Death, disability, and diversity: An investigation of physical impairment and differential mortuary treatment in Anglo-Saxon England

Appendix 1- Comparison of previous osteological data and demographic analysis

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1 Introduction

This appendix discusses the comparison of the current author's and previous researchers' osteological analyses, and the demographic data for each of the 19 analysed sites. This appendix is structured in the same order as the main text: the first nine sites are from the EAS period, the next five from the MAS period, and the final five from the LAS period. Within each period, the sites are ordered alphabetically. Included for each site is 1) a description of category adaptations which were necessary for statistical comparison between the current author's and previous researchers' data, 2) SPSS codes which were utilised for Cohen's weighted kappa tests, 3) a qualitative comparison between the current author's and previous researchers' age and sex data, and 4) graphs of the age and sex distributions for the burial population. The distributions of preservation or completeness levels are provided when possible. The sex/age categories and their abbreviations are provided below in Table 1.1.

Table 1.1- Demographic categories/terms and their abbreviations.

Category	Abbreviation
Adolescent	ADO
Female	F
Foetus	FE
Infant	IN
Male	M
Middle adult	MA
Months	m
Older adult	OA
Older child	OC
Possible female	F??
Possible male	M??
Probable female	F?
Probable male	M?
Unaged	UA
Unsexed	US
Weeks	w
Young adult	YA
Younger child	YC

2 Apple Down

2.1 Comparison of age and sex data

Some adaptation of Harman's (1990) data was necessary to allow for statistical comparison with the current author's data, and for subsequent demographic analysis of the entire burial population (Table 2.1). The codes which were assigned for the different sex and age groups are provided in Table 2.2. A qualitative comparison between the current author's and Harman's (1990) age and sex data is provided in Table 2.3.

Table 2.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Apple Down.

Harman (1990) category	Translated to
?Male/?Female	Probable male/female
2-8 years	Non-adult
5-10, 11-13 years	Older child
12-13, 12-14 years	Adolescent
16-18 years	Adolescent
17-20 years	Young adult
30+, 40+ years	Adult
45+ years	Older adult

Table 2.2- Cohen's weighted kappa codes for sex and age groups at Apple Down.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 2.3- Age/sex data comparison between current author and Harman (1990) for Apple Down.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age range (Bohling) (years)	Age group (Bohling)	Age range (Previous) (years)	Age group (Previous)
AD-1	M	M	26.8	MA	35-40	MA
AD-7B	F	F	27	MA	35-40	MA
AD-9	US	-	12-13	OC	12	OC
AD-17	F	F	39.4	MA	45+	OA
AD-19	M	M	20.6	YA	35-40	MA
AD-25	M	M	33.2	MA	30-35	MA
AD-37	US	-	4.5-7.5m	IN	0.5-0.75	IN
AD-41A	US	-	10.5-11.5	OC	11-12	OC
AD-41B	F?	F	25.2	YA	25-30	MA
AD-50	F	F	18.2	YA	20-25	YA
AD-57	US	-	9.5-11.5	OC	9-10	OC
AD-63	US	M	prob OA	OA	45+	OA
AD-68	M	M	32.7	MA	40-45	MA
AD-70	US	-	5-6	YC	7-8	OC
AD-71	F?	M	60	OA	45+	OA
AD-72	F?	F	Prob MA	MA	45+	OA
AD-79	US	-	14.5-15.5	ADO	15-17	ADO
AD-89	US	-	5.5-6.5	YC	3-4	YC
AD-93	F	F	48.2	MA	45+	OA
AD-97	F?	F	28.7	MA	20-25	YA
AD-100	US	-	3.5-4.5	YC	3-4	YC
AD-105	F	F	29.2	MA	45+	OA
AD-123	M?	M?	37.8	MA	30-35	MA
AD-125	M	M	40.7	MA	40-45	MA
AD-134	F?	F?	24.5	YA	25-30	MA
AD-145	M	M	17-20	YA	30-35	MA
AD-150	M	M	31.7	MA	30-35	MA
AD-161	US	-	4.5-5.5	YC	5-10	OC
AD-162	F?	M	25-35	MA	30-35	MA
AD-174	M	M	32.6	MA	30-35	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test.

As there was substantial agreement between the current author and Harman (1990) with regards to sex assessment (κ=0.73) and age estimation (κ=0.80), the demographic data provided by Harman (1990) was used in all subsequent analysis.

2.2 Demographic analysis

The Apple Down burial population consisted of 125 inhumed individuals (89 adults and 36 non-adults). The preservation of this assemblage was good, with cortical bone still present on many of the bones, and most of the individuals were >50% complete. Individuals defined as ?M or ?F by Harman (1990) were included in the male and female categories respectively. Some of the age ranges provided by Harman (1990) overlapped between two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 2.1). The sex distribution for the adult burial population and the age distribution for the entire burial population from Cemeteries 1 and 2 (see Volume 1, Section 5.3.1) are provided in Figure 2.1-Figure 2.4.

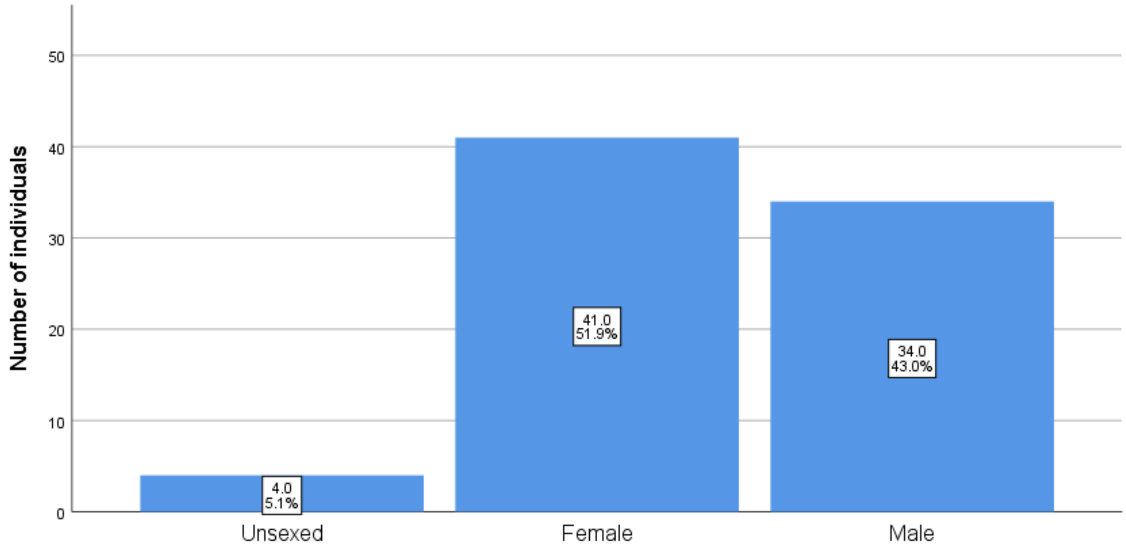

Figure 2.1- Sex distribution for the Apple Down Cemetery 1 adult burial population.

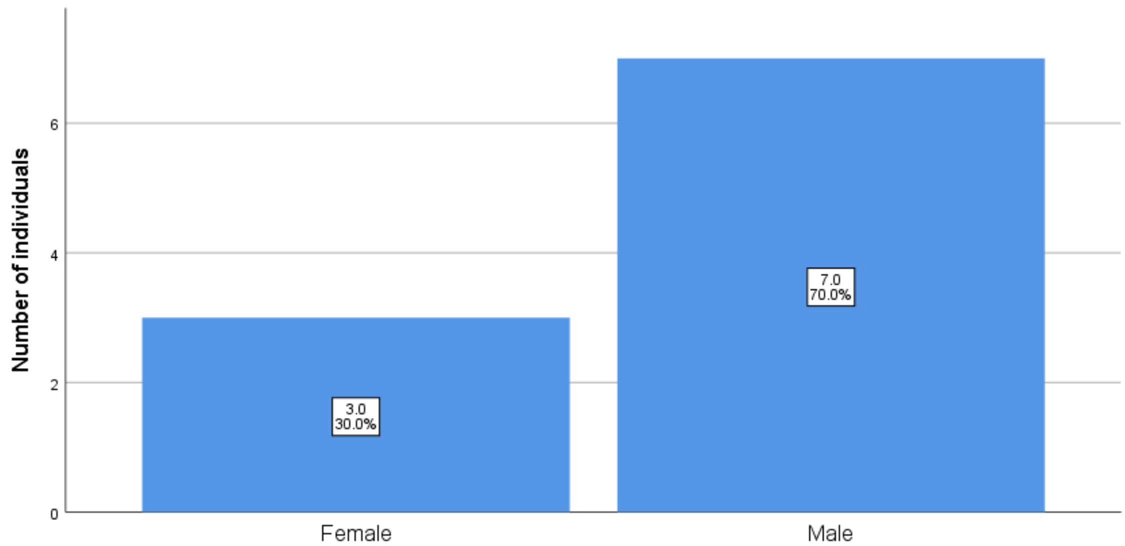

Figure 2.2- Sex distribution for the Apple Down Cemetery 2 adult burial population.

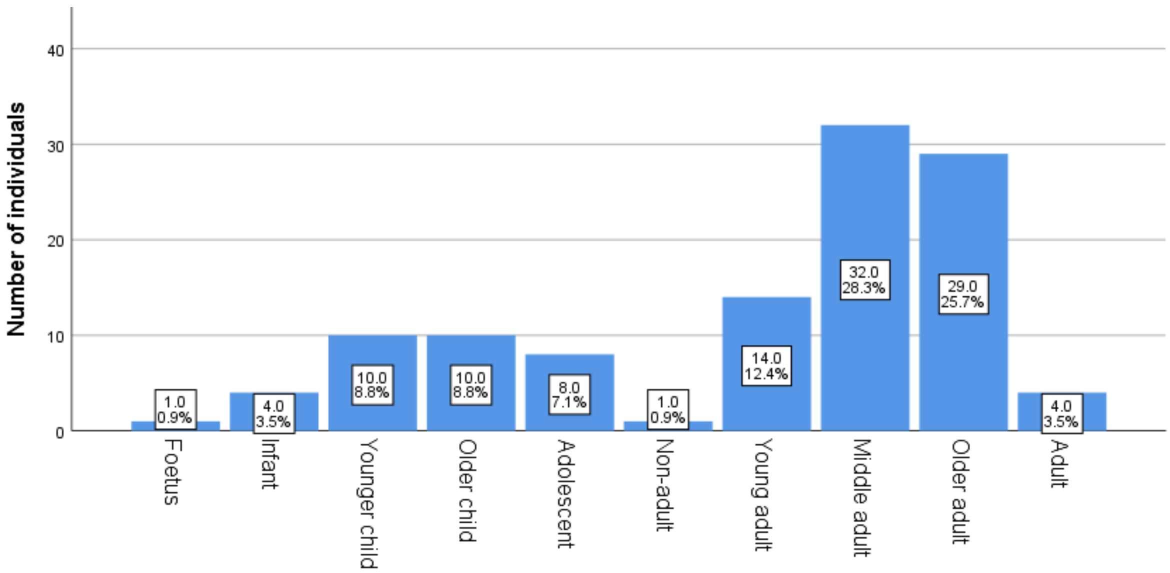

Figure 2.3- Age distribution for the Apple Down Cemetery 1 burial population.

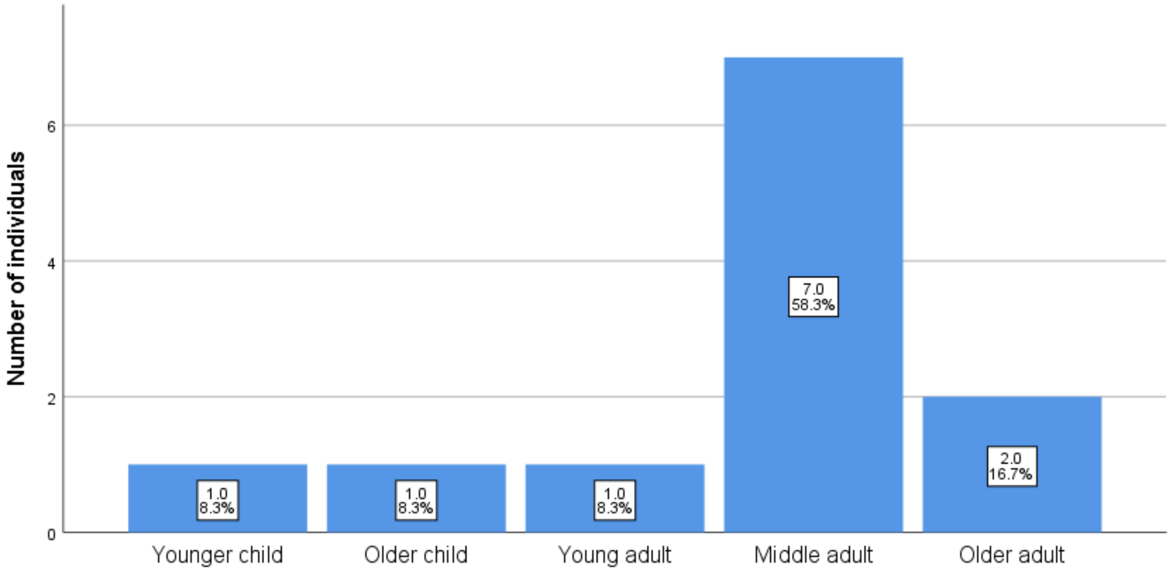

Figure 2.4- Age distribution for the Apple Down Cemetery 2 burial population.

3 Butler's Field

3.1 Comparison of age and sex data

Some adaptation of Harman's (1998) data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 3.1). The codes that were assigned to the different sex and age groups are provided in Table 3.2. A qualitative comparison between the current author's and Harman's (1998) age and sex data is provided in Table 3.3.

Table 3.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Butler's Field.

Harman (1998) category	Translated to
New-born	Infant
5.5-6.5 years	Younger child
6-7 years	Younger child
6-8 years	Older child
12-13 years	Older child
15-18,16-18 years	Adolescent
16-19, 16-20 years	Young adult
17-19, 17-20 years	Young adult
25+, 30+, 40+ years	Adult
45+ years	Older adult

Table 3.2- Cohen's weighted kappa codes for sex and age groups at Butler's Field.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 3.3- Age/sex data comparison between current author and Harman (1998) for Butler's Field.

Ind no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
BF-8	M?	M	33-45	MA	35-40	MA
BF-10	F	F	27.8	MA	25-30	MA
BF-12	US	US	38w-1.5m	FE	New-born	IN
BF-23	US	US	1.5-2.5	YC	*c.*2	YC
BF-33A	US	US	8.5-9.5	OC	9-10	OC
BF-45	F?	F	17-25	YA	25-30	MA
BF-47	F	F	27.4	MA	35-40	MA
BF-54	F	F	18.3	YA	20-25	YA
BF-63	US	US	*c.*12	OC	13-14	ADO
BF-68	F	F	24.8	YA	30-35	MA
BF-79	F	F	26.9	MA	30-35	MA
BF-88	US	US	9.5-11.5	OC	11-12	OC
BF-90	F?	F	25-35	MA	30-35	MA
BF-92	US	M?	12.5-15.5	ADO	16-18	ADO
BF-94	US	F?	15+	UA (ADO or adult)	Adult	Adult
BF-98	US	US	1.5-2.5	YC	2.5-3	YC
BF-100	US	US	6-7.5	YC	7-9	OC
BF-101	F?	F	33-45	MA	45+	OA
BF-121	M?	M	25-32	MA	20-25	YA
BF-123	F	F	29.7	MA	20-25	YA
BF-133	F	F	27.2	MA	18-22	YA
BF-147	M	F	28	MA	35-40	MA
BF-157	US	F	14.5-29	UA (ADO or adult)	18-22	YA
BF-167B	F	F	23.6	YA	19-22	YA
BF-172B	US	US	4-5	YC	2.5-3.5	YC
BF-173	US	US	1.5-2.5	YC	15-18m	YC
BF-180	F?	F	22.9	YA	20-25	YA
BF-192	M?	M?	32.8	MA	Adult	Adult
BF-198	US	US	<1.5m	IN	6-7m in utero	FE
BF-199	US	US	-	Non-adult	3-5?	YC

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test.

As there was moderate agreement between the current author and Harman (1998) with regards to sex assessment (κ=0.54) and almost perfect agreement between the current author and Harman (1998) with regards to age estimation (κ=0.81), the demographic data provided by Harman (1998) was used in all subsequent analysis (see Volume 1, Section 6.1.1).

3.2 Demographic analysis

The Butler's Field burial population consisted of 223 individuals (136 adults, 86 non-adults, and one unaged individual). The levels of completeness and preservation of the skeletal remains were both very good with 50% of the individuals being virtually complete and 71% being in good condition (Figure 3.1 and Figure 3.2).

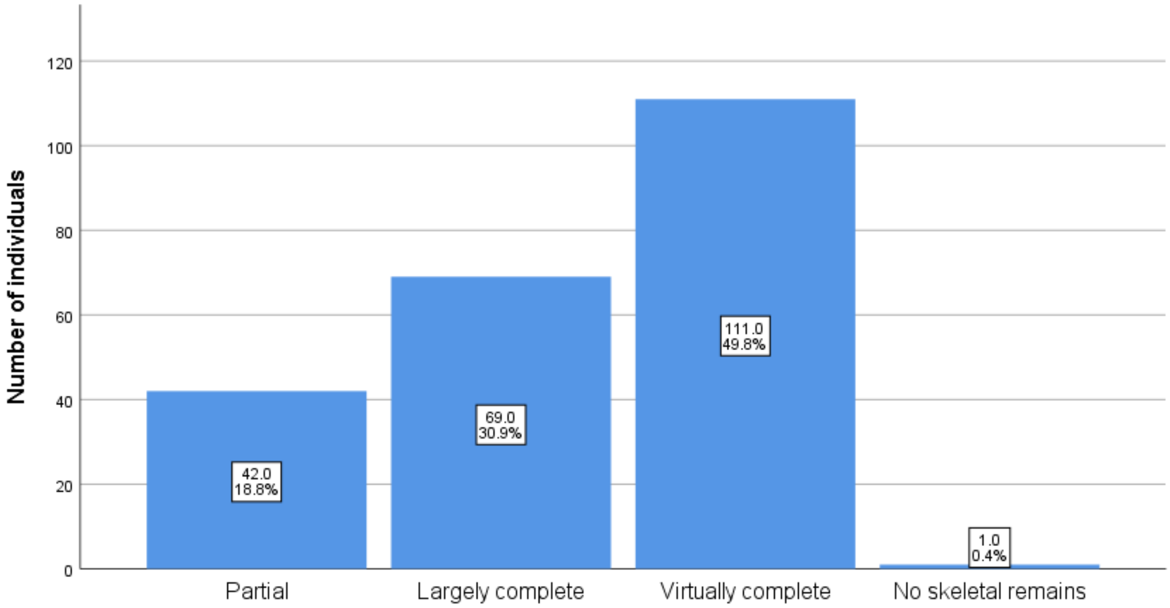

Figure 3.1- Levels of skeletal completeness in the Butler's Field burial population.

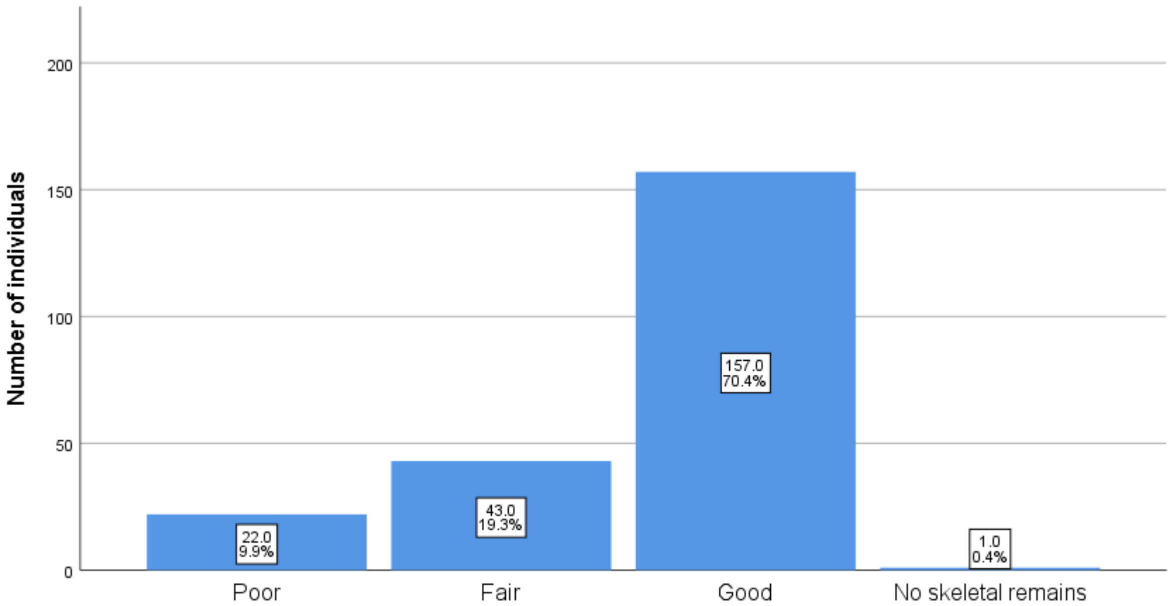

Figure 3.2- Levels of preservation of the skeletal material from the Butler's Field burial population.

