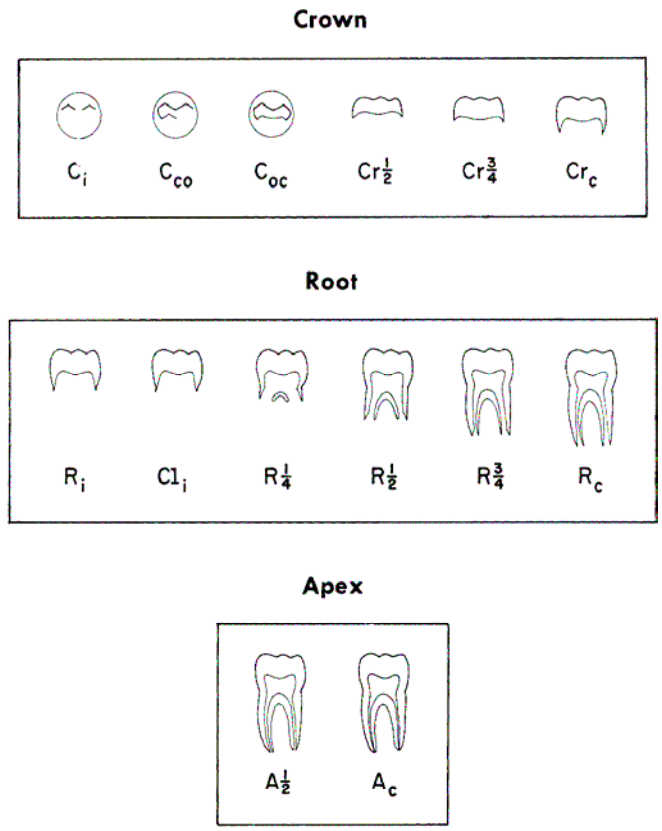

Figure 2 – Dental development of multiple rooted teeth, from Moorrees, Fanning, and Hunt (1963b).

For each individual, all eight teeth (first incisor, second incisor, canine, first premolar, second premolar, first molar, second molar, and third molar) were scored based on the degree of tooth completion using Moorrees et al. (1963b). In the complete dentition, each of the eight tooth types is represented by four teeth, with one in each quadrant. However, only one of each tooth type was scored. Mandibular teeth were preferred over maxillary teeth due to the fact that the study by Moorrees et al. (1963b) used only mandibular teeth. The right tooth versus the left tooth was randomly selected if both sides were available. A score of zero means that the tooth could not be scored (i.e. missing, broken, etc.). Because the sexes of the Averbuch adolescents are unknown, the scales for chronological age for males and females were averaged. While averaging the age scales introduces considerable error when aging individuals, the error is diminished in sample statistics because roughly the same number of individuals will be overaged as underaged (Wolpoff, 1979:73).

All 761 individuals were assigned tooth wear scores by Parvene Hamzavi and Samantha Hens based on Smith (1984, see Figure 3 and Table 2). As with dental development, one tooth of each of the eight tooth types was scored using the same tooth selection procedure described above. Smith explains that this system of scoring has a replicability of 90% in molars and 85% for the simpler teeth, and errors of more than one stage are rare. Additionally, the molar wear scale "seems to be applicable to a wide variety of human groups, pongids, and even to omnivorous fossil mammals" (Smith, 1984:44).

Attention now turned back to the adolescents in order to determine functional ages of the teeth. At this point, the focus was on each tooth, not each individual. In

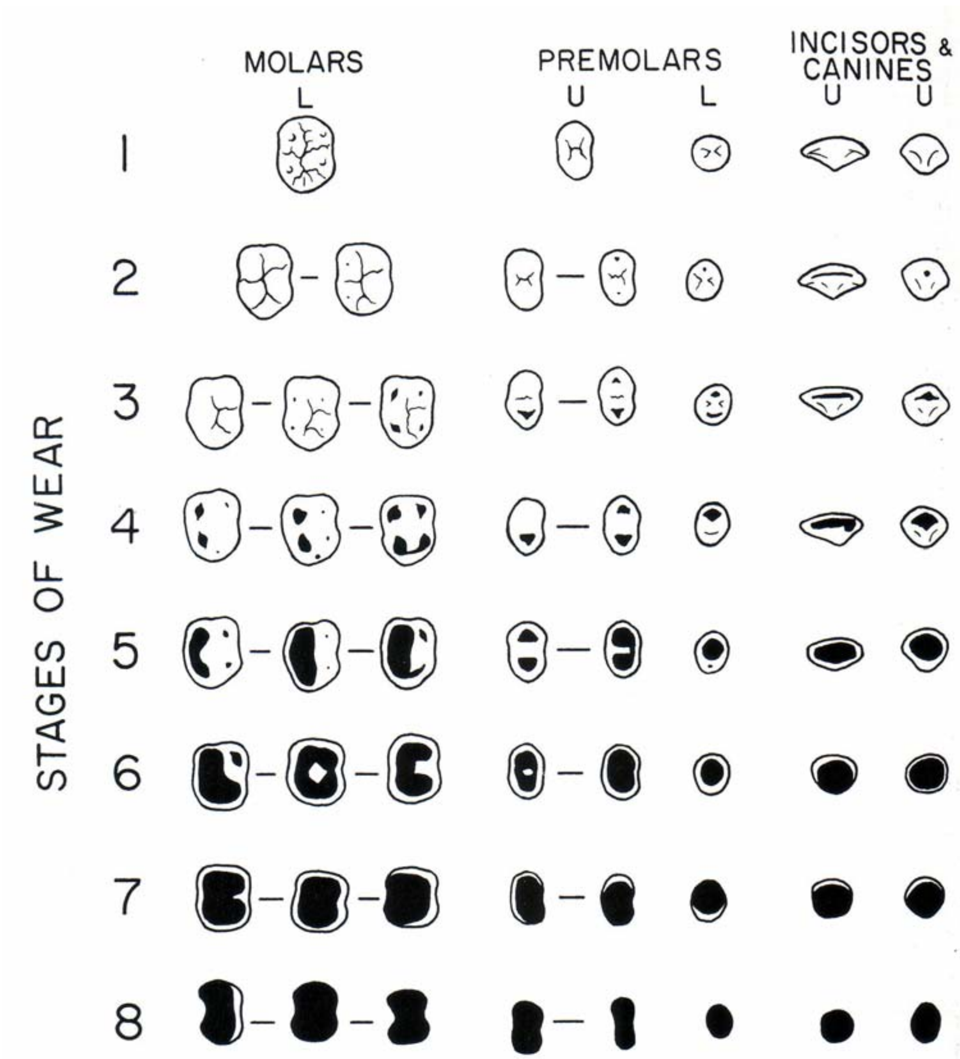

Figure 3 – Wear Stages, from B. Holly Smith (1984).

Table 2 – Description of Wear Stages

Wear Stage	Molars	Premolars	Incisors and canines
0.	Missing or can't be coded	Missing or can't be coded	Missing or can't be coded
1.	Unworn to polished or small facets	Unworn to polished or small facets	Unworn to polished or small facets
2.	Moderate cusp removal (blunting).	Moderate cusp removal (blunting).	Point of hairline of dentin exposure
3.	Full cusp removal and/or some dentin exposure, pinpoint to moderate	Full cusp removal and/or moderate dentin patches	Dentin line of distinct thickness
4.	Several large dentin exposures, still discrete	At least one large dentin exposure on one cusp	Moderate dentin exposure no longer resembling a line
5.	Two dentinal areas coalesced	Two large dentin areas (may be slight coalescence)	Large dentin area with enamel rim complete
6.	Three dentinal areas coalesced with enamel island	Dentinal areas coalesced, enamel rim still complete	Large dentin area with enamel rim lost on one side or very thin enamel only
7.	Dentin exposed on entire surface, enamel rim largely intact	Full dentin exposure, loss of rim on at least one side	Enamel rim lost on two sides or small remnants of enamel remain
8.	Severe loss of crown height, breakdown of enamel rim; crown surface takes on shape of roots	Severe loss of crown height; crown surface takes on shape of roots	Complete loss of crown, no enamel remaining; crown surface takes on shape of roots

Descriptions are from B. Holly Smith (1984).

order to determine the functional age of each tooth, the assumed eruption age of the tooth was subtracted from the dental age of the individual. The assumed eruption ages for each tooth come from Smith (1991) and are as follows: first incisor - 6.5 years; second incisor - 7.75 years; canine - 10.25 years; first premolar - 10.5 years; second premolar – 11.25 years; first molar - 6 years; second molar - 12 years; and third molar - 18 years. For example, the dental age of individual 21A was determined to be 13.69 years from Moorrees et al. (1963b), and the second molar is assumed to have an average eruption age of 12 years. Therefore, the functional age of M2 in individual 21A is 1.69 years. Similarly, the functional ages of the canine, the first premolar, the second premolar, and the first molar are 3.44 years, 3.19 years, 2.44 years, and 7.69 years, respectively.

At this stage, there were 361 teeth with functional ages. An individual may be represented here multiple times since the focus is on each tooth, not each person. Individual 21A is represented four times because there were four teeth that had erupted. The functional ages of each tooth were paired with the wear scores for that tooth. When an individual had more than one tooth for a tooth type (such as two first molars), the one with the higher wear score (if there were different scores) was selected for the data set. While there are many more than 361 teeth present in the 254 juveniles, these are only the teeth that have erupted. Therefore, no teeth are present in this set that do not also have wear scores.

In a few instances, a negative functional age was calculated for a tooth. In individual 143, for example, a third molar with a wear score of 1 is present. The dental age (17.59) minus the assumed eruption age (18 years) gives a functional age of -0.41 years. A negative functional age was calculated for 39 of the 361 teeth. These teeth were dropped from the data set, leaving 322 teeth with wear scores. Of these 322, only five teeth had a wear score higher than 3. For simplification, these five teeth were reclassified with wear scores of 3.

The data set consisting of the functional ages and wear scores for 322 juvenile teeth is now ready for transition analysis. Transition analysis is used to determine the timing of transition from one stage to the next, in this case from a wear score of one to a wear score of two, or from a wear score of two to a wear score of three. It must be assumed that the sequence of stages is invariable, and in this situation, wear scores always progress from one to two to three and so on. If there are only two stages for a given trait, then "the probability that a skeleton is in stage 1 (as opposed to stage 0) is a binomial random variable whose parameter is assumed to be a function of age" (Boldsen et al., 2002:82). However, in this case, there are more than two stages, so each transition is considered a "binomial contrast" between those individuals who have made the transition to the next stage and those who have not (Boldsen et al., 2002:82). This model, known as the proportional odds model, creates slopes that are the same for all transitions, but intercepts that vary by stage. Therefore, the age at which transitions from one stage to the next occurs increase with each stage, yet the standard deviation for each transition remains constant (Boldsen et al., 2002:83).

The fact that the age of transition increases for each subsequent stage is logical since stage order is invariable. However, it is unfortunate that the standard deviations for each stage remain constant even though this does not make sense biologically. Boldsen and colleagues explain that senescent changes are more variable in their timing than developmental changes in the skeleton, so standard deviations for the average age at a transition should increase with each stage. They offer an alternative model, known as the continuation ratio model, which calculates different standard deviations for each stage. This is done by contrasting the individuals in the first stage against those in stage two or higher, then contrasting the individuals in stage two against those in stage three or higher, and so on (Boldsen et al., 2002:83).

Alternatively, a program called "NPHASES2" (Kongisberg, 2003) was used because it also performs a separate standard deviation model. However, it looks at the data in a slightly different manner. Instead of looking at stage one versus all higher stages (as in the continuation ratio model), it simply looks at stage one versus stage two, then stage two versus stage three, and so on. Since the data used here only have three stages, the NPHASES2 model is easy to use.