Individuals defined as probable male/female by Harman (1998) were included in the male and female categories respectively. It should be noted that seven adolescents were not included in the below sex distribution despite being assessed for sex by Harman (1998), because sex assessment of non-adults is inaccurate (Volume 1, Section 4.3.1). Of these seven, three were recorded as female, two as probable females, and two as probable males. Some of the age ranges provided by Harman (1998) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 3.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are provided in Figure 3.3 and Figure 3.4 respectively.

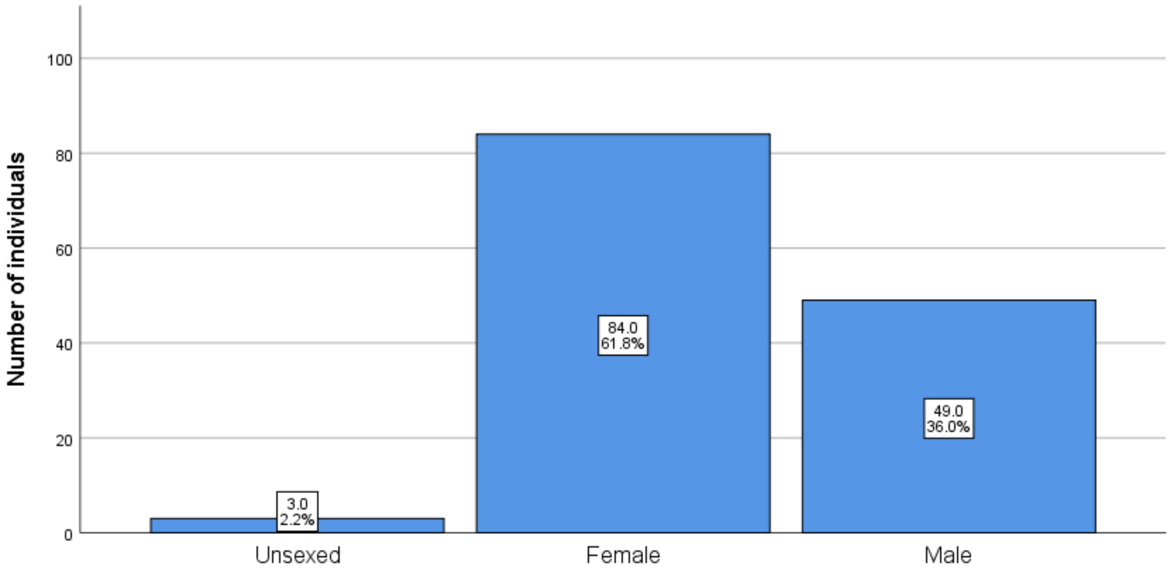

Figure 3.3- Sex distribution for the Butler's Field adult burial population.

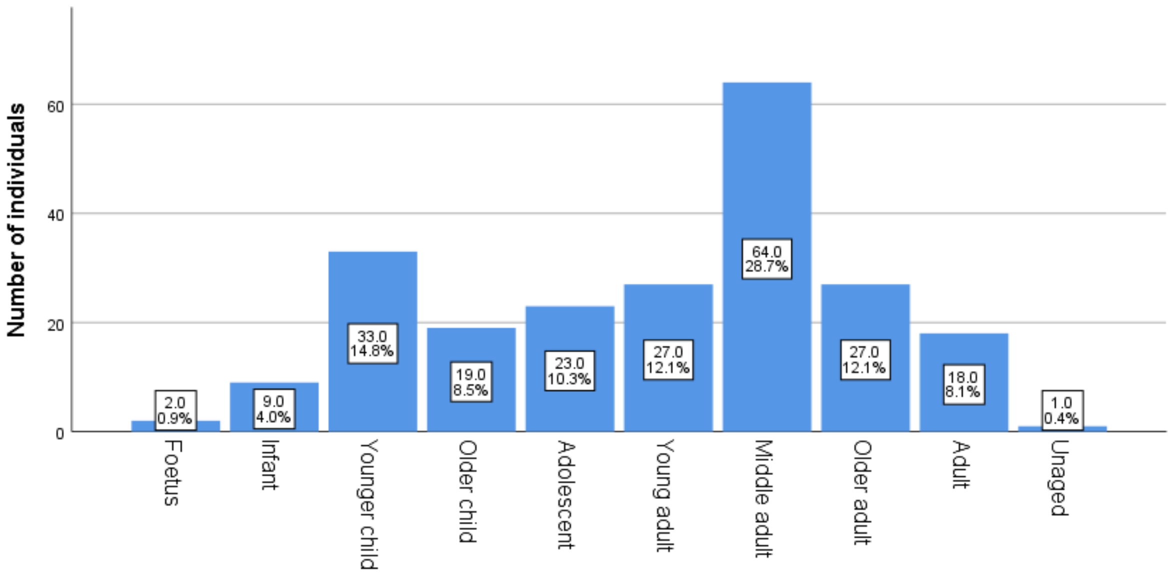

Figure 3.4- Age distribution for the Butler's Field burial population.

There were more females than males, with a F:M ratio of 1.66. Harman (1998) suggests that the high F:M ratio was due to the fact that the entire cemetery was not excavated. Thus, the excavated skeletal burial population may not be a representative sample of the entire cemetery population, as there may have been burial zoning based on gender.

4 Edix Hill

4.1 Comparison of age and sex data

Some adaptation of Duhig's (1998) data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 4.1). The codes which were assigned for the different sex and age groups are provided in Table 4.2. A qualitative comparison between the current author's and Duhig's (1998) age and sex data is provided in Table 4.3.

Table 4.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Edix Hill.

Duhig (1998) category	Translated to
?Male/?Female	Possible male/female
Child/adolescent	Non-adult
Perinatal	Infant
<7 years	Younger child
6-7 years	Younger child
17-18 years	Young adult
17-25 years	Young adult
20-30 years	Middle adult
19-35, 23-35 years	Middle adult
23-59 years	Middle adult
25-29 years	Middle adult
45+ years	Older adult
Adult, possibly 45+ years	Adult
26-70 years	Adult
Adolescent/adult	Unaged
Current author category	**Translated to**
Probable male/female	Male/female

Table 4.2- Cohen's weighted kappa codes for sex and age groups at Edix Hill.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Possible male	2	Infant	2
Unsexed	3	Younger child	3
Possible female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 4.3- Age/sex data comparison between current author and Duhig (1998) for Edix Hill.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
EH-3A1	US	F??	Adult	Adult	Adult	Adult
EH-3A2	US	M??	Adult	Adult	Adult	Adult
EH-12	US	US	6.5-7	YC	4	YC
EH-20B	M? (M)	F	17-23	YA	25	YA
EH-44B	F	F	34.2	MA	35	MA
EH-47	M??	US	Adult	Adult	Adult	Adult
EH-48	M? (M)	M	17-29	YA	25-35	MA
EH-50	US	US	17-23	YA	18-23	YA
EH-156	F? (F)	F	30.6	MA	25-29	MA
EH-177	US	US	Adult	Adult	Adult	Adult
EH-322B	F	F	24.2	YA	25	YA
EH-359	F? (F)	F	17-25	YA	18	YA
EH-372	M	M	31	MA	18-25	YA
EH-428	F	F	43.9	MA	30-34	MA
EH-430C	US	US	<16	Non-adult	<12	Non-adult
EH-436	F? (F)	F	25.1	YA	17-25	YA
EH-440A	F	F	20	MA	25-35	MA
EH-447B	US	US	6.5-7.5	YC	6-7	YC
EH-451A	M	M	69.9	OA	50-59	OA
EH-455	M?	US	*c.*16	ADO	17-18	YA
EH-466	M??	M	Probable OA	OA	Adult	Adult
EH-529	US	US	8.5-9.5	OC	9	OC
EH-547A	F	F	29.1	MA	25-35	MA
EH-584	US	US	2.5-4	YC	3	YC
EH-587	US	US	7.5-8.5	OC	8	OC
EH-679	US	US	1.5-2.5	YC	18m	YC
EH-683A	F??	US	Probable OA	OA	Adult	Adult
EH-719A	M	M	32.7	MA	25-35	MA
EH-725A	F? (F)	F	26	MA	25-35	MA
EH-726	F	F	28.6	MA	17-25	YA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was substantial agreement between the current author and Duhig (1998) with regards to sex assessment (κ=0.77), and almost perfect agreement between the current author and Duhig (1998) with regards to age estimation (κ=0.89), the demographic data provided by Duhig (1998) was used in all subsequent analysis.

4.2 Demographic analysis

The Edix Hill burial population consisted of 148 individuals (103 adults, 44 non-adults, and one unaged individual). The preservation of this burial population was variable, but a majority of the individuals were fairly well preserved and more than 50% complete (Figure 4.1).

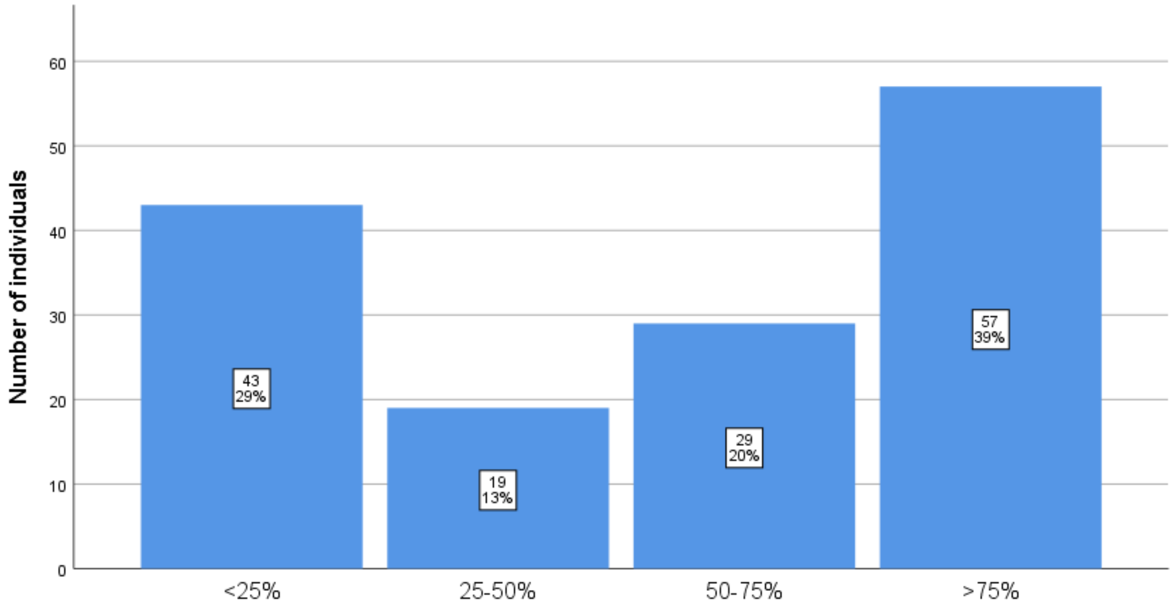

Figure 4.1- Levels of skeletal completeness in the Edix Hill burial population.

Individuals defined as possible males/females by Duhig (1998) were included in the unsexed category as most of these individuals lacked a pubic bone and were sexed based only on skull morphology (Volume 1, Section 4.1.3). Some of the age ranges provided by Duhig (1998) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 4.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 4.2 and Figure 4.3 respectively.

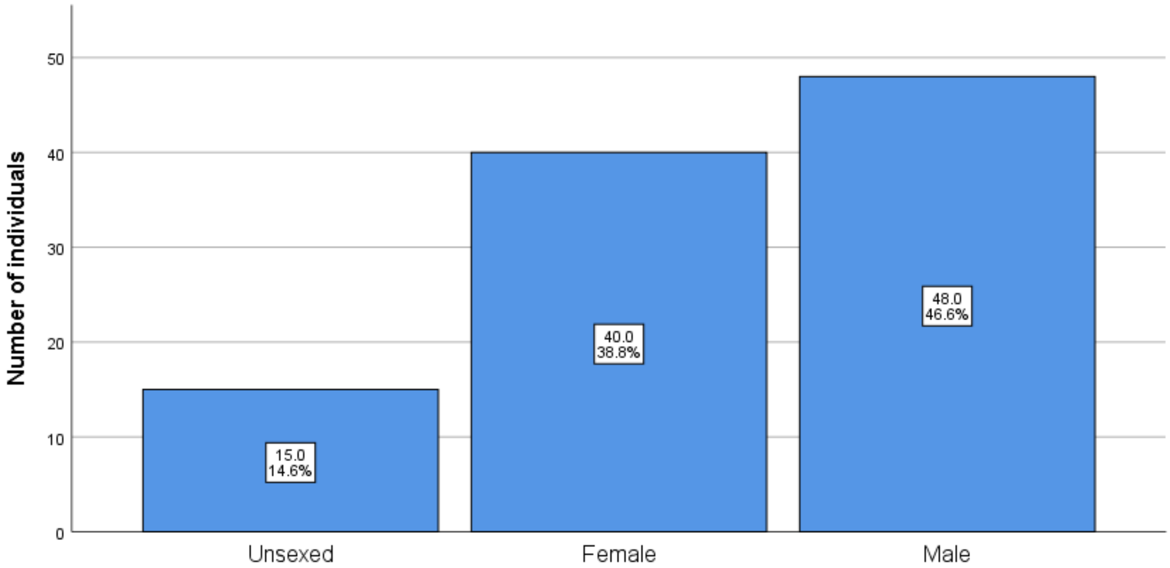

Figure 4.2- Sex distribution for the Edix Hill adult burial population.

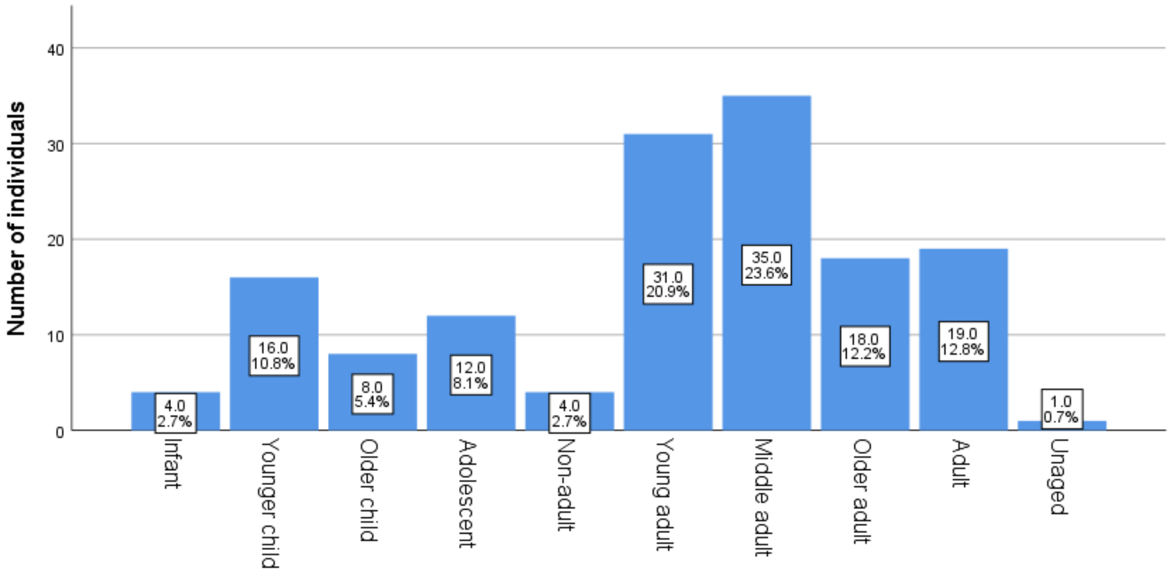

Figure 4.3- Age distribution for the Edix Hill burial population.

5 Finglesham

5.1 Comparison of age and sex data

Some adaptation of the previous osteological data provided in Grainger and Hawkes (2006) was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 5.1). The codes which were assigned for the different sex and age groups are provided in Table 5.2. A qualitative comparison between the current author's data and the data reported in Grainger and Hawkes (2006) is provided in Table 5.3.

Table 5.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Finglesham.

Grainger and Hawkes (2006) category	Translated to
Child	Non-adult
6-8 years	Older child
15-18 years	Adolescent
17-19, 17-20 years	Young adult
17-25 years	Young adult
45-55 years	Older adult
45+ year	Older adult
Adult-old	Older adult
Old/Old?/probably old	Older adult
?Adult	Adult
30+, 35+, 40+ years	Adult
Current author category	**Translated to**
Probable male/female	Male/female
Possible male/female	Unsexed

Table 5.2- Cohen's weighted kappa codes for sex and age groups at Finglesham.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Unsexed	2	Infant	2
Female	3	Younger child	3
		Older child	4
		Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 5.3- Age/sex data comparison between current author and Grainger and Hawkes (2006) for Finglesham.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
FS-13	M	M	31.9	MA	30-40	MA
FS-25	US	M	ADO or adult	UA	Adult	Adult
FS-30	M? (M)	M	22.4	YA	25-30	MA
FS-32	F? (F)	F	17-25	YA	25	YA
FS-33	M? (M)	M	-	Adult	40	MA
FS-48	M? (M)	M	17-25	YA	20-25	YA
FS-55	M? (M)	M	45+	OA	50	MA
FS-67	M?? (US)	M	17-25	YA	25	YA
FS-70	US	F	3.5-5.5	YC	3-5	YC
FS-77	US	US	15.5-16.5	ADO	15-17	ADO
FS-92	F	F	45+	OA	Adult	Adult
FS-111	US	US	7.5-8.5	OC	7-8	OC
FS-113	F	F	21.9	YA	25-30	MA
FS-128	US	US	18-19	YA	15	ADO
FS-137	US	US	1.5-3.5	YC	1.5	YC
FS-138	F	F	34.5	MA	25	YA
FS-144	M? (M)	M	41.5	MA	20-25	YA
FS-149	US	US	25-35	MA	30	MA
FS-159	M? (M)	M	45+	OA	40-45	MA
FS-165	M	M	46.3	MA	35-40	MA
FS-185	US	F	25-35	MA	25	YA
FS-193	M	M	19.2	YA	20-25	YA
FS-197	US	F	ADO or adult	UA	17-20	YA
FS-198	US	M	-	Adult	40+	Adult
FS-199	M? (M)	M	17-25	YA	25	YA
FS-200	US	F	9.5-10.5	OC	10-12	OC
FS-201	US	F	5.5-7.5	YC	6-8	OC
FS-211B	US	F	12+	UA	Adult	Adult
FS-212	M	M	66.5	OA	Adult-older	OA
FS-214	F? (F)	M	45+	OA	45+	OA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was substantial agreement between the current author and Grainger and Hawkes (2006) with regards to sex assessment (κ=0.71), and substantial agreement between the current author and Grainger and Hawkes (2006) with regards to age estimation (κ=0.77), the demographic data provided by Grainger and Hawkes (2006) was used in all subsequent analysis.

5.2 Demographic analysis

The Finglesham burial population consisted of 212 graves, excluding two which were unexcavated, and two which appeared to be unfinished in antiquity. Of these 212 graves, 15 contained no skeletal remains, most likely due to poor preservation. Of the 197 graves which contained skeletal remains, there were 223 individuals (161 adults, 46 non-adults, and one unaged individual). Some of the age ranges provided in Grainger and Hawkes (2006) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 5.1).

The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 5.1 and Figure 5.2 respectively. It should be noted that 13 non-adults were not included in the below sex distribution although they were assessed for sex by the previous authors because sex assessment of non-adults is inconsistent (Volume 1, Section 4.3.1).

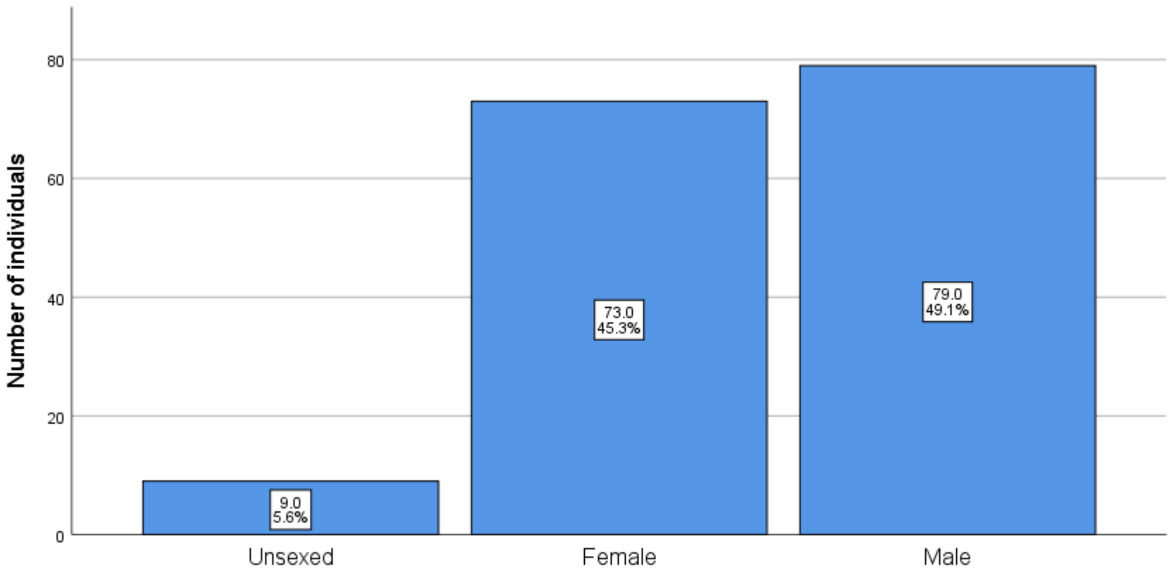

Figure 5.1- Sex distribution for the Finglesham adult burial population.