The data set consisting of the 322 juvenile teeth with functional ages and wear scores was used as input into NPHASES2, and the model was fit with option "s", or the separate standard deviation model. The model will determine the average number of functional years it takes for a tooth to transition from a wear score of one to a wear score of two, and from a wear score of two to a wear score of three. The number of functional years may then be added to the eruption age of the tooth to determine how old the individual is. As in the Miles method, this model is using only the juvenile teeth to estimate the average age of transition from stage to stage. Therefore, the number of functional years it takes to progress past a stage three cannot be calculated in this model.

Once the ages of the adults in the sample have been determined, a ratio of old adults to young adults will be calculated. Young adults are defined as individuals 15-29 years and old adults are 30 years and older. This ratio may then be used as a comparison against other skeletal assemblages.

CHAPTER 4: RESULTS

The ages at which transition from a wear score of one to a wear score of two and a wear score of two to a wear score of three occur were calculated using NPHASES2 (Konigsberg, 2003) with a separate standard deviation model. The results from the program may be seen in Table 3.

The left column of numbers contains the estimated means and standard deviations for ages-to-transitions, and the right column of numbers is the standard errors of these estimates. Therefore, the age at which the transition occurs from a wear score of one to a wear score of two is 4.36 years with a standard deviation of 3.91 years, and the age at which the transition occurs from a wear score of two to a wear score of three is 12.02 years with a standard deviation of 4.03 years.

It must be remembered that these ages represent functional ages of the tooth, so they must be added to the age at which the tooth erupted in order to determine the age of the individual. For example, the age at which a first molar transitions from a wear score of one to a wear score of two is 6 years (the age of eruption) plus 4.36 years (from NPHASES2), or 10.36 years plus or minus 3.91 years. A first molar transitions from a wear score of two to a wear score of three at an age of 18.02 years plus or minus 4.03 years. Similarly, a second molar transitions from a wear score of one to a wear score of two at 16.36 years plus or minus 3.91 years and from a wear score of two to a wear score of three at 24.02 years plus or minus 4.03 years. A third molar goes through the first transition at an age of 22.36 years plus or minus 3.91 years and through the second transition at 30.02 years plus or minus 4.03 years.

Table 3 - Wear Score Transition Ages

TRANSITION	ESTIMATE	STANDARD ERROR
MEAN 1→ 2	4.36 years	0.32
S.D. 1 → 2	3.91 years	0.44
MEAN 2 → 3	12.02 years	0.73
S. D. 2 → 3	4.03 years	0.62

The ages for transition were used to determine the age of the adults in the Averbuch sample. In order to determine the OY ratio for the Averbuch site, the adults were given an age of 15 (representing individuals between the ages of 15 and 29) or 30 (representing individuals 30 or older). The third molar was used exclusively to age the adults because it easily partitioned into the two age categories. Neither the first nor second molar had wear scores high enough in the juvenile set to age the adults into the old adult category. Individuals with a wear score of 1 or 2 on the third molar were placed in the age category of 15, and those with a wear score of 3 or higher were placed in the age category of 30. Of the 761 individuals in the sample, 165 were not aged with this system because they were missing all four third molars. Out of the remaining 596 individuals, 225 represent children under the age of 15 who were aged using Moorrees, Fanning, and Hunt (1963b). Of the adults, 246 represent those 15-29 years old and 125 represent those 30 years and older. The majority of the 15-29 year-olds and all of the 30 years and older were aged using the Miles method through transition analysis. There were a few individuals in the 15-29 age category (individuals 444 through 472 in Appendix 1) who were aged using Moorrees et al. (1963b). Using this information, the old to young ratio for the Averbuch site is 125/246, or 0.51. (see Appendix 1.)

CHAPTER 5: DISCUSSION AND CONCLUSION

What does an OY ratio of 0.51 mean? According to Caspari and Lee (2004), it reflects that fact that only 33.8% of the adults in the Averbuch population that survived to age 15 also survived to age 30. This percentage comes from the proportion of old individuals to the total number of individuals in the population, or the OY ratio divided by 1 plus the OY ratio. The percentage of each population that survived to age 15 and also to age 30 may be calculated the same way for each of the four groups examined by Caspari and Lee in their 2004 paper. For australopithecines, an OY ratio of 0.12 means that only 10.7% of adults that survived to age 15 also survived to age 30. Recalling the remaining groups (early *Homo*, Neandertals, and early modern humans) and their respective OY ratios (0.25, 0.39, and 2.08), the percentage of individuals that survived to age 15 and also age 30 are as follows: 20% of the early *Homo* population, 28.1% of the Neandertal population, and 67.5% of the early modern human population. It is clear that the Averbuch site has an OY ratio and a percentage closest to the Neandertals of the Caspari and Lee (2004) study. However, Averbuch represents a population that lived between 600-800 years ago, clearly within the limits of modern humans. Why, then, does the method employed by Caspari and Lee (2004) make the Averbuch longevity look like that of Neandertals?

According to Hawkes and O'Connell (2005), it is because what Caspari and Lee are calculating in their study is not a measure of longevity for each group, but "biases in the ages at death represented in the assemblages" (Hawkes and O'Connell, 2005:650). These authors support their claim by looking at various life history measurements across several primate species.

Life history studies include such things as age at maturity, average age at death, gestation length, interbirth interval, estrous cycle length, average birth weight, and average adult body size. The relative ages, sizes, and lengths of time that a species devotes to the various aspects of life vary widely because of the different demands that organisms face. Smith (1992) explains that there are several ways in which the variables within a species' life history may relate to one another. No relation exists if the timing of one event tells nothing about the timing of another event, or if there is a slope of zero when the variables are plotted against each other. For example, astronomical cycles, such as circadian rhythms and estrous cycles, are not related to other variables of life history. A second type of relation, isochrony, exists when two variables are directly related and have a slope of one when plotted. An example of this is the relationship between age at weaning and the eruption of the first molar. The third type of relation is known as allochrony and exists when the slope between two variables is somewhere between zero and one. Variables such as gestation length, interbirth interval, and age of maturity all have an allochronic relationship to the eruption of the first molar. The differences in types of variable relationships explain why it cannot be assumed that all animals spend the same amount of time on each part of their lives (Smith, 1992).

In his book entitled *Life History Invariants*, Charnov (1993) uses the relationships within life histories across species to show that there are broad patterns that are followed in nature. For example, Charnov plots the age at first reproduction (α) against the average adult life span (1/M) for both birds and mammals. The estimated slope (the variable he calls $(\alpha M)^{-1}$) is 2.47 for birds and 1.42 for mammals. Therefore, when the age at maturity is held constant, birds have average adult life spans almost double that of mammals (Charnov, 1993:12). Charnov explains that when δ (relative size at maturity) and C (relative units of parental growth) are constant, the dimensionless variable $(\alpha M)^{-1}$ is invariant within a group. This holds true for primates, meaning that all primate species have a similar ratio of average adult life span to age at maturity.

Hawkes and O'Connell (2005) exploit this fact in their study and show that the ratio of average adult life span to age at maturity is the same as the OY ratio. They state that the OY ratios calculated by Caspari and Lee (2004) should be relatively equal across species even with differences in longevity (2005:651). The authors of the study demonstrate their point by comparing the OY ratios for Japanese macaques, chimpanzees, and modern human hunter-gatherers. The average age of M3 eruption is used as the indicator for maturation, and the definitions for young and old adult remain consistent with Caspari and Lee (old is twice the age of young). The macaques have an OY ratio of 0.95, chimpanzees have a ratio of 1.21, and the ratio for modern human hunter-gatherers is 1.21. The differences in these ratios is approximately invariant despite average M3 eruption ages of about 5, 10, and 20 years, respectively, and longevities that vary just as much. Hawkes and O'Connell explain that the reason that Caspari and Lee's data do not actually represent longevity of the populations is because a skeletal assemblage does not accurately represent the living population it comes from. This and other problems with typical paleodemographic studies will be discussed further.

Konigsberg and Herrmann (in press) also critique the findings of Caspari and Lee (2004). The authors begin by calculating the mortality rate doubling (MRD) time for each of the groups in Caspari and Lee's work. Beginning with an initial mortality rate (IMR) value for modern humans and the number of individuals aged to be young adults and old adults by Caspari and Lee, the MRD time for all four groups is determined. The MRD times for australopithecines, early *Homo*, Neandertals, and early modern humans is found to be 1.18 years, 1.24 years, 1.27 years, and 1.53 years, respectively. The authors explain that, when rounded to the nearest year, "the mortality rate doubles for every year of life past age 15 in australopithecines, early *Homo*, and Neandertals, while it doubles every two years for Upper Paleolithic peoples" (Konigsberg and Herrmann, in press:18). These rates are much faster than the eight years it takes for mortality to double in modern human groups. The starting IMR is then multiplied by five, giving MRD rates for all four groups that round to two years, meaning that the mortality rates for each group double for every two years of life after the age of 15. While this is extremely quick, it is consistent with other groups the authors investigate, including Indian Knoll and Averbuch.

Konigsberg and Herrmann (in press) continue their critique by examining the test Caspari and Lee use to assess their null hypothesis that there is no difference in longevity between the four groups. Caspari and Lee find that all four groups are significantly different in their OY ratios, but Konigsberg and Herrmann argue that this conclusion is based on a misapplication of the bootstrap procedure. The authors reanalyze the Caspari and Lee data to find the proportion of those in each living population over the age of 15 that are also over the age of 30. For australopithecines, this proportion is 0.6%, for early *Homo* it is 1.56%, for Neandertals it is 2.49%, and for early Upper Paleolithic peoples it is 13.65%. Using these figures, which represent the life history of each group and not the death history, the only significant difference is found between early Upper Paleolithic peoples and all other groups (in press:19).

Finally, Konigsberg and Herrmann point out that Caspari and Lee place too much confidence on their age assignments. By assuming 100% correct classification when the percent correct is actually lower, biased estimates will be obtained. The authors graphically represent the 95% confidence intervals for the proportion of actual deaths over the age of 30 for all four groups, and show that the confidence intervals for early *Homo* and Neandertals overlap. This once again refutes the conclusion that the OY ratios for these two groups are statistically different.

It is evident that what Caspari and Lee (2004) calculated in their study is not a measure of longevity. While Hawkes and O'Connell (2005) use life history variables and Kongisberg and Herrmann (in press) use statistical arguments to make this clear, this study uses an OY ratio from a modern human group. The fact that the OY ratio from Averbuch looks like an OY ratio from a Neandertal population shows that what Caspari and Lee (2004) are measuring is something other than longevity since longevity should be consistent within a taxonomic group. The reason for this discrepancy is that "archaeological death assemblages do not reflect the age-specific mortality of the populations that left them" (Hawkes and O'Connell, 2005:653). This is perhaps one of the biggest problems in paleodemography, but certainly not the only one.

Walker and Lambert (1988) look at how big of an impact preservation biases can have on the age structure of a skeletal population. They find that children and elderly adults are more likely to be underrepresented while young adults are overrepresented, and the change can be "so great that little evidence remains regarding the original age structure of the burial population" (Walker and Lambert, 1988:188). This finding is explained by the fact that the remains of the very young and the very old are less resistant to disintegration, and thus will be lost with time. Obviously, if the older adults are underrepresented, then an analysis looking at the ratio between old adults and young adults will be inaccurate.

The histological study by Streeter and colleagues (2001) on the Boxgrove 1 tibia may be seen as evidence that older individuals were present in the Middle Pleistocene. The authors examined the histology of the diaphyseal midshaft from a tibia that is similar to other archaic *Homo* tibiae in order to age the individual. Using formulae developed for calculating age from small fragments, the age-at-death of this individual is calculated to be 39.5 years with a range of 31.0-48.0 years (Streeter et al., 2001:335). An individual in the late fourth to early fifth decade of life is a rarity, as evidenced by other hominid samples from the same period, such as Sima de los Huesos and Krapina (Bermúdez de Castro et al., 2004; Wolpoff, 1979). The authors of this study state that it is "apparent that the…hominid fossil record has an underrepresentation of older individuals" (Streeter et al. 2001:337). Once again, such an underrepresentation will skew an OY ratio.