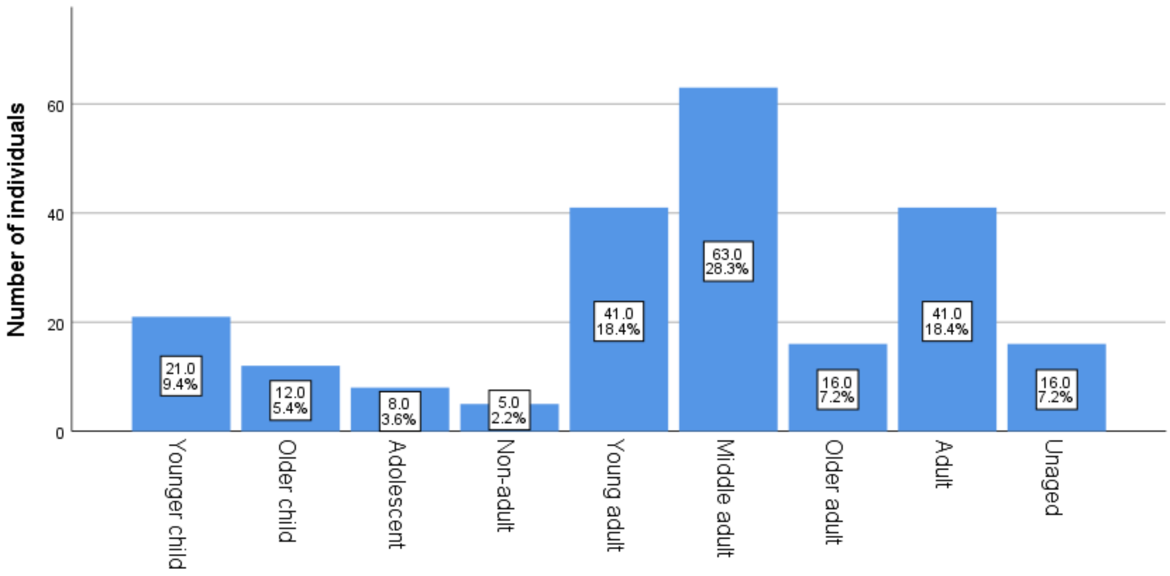

Figure 5.2- Age distribution for the Finglesham burial population.

6 Norton

6.1 Comparison of age and sex data

Some adaptation of Marlowe's (1992) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 6.1). The codes which were assigned for the different sex and age groups are provided in Table 6.2. A qualitative comparison between the current author's and Marlowe's (1992) age and sex data is provided in Table 6.3.

Table 6.1- Data categories and their translations for Cohen's weighted kappa test for Norton East Mill.

Marlowe (1992) category	Translated to
5-9 years	Older child
6-12 years	Older child
12-18 years	Adolescent
15-21 years	Young adult
17-25 years	Young adult
20-30 years	Middle adult
?middle aged	Middle adult
45-61 years	Older adult
Current author category	**Translated to**
Probable male/female	Male/female

Table 6.2- Cohen's weighted kappa codes for sex and age groups at Norton East Mill.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Possible male	2	Infant	2
Unsexed	3	Younger child	3
Possible female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 6.3- Age/sex data comparison between current author and Marlowe (1992) for Norton East Mill.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
NEM-1	F	F	26.3	MA	25-35	MA
NEM-5	US	US	11.5-14.5	ADO	12-18	ADO
NEM-7	US	M	45+	OA	45-61	OA
NEM-12	M??	M	32.3	MA	21-25	YA
NEM-19	US	F	13-16.5	ADO	15-21	YA
NEM-20	M??	M??	25-35	MA	25-35	MA
NEM-23	F? (F)	F??	25-45	MA	25-35	MA
NEM-24	US	M	12.5-18	ADO	15-21	YA
NEM-26	US	US	-	Non-adult	6-12	OC
NEM-27	US	US	6.5-7.5	OC	5-9	OC
NEM-28	F? (F)	F	15.5-16.5	ADO	15-21	YA
NEM-36	US	M	12.4-14.5	ADO	15-21	YA
NEM-38	F? (F)	F	-	Adult	20-30	MA
NEM-40	F	F	32.8	MA	20-30	MA
NEM-42	US	M	17-25	YA	20-30	MA
NEM-45	US	US	9.5-12.5	OC	12	OC
NEM-49	F	F	42.3	MA	20-30	MA
NEM-56	F? (F)	F	25-35	MA	30-40	MA
NEM-59	F	M	33-45	MA	35-45	MA
NEM-68	US	F	-	Adult	35-45	MA
NEM-73	F? (F)	F	17-25	YA	17-25	YA
NEM-76	US	M	-	Adult	?middle aged	MA
NEM-80A	M??	M	25-35	MA	25-35	MA
NEM-87	F? (F)	F	-	Adult	17-25	YA
NEM-90	F? (F)	M	25-35	MA	25-35	MA
NEM-99	F	F	17-25	YA	17-25	YA
NEM-108	US	US	-	UA	3-5	YC
NEM-110	US	US	7.5-9.5	OC	5-9	OC
NEM-113	M? (M)	M??	-	Adult	32-38	MA
NEM-116	US	US	12+	UA	UA	UA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

Because there was only fair agreement (κ=0.37) between the current author and Marlowe (1992) with regards to sex assessment, re-analysis of the entire burial population was performed by the current author (Volume 1, Section 6.1.2). The demographic data provided by the current author was used in all subsequent analysis (see Volume 1 Section 6.1.2).

6.2 Demographic analysis

The Norton East Mill burial population consisted of 118 individuals (69 adults, 35 non-adults, and 14 unaged individuals). The preservation and completeness of this burial population varied widely from graves with no skeletal remains, to graves with relatively complete skeletons. It must be kept in mind that, due to many of the individuals being less complete/well-preserved (41% of the adult burial population was impossible to assess for sex), there is a high likelihood that some of the individuals who were not well-preserved or complete may have had skeletal evidence of physical impairment that could not be identified.

Individuals defined as probable male/female by Marlowe (1992) were included in the male and female categories respectively, and individuals defined as possible male/female were included in the unsexed category. It should also be noted that a number of the skeletons mentioned in the monograph were not available for analysis, so the previous age and sex data from Marlowe (1992) was used (NEM 3, 33, 75, 77, 80B, 92, 102). The sex distribution for the adult burial population and the age distribution for the entire burial population are provided in Figure 6.1 and Figure 6.2 respectively.

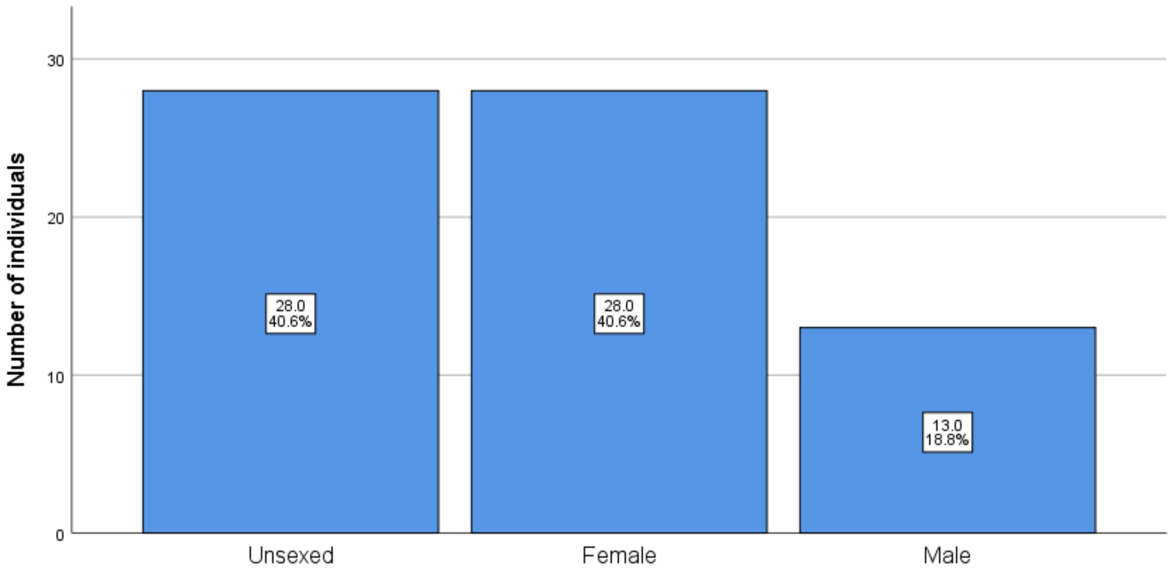

Figure 6.1- Sex distribution for the Norton East Mill adult burial population.

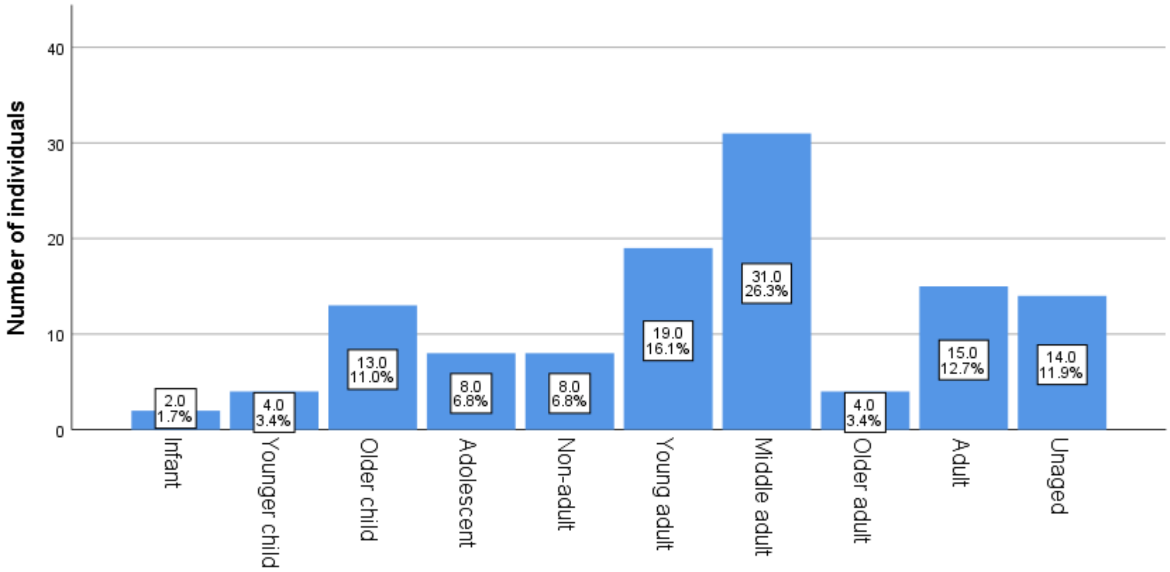

Figure 6.2- Age distribution for the Norton East Mill burial population.

There were more females than males with a F:M ratio of 2.2. It is likely that some of the unsexed adults were male and, given better preservation, it is possible that the sex ratio would have been less exaggerated.

7 St. Anne’s Hill

7.1 Comparison of age and sex data

As two sets of age/sex data were available for this cemetery, the current author’s data was compared to both. Comparison with analysis performed by Sibun (2016) is considered first. Some adaptation of Sibun’s (2016) osteological data was necessary to allow for statistical comparison with the current author’s data (Table 7.1). The codes which were assigned for the different sex and age groups are provided in Table 7.2. A qualitative comparison between the current author’s and Sibun’s (2016) age and sex data is provided in Table 7.3.

Table 7.1- Data categories and their translations for Cohen’s weighted kappa tests comparing data from Sibun (2016) for St. Anne’s Hill.

Sibun (2016) category	Translated to
1-11 years	Non-adult
1-5+ years	Younger child
6-11 years	Older child
12-17 years	Adolescent
18-29 years	Younger adult
30-45+ years	Middle adult
45+ years	Older adult
18-45, 18-45+ years	Adult
30+ years	Adult
12-45+ years	Unaged
Current author category	**Translated to**
Possible male/female	Unsexed

Table 7.2- Cohen’s weighted kappa codes for sex and age groups at St. Anne’s Hill for comparison with Sibun (2016).

Sex group	Code	Age group	Code
Female	1	Foetus	1
Probable female	2	Infant	2
Unsexed	3	Younger child	3
Probable male	4	Older child	4
Male	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 7.3- Age/sex data comparison between current author and Sibun (2016) for St. Anne's Hill.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age (Previous)
SAH-46	M?? (US)	F?	17-25	YA	18-29	YA
SAH-56	F?	F	17-25	YA	30+	Adult
SAH-62	US	F?	45+	OA	45+	OA
SAH-70	M?	M?	45+	OA	45+	OA
SAH-143	M?	M	34.2	MA	18-45	Adult
SAH-146	US	US	17-25	YA	18-45	Adult
SAH-149	US	US	Adult or adolescent	UA	18-45+	Adult
SAH-214	M	M	45+	OA	30-45+	MA
SAH-294	M?	M	45+	OA	30-45+	MA
SAH-331	US	F	17-25	YA	18-45	Adult
SAH-346	M?? (US)	M	45+	OA	30-45+	MA
SAH-358	US	US	-	Non-adult	1-11	Non-adult
SAH-375	F	F	33-45	MA	30-45	MA
SAH-395	US	M	25-35	MA	18-45+	Adult
SAH-402	M	M	45+	OA	30-45+	MA
SAH-450	US	US	2.5-4.5	YC	1-5+	YC
SAH-453	M	M	22.5	YA	18-29	YA
SAH-491	US	US	1.5-2.5	YC	1-5+	YC
SAH-588	M	M	33.1	MA	18-29	YA
SAH-603	US	US	14.5-15.5	ADO	12-17	ADO
SAH-634	US	US	25-35	MA	18-45+	Adult
SAH-637	US	US	11.5-12.5	OC	12-45+	UA
SAH-708	US	US	6.5-8.5	OC	6-11	OC
SAH-773	US	US	11.5-12.5	OC	12-17	ADO
SAH-780	F	F	28.6	MA	30-45	MA
SAH-809	M	M?	27.6	MA	30-45	MA
SAH-821	M	M	37	MA	18-29	YA
SAH-832	M	M	-	Adult	18-45+	Adult
SAH-1037	US	M	prob 45+	OA	30-45+	MA
SAH-1047	US	US	prob 17-25	YA	18-29	YA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

Comparison with osteological analysis performed by Forsyth and Seaman (2015) was also considered. Individuals considered probable male/female by the current author were considered male/female in the kappa analysis to allow for statistical comparison between the two datasets. No adaptation of the age groups provided by Forsyth and Seaman (2015) was necessary as the age ranges were the same as those used by the current author. The codes which were assigned for the different sex and age groups are provided in Table 7.4. A qualitative comparison between the current author's and Forsyth and Seaman's (2015) age and sex data is provided in Table 7.5.

Table 7.4- Cohen's weighted kappa codes for sex and age groups at St. Anne's Hill for comparison with Forsyth and Seaman (2015).

Sex group	Code	Age group	Code
Female	1	Foetus	1
Possible female	2	Infant	2
Unsexed	3	Younger child	3
Possible male	4	Older child	4
Male	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 7.5- Age/sex data comparison between current author and Forsyth and Seaman (2015) for St. Anne's Hill.

Ind. no.	Sex (Bohling)	Sex (Previous) (years)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
SAH-46	M??	M??	17-25	YA	26-45	MA
SAH-56	F? (F)	N/A	17-25	YA	N/A	N/A
SAH-62	US	F??	45+?	OA	46+	OA
SAH-70	M? (M)	M	45+	OA	46+	OA
SAH-143	M? (M)	US	34.2	MA	26-45	MA
SAH-146	US	F??	17-25	YA	26-45	MA
SAH-149	US	US	ADO/adult	UA	18-46+	Adult
SAH-214	M	M	45+	OA	46+	OA
SAH-294	M? (M)	M	45+	OA	18-25	YA
SAH-331	US	F??	17-25	YA	18-25	YA
SAH-346	M??	M??	45+	OA	18-46+	Adult
SAH-358	US	US	-	Non-adult	1-17	Non-adult
SAH-375	F	F	33-45	MA	26-45	MA
SAH-395	US	US	25-35	MA	18-46+	Adult
SAH-402	M	US	45+	OA	46+	OA
SAH-450	US	US	2.5-4.5	YC	1-6	YC
SAH-453	M	M	22.5	YA	18-46+	Adult
SAH-491	US	US	1.5-2.5	YC	1-6	YC
SAH-588	M	M	33.1	MA	46+	OA
SAH-603	US	US	14.5-15.5	ADO	N/A	N/A
SAH-634	US	US	25-35	MA	18-46+	Adult
SAH-637	US	US	11.5-12.5	OC	7-12	OC
SAH-708	US	US	6.5-8.5	OC	7-12	OC
SAH-773	US	US	11.5-12.5	OC	13-17	ADO
SAH-780	F	US	28.6	MA	26-45	MA
SAH-809	M	M	27.6	MA	26-45	MA
SAH-821	M	M	37	MA	18-25	YA
SAH-832	M	M	-	Adult	18-46+	Adult
SAH-1037	US	US	prob 45+	OA	26-45	MA
SAH-1047	US	US	prob 17-25	YA	18-25	YA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

There was substantial agreement between the current author and Forsyth and Seaman (2015) with regards to sex assessment (κ=0.69) and age estimation (κ=0.78) (Volume 1, Section 6.1). Agreement with regards to sex assessment between the current author and Sibun (2016) was only moderate (κ=0.60), while agreement with regards to age estimation was substantial (κ=0.77). As the agreement between the current author and Forsyth and Seaman (2015) was better with regards to sex assessment, the demographic data provided by Forsyth and Seaman (2015) was used in all subsequent analysis (see Volume 1, Section 6.1.3).

7.2 Demographic analysis

There is some discrepancy between the labelling of the skeletons and the recording of the skeletons in the monograph. SAH-55 was recorded by Forsyth and Seaman (2015) but does not exist in the monograph catalogue (Clifford et al. 2016), so it will not be included in further analysis. In addition, Grave 235 (containing SAH-236) is described as the single inhumation of a male aged 18-29 years (Greatorex 2016), but Forsyth and Seaman's (2015) analysis located three individuals (at least two of which were more than 75% complete) labelled SAH-236. The individual called SAH-236A (young adult male) by Forsyth and Seaman (2015) is considered to be the skeleton called SAH-236 by Greatorex (2016) (18-29 year old male) and SAH-236B will not be included in further analysis.

There were several skeletons that had been analysed by Sibun (2016) that were not analysed by Forsyth and Seaman (2015), as they were not present. In these cases (SAH 56, 93, 140, 231, 497, 603, 497, 603, 647, 659, 829, 1002, 1013, and 1051), the age and sex data from Sibun (2016) was utilised. SAH-1002 (1-45+ years) was recorded as unaged, and the remainder of these skeletons conformed to the age category translations provided in Table 7.1.

The St. Anne's Hill burial population consisted of 192 individuals in 191 graves (145 adults, 42 non-adults, and five unaged individuals). In general, the preservation of the skeletal remains was poor, with only 18% of the burial population considered to be at moderate to good levels of preservation (Figure 7.1). Although the preservation was not particularly good, a majority of the burial population were more than 25% complete (Figure 7.2).

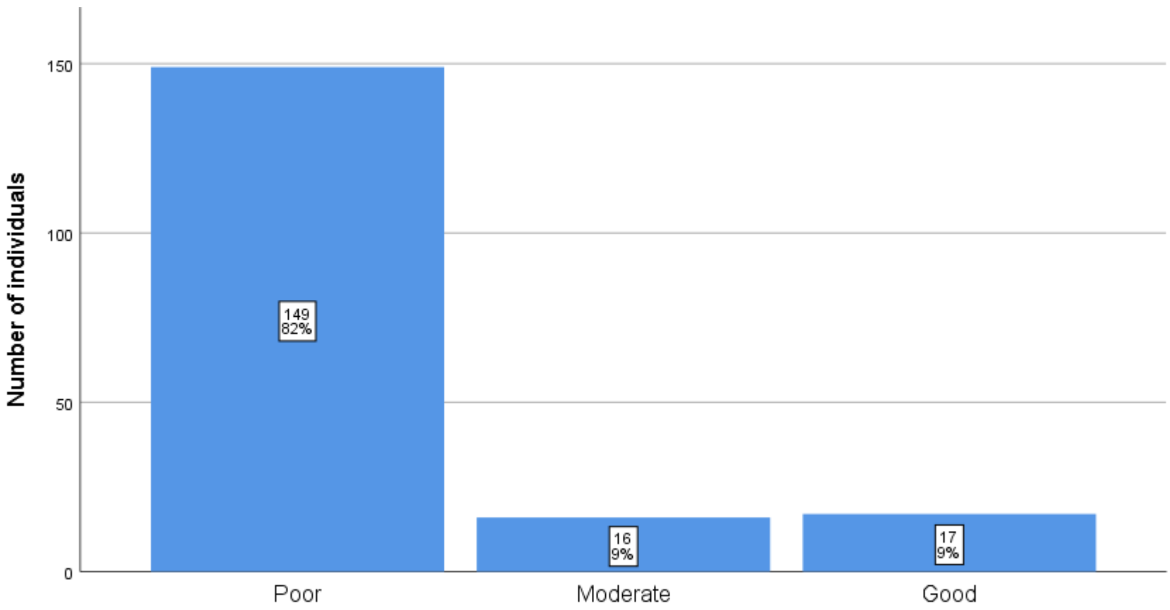

Figure 7.1- Levels of preservation of the skeletal material from the St. Anne's Hill burial population.