Other than preservation biases, one of the main sources of error in paleodemography is the misestimation of adult ages. Numerous authors have cited this problem, including Bocquet-Appel and Masset (1982) who completely denounce the use of paleodemography because of the errors. The problems that Bocquet-Appel and Masset present are mainly due to the fact that reference samples used to determine age-at-death distributions influence the archaeological sample. Traditionally in paleodemography, the age-at-death of a skeleton is determined by considering the age dependent on the indicator used to determine age. The age of the skeleton is determined by selecting the age from the reference distribution at which the probability of seeing the indicator state found in the skeleton is the highest. This requires a prior age distribution before the indicator has been observed, yet the age distribution of the skeletal assemblage is not known because that is what is being constructed. Additionally, because of the prior probability, this method assumes that the archaeological sample being studied has the same age-at-death distribution as the reference sample it is being compared to, which is exactly what Bocquet-Appel and Masset were concerned about. Konigsberg and Frankenberg (1994) propose a new method to avoid this problem. They suggest using maximum likelihood estimation to find the highest probability of a skeleton being a certain age when the age indicator has been regressed on age. While maximum likelihood estimation is more complicated than traditional approaches, it eliminates the prior probability issue stated above (Konigsberg and Frankenberg, 1994).

The Miles method is useful for several reasons. One benefit of the method over other techniques is the fact that it does not require a reference sample. As pointed out by numerous authors (Miles, 1963; Lovejoy et al., 1985a; Bocquet-Appel and Arsuaga, 1999; Caspari and Lee, 2004), the method is beneficial precisely because it is internally calibrated by and for the skeletal population under investigation. Therefore, the age structure of the skeletal assemblage will not mimic the age structure of a reference sample, avoiding the problem posited by Bocquet-Appel and Masset (1982). However, just because the Miles method is capable of accurately producing an age-at-death distribution for a sample does not mean that the distribution represents the actual age structure of the population it comes from. The Miles method is only capable of aging the dental material present, and hence cannot say anything about the individuals that may be missing due to preservation biases. This method is just as susceptible to misrepresenting age-at-death distributions as any other aging technique, and it is for this reason that studies like Caspari and Lee's (2004) must be considered highly speculative.

Another benefit of the Miles method is that it may be applied to any skeletal assemblage provided that subadults are present. This is because age determination depends on the tooth wear rate calculated from the juvenile portion of the skeletal sample. In order to place exact ages on individuals, as opposed to relative ages, the age at which the molars erupt must be known. The fact that nonhumans can be aged using the Miles method, as evidenced by Bramblett (1969), shows that all that is needed to obtain accurate ages is the knowledge of the timing of dental eruption for the population being studied.

Like all aging techniques, the Miles method is not infallible. Miles himself points out the fact that "it has yet to be determined whether the rate of tooth wear remains more or less the same in adult life as in childhood when the consumption of food is particularly high" (Miles, 2001:975). This idea directly violates the second assumption of the Miles method, that the tooth wear rate of juveniles remains constant into adulthood, provided that diet remains the same. Additionally, it has been pointed out that variation exists in enamel thickness between individuals, which may affect the rate of transition from one attritional stage to the next (Molleson and Cohen, 1990:368). If individuals within a population are experiencing the same wear stage in different lengths of time, then the wear rate established by the Miles method may not be accurate.

In his 2005 study, Boldsen concludes that attrition scores cannot be used to age even a homogenous population due to several factors that make the relationship between age and attritional score quite complicated (Boldsen 2005:174). These factors include individual differences, such as differences in enamel thickness, social differences, such as differences in nutrition and healthcare across social classes, and temporal differences. Also, Boldsen explains that in most cases, the frailest of the population are the one that die in each age class. Therefore, when compared to the "age matched living population," the skeletal sample represents the weakest of the population (Boldsen, 2005:169). For these reasons, tooth wear may not actually be an acceptable method of aging because the age marker being utilized is subjective to selective mortality.

Overall, the Miles method can be extremely useful in paleodemographic studies. Whether the population being aged represents modern humans, human ancestors, or nonhumans, the method may be applied. Additionally, a reference sample is not required, so investigations need not be limited in that respect. It is important to bear in mind, however, that any paleodemographic analysis is imperfect because individuals will be missing from the skeletal assemblage and the individuals that are present may be the weakest of the population. Therefore, researchers must be aware that even though accurate age estimations can be made, research questions must still be framed around age-at-death distributions that may not represent the actual living population structure.

WORKS CITED

WORKS CITED

Benfer, Robert A. and Daniel S. Edwards (1991) The Principal Axis Method for Measuring Rate and Amount of Dental Attrition: Estimating Juvenile or Adult Tooth Wear from Unaged Adult Teeth. In *Advances in Dental Anthropology*, Ed. Marc A. Kelley and Clark Spencer Larsen. New York: Wiley-Liss, 325-340.

Bermúdez de Castro, J. M., M. Martinón-Torres, E. Carbonell, S. Sarmiento, A. Rosas, J. Van der Made, and M. Lozano (2004) The Atapuerca Sites and Their Contribution to the Knowledge of Human Evolution in Europe. *Evolutionary Anthropology*13:25-41.

Berryman, Hugh E. (1984) The Averbuch Skeletal Series: A study of the biological and social stress at a Late Mississippian period site from Middle Tennessee. In *Averbuch: a Late Mississippian Manifestation in the Nashville Basin, Volume I, Observations*, Ed. Walter E. Klippel and William M. Bass. Atlanta: National Park Services, 1.5.1 - 1.5.133.

Bocquet-Appel, Jean-Pierre, and Claude Masset (1982) Farewell to Paleodemography. *Journal of Human Evolution* 11:321-333.

Bocquet-Appel, Jean-Pierre, and Juan-Luis Arsuaga (1999)Age Distributions of Hominid Samples at Atapuerca (SH) and Krapina Could Indicate Accumulation by Catastrophe. *Journal of Archaeological Science* 26:327-338.

Boldsen, Jesper L. (2005) Analysis of Dental Attrition and Mortality in the Medieval Village of Tirup, Denmark. *American Journal of Physical Anthropology* 129:169-176.

Boldsen, Jesper L., George R. Milner, Lyle W. Konigsberg, and James W. Wood (2002) Transition Analysis: a new method for estimating age from skeletons. In *Paleodemography: age distributions from skeletal samples,* Ed. Robert D. Hoppa and James W. Vaupel. New York: Cambridge University Press, 1-8.

Bramblett, Claud A. (1969) Non-Metric Skeletal Age Changes in the Darajani Baboon. *American Journal of Physical Anthropology* 30:161-172.

Brooks, S. T. and J. M. Suchey (1990) Skeletal age determination based on the os pubis: A comparison of the Ascaadi-Nemeskeri and Suchey Brooks methods. *Human Evolution* 5:22-238.

Brothwell, D. R. (1981) *Digging Up Bones: The Excavation, Treatment and Study of Human Skeletal Remains*. 3rd edition, New York: Cornell University Press.

Buikstra, J. E. and D. H. Ubelaker (1994) *Standards for Data Collection from Human Skeletal Remains*. Fayetteville, AR: Arkansas Archaeological Survey Research Series 44.

Caspari, Rachel, and Sang-Hee Lee (2004) Older age becomes common in late human evolution. *Proceedings of the National Academy of Science* 101:10895-10900.

Charnov, Eric L. (1993) *Life History Invariants: Some Explorations of Symmetry in Evolutionary Ecology*. New York: Oxford University Press.

Demirjian, A., H. Goldstein, and J. M. Tanner (1973) A New System of Dental Age Assessment. *Human Biology* 45:211-227.

Dreier, Frederick G. (1994) Age at Death Estimates for the Protohistoric Arikara Using Molar Attrition Rates: A New Quantification Method. *International Journal of Osteoarchaeology* 4:137-147.

Grant, Annie (1982) The Use of Tooth Wear as a Guide to the Age of Domestic Ungulates. In *Ageing and Sexing Animal Bones from Archaeological Sites* Ed. by Bob Wilson, Caroline Gigson, and Sebastian Payne. Oxford: BAR British Series 109, 91-108.

Harvati, Katerina, Eleni Panagopoulou, and Panagiotis Karkanas (2003) First Neanderthal remains from Greece: the evidence from Lakonis. *Journal of Human Evolution* 45:465-473.

Hawkes, K. and J.F. O'Connell (2005) How old is human longevity? *Journal of Human Evolution* 49:650-653.

Helm, Sven and Uwe Prydso (1979) Assessment of age-at-death from mandibular molar attrition in medieval Danes. *Scandinavian Journal of Dental Research* 87:79-90.

Hinton, R. J. (1981) Form and Patterning of Anterior Tooth Wear Among Aboriginal Human Groups. *American Journal of Physical Anthropology* 54:555-564.

Hoppa, Robert D. and James W. Vaupel (2002) The Rostock Manifesto for paleodemography: the way from stage to age. In *Paleodemography: age distributions from skeletal samples,* Ed. Robert D. Hoppa and James W. Vaupel. New York: Cambridge University Press, 1-8.

Hunt, Edward E. and Izaac Gleiser (1955) The Estimation of Age and Sex of Preadolescent Children from Bones and Teeth. *American Journal of Physical Anthropology* 13:479-487.

Iscan, M. Y., S. R. Loth, and R. K. Wright (1984) Age estimation from the rib by phase analysis: white males. *Journal of Forensic Sciences* 29:1094-1104.

Iscan, M. Y., S. R. Loth, and R. K. Wright (1985) Age estimation from the rib by phase analysis: white females. *Journal of Forensic Sciences* 30:853-863.

Kieser, J. A., C. B. Preston, and W. G. Evans (1983) Skeletal Age at Death: an Evaluation of the Miles Method of Ageing. *Journal of Archaeological Science* 10:9-12.

Konigsberg, Lyle W. (2003) NPHASES2, University of Tennessee, Knoxville, Tennessee, USA, http://konig.la.utk.edu/nphases.exe.

Konigsberg , Lyle W. and Susan R. Frankenberg (1994) Paleodemography: "Not Quite Dead." *Evolutionary Anthropology* 3:92-105.

Konigsberg, Lyle W. and Nicholas P. Herrmann (in press) The Osteological Evidence for Human Longevity in the Recent Past. In: R.R. Paine and K. Hawkes (eds.), *The Evolution of Human Life History*. School of American Research Press.

Lovejoy, C. O., R. S. Meindl, R. Mensforth, and T. J. Barton (1985a) Multifactorial Determination of Skeletal Age at Death: A Method and Blind Tests of Its Accuracy. *American Journal of Physical Anthropology* 68:1-14.

Lovejoy, C. O., R. S. Meindl, R. Mensforth, and T. J. Barton (1985b) Chronological metamorphosis of the auricular surface of the ilium: a new method for the determination of adult skeletal age at death. *American Journal of Physical Anthropology* 68:15-28.

Lovejoy, C. O. (1985) Dental Wear in the Libben Popuation: Its Functioal Pattern and Role in the Determination of Adult Skeletal Age at Death. *American Journal of Physical Anthropology* 68:47-56.

Mann, Alan E. (1975) *Paleodemographic Aspects of the South African Australopithecines*. Philadelphia, PA: University of Pennsylvania Publications in Anthropology.

Mayhall, John T. and Ikuo Kageyama (1997) A New, Three-Dimensional Method for Determining Tooth Wear. *American Journal of Physical Anthropology* 103:463-469.

Mays, Simon, Concepcion de la Rua, and Theya Molleson (1995) Molar Crown Height as a Means of Evaluating Existing Dental Wear Scales for Estimating Age at Death in Human Skeletal Remains. *Journal of Archaeological Science* 22:659-670.

Mays, S., G. M. Taylor, A. J. Legge, D. B. Young, and G. Turner-Walker (2001) Paleopathological and Biomolecular Study of Tuberculosis in a Medieval Skeletal Collection from England. *American Journal of Physical Anthropology* 114:298-311.