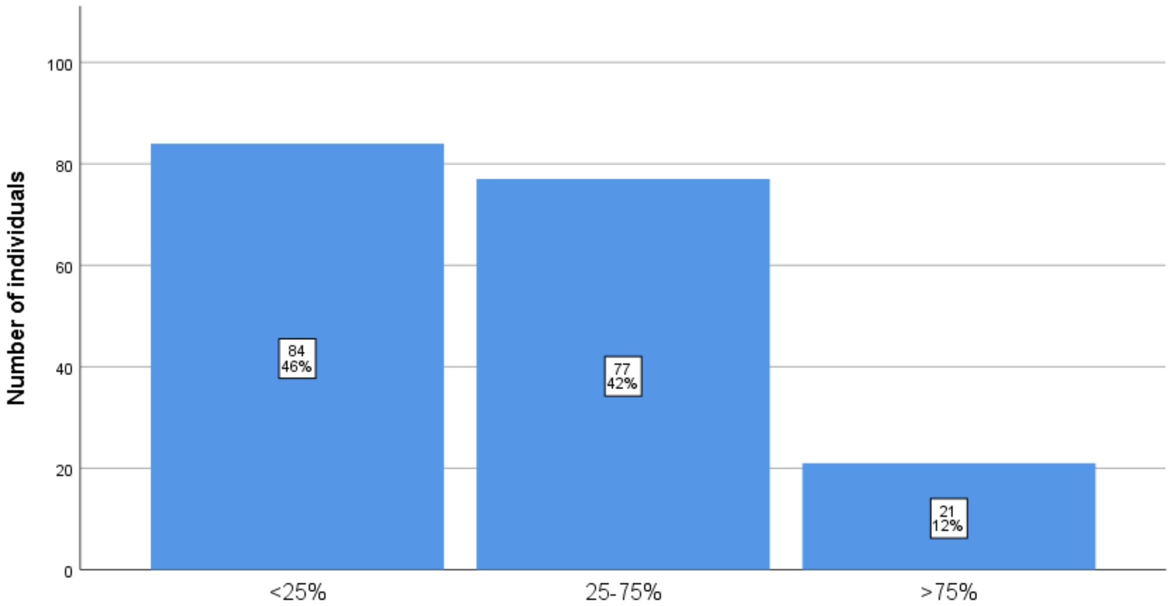

Figure 7.2- Levels of skeletal completeness in St. Anne's Hill burial population.

The sex distribution for the adult individuals and the age distribution for the entire burial population are provided in Figure 7.3 and Figure 7.4 respectively

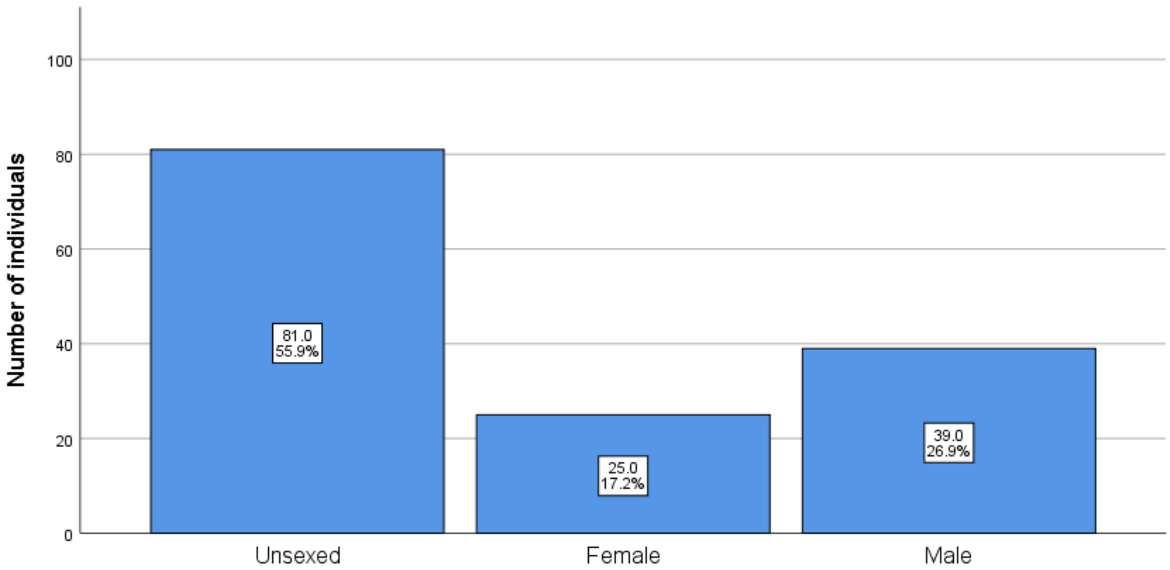

Figure 7.3- Sex distribution for the St. Anne's Hill adult burial population.

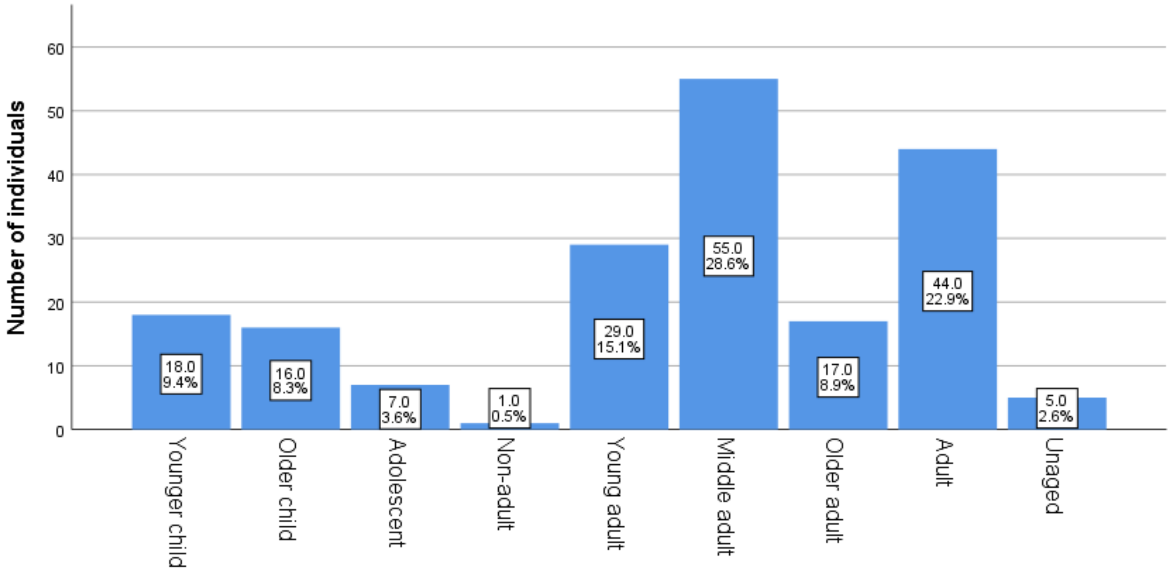

Figure 7.4- Age distribution for the St. Anne's Hill burial population.

8 Watchfield

8.1 Comparison of age and sex data

Some adaptation of previous osteological data provided in Scull et al. (1992) was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 8.1). The codes which were assigned for the different sex and age groups are provided in Table 8.2. A qualitative comparison between the current author's age/sex data and the age/sex data reported in Scull et al. (1992) is provided in Table 8.3.

Table 8.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Watchfield

Scull et al. (1992) category	Translated to
4-8 years	Younger child
Child >7 years	Older child
15-18, 15-20 years	Adolescent
16-20 years	Young adult
40+ years	Adult
45+ years	Older adult

Table 8.2- Cohen's weighted kappa codes for sex and age groups at Watchfield.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Possible male	3	Younger child	3
Unsexed	4	Older child	4
Possible female	5	Adolescent	5
Probable female	6	Young adult	6
Female	7	Middle adult	7
		Older adult	8

Table 8.3- Age/sex data comparison between current author and Scull et al. (1992) for Watchfield.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
WF-2	M	M	29.4	MA	35-40	MA
WF-3	US	US	3-4	YC	5-6	YC
WF-5	M	M	39.5	MA	40-45	MA
WF-9	US	M?	11-16	ADO	18-25	YA
WF-13	US	M?	13.5-16.5	ADO	15-20	ADO
WF-14	F?	F	26.1	MA	20-25	YA
WF-19	US	US	9.5-10.5	OC	10-12	OC
WF-20	US	US	14.5-15.5	ADO	13-14	ADO
WF-27	F?	F?	31.8	MA	Adult	Adult
WF-52	M??	US	25-35	MA	35-40	MA
WF-54	US	US	*c.*16	ADO	14	ADO
WF-66	F?	F	25.4	MA	Adult	Adult
WF-67	M?	M	41.7	MA	20-25	YA
WF-68	M??	F	25.7	MA	Adult	Adult
WF-72	M	M	29.1	MA	25-30	MA
WF-73	M?	M??	45+	OA	40+	Adult
WF-74	M	M	64.5	OA	35-40	MA
WF-76	F?	F	-	Adult	Adult	Adult
WF-77	US	F	17-18	YA	15-20	ADO
WF-81	US	M??	Adult	Adult	Adult	Adult
WF-108	F	F	28.7	MA	25-35	MA
WF-117	M	M	33.1	MA	35-40	MA
WF-304	F	F?	29.1	MA	35-45	MA
WF-307	F	F	23.4	YA	20-25	YA
WF-308	US	US	<2m	IN	7m in utero	FE
WF-318	M?	M?	17-23	YA	18-25	YA
WF-343	US	US	8-9	OC	7-11	OC
WF-345	US	US	3-10.5	Non-adult	<7	YC
WF-348	US	US	probably YC	Non-adult	4-8	YC
WF-350	US	F?	41	MA	35-45	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test.

As there was substantial agreement between the current author and the previous researchers (in Scull et al. 1992) with regards to sex assessment (κ=0.73) and almost perfect agreement between the current author and the previous researchers with regards to age estimation (κ=0.87), the demographic data provided in Scull et al. (1992) was used in all subsequent analysis.

8.2 Demographic analysis

The Watchfield burial population consisted of 43 inhumed individuals (27 adults, 15 non-adults, and one unaged individual). The preservation of this burial population was varied with some individuals largely complete and others highly fragmented, particularly those excavated in 1983 (see Volume 1, Section 5.3.7).

Individuals defined as probable male/females by Harman and Marlow (in Scull et al. 1992) were included in the male/female categories respectively, while individuals defined as possible male/females by Harman and Marlow (in Scull et al. 1992) were considered unsexed. Some of the age ranges provided by Harman and Marlow (in Scull et al. 1992) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 8.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 8.1 and Figure 8.2 respectively.

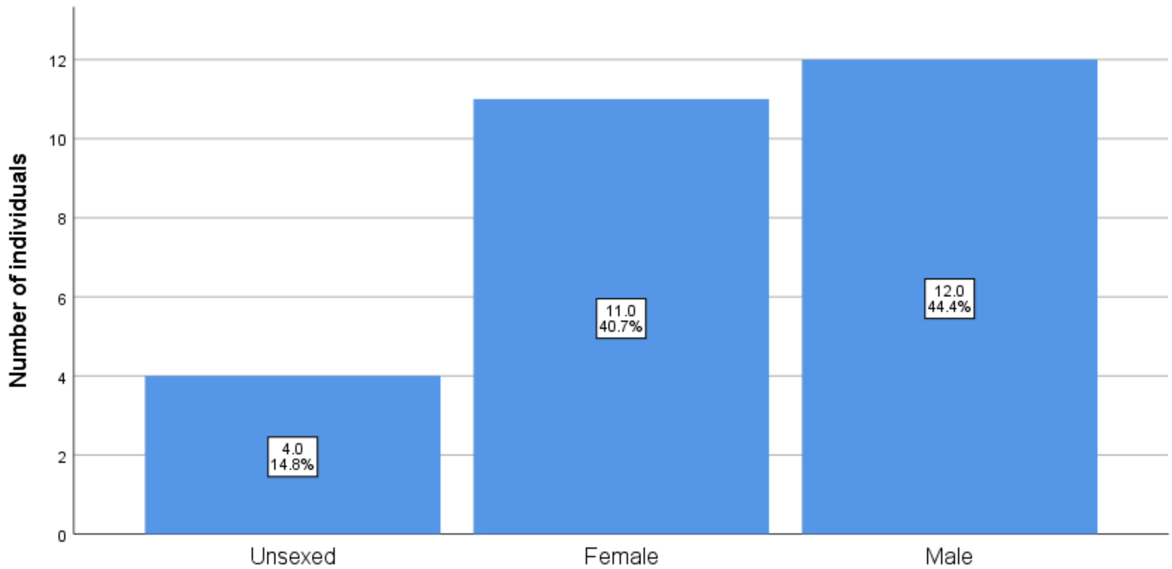

Figure 8.1- Sex distribution for the Watchfield adult burial population.

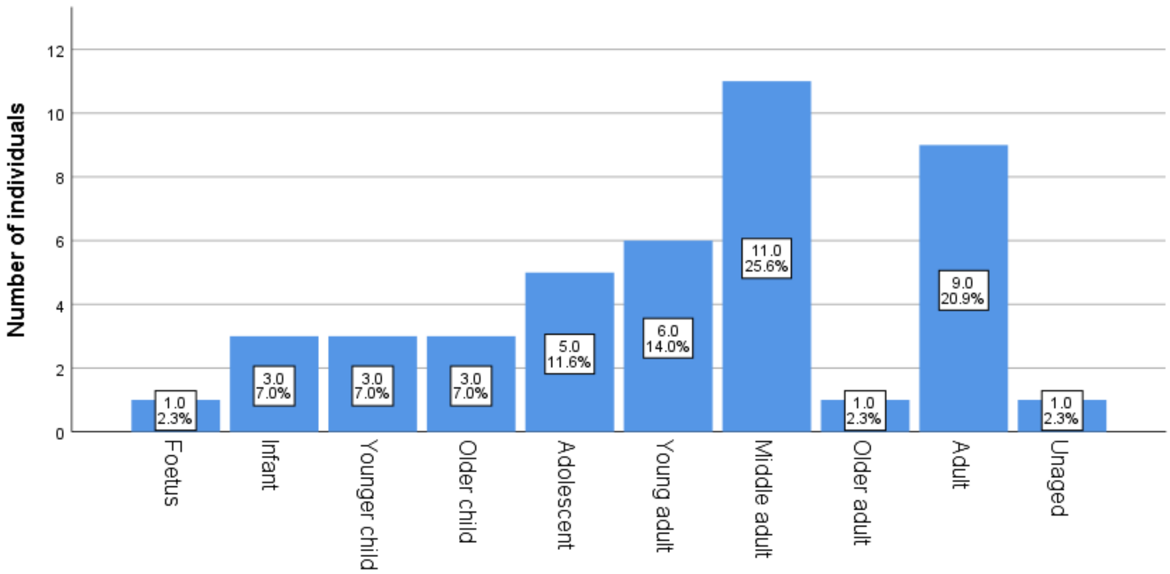

Figure 8.2- Age distribution for the Watchfield burial population.

9 Windmill Hill

9.1 Comparison of age and sex data

Some adaptation of Green's (2016) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 9.1). The codes which were assigned for the different sex and age groups are provided in Table 9.2. A qualitative comparison between the current author's and Green's (2016) age and sex data is provided in Table 9.3.

Table 9.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Windmill Hill.

Green (2016) category	Translated to
Intermediate sex	Unsexed
5-14 months	Infant
7 months- 2 years	Younger child
5-8 years	Older child
5.5-8.5 years	Older child
6.5-10 years	Older child
6-9 years	Older child
11-15 years	Adolescent
14-18, 15-18 years	Adolescent
18-29 years	Young adult
45+	Older adult
MA-OA	Adult
Current author category	**Translated to**
Probable male/female	Male/female

Table 9.2- Cohen's weighted kappa codes for sex and age groups at Windmill Hill.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Possible male	2	Infant	2
Unsexed	3	Younger child	3
Possible female	4	Older child	4
Female	5	Adolescent	5
		Middle adult	7
		Older adult	8

Table 9.3- Age/sex data comparison between current author and Green (2016) for Windmill Hill.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
WMH-6	F	F	19.5-25	YA	18-29	YA
WMH-10	F? (F)	F??	31.3	MA	30-44	MA
WMH-12	F??	F??	31.6	MA	18-29	YA
WMH-18	F	F	17-25	YA	18-29	YA
WMH-19	US	US	17-20	YA	15-18	ADO
WMH-23	US	US	-	Adult	Adult	Adult
WMH-24	M? (M)	M??	33-45	MA	30-44	MA
WMH-26	F	F	37.3	MA	30-44	MA
WMH-27	F??	F	33-45	MA	30-44	MA
WMH-32	M	M??	27.8	MA	18-29	YA
WMH-37	US	US	1.0-1.5	YC	1.5-3.5	YC
WMH-44	M	M	46.4	MA	30-44	MA
WMH-52	F? (F)	US	prob MA	MA	Adult	Adult
WMH-52A	US	US	2.5-3.5	YC	4-5	YC
WMH-53	M	M	34.5	MA	18-29	YA
WMH-59	F	F	34.5	MA	30-44	MA
WMH-61	M	M	45.8	MA	45+	OA
WMH-66	US	US	2.5-5.5	YC	3-6	YC
WMH-67	US	F??	37.4	MA	30-44	MA
WMH-68	F??	F??	17-25	YA	18-29	YA
WMH-70	F	F	46.7	MA	30-44	MA
WMH-71	F	F	17-25	YA	18-29	YA
WMH-75	M? (M)	M??	35.4	MA	45+	OA
WMH-76	US	US	1.5-4.5m	IN	3-6m	IN
WMH-77	US	US	1.5-3.5	YC	1.5-3.5	YC
WMH-79	M	M	45.1	MA	30-44	MA
WMH-80	F	F	55.5	OA	45+	OA
WMH-81	M? (M)	M	17-25	YA	18-29	YA
WMH-86	M? (M)	M??	25-45	MA	30-44	MA
WMH-88	F? (F)	US	-	Adult	45+	OA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was substantial agreement between the current author and Green (2016) with regards to sex assessment (κ=0.76), and almost perfect agreement between the current author and Green (2016) with regards to age estimation (κ=0.87), the demographic data provided by Green (2016) was used in all subsequent analysis.

9.2 Demographic analysis

The Windmill Hill burial population consisted of 85 inhumed individuals (61 adults and 24 non-adults). The preservation and completeness of this burial population was highly variable, but a majority of the skeletons were <50% present (Figure 9.1) and in either poor or poor to fair condition (Figure 9.2). It must be kept in mind that, due to a majority of the individuals being less complete/well-preserved, there is a high likelihood that some of the individuals who were not well-preserved or complete may have had skeletal evidence of physical impairment that could not be identified.

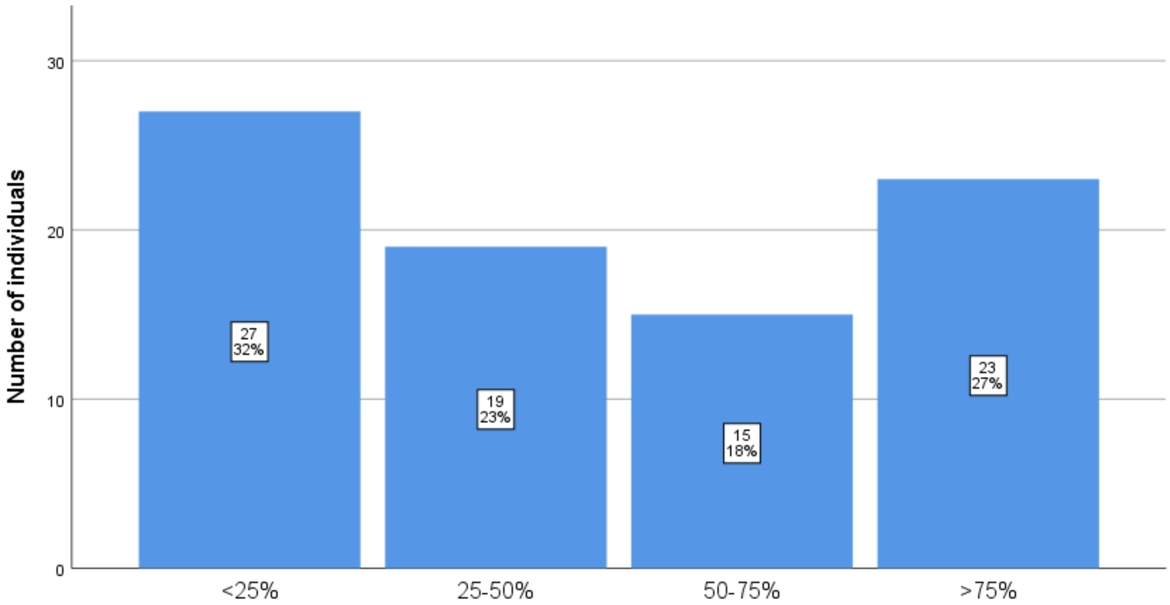

Figure 9.1- Levels of skeletal completeness in the Windmill Hill burial population.