Meindl, R. S. and C. O. Lovejoy (1985) Ectocranial suture closure: a revised method for determination of skeletal age at death based on the lateral-anterior sutures. *American Journal of Physical Anthropology* 68:57-66.

Miles, A. E. W. (1962) Assessment of the Ages of a Population of Anglo-Saxons from Their Dentitions. *Proceedings of the Royal Society of Medicine* 55:881-886.

Miles, A. E. W. (1963) The Dentition in the Assessment of Individual Age in Skeletal Material. In *Dental Anthropology*, Ed. D. R. Brothwell. Oxford: Pergamon Press, 191-209.

Miles, A. E. W. (2001) The Miles Method of Assessing Age from Tooth Wear Revisited. *Journal of Archaeological Science* 28:973-982.

Molleson, Theya I. and Percy Cohen (1990) The Progression of Dental Attrition Stages Used for Age Assessment. *Journal of Archaeological Science* 17:363-371.

Molnar, Stephen (1972) Tooth Wear and Culture: A Survey of Tooth Functions Among Some Prehistoric Populations. *Current Anthropology* 13:511-526.

Moorrees, Coenraad F., Elizabeth A. Fanning, and Edward E. Hunt, Jr. (1963a) Formation and Resorption of Three Deciduous Teeth in Children. *American Journal of Physical Anthropology* 21:205-213.

Moorrees, Coenraad F., Elizabeth A. Fanning, and Edward E. Hunt, Jr. (1963b) Age Variation of Formation for Ten Permanent Teeth. *Journal of Dental Research* 42:1490-1502.

Nowell, George Wesley (1978) An Evaluation of the Miles Method of Ageing Using the Tepe Hissar Dental Sample. *American Journal of Physical Anthropology* 49:271-276.

O'Connell, J. F., K. Hawkes, and N. G. Blurton Jones (1999) Grandmothering and the evolution of *Homo erectus*. *Journal of Human Evolution* 36:461-485.

Payne, Sebastian (1973) Kill-off Patterns in Sheep and Goats: The Mandibles from Asvan Kale. *Journal of the British Institute of Archaeology at Ankara: Anatolian Studies* 23:281-303.

Richards, M. P., S. Mays, and B. T. Fuller (2002) Stable Carbon and Nitrogen Isotope Values of Bone and Teeth Reflect Weaning Age at the Medieval Wharram Percy Site, Yorkshire UK. *American Journal of Physical Anthropology* 119:205-210.

Schour, Isaac and M. Massler (1941) The Development of the Human Dentition. *The Journal of the American Dental Association* 28:1153-1160.

Scott, E. C. (1979a) Dental Wear Scoring Technique. *American Journal of Physical Anthropology* 51:213-216.

Scott, E. C. (1979b) Principal Axis Analysis of Dental Attrition Data. *American Journal of Physical Anthropology* 51:203-212.

Smith, B. Holly (1984) Patterns of Molar Wear in Hunter-Gatherers and Agriculturalists. *American Journal of Physical Anthropology* 63:39-56.

Smith, B. Holly (1986) Dental development in *Australopithecus* and early *Homo*. *Nature* 323:327-330.

Smith, B. Holly (1991) Standards of Human Tooth Formation and Dental Age Assessment. In *Advances in Dental Anthropology*, Ed. Marc A. Kelley and Clark Spencer Larsen. New York: Wiley-Liss, 169-178.

Smith, B. Holly (1992) Life History and the Evolution of Human Maturation. *Evolutionary Anthropology* 1:134-142.

Smith, B. Holly (1994) Patterns of Dental Development in *Homo, Australopithecus, Pan,* and *Gorilla*. *American Journal of Physical Anthropology* 94:307-325.

Stewart, T. D. (1979) *Essentials of Forensic Anthropology*, Springfield, IL: Charles C Thomas.

Steyn, M., W. C. Nienaber, and J. H. Meiring (2002) An assessment of the health status and physical characteristics of an early 20th century community at Maroelabult in the North West Province, South Africa. *Homo* 53:131-145.

Streeter, Margaret, Sam D. Stout, Erik Trinkaus, Chris B. Stringer, Mark B. Roberts, and Simon A. Parfitt (2001) Histomorphometric age assessment of the Boxgrove 1 tibial diaphysis. *Journal of Human Evolution* 40, 331-338.

Tanner, J. M., R. H. Whitehouse, W. A. Marshall, M. J. R. Healy, and H. Goldstein (1962) A new system for estimating skeletal maturity from the hand and wrist, with standards derived from a study of 2,600 healthy British children. Centre International de I'Enfance, Paris.

Todd, T. W. (1920) Age changes in the pubic bone: I, the male white pubis. *American Journal of Physical Anthropology* 3:285-334.

Trinkaus, Erik (1995) Neandertal Mortality Patterns. *Journal of Archaeological Science* 22:121-142.

Trinkaus, Erik, Louise Humphrey, Chris Stringer, Steven E. Churchill, and Robert G. Tague (2003) Gough's Cave 1 (Somerset, England): an Assessment of the Sex and Age at Death. *Bulletin of the Natural History Museum of London, Geology Series* 58:45-50.

Ubelaker, Douglas H. (1989) *Human Skeletal Remains: Excavation, Analysis, Interpretation,* 2nd edition, Washington: Smithsonian Institute.

Walker, Phillip L. and Patricia M. Lambert (1988) Age and Sex Biases in the Preservation of Human Skeletal Remains. *American Journal of Physical Anthropology* 76:183-188.

Walker, Phillip L, Gregory Dean, and Perry Shapiro (1991) Estimating Age from Tooth Wear in Archaeological Populations. In *Advances in Dental Anthropology*, Ed. Marc A. Kelley and Clark Spencer Larsen. New York: Wiley-Liss, 169-178.

Wolpoff, Milford H. (1979) The Krapina Dental Remains. *American Journal of Physical Anthropology* 50:67-114.

APPENDIX

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-384	384		0.43		0	0	0	0	0	0	0	0
40DV60-385	385		0.43		0	0	0	0	0	0	0	0
40DV60-449A	449	A	0.84		0	0	0	0	0	0	0	0
40DV60-611A	611	A	0.84		0	0	0	0	0	0	0	0
40DV60-611B	611	B	0.84		0	0	0	0	0	0	0	0
40DV60-612	612		0.84		0	0	0	0	0	0	0	0
40DV60-617	617		0.84		0	0	0	0	0	0	0	0
40DV60-7B	7	B	1.28		0	0	0	0	0	0	0	0
40DV60-10C	10	C	1.28		0	0	0	0	0	0	0	0
40DV60-133	133		1.28		0	0	0	0	0	0	0	0
40DV60-153	153		1.28		0	0	0	0	0	0	0	0
40DV60-246	246		1.28		0	0	0	0	0	0	0	0
40DV60-265	265		1.28		0	0	0	0	0	0	0	0
40DV60-276	276		1.28		0	0	0	0	0	0	0	0
40DV60-314	314		1.28		0	0	0	0	0	0	0	0
40DV60-331	331		1.28		0	0	0	0	0	0	0	0
40DV60-380	380		1.28		0	0	0	0	0	0	0	0
40DV60-487A	487	A	1.28		0	0	0	0	0	0	0	0
40DV60-538	538		1.28		0	0	0	0	0	0	0	0
40DV60-601	601		1.28		0	0	0	0	0	0	0	0
40DV60-668	668		1.28		0	0	0	0	0	0	0	0
40DV60-193C	193	C	1.65		0	0	0	0	0	0	0	0
40DV60-643	643		1.65		0	0	0	0	0	0	0	0
40DV60-10B	10	B	1.85		0	0	0	0	0	0	0	0
40DV60-129	129		1.85		0	0	0	0	0	0	0	0
40DV60-154A	154	A	1.85		0	0	0	0	0	0	0	0
40DV60-155	155		1.85		0	0	0	0	0	0	0	0
40DV60-167	167		1.85		0	0	0	0	0	0	0	0
40DV60-167C	167	C	1.85		0	0	0	0	0	0	0	0
40DV60-185B/C	185	B/C	1.85		0	0	0	0	0	0	0	0
40DV60-237	237		1.85		0	0	0	0	0	0	0	0
40DV60-254	254		1.85		0	0	0	0	0	0	0	0
40DV60-272	272		1.85		0	0	0	0	0	0	0	0
40DV60-317B	317	B	1.85		0	0	0	0	0	0	0	0
40DV60-354B	354	B	1.85		0	0	0	0	0	0	0	0
40DV60-368A	368	A	1.85		0	0	0	0	0	0	0	0
40DV60-396	396		1.85		0	0	0	0	0	0	0	0
40DV60-461	461		1.85		0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-468B	468	B	1.85		0	0	0	0	0	0	0	0
40DV60-500*	500	*	1.85		0	0	0	0	0	0	0	0
40DV60-537*	537	*	1.85		0	0	0	0	0	0	0	0
40DV60-558	558		1.85		0	0	0	0	0	0	0	0
40DV60-574	574		1.85		0	0	0	0	0	0	0	0
40DV60-581	581		1.85		0	0	0	0	0	0	0	0
40DV60-598A	598	A	1.85		0	0	0	0	0	0	0	0
40DV60-677	677		1.85		0	0	0	0	0	0	0	0
40DV60-1	1		2.46		0	0	0	0	0	0	0	0
40DV60-30B	30	B	2.46		0	0	0	0	0	0	0	0
40DV60-108	108		2.46		0	0	0	0	0	0	0	0
40DV60-115	115		2.46		0	0	0	0	0	0	0	0
40DV60-163	163		2.46		0	0	0	0	0	0	0	0
40DV60-192	192		2.46		0	0	0	0	0	0	0	0
40DV60-193B	193	B	2.46		0	0	0	0	0	0	0	0
40DV60-219	219		2.46		0	0	0	0	0	0	0	0
40DV60-235	235		2.46		0	0	0	0	0	0	0	0
40DV60-2383	238	3	2.46		0	0	0	0	0	0	0	0
40DV60-240B	240	B	2.46		0	0	0	0	0	0	0	0
40DV60-283	283		2.46		0	0	0	0	0	0	0	0
40DV60-298	298		2.46		0	0	0	0	0	0	0	0
40DV60-316	316		2.46		0	0	0	0	0	0	0	0
40DV60-344	344		2.46		0	0	0	0	0	0	0	0
40DV60-353A	353	A	2.46		0	0	0	0	0	0	0	0
40DV60-360	360		2.46		0	0	0	0	0	0	0	0
40DV60-371	371		2.46		0	0	0	0	0	0	0	0
40DV60-372	372		2.46		0	0	0	0	0	0	0	0
40DV60-448	448		2.46		0	0	0	0	0	0	0	0
40DV60-468A	468	A	2.46		0	0	0	0	0	0	0	0
40DV60-468A/B	468	A/B	2.46		0	0	0	0	0	0	0	0
40DV60-484	484		2.46		0	0	0	0	0	0	0	0
40DV60-500A	500	A	2.46		0	0	0	0	0	0	0	0
40DV60-500B	500	B	2.46		0	0	0	0	0	0	0	0
40DV60-556	556		2.46		0	0	0	0	0	0	0	0
40DV60-584	584		2.46		0	0	0	0	0	0	0	0
40DV60-631B	631	B	2.46		0	0	0	0	0	0	0	0
40DV60-641	641		2.46		0	0	0	0	0	0	0	0
40DV60-661A	661	A	2.46		0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-706	706		2.46		0	0	0	0	0	0	0	0
40DV60-158C	158	C	3.44		0	0	0	0	0	0	0	0
40DV60-343	343		3.44		0	0	0	0	0	0	0	0
40DV60-4	4		3.56		0	0	0	0	0	0	0	0
40DV60-21B	21	B	3.56		0	0	0	0	0	0	0	0
40DV60-112	112		3.56		0	0	0	0	0	0	0	0
40DV60-125	125		3.56		0	0	0	0	0	0	0	0
40DV60-167B	167	B	3.56		0	0	0	0	0	0	0	0
40DV60-175B	175	B	3.56		0	0	0	0	0	0	0	0
40DV60-179	179		3.56		0	0	0	0	0	0	0	0
40DV60-183	183		3.56		0	0	0	0	0	0	0	0
40DV60-186	186		3.56		0	0	0	0	0	0	0	0
40DV60-193A	193	A	3.56		0	0	0	0	0	0	0	0
40DV60-210	210		3.56		0	0	0	0	0	0	0	0
40DV60-245	245		3.56		0	0	0	0	0	0	0	0
40DV60-270C	270	C	3.56		0	0	0	0	0	0	0	0
40DV60-321A	321	A	3.56		0	0	0	0	0	0	0	0
40DV60-412B	412	B	3.56		0	0	0	0	0	0	0	0
40DV60-413A	413	A	3.56		0	0	0	0	0	0	0	0
40DV60-438	438		3.56		0	0	0	0	0	0	0	0
40DV60-476A	476	A	3.56		0	0	0	0	0	0	0	0
40DV60-486	486		3.56		0	0	0	0	0	0	0	0
40DV60-506	506		3.56		0	0	0	0	0	0	0	0
40DV60-509	509		3.56		0	0	0	0	0	0	0	0
40DV60-537A	537	A	3.56		0	0	0	0	0	0	0	0
40DV60-543	543		3.56		0	0	0	0	0	0	0	0
40DV60-549B	549	B	3.56		0	0	0	0	0	0	0	0
40DV60-568A	568	A	3.56		0	0	0	0	0	0	0	0
40DV60-582	582		3.56		0	0	0	0	0	0	0	0
40DV60-587C	587	C	3.56		0	0	0	0	0	0	0	0
40DV60-596A	596	A	3.56		0	0	0	0	0	0	0	0
40DV60-645A	645	A	3.56		0	0	0	0	0	0	0	0
40DV60-670	670		3.56		0	0	0	0	0	0	0	0
40DV60-697	697		3.56		0	0	0	0	0	0	0	0
40DV60-704	704		3.56		0	0	0	0	0	0	0	0
40DV60-280B	280	B	4.01		0	0	0	0	0	0	0	0
40DV60-414	414		4.11		0	0	0	0	0	0	0	0
40DV60-226	226		4.69		0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-286	286		4.69		0	0	0	0	0	0	0	0
40DV60-340A	340	A	4.69		0	0	0	0	0	0	0	0
40DV60-443B	443	B	4.69		0	0	0	0	0	0	0	0
40DV60-449B	449	B	4.69		0	0	0	0	0	0	0	0
40DV60-499	499		4.69		0	0	0	0	0	0	0	0
40DV60-557	557		4.69		0	0	0	0	0	0	0	0
40DV60-655	655		4.69		0	0	0	0	0	0	0	0
40DV60-698	698		4.69		0	0	0	0	0	0	0	0
40DV60-116	116		4.84		0	0	0	0	0	0	0	0
40DV60-144	144		4.84		0	0	0	0	0	0	0	0
40DV60-389	389		4.84		0	0	0	0	0	0	0	0
40DV60-458	458		4.84		0	0	0	0	0	0	0	0
40DV60-572	572		5.07		0	0	0	0	0	0	0	0
40DV60-242C	242	C	5.22		0	0	0	0	0	0	0	0
40DV60-337C	337	C	5.22		0	0	0	0	0	0	0	0
40DV60-367	367		5.22		0	0	0	0	0	0	0	0
40DV60-373	373		5.22		0	0	0	0	0	0	0	0
40DV60-434A	434	A	5.22		0	0	0	0	0	0	0	0
40DV60-493	493		5.22		0	0	0	0	0	0	0	0
40DV60-495	495		5.22		0	0	0	0	0	0	0	0
40DV60-602	602		5.22		0	0	0	0	0	0	0	0
40DV60-25B	25	B	5.47		0	0	0	0	0	0	0	0
40DV60-375A	375	A	5.47		0	0	0	0	0	0	0	0
40DV60-513*	513	*	5.47		0	0	0	0	0	0	0	0
40DV60-177	177		5.49		0	0	0	0	0	0	0	0
40DV60-256B	256	B	5.49		0	0	0	0	0	0	0	0
40DV60-549*	549	*	5.49		0	0	0	0	0	0	0	0
40DV60-553A	553	A	5.49		0	0	0	0	0	0	0	0
40DV60-31	31		5.91		0	0	0	0	0	0	0	0
40DV60-109	109		5.91		0	0	0	0	0	0	0	0
40DV60-111	111		5.91		0	0	0	0	0	0	0	0
40DV60-117	117		5.91		0	0	0	0	0	0	0	0
40DV60-119	119		5.91		0	0	0	0	0	0	0	0
40DV60-233A	233	A	5.91		0	0	0	0	0	0	0	0
40DV60-249	249		5.91		0	0	0	0	0	0	0	0
40DV60-257	257		5.91		0	0	0	0	0	0	0	0
40DV60-268	268		5.91		0	0	0	0	0	0	0	0
40DV60-282B	282	B	5.91		0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-378	378		5.91		0	0	0	0	0	0	0	0
40DV60-479	479		5.91		0	0	0	0	0	0	0	0
40DV60-523	523		5.91		0	0	0	0	0	0	0	0
40DV60-537B	537	B	5.91		0	0	0	0	0	0	0	0
40DV60-542A	542	A	5.91		0	0	0	0	0	0	0	0
40DV60-596B	596	B	5.91		0	0	0	0	0	0	0	0
40DV60-613	613		5.91		0	0	0	0	0	0	0	0
40DV60-154B	154	B	5.97		0	0	0	0	0	0	0	0
40DV60-176B	176	B	5.97		0	0	0	0	0	0	0	0
40DV60-182	182		5.97		0	0	0	0	0	0	0	0
40DV60-302	302		5.97		0	0	0	0	0	0	0	0
40DV60-307	307		5.97		0	0	0	0	0	0	0	0
40DV60-340B	340	B	5.97		0	0	0	0	0	0	0	0
40DV60-534	534		5.97		0	0	0	0	0	0	0	0
40DV60-221	221		6.30		0	0	0	0	0	0	0	0
40DV60-124	124		6.30		0	0	0	0	0	0	0	0
40DV60-563*	563	*	6.55		0	0	0	0	0	0	0	0
40DV60-140B	140	B	6.69		0	0	0	0	0	0	0	0
40DV60-147B	147	B	6.69		0	0	0	0	0	0	0	0
40DV60-162B	162	B	6.69		0	0	0	0	0	0	0	0
40DV60-239	239		6.69		0	0	0	0	0	0	0	0
40DV60-422	422		6.69		0	0	0	0	0	0	0	0
40DV60-425	425		6.69		0	0	0	0	0	0	0	0
40DV60-483A	483	A	6.69		0	0	0	0	0	0	0	0
40DV60-635	635		6.69		0	0	0	0	0	0	0	0
40DV60-663	663		6.69		0	0	0	0	0	0	0	0
40DV60-323B	323	B	7.34		0	0	0	0	0	0	0	0
40DV60-510	510		7.34		0	0	0	0	0	0	0	0
40DV60-120	120		8.10		0	0	0	0	0	1	0	0
40DV60-130C	130	C	8.10		1	1	1	1	0	1	0	0
40DV60-233B	233	B	8.10		0	0	0	0	0	0	0	0
40DV60-275	275		8.10		0	0	0	0	0	0	0	0
40DV60-507A	507	A	8.10		0	0	0	0	0	0	0	0
40DV60-542B	542	B	8.10		0	0	0	0	0	0	0	0
40DV60-549A	549	A	8.10		0	0	0	0	0	0	0	0
40DV60-420C	420	C	8.27		0	0	0	0	0	0	0	0
40DV60-274	274		9.25		0	0	0	0	0	0	0	0
40DV60-301B	301	B	9.62		1	1	1	1	1	2	1	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-564	564		9.62		1	1	1	0	0	1	1	0
40DV60-622A	622	A	9.62		0	0	0	0	0	0	0	0
40DV60-142B	142	B	10.36		0	0	0	1	0	0	0	0
40DV60-145	145		10.36		0	0	0	0	0	0	0	0
40DV60-295B	295	B	10.41		0	0	0	0	0	0	0	0
40DV60-416	416		10.41		0	0	0	0	0	0	0	0
40DV60-569	569		10.41		0	0	0	0	0	0	0	0
40DV60-659	659		10.41		2	2	2	1	1	2	1	0
40DV60-676	676		10.41		0	0	0	0	0	0	0	0
40DV60-357A	357	A	10.54		0	0	0	0	0	0	0	0
40DV60-494	494		10.82		0	0	0	0	0	0	0	0
40DV60-130A	130	A	10.82		0	0	0	0	0	0	0	0
40DV60-583A	583	A	11.17		3	1	2	2	1	2	1	0
40DV60-654	654		11.17		2	2	1	1	1	2	1	0
40DV60-228A	228	A	11.37		2	1	1	1	1	2	1	0
40DV60-341D	341	D	11.37		0	0	0	0	0	0	0	0
40DV60-598*	598	*	11.87		3	2	2	1	1	0	0	0
40DV60-29C	29	C	11.90		0	0	0	0	0	0	0	0
40DV60-253A	253	A	11.90		2	1	1	1	1	2	1	0
40DV60-548	548		11.90		1	1	1	1	1	1	1	0
40DV60-8B	8	B	12.06		2	2	2	1	1	2	1	0
40DV60-222	222		12.06		1	2	1	1	1	1	1	0
40DV60-288B	288	B	12.06		3	2	2	2	1	2	1	0
40DV60-289A	289	A	12.06		3	1	1	1	1	2	1	0
40DV60-205B	205	B	12.50		2	2	2	1	1	2	1	0
40DV60-327B	327	B	12.50		0	1	1	1	0	2	0	0
40DV60-566	566		12.50		2	1	1	1	1	1	1	0
40DV60-707	707		12.50		0	0	0	0	0	0	0	0
40DV60-291A	291	A	13.69		3	2	2	1	1	3	2	0
40DV60-518	518		13.69		3	2	2	1	1	2	1	0
40DV60-21A	21	A	13.69		0	0	2	1	1	2	2	1
40DV60-27	27		13.72		0	0	0	0	0	0	0	0
40DV60-151	151		13.72		2	1	2	2	1	2	1	0
40DV60-352	352		13.72		0	0	0	0	1	0	0	0
40DV60-703B	703	B	13.72		2	1	1	1	1	2	1	0
40DV60-3A	3	A		15	5	2	3	2	2	3	2	1
40DV60-12	12			15	0	4	4	0	4	4	2	1
40DV60-15	15			15	4	3	5	4	4	5	4	1

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-16	16			15	3	2	2	2	1	2	1	1
40DV60-23	23			15	4	0	5	4	5	4	2	1
40DV60-32	32			15	2	2	3	2	2	3	2	1
40DV60-33A	33	A		15	3	2	5	5	4	6	7	1
40DV60-107A	107	A		15	4	3	3	1	1	2	2	1
40DV60-113	113			15	5	6	5	3	3	7	5	1
40DV60-121A	121	A		15	2	1	2	1	1	2	2	1
40DV60-121B	121	B		15	2	3	3	3	3	4	2	1
40DV60-123A	123	A		15	3	3	3	2	2	2	1	1
40DV60-140A	140	A		15	5	5	4	2	2	3	1	1
40DV60-160A	160	A		15	0	2	2	2	2	3	2	1
40DV60-161A	161	A		15	0	4	3	2	2	3	2	1
40DV60-167A	167	A		15	2	1	2	2	1	2	2	1
40DV60-171	171			15	2	0	2	2	2	3	2	1
40DV60-175	175			15	3	2	2	2	2	4	3	1
40DV60-176C	176	C		15	5	5	4	4	5	6	4	1
40DV60-180	180			15	5	4	4	2	2	3	3	1
40DV60-191	191			15	3	3	5	2	2	3	2	1
40DV60-194B	194	B		15	0	2	3	2	2	2	2	1
40DV60-197A	197	A		15	3	3	3	2	2	3	2	1
40DV60-204B	204	B		15	4	4	3	2	1	2	2	1
40DV60-214C	214	C		15	0	0	3	1	1	2	1	1
40DV60-220A	220	A		15	3	2	2	2	2	3	2	1
40DV60-229B	229	B		15	0	2	3	2	2	3	2	1
40DV60-232A	232	A		15	3	1	1	1	2	2	2	1
40DV60-242A	242	A		15	2	2	2	2	2	2	2	1
40DV60-248	248			15	4	4	4	3	3	3	3	1
40DV60-253B	253	B		15	3	3	3	2	2	3	3	1
40DV60-267	267			15	3	2	2	2	2	3	2	1
40DV60-282A	282	A		15	3	3	3	1	1	3	3	1
40DV60-282C	282	C		15	2	3	4	1	1	4	2	1
40DV60-285	285			15	3	2	2	2	1	3	2	1
40DV60-293	293			15	3	2	2	2	2	3	2	1
40DV60-301A	301	A		15	2	2	2	2	1	2	2	1
40DV60-306B	306	B		15	0	6	5	5	6	5	6	1
40DV60-319A	319	A		15	3	1	2	1	2	3	2	1
40DV60-327A	327	A		15	0	0	0	0	0	3	2	1
40DV60-353C	353	C		15	0	0	0	0	0	0	2	1