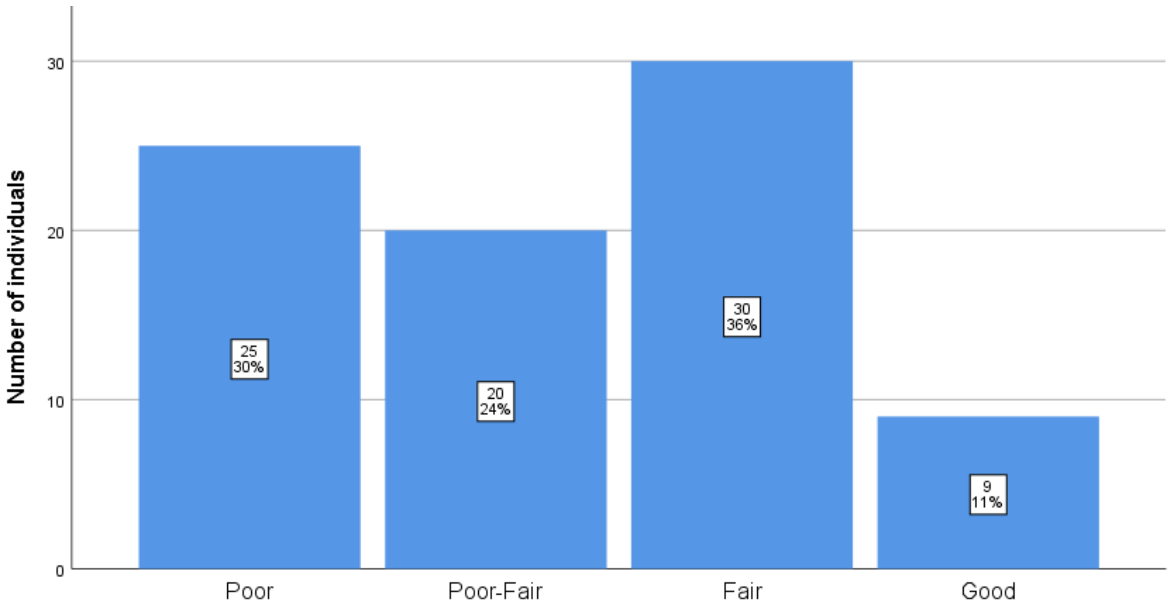

Figure 9.2- Levels of preservation of the skeletal material from the Windmill Hill burial population.

Individuals defined by Green (2016) as possible male/females were placed into the male/female categories. This was because Green (2016) used four sex categories: male/female, possible male/female, intermediate, and indeterminate. It is likely that those individuals in the intermediate category would be more similar to the current author's possible male/female category, while Green's (2016) possible male/female category would be more similar to the current author's probable male/female category. Some of the age ranges provided by Green (2016) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 9.1). The sex distribution for the adult individuals and the age distribution for the entire burial population are provided in Figure 9.3 and Figure 9.4 respectively.

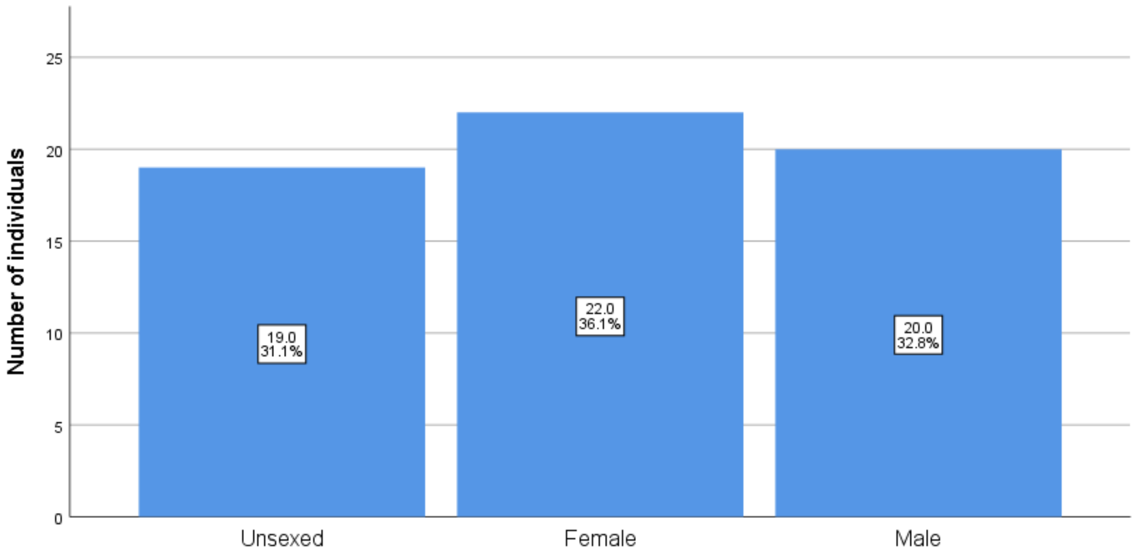

Figure 9.3- Sex distribution for the Windmill Hill adult burial population.

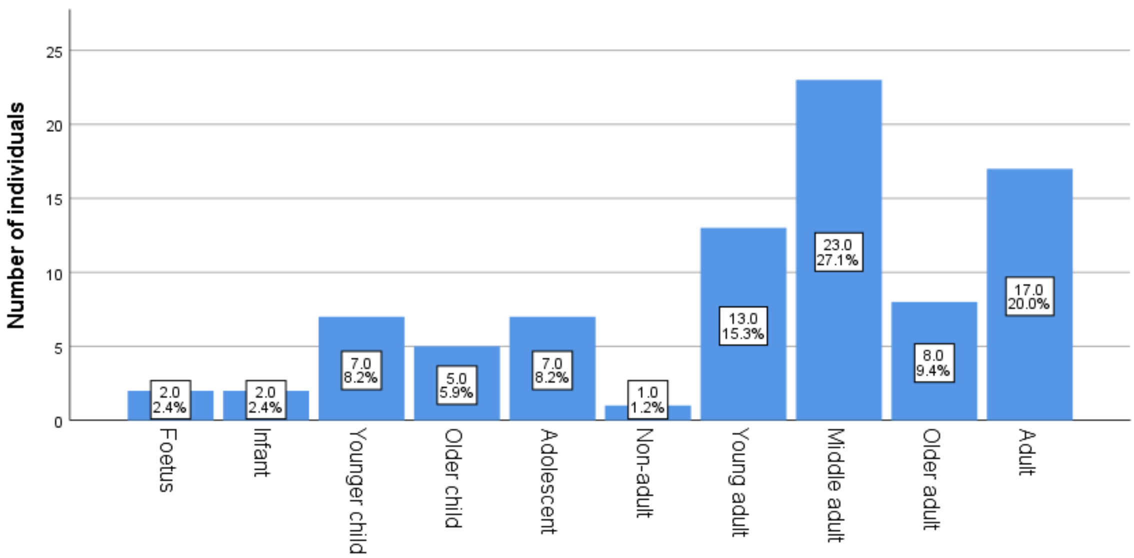

Figure 9.4- Age distribution for the Windmill Hill burial population.

10 Worthy Park

10.1 Comparison of age and sex data

Some adaptation of the data provided in Wells et al. (2003) was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 10.1). The codes which were assigned for the different sex and age groups are provided in Table 10.2. A qualitative comparison between the current author's data and the data reported in Wells et al. (2003) is provided in Table 10.3.

Table 10.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Worthy Park.

Wells et al. (2003) category	Translated to
0-2 years	Infant
6-7 years	Younger child
6-8 years	Older child
18-30 years	Young adult
20-30 years	Young adult
18-35 years	Middle adult
45-55 years	Older adult
30+, 40+ years	Adult
Current author category	**Translated to**
Probable male/female	Male/female

Table 10.2- Cohen's weighted kappa codes for sex and age groups at Worthy Park.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Unsexed	2	Infant	2
Female	3	Younger child	3
		Older child	4
		Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 10.3- Age/sex data comparison between current author and Wells et al. (2003) for Worthy Park.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
WP-5	US	US	8.5-9.5	OC	10	OC
WP-12	F	F	45+	OA	50+	OA
WP-18A	F	F	17-23	YA	21-25	YA
WP-20	F	F	33-45	MA	50+	OA
WP-22	M? (M)	M	24.4	YA	25-30	MA
WP-26A	F	F	33.9	MA	18-30	YA
WP-31	US	US	5.5-7.5	YC	5	YC
WP-33	US	M	17-25	YA	30-40	MA
WP-35	US	US	10.5-11.5	OC	10-12	OC
WP-37	US	US	6.5-7.5	YC	6	YC
WP-42A	F	F	40.5	MA	40+	Adult
WP-43	F	F	35.2	MA	25-30	MA
WP-44	M	M	31.7	MA	35-45	MA
WP-56	US	F	Adult/ADO	UA	Adult	Adult
WP-59	US	US	10.5-12	OC	10	OC
WP-60	F	F	20-25	YA	24-25	YA
WP-65	US	US	FE/IN	Non-adult	0-1	IN
WP-68	F	F	17-25	YA	25-30	MA
WP-69	M	M	29	MA	20?	YA
WP-70	M	M	63.2	OA	40-50	MA
WP-71	US	M	15-17	ADO	16-17	ADO
WP-73	M	M	28	MA	35-45	MA
WP-78	US	F	15.5-6	ADO	13-15	ADO
WP-82	US	F	45+	OA	40-50	MA
WP-84	US	M	17	ADO	18-20	YA
WP-88	US	US	Adult/ADO	UA	c. 18	YA
WP-90	US	M	65.6	OA	35-45	MA
WP-92	M? (M)	M	-	Adult	40+	Adult
WP-94A	M	M	25-35	MA	30-40	MA
WP-94B	US	US	2.5-4.5	YC	4-6?	YC

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was almost perfect agreement between the current author and the previous researchers (in Wells et al. 2003) with regards to sex assessment (κ=0.83) and substantial agreement between the current author and previous researchers (in Wells et al. 2003) with regards to age estimation (κ=0.77), the demographic data provided by previous researchers (in Wells et al. 2003) was used in all subsequent analysis.

10.2 Demographic analysis

The Worthy Park burial population consisted of 104 individuals (72 adults, 29 non-adults, and three unaged individuals), excluding the six empty graves and including the five individuals excavated in 1944 (although the bones of these were not available). The level of preservation at Worthy Park was variable with 56% of the burial population fairly preserved or better (Figure 3.2).

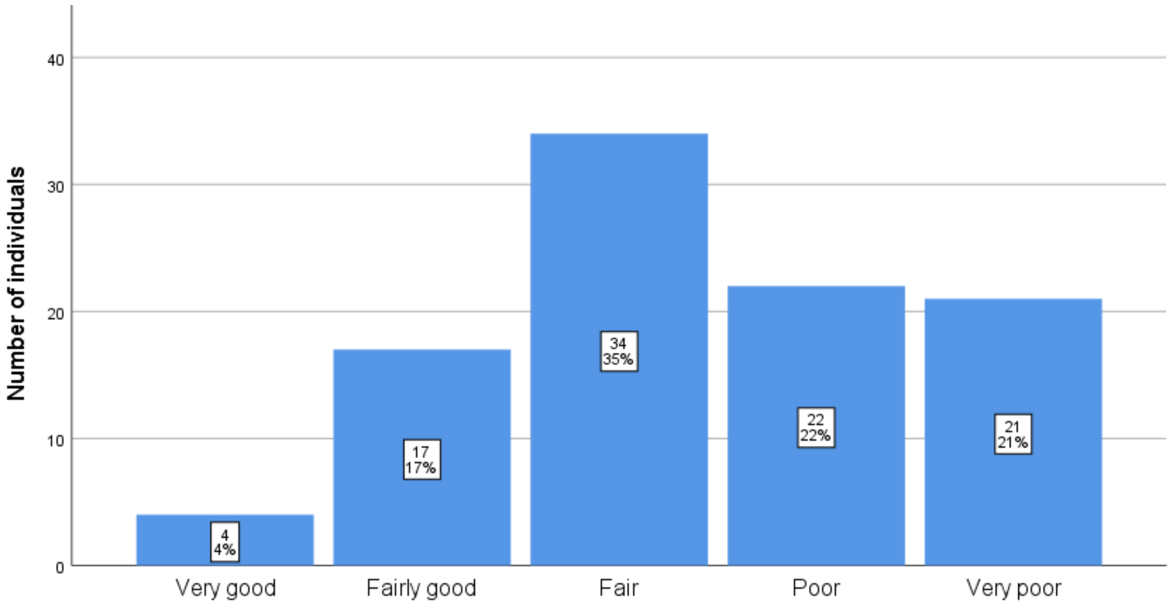

Figure 10.1- Levels of preservation of the skeletal material from the Worthy Park burial population.

For demographic analysis, individuals defined by Wells et al. (2003) as possible male/females were included in the unsexed sex category, while individuals defined by Wells et al. (2003) as probable male/females were included in the male/female categories. Some of the age ranges provided by Wells et al. (2003) overlapped two of the current author’s age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 10.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 10.2 and Figure 10.3 respectively. It should be noted that two adolescents were not included in the below sex distribution, although they were assessed for sex by Wells et al. (2003), because sex assessment of non-adults is not consistent (Volume 1, Section 4.3.1).

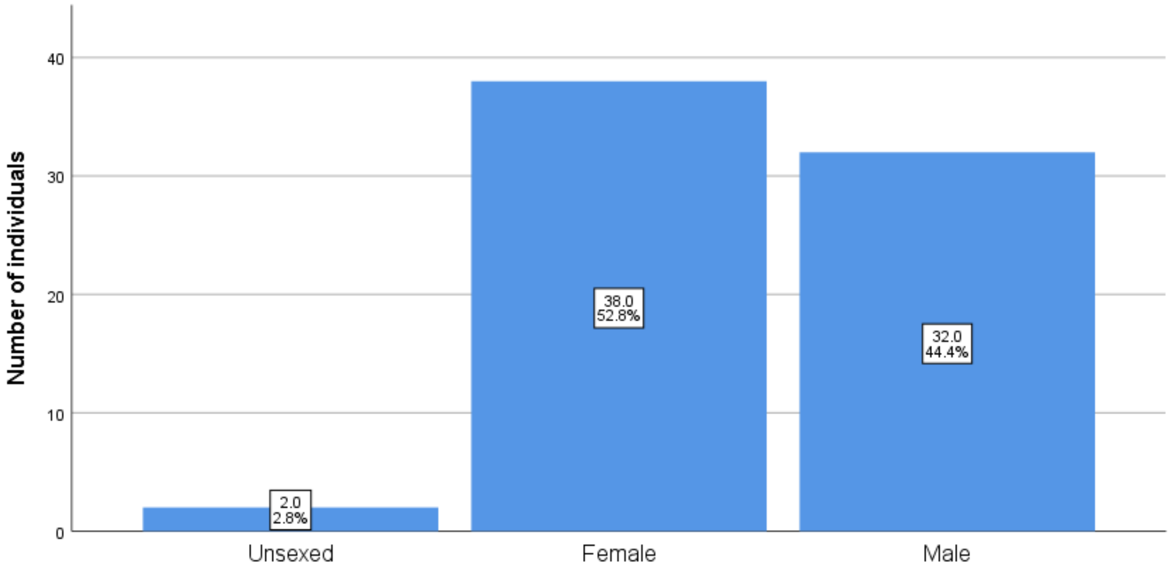

Figure 10.2- Sex distribution for the Worthy Park adult burial population.

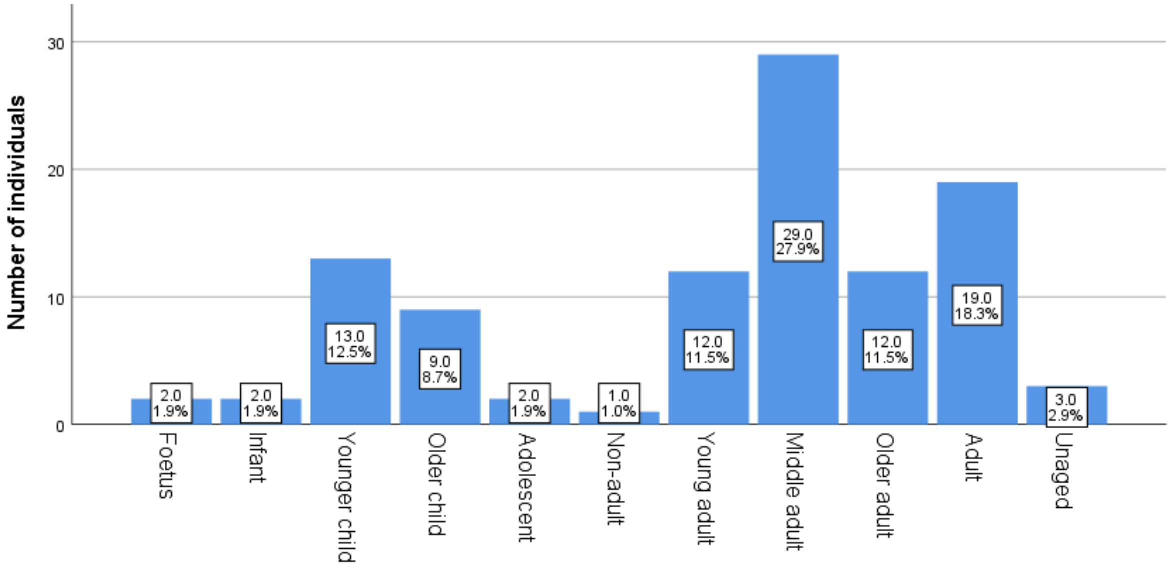

Figure 10.3- Age distribution for the Worthy Park burial population.

There were more females than males with a F:M ratio of 1.19. Hawkes (2003) notes that the entire cemetery was not excavated, so whether or not the burial population remaining is a representative sample of the living population is unclear.

11 Bevis's Grave

11.1 Comparison of age and sex data

Some adaptation of Shennan's (1978) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 11.1). The codes which were assigned for the different sex and age groups are provided in Table 11.2. A qualitative comparison between the current author's and Shennan's (1978) age and sex data is provided in Table 11.3.

Table 11.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Bevis's Grave.

Shennan (1978) category	Translated to
Baby	Non-adult
13-19, 15-19 years	Adolescent
16-21 years[1]	Adolescent
c. 18+	Young adult
15-21 years[2]	Young adult
?16-20 years	Young adult
Probably young adult	Young adult
Mature adult/?mature adult	Middle adult
c. 25-30?, ?25-30	Middle adult
?c. 40, ?30-40	Middle adult
Adult-old	Older adult
Possibly young/mature/old adult	Adult
Probably adult, ?Adult	Adult
?c. 40+, ?c. 30+, 30+	Adult
?infant[3]	Unaged
Young	Unaged

[1]=Extra description mentioned the third molars had not erupted; [2]=Extra description mentioned the third molars had erupted; [3]=age estimation based on size of grave.

Table 11.2- Cohen's weighted kappa codes for sex and age groups at Bevis's Grave.

Sex group	Code	Age group	Code
Female	1	Foetus	1
Probable female	2	Infant	2
Possible female	3	Younger child	3
Unsexed	4	Older child	4
Possible male	5	Adolescent	5
Probable male	6	Young adult	6
Male	7	Middle adult	7
		Older adult	8

Table 11.3- Age/sex data comparison between current and Shennan (1978) for Bevis's Grave.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
BGR-2	M	M	26.5	MA	30-40	MA
BGR-6	US	US	45 +	OA	Adult-old	OA
BGR-11	F??	US	Adult	Adult	Adult	Adult
BGR-22	US	US	UA	UA	Young	UA
BGR-23	US	US	17-25	YA	Mature adult	MA
BGR-28	US	US	UA	UA	UA	UA
BGR-29	US	US	5.5-6.5	YC	Non-adult	Non-adult
BGR-32	M?	M??	25-35	MA	Adult, prob young	YA
BGR-38	F??	F?	Adult	Adult	Possibly young adult	Adult
BGR-39	US	US	17-25	YA	Possibly young adult	Adult
BGR-40	US	US	10.5-12.5	OC	?16-20	YA
BGR-41	F??	F?	45+	OA	?c. 40	MA
BGR-43	F	F	29.7	MA	40-50	MA
BGR-46	F?	F?	25-35	MA	Young adult	YA
BGR-49	US	US	UA	UA	?Infant	UA
BGR-50	F	F	78.2	OA	c. 40	MA
BGR-57	US	US	17-25	YA	Young adult	YA
BGR-59	US	US	UA	UA	?Adult	Adult
BGR-61	M	M	69.7	OA	40-50	MA
BGR-64	US	US	UA	UA	UA	UA
BGR-65	F?	F	33-45?	MA	50-60	OA
BGR-70	M??	M?	26.7	MA	Young adult	YA
BGR-71	US	US	4.5-7.5m	IN	8m	IN
BGR-77	M	M?	25.4	YA	?c. 30+	Adult
BGR-78	US	US	8.5-9.5	OC	c.9-10	OC
BGR-79	F??	F??	45+	OA	?c. 40 +	Adult
BGR-80	M	F	52	OA	40-50	MA
BGR-82	US	F??	11.5-12.5	OC	c. 15	ADO
BGR-84	M?	F??	29.9	MA	30-40	MA
BGR-88	M	M??	33-45	MA	c. 50	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test.