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-377	377			15	3	3	3	2	2	2	2	1
40DV60-390B	390	B		15	3	3	2	2	2	2	2	1
40DV60-394A	394	A		15	3	3	3	2	2	3	2	1
40DV60-404A	404	A		15	4	3	3	2	1	3	2	1
40DV60-407	407			15	0	0	3	0	2	4	3	1
40DV60-415B	415	B		15	0	0	3	3	3	4	3	1
40DV60-420A	420	A		15	3	2	2	2	2	2	2	1
40DV60-420B	420	B		15	2	2	2	1	2	3	2	1
40DV60-421	421			15	7	6	4	3	3	4	3	1
40DV60-440	440			15	3	3	4	2	3	5	3	1
40DV60-447	447			15	4	4	2	1	1	3	2	1
40DV60-477A	477	A		15	3	3	2	1	2	3	2	1
40DV60-477B	477	B		15	5	3	5	4	5	5	4	1
40DV60-478A	478	A		15	4	4	3	3	2	4	2	1
40DV60-480	480			15	3	3	4	3	2	4	2	1
40DV60-483B	483	B		15	4	4	3	2	2	3	2	1
40DV60-488A	488	A		15	8	6	6	6	5	1	1	1
40DV60-488B	488	B		15	3	3	3	3	3	4	3	1
40DV60-490	490			15	3	2	2	2	2	3	2	1
40DV60-496B	496	B		15	0	0	2	1	1	2	2	1
40DV60-498	498			15	5	5	4	3	4	4	4	1
40DV60-502	502			15	3	2	3	2	2	2	2	1
40DV60-503	503			15	0	0	0	3	2	3	2	1
40DV60-504	504			15	2	1	2	1	2	2	1	1
40DV60-505	505			15	3	4	2	2	2	4	3	1
40DV60-511	511			15	2	2	2	1	1	2	1	1
40DV60-512	512			15	5	4	4	3	3	3	2	1
40DV60-513	513			15	6	6	5	6	6	6	5	1
40DV60-521	521			15	4	3	3	3	3	3	3	1
40DV60-527	527			15	4	5	5	4	4	5	4	1
40DV60-539	539			15	4	2	3	2	2	3	2	1
40DV60-541A	541	A		15	2	1	3	2	3	1	2	1
40DV60-554	554			15	4	2	3	2	2	2	1	1
40DV60-562	562			15	3	2	2	1	1	3	2	1
40DV60-567	567			15	5	5	3	3	2	3	3	1
40DV60-583B	583	B		15	0	0	6	6	8	0	3	1
40DV60-585	585			15	4	0	4	3	2	3	2	1
40DV60-605	605			15	4	5	5	4	2	3	2	1

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-614	614			15	5	5	4	3	2	2	1	1
40DV60-618	618			15	4	4	3	4	2	3	2	1
40DV60-619A	619	A		15	4	4	3	3	2	3	3	1
40DV60-622B	622	B		15	3	3	2	1	1	2	2	1
40DV60-625	625			15	3	0	3	2	1	4	1	1
40DV60-627	627			15	4	3	3	3	2	4	2	1
40DV60-628A	628	A		15	4	3	3	0	3	3	3	1
40DV60-638	638			15	3	3	3	1	2	3	2	1
40DV60-642	642			15	4	4	4	2	2	3	2	1
40DV60-645B	645	B		15	5	5	5	4	4	0	3	1
40DV60-647	647			15	0	2	2	1	2	4	3	1
40DV60-648	648			15	5	4	4	1	2	2	2	1
40DV60-653	653			15	4	3	4	3	2	3	2	1
40DV60-665A	665	A		15	4	3	3	2	2	4	2	1
40DV60-672	672			15	3	3	2	1	1	2	2	1
40DV60-694	694			15	4	3	3	2	2	3	2	1
40DV60-3B	3	B		15	0	0	4	0	3	4	0	2
40DV60-10A	10	A		15	5	4	4	5	6	6	4	2
40DV60-11B	11	B		15	0	2	4	3	3	3	2	2
40DV60-13	13			15	0	2	4	2	2	4	2	2
40DV60-19B	19	B		15	0	0	0	0	3	0	0	2
40DV60-20	20			15	3	3	3	2	2	3	2	2
40DV60-25A	25	A		15	6	6	7	7	5	6	3	2
40DV60-28	28			15	2	2	4	3	3	3	3	2
40DV60-30A	30	A		15	0	0	0	0	0	3	3	2
40DV60-35B	35	B		15	6	5	3	3	3	4	3	2
40DV60-107B	107	B		15	5	5	6	6	6	5	3	2
40DV60-110	110			15	3	3	3	2	2	0	3	2
40DV60-123B	123	B		15	4	4	3	3	2	3	2	2
40DV60-126B	126	B		15	6	7	5	6	5	3	5	2
40DV60-130B	130	B		15	5	4	3	2	3	4	2	2
40DV60-131	131			15	0	4	3	3	3	3	2	2
40DV60-137B	137	B		15	3	3	3	3	3	4	3	2
40DV60-141A	141	A		15	7	7	4	4	4	4	3	2
40DV60-142A	142	A		15	2	2	3	4	4	2	3	2
40DV60-147D	147	D		15	0	3	2	1	2	3	3	2
40DV60-149	149			15	5	4	3	3	3	3	3	2
40DV60-150	150			15	6	0	6	4	0	6	3	2

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-152A	152	A		15	6	6	5	4	3	6	0	2
40DV60-152B	152	B		15	4	3	5	4	4	5	3	2
40DV60-160B	160	B		15	0	0	3	2	3	4	4	2
40DV60-164	164			15	5	4	5	4	4	4	3	2
40DV60-166	166			15	7	4	4	4	4	5	3	2
40DV60-170	170			15	3	3	4	2	2	3	2	2
40DV60-185A	185	A		15	2	3	2	2	2	3	3	2
40DV60-195	195			15	3	0	2	1	2	4	3	2
40DV60-198	198			15	3	2	2	2	2	3	2	2
40DV60-200	200			15	6	3	4	3	3	4	3	2
40DV60-201A	201	A		15	0	0	3	2	2	3	2	2
40DV60-202	202			15	2	3	5	2	2	4	3	2
40DV60-204A	204	A		15	0	0	3	2	2	3	2	2
40DV60-205A	205	A		15	4	4	4	4	4	3	2	2
40DV60-206A	206	A		15	3	6	4	2	2	3	2	2
40DV60-208	208			15	3	2	3	1	1	2	2	2
40DV60-212	212			15	3	2	3	2	1	2	2	2
40DV60-214B	214	B		15	0	0	3	2	2	3	2	2
40DV60-229A	229	A		15	3	3	3	2	2	3	2	2
40DV60-231	231			15	4	3	3	3	2	2	2	2
40DV60-232B	232	B		15	5	5	4	4	3	4	3	2
40DV60-236	236			15	4	3	3	2	3	4	3	2
40DV60-240A	240	A		15	0	0	5	4	4	3	4	2
40DV60-241A	241	A		15	5	5	4	4	4	3	3	2
40DV60-241B	241	B		15	5	4	4	4	4	4	3	2
40DV60-243	243			15	5	4	3	2	2	5	3	2
40DV60-251	251			15	6	5	4	4	3	3	3	2
40DV60-260B	260	B		15	5	4	4	2	3	3	2	2
40DV60-262	262			15	5	0	3	2	2	3	2	2
40DV60-264B	264	B		15	4	3	3	3	4	5	4	2
40DV60-266A	266	A		15	0	3	4	2	2	4	3	2
40DV60-271A	271	A		15	8	7	7	7	6	3	5	2
40DV60-277A	277	A		15	3	2	3	2	2	3	3	2
40DV60-279	279			15	2	2	2	2	1	3	2	2
40DV60-280A	280	A		15	6	0	0	0	0	0	3	2
40DV60-284A	284	A		15	3	3	4	2	2	4	2	2
40DV60-290	290			15	6	6	4	4	4	5	4	2
40DV60-311A	311	A		15	0	0	0	4	4	2	2	2

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-311B	311	B		15	4	3	3	2	2	3	2	2
40DV60-312A	312	A		15	4	4	4	4	4	4	3	2
40DV60-312B	312	B		15	3	3	4	3	3	4	3	2
40DV60-322	322			15	0	0	0	0	0	0	3	2
40DV60-324B	324	B		15	2	2	3	1	1	3	2	2
40DV60-328	328			15	3	3	3	3	2	4	3	2
40DV60-333	333			15	5	5	5	4	3	4	2	2
40DV60-335A	335	A		15	5	4	4	4	3	5	2	2
40DV60-345	345			15	4	0	0	0	0	0	0	2
40DV60-348	348			15	4	2	3	2	2	3	2	2
40DV60-355	355			15	4	3	3	2	2	3	2	2
40DV60-356	356			15	5	4	4	3	3	4	3	2
40DV60-359A	359	A		15	4	3	3	2	2	3	3	2
40DV60-374	374			15	4	3	3	2	2	4	2	2
40DV60-395	395			15	3	3	3	2	2	3	3	2
40DV60-398	398			15	0	0	0	0	0	0	4	2
40DV60-405	405			15	4	3	3	2	2	4	3	2
40DV60-406	406			15	3	3	3	2	2	4	3	2
40DV60-412A	412	A		15	4	3	2	2	0	4	4	2
40DV60-417A	417	A		15	3	3	3	2	2	4	2	2
40DV60-417B	417	B		15	4	4	3	3	3	3	2	2
40DV60-426	426			15	3	3	3	3	3	5	3	2
40DV60-428	428			15	0	4	4	3	2	4	3	2
40DV60-431	431			15	4	4	4	3	3	4	2	2
40DV60-442B	442	B		15	3	2	2	2	2	4	3	2
40DV60-445	445			15	4	4	4	4	4	4	4	2
40DV60-451	451			15	0	0	2	3	2	3	2	2
40DV60-455	455			15	7	7	6	5	5	6	4	2
40DV60-459	459			15	4	4	4	3	2	4	2	2
40DV60-460	460			15	4	4	4	3	3	4	3	2
40DV60-466	466			15	5	5	4	3	3	4	3	2
40DV60-467	467			15	4	3	4	3	3	4	4	2
40DV60-473	473			15	4	4	4	4	4	4	4	2
40DV60-476B	476	B		15	5	5	4	4	3	4	3	2
40DV60-478B	478	B		15	5	5	4	5	5	6	5	2
40DV60-496A	496	A		15	0	5	0	3	3	4	3	2
40DV60-515	515			15	4	3	3	2	2	3	2	2
40DV60-516B	516	B		15	6	5	5	5	4	4	3	2