There was a substantial agreement between the current author and Shennan (1978) with regards to sex assessment (κ=0.61) and moderate agreement between the current author and Shennan (1978) with regards to age estimation (κ=0.59). Although it is not ideal that there was only moderate agreement between the current author and Shennan (1978) with regards to age estimation, it is sufficient for inclusion in this research, although a re-evaluation of the Bevis's Grave skeletal collection is suggested (Volume 1, Section 6.1.4). The demographic data provided by Shennan (1978) was used in all subsequent analysis.

11.2 Demographic analysis

The Bevis's Grave burial population consisted of 84 individuals (62 adults, 15 non-adults, and seven unaged individuals) in 67 graves (71 graves were excavated in total with four containing no human remains). The level of preservation at Bevis's Grave was variable with 43% of the population fairly well preserved or better (Figure 11.1).

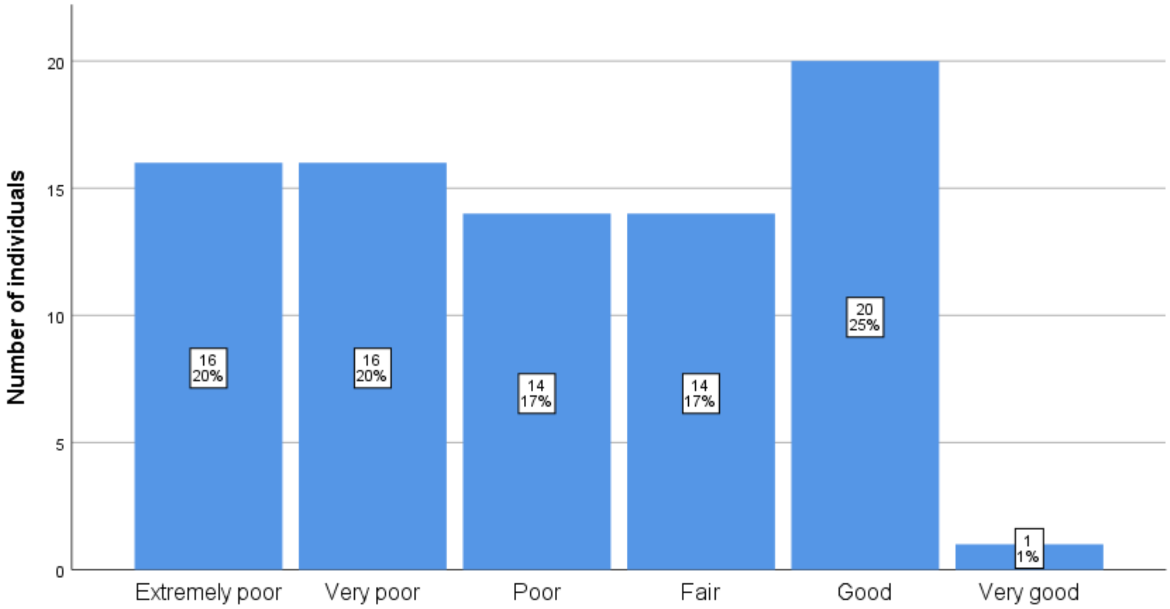

Figure 11.1- Levels of preservation of the skeletal material from the Bevis's Grave burial population.

Some of the age ranges provided by Sherman (1978) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 11.3). The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 11.2 and Figure 11.3 respectively.

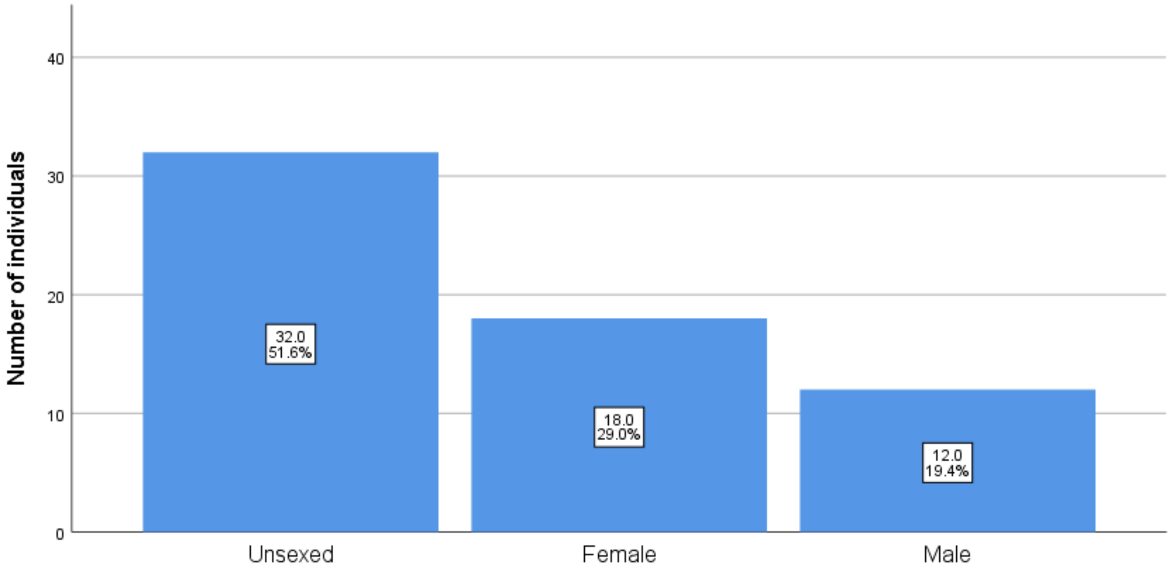

Figure 11.2- Sex distribution for the Bevis's Grave adult burial population.

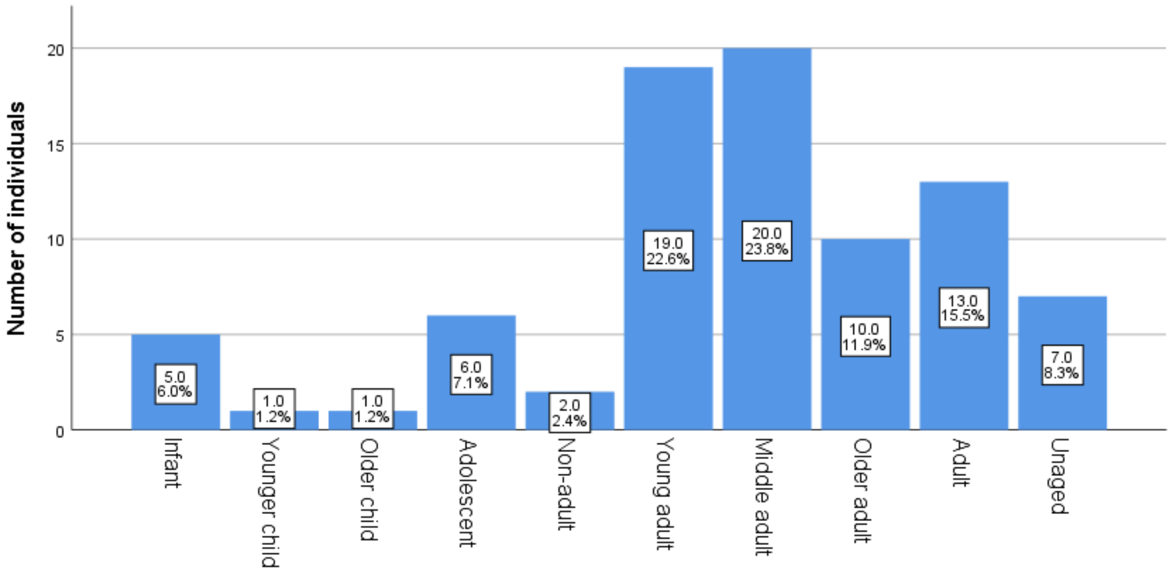

Figure 11.3- Age distribution for the Bevis's Grave burial population.

12 Bishopsmill School

12.1 Comparison of age and sex data

Some adaptation of the Johnson's (2005) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 12.1). The codes which were assigned for the different sex and age groups are provided in Table 12.2. A qualitative comparison between the current author's and Johnson's (2005) age and sex data is provided in Table 12.3.

Table 12.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Bishopsmill School.

Johnson (2005) category	Translated to
Probable male/female	Male/female
5-11, 6-11 years	Older child
12-15 years	Adolescent
12-18, 13-18 years	Adolescent
15-20 years	Adolescent
16-18 years	Adolescent
16-20 years	Young adult
16-29 years	Young adult
20-27 years	Young adult
22-33 years	Young adult
24-32, 24-34, 24-35 years	Middle adult
25-27, 25-29, 25-31, 25-32, 25-34 years	Middle adult
39-56 years	Older adult
45-56, 45-59 years	Older adult
48-64, 48-67 years	Older adult
Current author category	**Translated to**
Possible male/female	Unsexed

Table 12.2- Cohen's weighted kappa codes for sex and age groups at Bishopsmill School.

Sex group	Code	Age group	Code
Female	1	Foetus	1
Probable female	2	Infant	2
Unsexed	3	Younger child	3
Probable male	4	Older child	4
Male	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 12.3- Age/sex data comparison between current and Johnson (2005) for Bishopsmill School.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
BMS-3	M?? (US)	M?	45+	OA	48-64	OA
BMS-54	US	US	-	UA	13-18	ADO
BMS-73	US	US	-	UA	-	Adult
BMS-84	M?	US	-	Adult	25-32	MA
BMS-92	US	US	6-12	OC	5-11	OC
BMS-214	US	US	6.5-8.5	OC	6-11	OC
BMS-223	US	US	17-25	YA	21-24	YA
BMS-229	US	US	-	Adult	-	Adult
BMS-237	US	F?	16-19	YA	16-29	YA
BMS-249	F?	US	25-35	MA	27-32	MA
BMS-268	M?	M?	17-45	MA	22-33	YA
BMS-294	US	US	-	Adult	-	Adult
BMS-298	US	US	-	Adult	-	Adult
BMS-303	M?? (US)	US	25-35	MA	31-32	MA
BMS-313	M?	US	25-45	MA	38	MA
BMS-317	US	US	13+	UA	-	Adult
BMS-330	M	M	33.1	MA	44-46	MA
BMS-336	M?	F?	33-45	MA	36-42	MA
BMS-344	US	US	-	UA	-	Adult
BMS-352	US	US	-	Adult	-	Adult
BMS-360	M	M?	72.8	OA	50+	OA
BMS-370	F	F	15-23	YA	20-25	YA
BMS-422	F	F?	25-35	MA	24-35	MA
BMS-426	F	F?	30.8	MA	25-29	MA
BMS-427	M	M	31	MA	24-35	MA
BMS-456	F?	US	17-20	YA	15-20	ADO
BMS-468	US	US	-	Adult	-	Adult
BMS-478	F	US	33-45	MA	38-48	MA
BMS-493	M?	US	33-45	MA	-	Adult
BMS-494	US	US	33-45	MA	32-45	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

There was almost perfect agreement between the current author and Johnson (2005) with regards to age estimation (κ=0.90), but only moderate agreement between the current author and Johnson (2005) with regards to sex assessment (κ=0.51). Although it is not ideal that there was only moderate agreement between the current author and Johnson (2005) with regards to sex assessment, it is sufficient for inclusion in this research (see Volume 1, Section 6.1.5). The demographic data provided by Johnson (2005) was used in all subsequent analysis.

12.2 Demographic analysis

The Bishopsmill School population consisted of 89 individuals (74 adults, 12 non-adults, and three unaged individuals) in 84 graves (98 graves were identified, nine were left unexcavated, and five contained no human remains). A majority of the individuals were more than 50% complete, but a majority of the population was poorly preserved (Figure 12.1 and Figure 12.2). However, as MAS sites are relatively rare, particularly cemeteries with more than 50 individuals, it was decided that the Bishopsmill School collection would be included in this research, while keeping in mind that the number of individuals with physical impairment was probably underestimated due to the poor preservation of the skeletal remains.

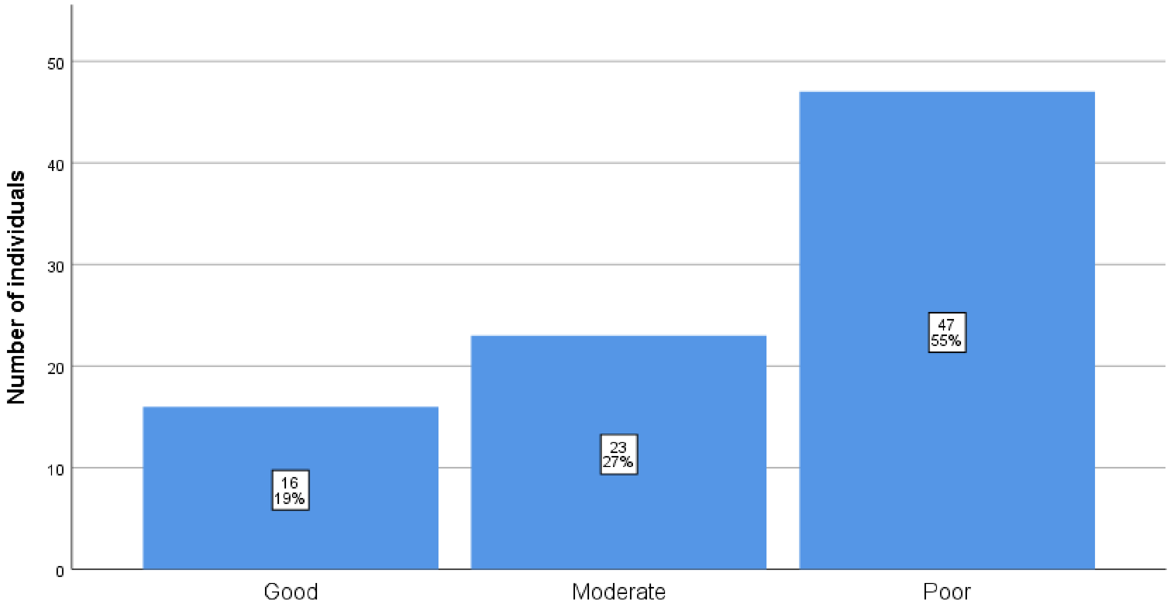

Figure 12.1- Levels of preservation of the skeletal material from the Bishopsmill School burial population.

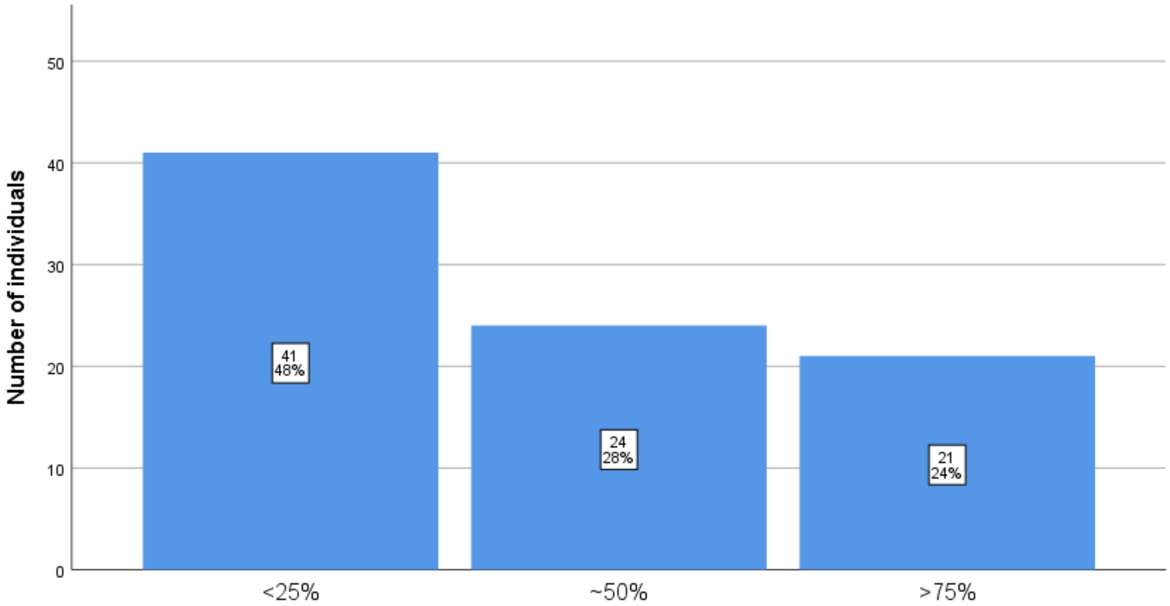

Figure 12.2- Levels of skeletal completeness in the Bishopsmill School burial population.

Some of the age ranges provided by Johnson (2005) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 12.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 12.3 and Figure 12.4 respectively. Due to the poor preservation of the skeletal remains, it was impossible to perform sex assessment for a majority of the adult individuals.

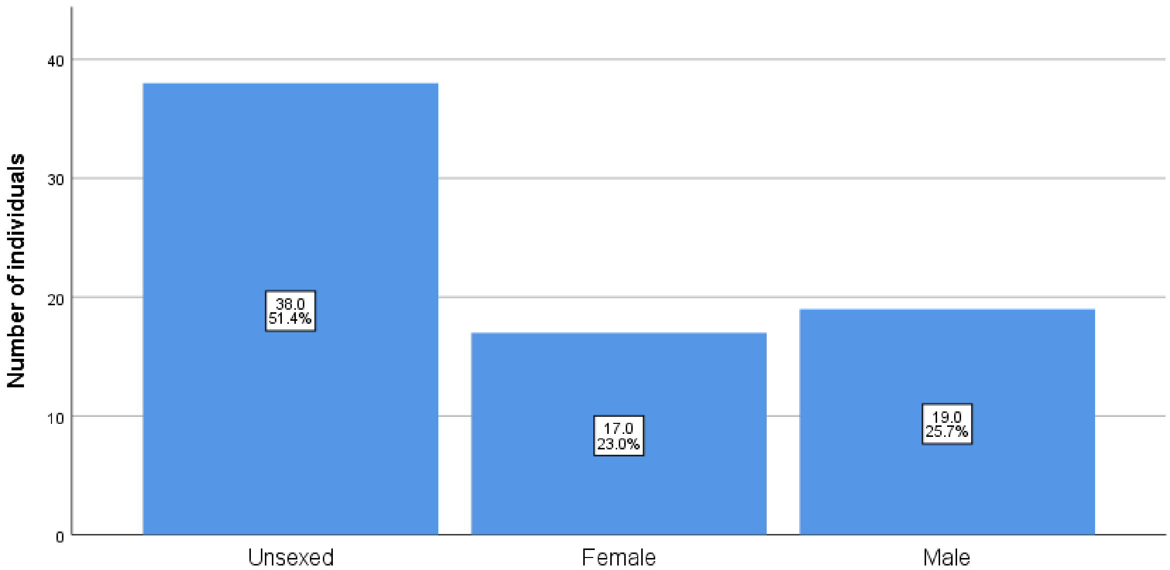

Figure 12.3- Sex distribution for the Bishopsmill School adult burial population.

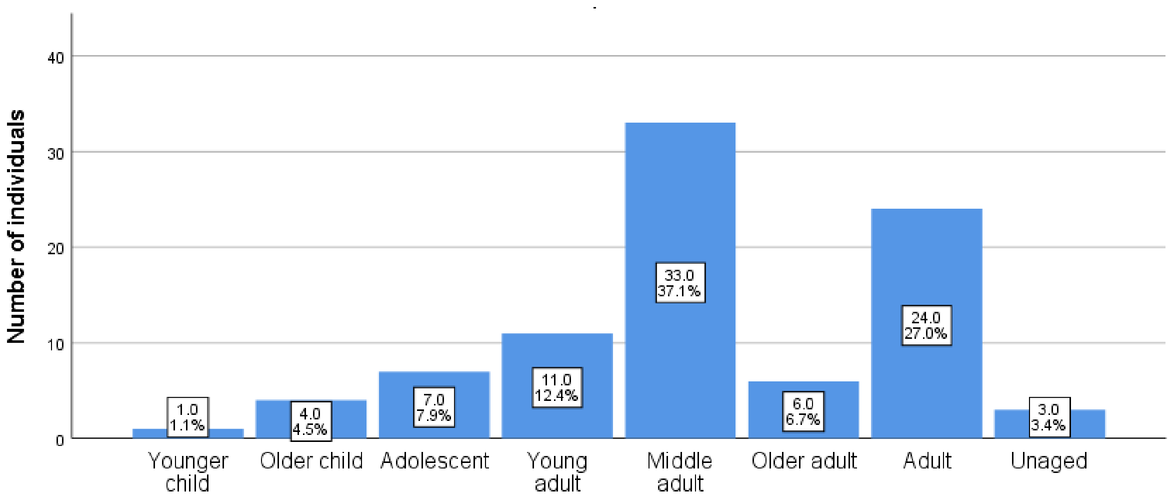

Figure 12.4- Age distribution for the Bevis's Grave burial population.

13 Burwell

13.1 Demographic analysis

Because analysis of the skeletons took place in the early 20th century, no methods were cited, and not all of the skeletons were assigned a sex or age, it was decided that a full re-analysis of the burial population was necessary. This took place at the Duckworth Laboratory at the Leverhulme Centre for Human Evolutionary Studies, University of Cambridge. Osteological assessment of each adult individual followed standard methods which are outlined in the main text (Volume 1, Sections 4.3.1-4.3.3).