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-526A	526	A		15	5	5	4	4	5	5	4	2
40DV60-526B	526	B		15	5	5	4	3	3	4	3	2
40DV60-528	528			15	5	4	4	2	1	2	3	2
40DV60-531	531			15	6	7	6	5	3	4	0	2
40DV60-544	544			15	4	4	4	3	3	3	2	2
40DV60-545A	545	A		15	4	3	3	2	2	3	3	2
40DV60-546	546			15	5	5	5	3	3	6	3	2
40DV60-547	547			15	4	4	4	4	4	4	3	2
40DV60-550	550			15	3	2	3	2	2	3	2	2
40DV60-552	552			15	4	4	4	2	3	3	3	2
40DV60-570	570			15	5	5	4	4	4	5	3	2
40DV60-575	575			15	4	3	3	2	2	3	3	2
40DV60-579	579			15	4	3	3	2	2	3	3	2
40DV60-587B	587	B		15	4	3	3	3	2	4	3	2
40DV60-591	591			15	5	4	4	3	3	4	2	2
40DV60-592	592			15	5	5	4	3	3	4	3	2
40DV60-604	604			15	4	4	3	2	2	3	2	2
40DV60-633	633			15	0	4	0	6	0	4	0	2
40DV60-656	656			15	4	3	3	3	3	4	2	2
40DV60-664	664			15	0	5	0	5	4	5	6	2
40DV60-692	692			15	0	2	2	2	2	0	2	2
40DV60-699	699			15	4	4	4	3	2	3	2	2
40DV60-701A	701	A		15	5	5	4	3	4	4	3	2
40DV60-703A	703	A		15	7	8	4	4	0	4	4	2
40DV60-189A	189	A	15.02		2	2	2	2	2	3	2	0
40DV60-304	304		15.02		3	2	2	1	1	2	2	0
40DV60-364	364		15.02		3	2	2	1	1	2	1	0
40DV60-598B	598	B	15.02		2	1	1	1	1	1	1	0
40DV60-136A	136	A	15.02		2	2	2	1	1	2	1	1
40DV60-589	589		15.02		0	1	2	1	1	2	2	1
40DV60-696	696		15.02		3	2	2	2	2	3	2	1
40DV60-227	227		15.92		3	2	1	2	2	2	2	1
40DV60-278	278		15.92		2	2	2	1	1	2	2	1
40DV60-482	482		15.92		2	2	2	2	2	2	2	1
40DV60-10D	10	D	16.70		0	0	0	0	1	2	1	1
40DV60-250	250		16.70		3	2	3	2	2	2	2	1
40DV60-299A	299	A	16.70		0	3	3	1	1	2	2	1
40DV60-300	300		16.70		3	2	3	2	2	2	2	1

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-561A	561	A	16.70		2	2	2	1	1	2	2	1
40DV60-681	681		16.70		3	2	2	1	1	3	2	1
40DV60-143	143		17.59		2	2	2	2	2	2	1	1
40DV60-270A	270	A	17.59		3	2	1	1	0	0	1	1
40DV60-308	308		17.59		0	3	2	1	0	3	0	1
40DV60-351A	351	A	17.59		3	4	2	2	1	3	2	1
40DV60-403	403		17.59		3	2	2	2	2	2	2	1
40DV60-609	609		17.59		4	2	2	1	1	2	2	1
40DV60-640	640		17.59		3	3	3	2	1	3	2	1
40DV60-9A	9	A	19.27		2	2	2	2	1	2	1	1
40DV60-215B	215	B	19.27		0	0	3	2	2	3	2	1
40DV60-423	423		19.27		2	2	2	2	2	8	1	1
40DV60-507B	507	B	19.27		2	1	2	1	1	2	1	1
40DV60-578	578		19.27		4	4	2	2	1	3	2	1
40DV60-608	608		19.27		0	1	2	1	1	2	2	1
40DV60-6	6			30	5	3	5	0	3	5	6	3
40DV60-19A	19	A		30	4	4	4	2	2	3	3	3
40DV60-29A	29	A		30	2	2	3	2	3	4	3	3
40DV60-30C	30	C		30	4	7	4	4	3	6	5	3
40DV60-101	101			30	5	5	5	6	4	3	4	3
40DV60-102	102			30	6	5	5	5	4	5	3	3
40DV60-103	103			30	7	6	6	7	7	7	7	3
40DV60-118B	118	B		30	5	5	4	4	4	5	4	3
40DV60-126A	126	A		30	6	5	4	2	4	5	5	3
40DV60-136B	136	B		30	4	4	5	4	4	4	4	3
40DV60-148	148			30	6	0	5	4	4	4	4	3
40DV60-156A	156	A		30	5	3	4	3	4	4	3	3
40DV60-158A	158	A		30	4	4	3	3	3	4	3	3
40DV60-169B	169	B		30	7	0	5	0	4	6	4	3
40DV60-194A	194	A		30	6	6	5	4	4	4	5	3
40DV60-196	196			30	3	1	3	2	2	4	3	3
40DV60-218	218			30	0	3	3	3	3	4	4	3
40DV60-220B	220	B		30	3	3	4	3	4	3	4	3
40DV60-230	230			30	3	2	3	2	2	3	3	3
40DV60-255	255			30	4	3	3	3	3	4	4	3
40DV60-260A	260	A		30	6	6	5	3	2	4	4	3
40DV60-273A	273	A		30	3	3	3	2	2	3	3	3
40DV60-282D	282	D		30	4	6	4	4	3	4	4	3

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-299B	299	B		30	4	4	4	3	3	4	3	3
40DV60-315A	315	A		30	5	5	5	4	3	4	4	3
40DV60-319C	319	C		30	4	4	4	4	3	5	3	3
40DV60-323	323			30	0	4	6	4	0	4	4	3
40DV60-332	332			30	6	6	6	4	3	7	3	3
40DV60-341A	341	A		30	6	6	5	4	5	6	6	3
40DV60-341C	341	C		30	5	5	4	3	3	5	4	3
40DV60-347	347			30	5	0	0	0	0	7	0	3
40DV60-349	349			30	7	6	6	5	4	6	4	3
40DV60-354A	354	A		30	7	6	5	5	5	7	5	3
40DV60-381	381			30	5	5	4	4	4	4	4	3
40DV60-390A	390	A		30	7	6	5	5	3	5	4	3
40DV60-391	391			30	8	7	5	5	3	0	3	3
40DV60-411	411			30	4	4	4	3	4	5	4	3
40DV60-415A	415	A		30	3	3	5	3	3	5	4	3
40DV60-432A	432	A		30	7	7	6	0	6	7	6	3
40DV60-433	433			30	7	7	6	6	4	2	2	3
40DV60-435B	435	B		30	5	5	4	3	3	4	3	3
40DV60-436B	436	B		30	4	4	4	4	3	4	3	3
40DV60-437A	437	A		30	5	4	4	4	3	5	4	3
40DV60-437B	437	B		30	6	7	6	5	4	7	5	3
40DV60-441	441			30	4	3	3	3	3	5	5	3
40DV60-471	471			30	5	5	5	5	5	6	5	3
40DV60-491	491			30	7	5	5	6	4	7	4	3
40DV60-508MIS	508	MIS		30	6	7	5	5	4	0	4	3
40DV60-516A	516	A		30	6	6	5	4	4	4	4	3
40DV60-517B	517	B		30	6	5	5	4	4	6	4	3
40DV60-540	540			30	5	0	5	4	3	5	2	3
40DV60-553B	553	B		30	5	5	4	3	3	5	4	3
40DV60-555	555			30	4	4	4	3	3	4	4	3
40DV60-560	560			30	6	6	6	4	2	4	5	3
40DV60-563	563			30	6	6	5	7	6	5	5	3
40DV60-568B	568	B		30	5	5	4	3	4	5	4	3
40DV60-577B	577	B		30	5	4	4	4	3	3	3	3
40DV60-580	580			30	5	5	5	5	5	6	4	3
40DV60-586	586			30	7	7	5	6	7	4	4	3
40DV60-588	588			30	5	5	4	4	3	5	4	3
40DV60-603	603			30	5	4	5	4	3	5	4	3

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-623	623			30	5	4	3	3	3	3	2	3
40DV60-624	624			30	6	6	6	7	4	6	6	3
40DV60-628	628			30	0	0	0	2	2	3	3	3
40DV60-660	660			30	0	0	0	3	2	4	4	3
40DV60-666	666			30	6	6	6	3	3	4	0	3
40DV60-674	674			30	6	7	7	7	6	4	0	3
40DV60-679	679			30	0	6	5	4	3	4	4	3
40DV60-695	695			30	5	5	4	3	3	4	3	3
40DV60-700A	700	A		30	5	5	5	3	3	5	3	3
40DV60-35A	35	A		30	5	4	4	3	0	4	2	4
40DV60-100	100			30	6	6	6	7	7	7	5	4
40DV60-168	168			30	6	6	5	6	5	6	5	4
40DV60-184	184			30	0	6	5	4	4	5	4	4
40DV60-207	207			30	7	7	7	7	6	6	5	4
40DV60-214A	214	A		30	5	5	5	4	5	4	4	4
40DV60-225A	225	A		30	5	4	4	3	3	5	4	4
40DV60-225C	225	C		30	0	5	4	5	5	6	6	4
40DV60-252A	252	A		30	8	8	8	6	5	6	6	4
40DV60-256A	256	A		30	5	5	4	4	4	5	5	4
40DV60-258	258			30	0	6	5	4	4	0	0	4
40DV60-259	259			30	5	4	4	4	3	6	5	4
40DV60-287A	287	A		30	7	7	7	5	5	6	6	4
40DV60-297	297			30	7	6	7	4	3	4	4	4
40DV60-318	318			30	5	4	4	3	4	4	4	4
40DV60-330A	330	A		30	6	6	5	4	4	4	4	4
40DV60-334	334			30	5	5	4	4	4	5	4	4
40DV60-363	363			30	5	0	8	7	7	6	4	4
40DV60-401A	401	A		30	7	0	6	6	0	5	3	4
40DV60-418	418			30	7	7	6	6	6	7	4	4
40DV60-430A	430	A		30	4	4	8	8	8	8	5	4
40DV60-435A	435	A		30	4	0	5	4	5	6	5	4
40DV60-442A	442	A		30	6	6	7	4	3	8	8	4
40DV60-443A	443	A		30	3	0	4	4	3	4	4	4
40DV60-446	446			30	6	5	6	5	4	6	5	4
40DV60-462	462			30	0	0	6	6	5	5	5	4
40DV60-501	501			30	0	5	5	4	4	6	5	4
40DV60-519	519			30	0	0	5	4	4	5	4	4
40DV60-583C	583	C		30	5	5	4	4	4	6	5	4