The Burwell population consisted of 146 individuals in 140 graves (78 adults, 52 non-adults, and 16 unaged individuals). Forty-two of the skeletons which were recorded in Lethbridge's (1926; 1927; 1928; 1929; 1931) publications and unpublished field notebooks were not present in the Duckworth Laboratory. Lethbridge did not provide any age or sex information for 16 of these individuals, and they were recorded as unsexed. For 35 of the missing skeletons, Lethbridge recorded that they were non-adult, and for six of these, enough information was provided (e.g. length of femur) to provide a more specific non-adult age range. Only one of the individuals missing from the Duckworth Laboratory was recorded by Lethbridge as an adult. Thus, it is clear that the excavators were preferentially keeping the remains of the adult individuals, but were less inclined to keep the remains of the non-adult individuals. In addition, there were ten skeletons present in the Duckworth Laboratory which did not match the skeletons reported on in Lethbridge's (1926; 1927; 1928; 1929; 1931) publications or unpublished field notebooks. These ten individuals were not included in any further analysis. Seven of these were non-adult, suggesting these are probably some of the missing non-adult individuals mentioned above.

The skeletal remains that were present in the Duckworth Laboratory were extremely well-preserved, but it should be noted that the skulls and long bones were preferentially kept by the excavators. There were very few vertebrae, ribs, and hand/feet bones present in the remaining skeletons. The sex distribution for the adult burial population and the age distribution of the entire burial population are provided below (Figure 13.1 and Figure 13.2).

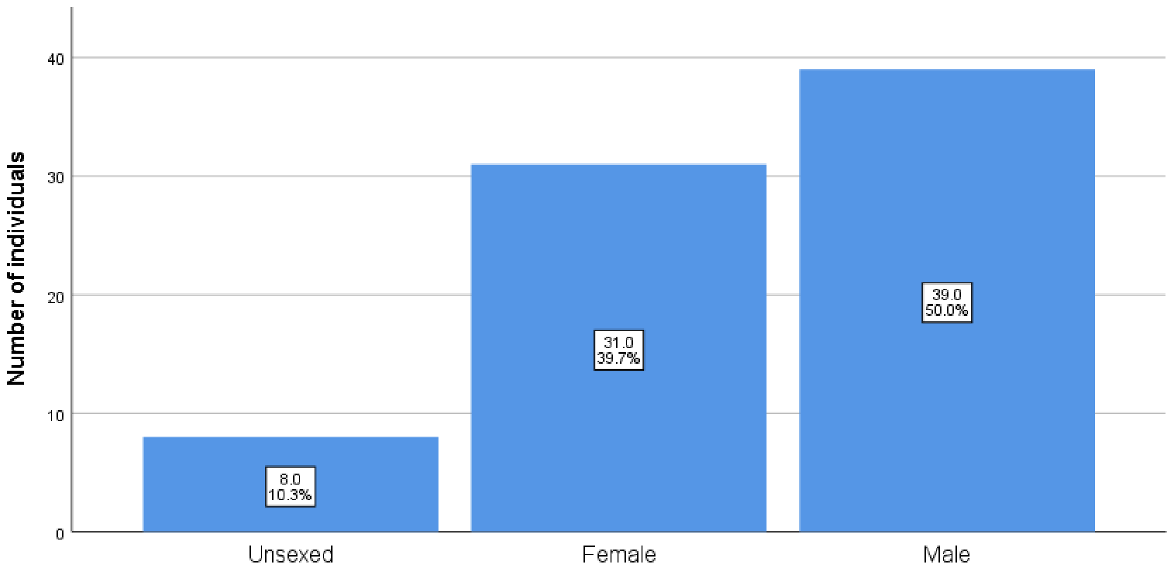

Figure 13.1- Sex distribution for the Burwell adult burial population.

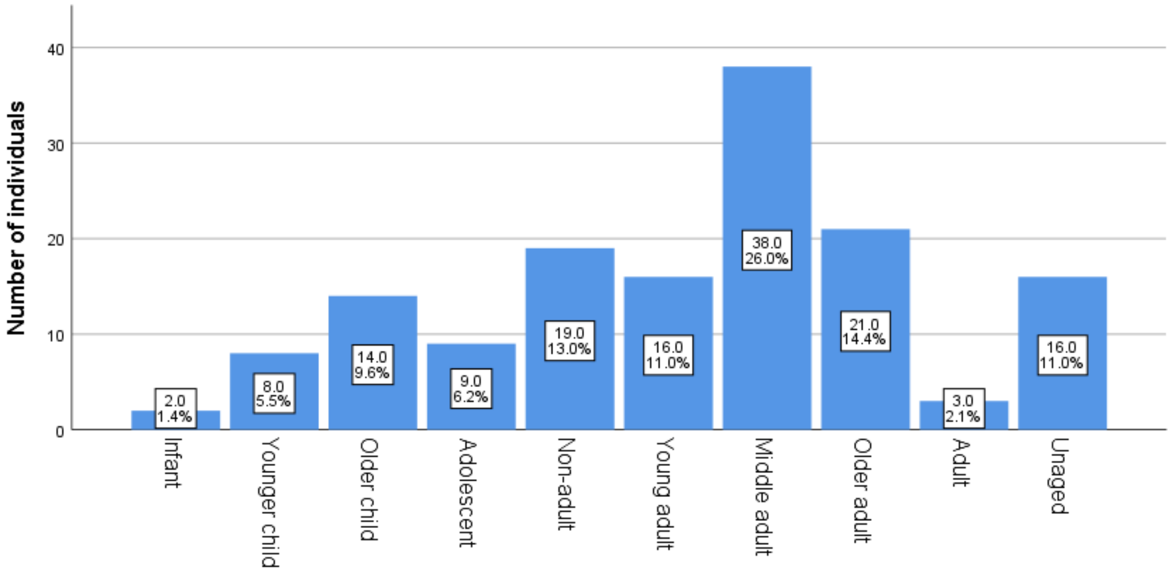

Figure 13.2- Age distribution for the Burwell burial population.

14 Staunch Meadow

14.1 Comparison of age and sex data

Some adaptation of Anderson’s (1990; 2014) osteological data was necessary to allow for statistical comparison with the current author’s data and for subsequent demographic analysis of the entire burial population (Table 14.1). The codes which were assigned for the different sex and age groups are provided in Table 14.2. A qualitative comparison between the current author’s and Anderson’s (1990; 2014) age and sex data is provided in Table 14.3.

Table 14.1- Data categories and their translations for Cohen’s weighted kappa test and subsequent demographic analysis for Staunch Meadow.

Anderson (1990; 2014) category	Translated to
?Male/?Female	Probable male/female
Foetal?	Foetus
New-born, c. 12 months	Infant
*c.*2?, *c.*6? years	Younger child
5-7 years	Younger child
11-13 years, 12-13? years	Older child
<6 years	Non-adult
*c.*15?, c. 15-18 years	Adolescent
16-18 years	Adolescent
17-25? years	Young adult
25-35?, 35-45? years	Middle adult
MA?	Middle adult
Y-MA? (25-35 years)	Middle adult
45+, 45+? years	Older adult
MA-Old (45-55 years)	Older adult
Old, Old?	Older adult
<30, ?<30, 30+ years	Adult
18-25+? years	Adult
35-45+ years	Adult
MA+?, ?Adult, ?Young/Young	Adult
?	Unaged
Current author category	**Translated to**
Possible male/female	Unsexed

Table 14.2- Cohen's weighted kappa codes for sex and age groups at Staunch Meadow.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 14.3- Age/sex data comparison between current author and Anderson (1990; 2014) for Staunch Meadow.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling) (years)	Age (Previous) (years)	Age category (Previous)
SM-1497	F	M?	26	MA	25-35	MA
SM-1541	US	US	14-23?	YA	18-25	YA
SM-1778	US	US	5.5-6.5	YC	5-6	YC
SM-1830	M	M	33-45	MA	MA?	MA
SM-1840	US	M?	14.5-18	ADO	16-18	ADO
SM-1844	US	US	6.5-7.5	YC	7-8	OC
SM-1845	US	US	14.5-15.5	ADO	*c.*15?	ADO
SM-1857	US	US	7.5-8.5	OC	7-8	OC
SM-1860	US	F?	Adult	Adult	Adult	Adult
SM-1882	F	F	26.2	MA	MA-Old	OA
SM-1900	US	M?	33-45	MA	MA-Old	OA
SM-1917	M	M	28.1	MA	35-45?	MA
SM-3062	US	US	<16.5 (OC or ADO)	Non-adult	Non-adult	Non-adult
SM-3072	M	M	68.6	OA	MA	MA
SM-4002	US	US	45+	OA	Old	OA
SM-4004	US	US	9.5-10.5	OC	*c.*8	OC
SM-4009	F	F	30.8	MA	MA?	MA
SM-4021	M?	M	16.5-18.5	YA	18-25	YA
SM-4038	M?	M	33.7	MA	Y-MA	MA
SM-4050	F?? (US)	F	17-20	YA	18-22	YA
SM-4055	M	M	31.6	MA	Young?	Adult
SM-4081	US	US	Adult	Adult	Adult	Adult
SM-4093	US	US	<29, YA or MA	Adult	Non-adult	Non-adult
SM-4097	US	US	YC or OC	Non-adult	*c.*9	OC
SM-4728	US	US	birth-1.5m	IN	*c.*6m	IN
SM-4733	US	US	4.5-7.5 m	IN	6-9m	IN
SM-4807	US	US	1.5-2.5	YC	18-24m	YC
SM-4956	US	US	38w-birth	FE	New-born	IN
SM-8011	US	US	Adult	Adult	Adult	Adult
SM-8015	M?? (US)	M	45+	OA	MA?	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

There was almost perfect agreement between the current author and Anderson (1990; 2014) with regards to age estimation (κ=0.89), but only moderate agreement between the current author and Anderson (1990; 2014) with regards to sex assessment (κ=0.50). Although it is not ideal that there was only moderate agreement between the current author and Anderson (1990; 2014) with regards to sex assessment, it is sufficient for inclusion in this research (see Volume 1, Section 6.1.6). The demographic data provided by Anderson (1990; 2014) was used in all subsequent analysis.

14.2 Demographic analysis

Originally, the excavators recorded 152 articulated skeletons and 157 groups of disarticulated bone, however the number of articulated skeletons decreased in post-excavation analysis as many of the bone groups that had been recorded separately actually belonged to the same individual (Anderson 1990; 2014). Including the disarticulated bones, the minimum number of individuals (MNI) for Cemetery 1 was 205 (based on skulls), although Anderson (1990; 2014) notes that this number is probably too high as many of the crania were not complete. MNI based on the left femora was 172. The disarticulated bone groups will be excluded from the remainder of this research.

The Staunch Meadow Cemetery 1 articulated burial population consisted of 145 individuals (114 adults, 30 non-adults, and one unaged individual). The Cemetery 2 burial population consisted of 31 individuals (11 adults and 20 non-adults). Overall, the preservation of the skeletal remains in both of the cemeteries at Staunch Meadow was poor, with a majority of the individuals either classified as having poor or poor/fair preservation, and only four individuals classified as having good preservation (Figure 14.1).

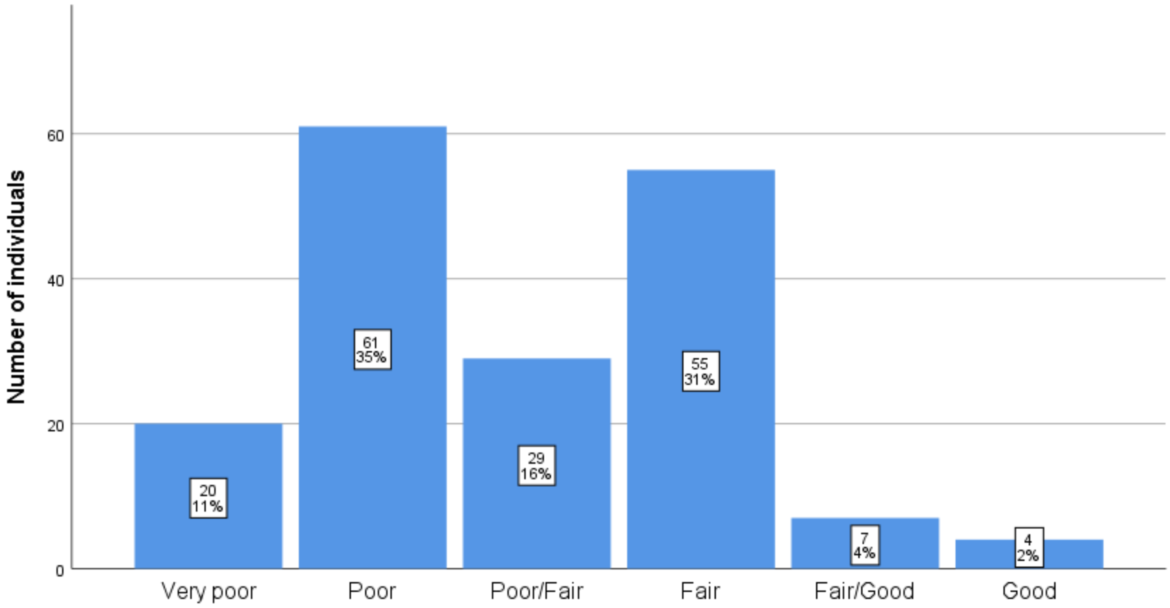

Figure 14.1- Levels of preservation of the skeletal material from the Staunch Meadow burial population.

Some of the age ranges provided by Anderson (1990; 2014) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 14.1). The sex distributions for the adult burial populations of Cemeteries 1 and 2 (Figure 14.2 and Figure 14.3) and the age distributions for the entire burial populations of Cemeteries 1 and 2 (Figure 14.4 and Figure 14.5) are provided below.

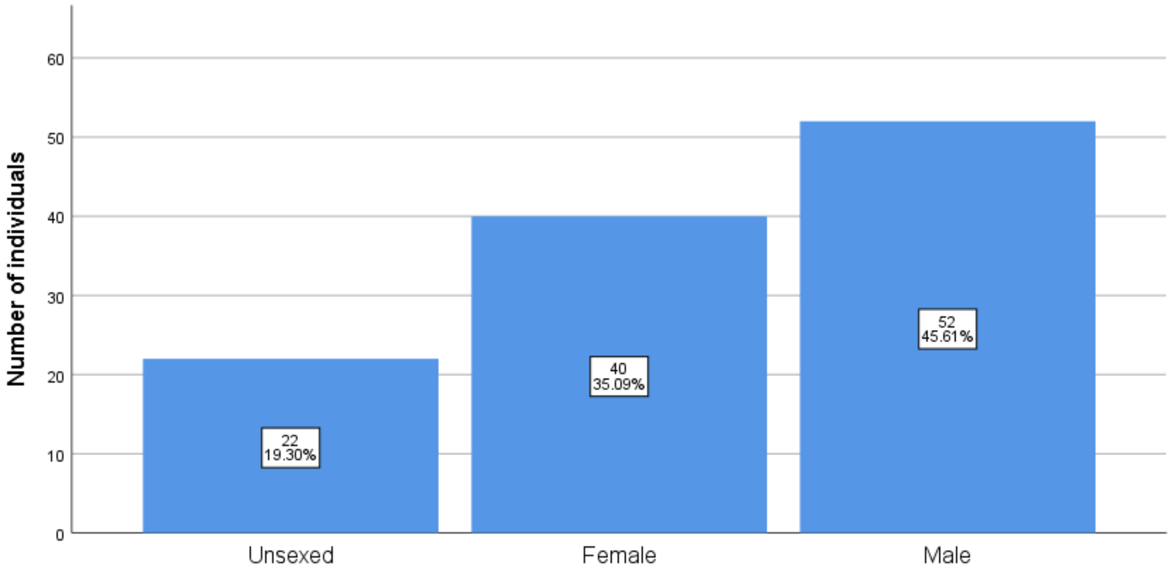

Figure 14.2- Sex distribution for the Staunch Meadow Cemetery 1 adult burial population.

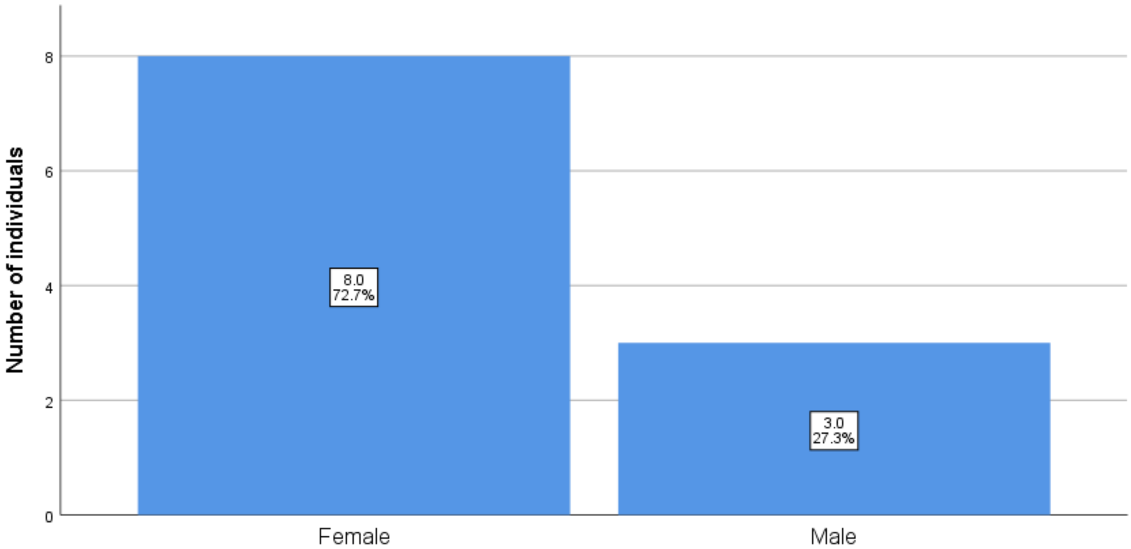

Figure 14.3- Sex distribution for the Staunch Meadow Cemetery 2 adult burial population.

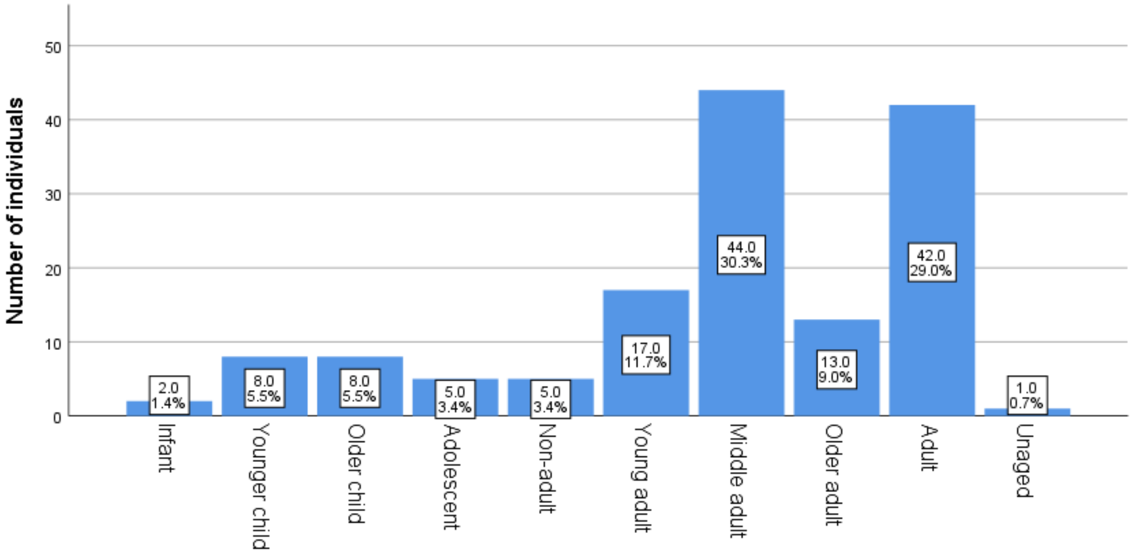

Figure 14.4- Age distribution for the Staunch Meadow Cemetery 1 burial population.

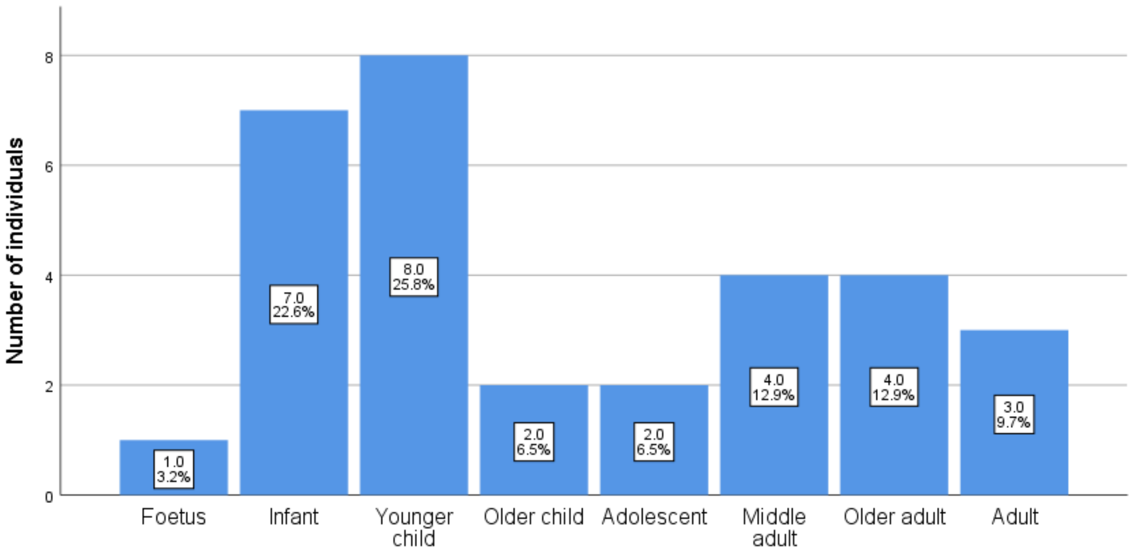

Figure 14.5- Age distribution for the Staunch Meadow Cemetery 2 burial population.