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-621A	621	A		30	5	5	4	4	4	5	5	4
40DV60-687	687			30	7	7	6	7	7	4	0	4
40DV60-693	693			30	0	0	0	0	0	0	5	4
40DV60-139	139			30	7	7	5	6	7	7	3	5
40DV60-147A	147	A		30	6	6	6	3	4	4	4	5
40DV60-157	157			30	4	12	4	5	5	5	4	5
40DV60-287B	287	B		30	7	6	7	6	6	6	6	5
40DV60-289B	289	B		30	5	6	5	4	4	5	4	5
40DV60-295A	295	A		30	0	6	7	7	7	8	5	5
40DV60-520	520			30	7	7	6	7	3	6	6	5
40DV60-561B	561	B		30	5	5	4	5	4	6	6	5
40DV60-600	600			30	5	5	6	6	6	7	6	5
40DV60-626	626			30	5	5	5	5	5	7	5	5
40DV60-14A	14	A		30	0	0	5	0	4	6	5	6
40DV60-181	181			30	6	6	7	5	6	2	2	6
40DV60-400	400			30	8	0	7	4	5	7	7	6
40DV60-525	525			30	5	5	5	5	5	6	6	6
40DV60-533	533			30	5	6	6	6	6	6	6	6
40DV60-551	551			30	7	7	6	8	6	6	6	6
40DV60-457	457			30	0	4	5	5	5	8	6	7
40DV60-472	472			30	8	7	7	6	6	7	6	7
40DV60-489	489			30	7	6	7	6	5	5	6	7
40DV60-616	616			30	0	7	7	8	8	8	8	7
40DV60-8A	8	A		30	0	0	8	0	8	8	8	8
40DV60-147C	147	C		30	6	6	6	4	5	7	7	8
40DV60-156B	156	B		30	7	7	6	6	8	8	8	8
40DV60-2	2				0	0	0	0	0	0	0	0
40DV60-7A	7	A			0	4	4	2	0	0	0	0
40DV60-9B	9	B			0	0	0	2	0	2	1	0
40DV60-11A	11	A			0	7	6	0	4	7	3	0
40DV60-16B	16	B			3	2	2	1	1	2	1	0
40DV60-17	17				0	0	2	2	0	0	0	0
40DV60-26	26				0	0	0	0	0	0	0	0
40DV60-29B	29	B			8	7	7	7	7	6	4	0
40DV60-30D	30	D			6	7	4	4	3	4	0	0
40DV60-45B	45	B			0	0	0	0	0	0	0	0
40DV60-104	104				3	0	0	3	2	0	0	0
40DV60-105	105				5	5	5	6	6	6	5	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-106	106				0	8	8	8	7	6	0	0
40DV60-114	114				0	0	0	0	0	0	0	0
40DV60-118A	118	A			0	6	6	7	7	4	6	0
40DV60-122	122				0	5	5	6	6	6	5	0
40DV60-127	127				0	8	7	7	7	3	0	0
40DV60-128	128				0	0	0	0	0	0	0	0
40DV60-132	132				2	1	1	1	1	2	1	0
40DV60-135	135				4	4	4	4	3	4	3	0
40DV60-137A	137	A			0	0	7	7	6	0	0	0
40DV60-140C	140	C			4	8	8	7	4	7	3	0
40DV60-141B	141	B			5	4	4	4	4	4	3	0
40DV60-146A	146	A			6	7	6	5	5	6	5	0
40DV60-146B	146	B			0	0	0	0	0	0	5	0
40DV60-154C	154	C			0	0	0	5	6	0	6	0
40DV60-159	159				4	0	0	5	0	0	0	0
40DV60-160	160				0	6	5	5	4	4	0	0
40DV60-165	165				0	0	7	7	5	0	3	0
40DV60-173	173				0	3	0	3	0	0	0	0
40DV60-174	174				8	8	7	0	0	0	0	0
40DV60-176A	176	A			0	0	0	0	0	0	0	0
40DV60-188A	188	A			0	5	5	6	6	7	0	0
40DV60-189B	189	B			5	4	4	2	2	6	3	0
40DV60-190A	190	A			0	0	0	0	0	0	0	0
40DV60-195B	195	B			5	4	5	4	4	5	4	0
40DV60-199	199				0	5	4	3	3	3	3	0
40DV60-203A	203	A			5	4	5	4	4	5	3	0
40DV60-206B	206	B			4	4	4	4	4	3	3	0
40DV60-206MIS	206	MIS			0	0	0	0	0	0	0	0
40DV60-213	213				3	0	0	0	0	3	0	0
40DV60-215A	215	A			6	7	6	4	0	0	5	0
40DV60-216A/B	216	A/B			0	0	0	0	0	0	0	0
40DV60-223	223				0	0	0	0	0	0	0	0
40DV60-225B	225	B			6	6	4	3	3	3	3	0
40DV60-228B	228	B			0	0	0	0	0	0	0	0
40DV60-241C	241	C			5	5	4	3	2	3	2	0
40DV60-241D	241	D			4	0	3	0	0	0	0	0
40DV60-241E	241	E			0	0	0	0	0	0	0	0
40DV60-242B	242	B			5	0	5	0	3	6	4	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-244	244				0	0	0	4	4	6	7	0
40DV60-247	247				0	6	0	0	7	7	7	0
40DV60-263A	263	A			5	4	4	5	4	2	5	0
40DV60-264A	264	A			0	0	5	0	5	2	2	0
40DV60-284B	284	B			0	0	0	0	0	0	0	0
40DV60-288A	288	A			0	0	5	6	3	3	5	0
40DV60-291B	291	B			6	5	5	5	4	5	6	0
40DV60-296	296				0	0	0	0	0	0	0	0
40DV60-310	310				2	1	1	1	1	2	2	0
40DV60-313	313				0	0	0	0	0	0	0	0
40DV60-315B	315	B			0	0	0	0	3	4	4	0
40DV60-317A	317	A			6	0	0	0	1	0	0	0
40DV60-319B	319	B			7	0	6	7	6	0	0	0
40DV60-324A	324	A			0	0	0	7	0	0	0	0
40DV60-329A	329	A			4	4	0	0	0	3	2	0
40DV60-329B	329	B			0	0	0	0	0	0	0	0
40DV60-330B	330	B			0	0	0	0	0	0	0	0
40DV60-335B	335	B			0	1	0	0	0	0	0	0
40DV60-341B	341	B			0	0	6	6	6	6	0	0
40DV60-350	350				0	0	0	0	0	0	0	0
40DV60-351B	351	B			0	0	0	0	0	0	0	0
40DV60-353B	353	B			0	4	3	1	1	4	2	0
40DV60-357B	357	B			0	5	5	5	4	0	0	0
40DV60-358	358				0	0	0	0	0	0	0	0
40DV60-359B	359	B			0	0	0	0	0	0	0	0
40DV60-365	365				0	0	6	0	4	5	0	0
40DV60-368B	368	B			0	0	0	0	0	0	0	0
40DV60-370	370				2	2	2	1	2	3	1	0
40DV60-375B	375	B			0	0	0	0	0	0	0	0
40DV60-382	382				0	0	0	0	0	0	0	0
40DV60-387	387				0	0	0	0	0	0	0	0
40DV60-388A	388	A			0	7	5	4	4	0	4	0
40DV60-388B	388	B			0	3	4	3	3	3	0	0
40DV60-388C	388	C			0	0	0	0	0	0	0	0
40DV60-390	390				3	3	0	0	0	0	0	0
40DV60-397	397				0	0	0	0	0	0	0	0
40DV60-401B	401	B			0	0	0	0	0	0	0	0
40DV60-408	408				0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-409	409				0	3	3	2	2	4	3	0
40DV60-410	410				8	8	8	8	7	5	3	0
40DV60-419A	419	A			0	0	0	0	4	0	4	0
40DV60-420*	420	*			2	3	2	0	0	0	0	0
40DV60-427	427				0	0	0	3	0	0	0	0
40DV60-429	429				0	0	0	0	0	0	0	0
40DV60-432B	432	B			6	6	7	5	5	6	4	0
40DV60-435C	435	C			0	0	3	3	3	3	2	0
40DV60-436A	436	A			0	4	4	2	3	3	2	0
40DV60-439	439				8	7	7	7	6	3	6	0
40DV60-444	444				4	2	4	3	4	4	3	0
40DV60-452	452				0	0	0	0	0	0	0	0
40DV60-456	456				0	0	0	0	0	0	0	0
40DV60-463A	463	A			5	5	4	4	5	5	4	0
40DV60-464	464				0	0	0	0	0	0	0	0
40DV60-465A	465	A			0	0	0	0	0	0	4	0
40DV60-469A	469	A			7	7	6	6	6	7	7	0
40DV60-474	474				0	0	0	0	0	0	0	0
40DV60-477C	477	C			0	0	0	0	0	0	0	0
40DV60-481	481				5	8	8	8	7	8	0	0
40DV60-485	485				0	0	0	0	0	0	0	0
40DV60-487	487				0	0	0	0	0	0	0	0
40DV60-488*	488	*			6	0	0	0	0	0	5	0
40DV60-514	514				6	5	5	3	0	6	2	0
40DV60-517A	517	A			0	0	0	0	0	0	0	0
40DV60-524	524				5	5	3	2	2	3	2	0
40DV60-526*	526	*			4	4	3	3	3	4	0	0
40DV60-528*	528	*			0	0	0	0	0	0	0	0
40DV60-532	532				0	0	0	0	0	0	0	0
40DV60-535	535				0	0	0	0	0	0	0	0
40DV60-536A	536	A			3	3	3	1	1	2	2	0
40DV60-536B	536	B			0	0	0	0	0	0	0	0
40DV60-545*	545	*			5	4	5	3	4	4	4	0
40DV60-545B	545	B			5	5	5	5	4	4	2	0
40DV60-565	565				6	7	6	6	7	8	3	0
40DV60-571	571				0	0	0	0	0	0	0	0
40DV60-583*	583	*			4	6	0	0	0	0	3	0
40DV60-587*	587	*			0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-587A	587	A			7	7	6	7	7	6	6	0
40DV60-593	593				0	0	0	0	0	0	0	0
40DV60-596*	596	*			0	0	4	0	0	0	0	0
40DV60-606	606				0	0	0	0	0	0	0	0
40DV60-607	607				0	0	0	3	0	4	0	0
40DV60-610	610				0	0	0	0	0	0	0	0
40DV60-611*	611	*			0	0	0	0	0	0	0	0
40DV60-615	615				3	0	0	0	0	0	3	0
40DV60-620	620				5	5	4	3	3	4	2	0
40DV60-622*	622	*			4	0	3	0	0	0	0	0
40DV60-628*	628	*			3	0	3	3	3	3	3	0
40DV60-629*	629	*			5	5	5	0	0	2	0	0
40DV60-629B	629	B			0	0	5	4	4	3	4	0
40DV60-630	630				7	0	0	0	0	0	0	0
40DV60-632	632				0	0	0	0	0	0	0	0
40DV60-634	634				4	0	3	3	3	4	3	0
40DV60-636	636				0	0	0	0	0	0	0	0
40DV60-644	644				0	0	0	0	0	0	0	0
40DV60-646	646				0	0	0	0	0	0	0	0
40DV60-650	650				0	0	5	5	4	3	3	0
40DV60-662	662				4	4	3	3	4	7	4	0
40DV60-665B	665	B			0	0	0	0	0	0	0	0
40DV60-667	667				0	0	0	0	0	7	0	0
40DV60-669	669				0	0	0	0	0	0	0	0
40DV60-671	671				0	0	0	0	0	0	0	0
40DV60-673	673				0	0	0	0	0	0	0	0
40DV60-675	675				0	0	0	0	0	0	0	0
40DV60-682	682				0	0	0	0	0	2	0	0
40DV60-683	683				0	0	0	0	0	0	6	0
40DV60-685	685				5	5	6	5	5	6	4	0
40DV60-688	688				7	7	6	4	4	4	5	0
40DV60-689	689				0	0	7	4	4	3	2	0
40DV60-690	690				0	2	0	0	4	0	0	0
40DV60-691	691				0	0	0	0	0	0	0	0
40DV60-705A	705	A			0	0	0	0	0	0	0	0
40DV60-705B	705	B			0	0	0	0	0	0	0	0
40DV60-708	708				0	0	0	0	0	0	0	0
40DV60-709	709				0	0	0	0	0	0	0	0

			Years		Wear Scores							
Compid	Burial	Sub	Dental	Miles	I1	I2	C	P1	P2	M1	M2	M3
40DV60-594	594				5	5	5	4	3	4	3	0

VITA

Brannon Irene Jones was born in Fort Worth, Texas on December 10, 1981. She was raised in Hurst, Texas and attended school at Richland High School, graduating in 2000. She spent the next four years in Waco, Texas where she attended Baylor University and was a member of the Honors Program. Brannon graduated Cum Laude in May 2004 with a Bachelor of Science degree in Forensic Science with minors in Biology and Chemistry. She obtained her M.A. in Anthropology with a focus in biological anthropology from the University of Tennessee in Knoxville in August 2006.

Brannon is currently working on her Ph.D. in Anthropology with a focus in biological anthropology at the University of Tennessee in Knoxville.