The age distribution in Cemetery 1 was normal for Anglo-Saxon contexts with fewer non-adults than adults. Although only a small portion of Cemetery 2 was excavated, it is clear that there were considerably more non-adults included in this cemetery than in Cemetery 1, especially infants and younger children, as well as more females. It is possible that selective burial was being practiced in Cemetery 2 (Anderson 2014), or that the excavation revealed an area of the overall cemetery that was reserved for non-adults and females.

15 Water Lane

15.1 Comparison of age and sex data

Some adaptation of the previous osteological data provided in Duncan et al. (2003) was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 15.1). The codes which were assigned for the different sex and age groups are provided in Table 15.2. A qualitative comparison between the current author's data and the data reported in Duncan et al. (2003) is provided in Table 15.3.

Table 15.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Water Lane.

Duhig in Duncan et al. (2003) category	Translated to
?Male/?Female	Probable male/female
17-25 years	Young adult
21-30 years	Middle adult
23-30 years	Middle adult
23-57 years	Middle adult
35-57 years	Middle adult
34-86 years	Adult
45+ years	Older adult
45-57, 45-66, 45-87 years	Older adult
Current author category	**Translated to**
Possible male/female	Unsexed

Table 15.2- Cohen's weighted kappa codes for sex and age groups at Water Lane.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 15.3- Age/sex data comparison between current author and Duncan et al (2003) for Water Lane.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
WL-217	M?	M	45+	OA	34-86	Adult
WL-312	M	M	45+	OA	45+	OA
WL-316	US	US	14.5-16.5	ADO	14-15	ADO
WL-1002	M	M	43.8	MA	45-66	OA
WL-1008	M	M	32.4	MA	23-30	MA
WL-1012	M	M	32.7	MA	25-46	MA
WL-1015	US	US	5.5-6.5	YC	3.7-6.3	YC
WL-1021	F	F	39	MA	21-30	MA
WL-1028	US	US	4.5-5.5	YC	2.5-4.5	YC
WL-1032	M	M	48.7	MA	35-45	MA
WL-1038	M?? (US)	F	MA-OA	Adult	45+	OA
WL-1124	M	M	51.2	OA	45-57	OA
WL-1132	US	US	25-35	MA	25-35	MA
WL-1165	F	F	46.4	MA	25-35	MA
WL-1169	F?	F?	17-25	YA	17-25	YA
WL-1176	US	F	45+	OA	45+	OA
WL-1184	M?? (US)	M	45+	OA	45-57	OA
WL-1187	M	M	72.1	OA	60+	OA
WL-1188	M	M	70.1	OA	60-70	OA
WL-1189	F	F	32.5	MA	33-46	MA
WL-1204	US	M	16-17	ADO	18.5-20	YA
WL-1229	F	F	25.2	MA	19-25	YA
WL-1259	US	F	17-25	YA	21-25	YA
WL-1267	F?	F	17-23	YA	17	ADO
WL-1293	US	US	25-35	MA	25-35	MA
WL-1312	M	M	32.9	MA	35-57	MA
WL-1322	F?	M?	39.8	MA	-	Adult
WL-1325	US	US	ADO or adult	UA	ADO or adult	UA
WL-1348	M	M	34.3	MA	23-57	MA
WL-1386	M	M	32.7	MA	35-57	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was substantial agreement between the current author and Duhig (in Duncan et al. 2003) with regards to sex assessment (κ=0.74), and almost perfect agreement between the current author and Duhig (in Duncan et al. 2003) with regards to age estimation (κ=0.88), the demographic data provided by Duhig (in Duncan et al. 2003) was used in all subsequent analysis.

15.2 Demographic analysis

The Water Lane burial population consisted of 54 individuals (excluding individuals found in grave fills): 43 adults, ten non-adults, and one unaged individual (adolescent/adult). There were six individuals identified via fragments in the grave fill (one non-adult, one adult probable female, one adult male, and three unaged and unsexed individuals). As the skeletal remains were fragmentary and found in the grave fill, they will be excluded from the remainder of this research.

Duncan et al. (2003: 63) defines the preservation scale utilised for this assemblage as “5 = complete apart from a few small or fragile bones, down to 1 = only one or two bones present”. For the purposes of descriptive statistics, the following preservation categories were assigned the following labels:

Table 15.4- Preservation code descriptions for Water Lane.

Code	Description
1	Very poor
2	Poor
3	Fair
4	Fairly good
5	Very good

The preservation of this assemblage was variable, but a majority of the individuals were fairly preserved or better (Figure 15.1).

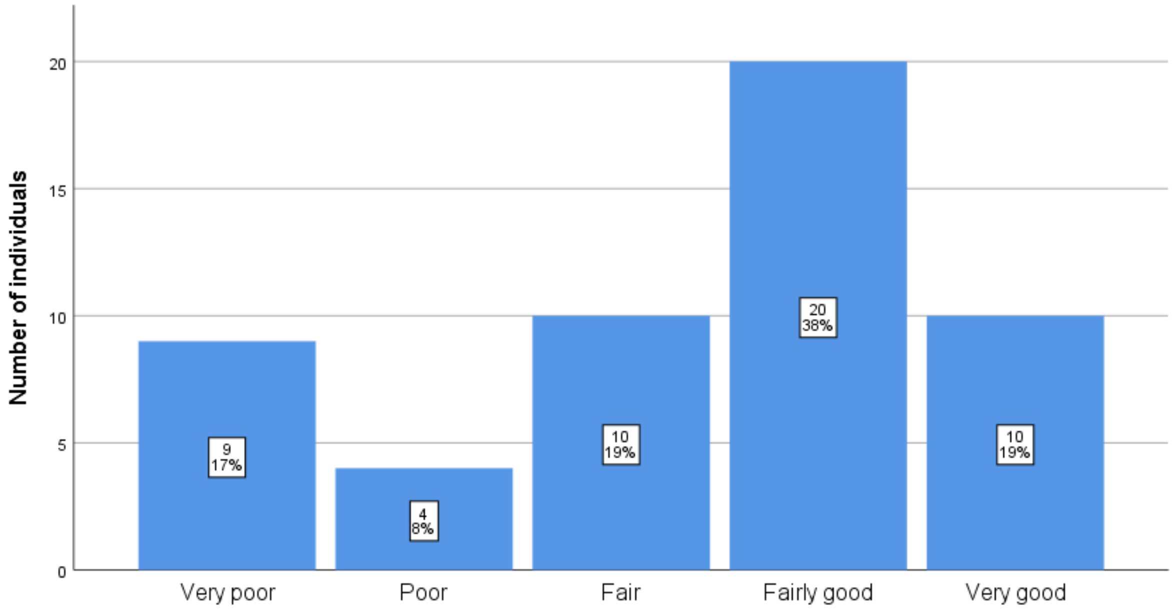

Figure 15.1- Levels of preservation of the skeletal material from the Water Lane burial population.

Duhig (in Duncan et al. 2003) does not make it clear whether ?M indicates probable or possible male, so for this research, any individual labelled ?M or ?F was considered a probable male or probable female. For demographic analysis, probable males/females were included in the male/female categories, as was done by Duhig (in Duncan et al. 2003). Some of the age ranges provided by Duhig (in Duncan et al. 2003) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 15.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are provided in Figure 15.2 and Figure 15.3.

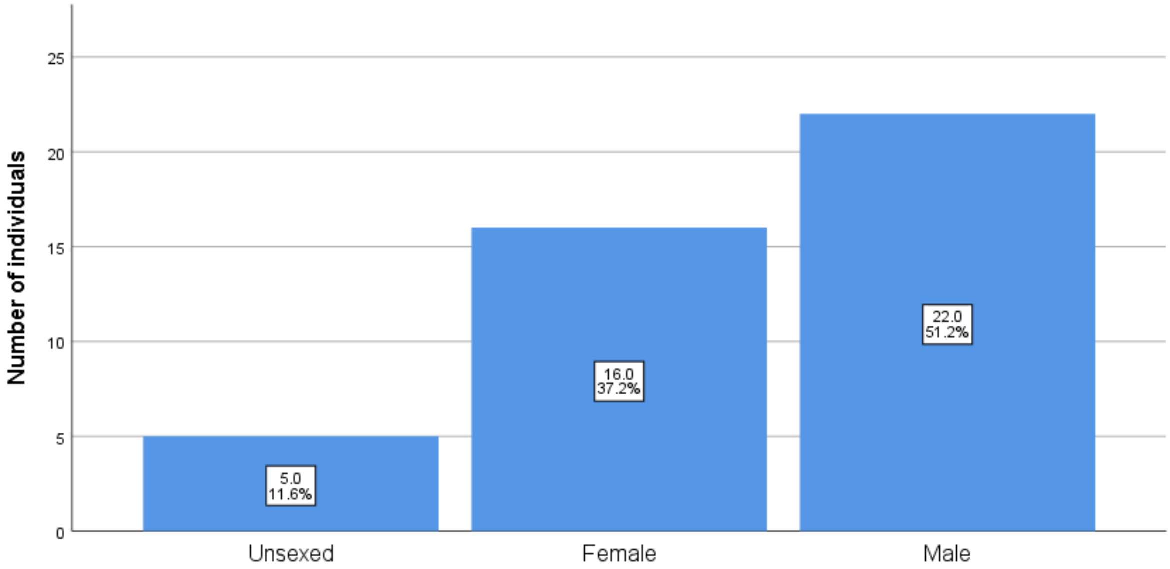

Figure 15.2- Sex distribution for the adult Water Lane burial population.

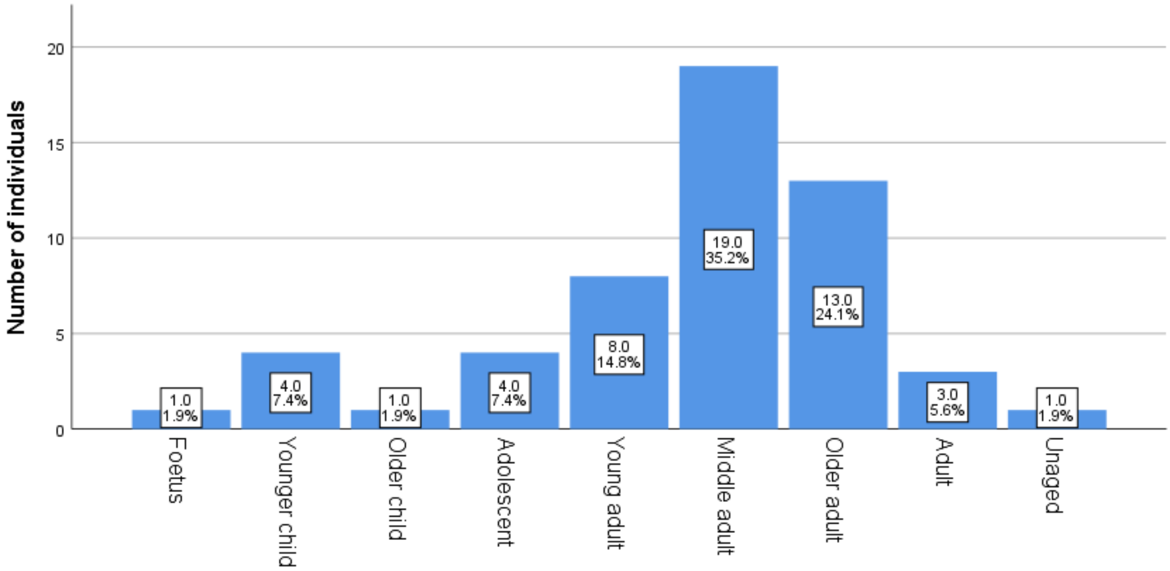

Figure 15.3- Age distribution for the Water Lane burial population.

16 Black Gate

16.1 Comparison of age and sex data

Some adaptation of Swales' (2012) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 16.1). The codes which were assigned for the different sex and age groups are provided in Table 16.2. A qualitative comparison between the current author's and Swales' (2012) age and sex data is provided in Table 16.3.

Table 16.1- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic for Black Gate.

Swales (2012) category (years)	Translated to
0.5-1.5	Infant
8-18 months, 9-18 months	Infant
5.5-6.5, 5.5-7, 6-7	Younger child
6.5-7.5, 6-8	Older child
7.5-12.5, 9.5-12.5, 11.5-12.5	Older child
10-14, 11-13, 11.5-13.5	Older child
12.5-13.5	Adolescent
12-14, 12-15	Adolescent
15-18, 16-18, 16-19	Adolescent
15-25	Young adult
16-20, 17-20	Young adult
17-19, 17-25	Young adult
22-26, 23-26	Young adult
22-28, 23-27, 23-57	Middle adult
20-30, 20-40	Middle adult
35-55	Middle or older adult*
40-55, 40-60	Older adult
45+	Older adult
45-55, 45-59, 45-60, 35-60, 45-65	Older adult
48-54	Older adult
18+	Adult
20-60	Adult
Current author category	**Translated to**
Possible male/female	Unsexed

NB: *Some individuals aged 35-55 years were placed into either the middle adult or older adult categories by Swales (2012).

Table 16.2- Cohen's weighted kappa codes for sex and age groups for Black Gate.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 16.3- Age/sex data comparison between current author and Swales (2012) for Black Gate.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
BLG-21	M	F	41.5	MA	35-45	MA
BLG-26	US	US	16.5-18.5	ADO	16-19	ADO
BLG-40	M?	M	32.3	MA	25-30	MA
BLG-51	M?? (US)	F	-	Adult	35-60	OA
BLG-112	M	M?	40.9	MA	40-50	MA
BLG-120	F	F	30.2	MA	25-35	MA
BLG-143	US	US	-	Adult	18+	Adult
BLG-160	F	F	43.2	MA	40-50	MA
BLG-184	US	US	4.5-6.5	YC	6-7	YC
BLG-211	M	M	35.7	MA	35-45	MA
BLG-230	F	F	34.1	MA	30-40	MA
BLG-263	US	US	33w	FE	32-36w	FE
BLG-310	F	F	78.5	OA	50-60	OA
BLG-337	F	F	53.9	OA	45-55	OA
BLG-359	US	US	4.5-7.5m	IN	3-6m	IN
BLG-381	F	F	32.6	MA	30-40	MA
BLG-441	US	US	-	Adult	18+	Adult
BLG-443	US	US	25-35	MA	18+	Adult
BLG-447	M?	M	77	OA	35-55	OA
BLG-453	M?	M?	33-45	MA	35-45	MA
BLG-455	M?	M	16-20	YA	19-20	YA
BLG-496	US	US	33-35w	FE	34-36w	FE
BLG-497	US	US	4-6m	IN	6-12m	IN
BLG-535	M	M	20-32	MA	25-30	MA
BLG-537	US	US	-	Adult	18+	Adult
BLG-604	M	M	29.2	MA	25-30	MA
BLG-610	F	F	42.7	MA	30-40	MA
BLG-635	F	F	29.6	MA	28-34	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was substantial agreement between the current author and Swales (2012) with regards to sex assessment (κ=0.75), and perfect agreement between the current author and Swales (2012) with regards to age estimation (κ=1.00), the demographic data provided by Swales (2012) was used in all subsequent analysis.

16.2 Demographic analysis

Nolan et al. (2010) report that 660 graves were excavated (679 individuals identified post-excavation), and that 13 skeletons are absent. However, the Black Gate burial population as it stands today only consists of 643 individuals. For this research, the individuals that were identified as probably post-1080 AD by Nolan (pers comm) were excluded. Thus, the pre-1080 AD Black Gate burial population consists of 590 individuals (404 adults and 186 non-adults). The levels of completeness and preservation at Black Gate were variable, but 48% of the population was greater than 50% complete (Figure 16.1), and 53% of the population was in good or excellent condition (Figure 16.2).

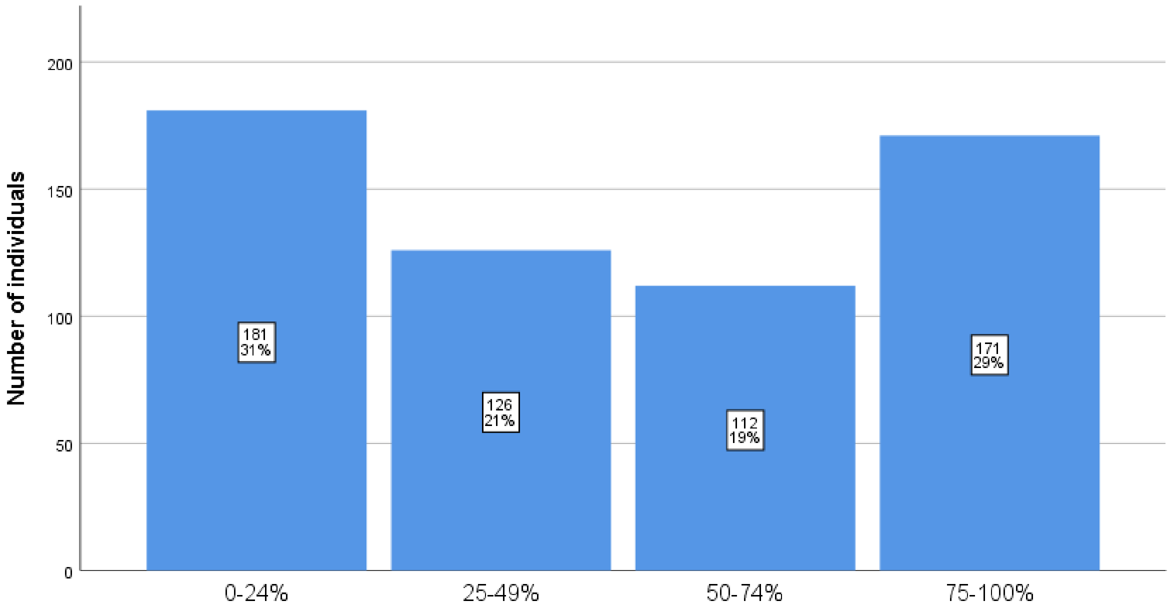

Figure 16.1- Levels of skeletal completeness in the Black Gate burial population.

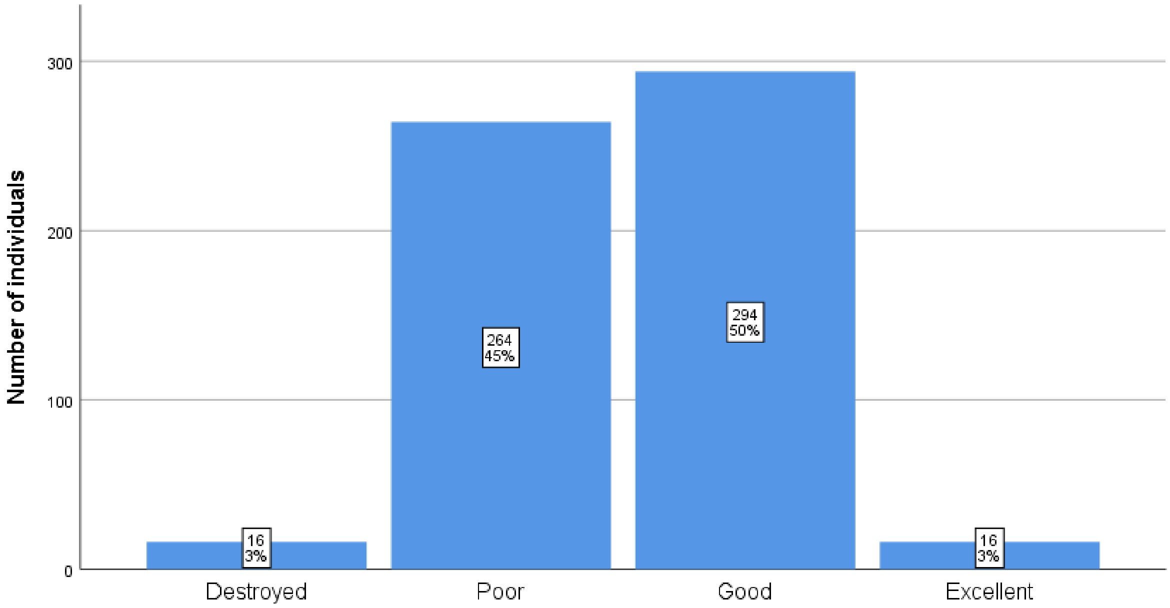

Figure 16.2- Levels of preservation of the skeletal material from the Black Gate burial population.

Some of the age categories provided by Swales (2012) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 16.1). It should be noted that individuals defined by Swales (2012) as probable male/females were considered male/females for demographic analysis. The sex distribution for the adult burial population and the age distribution for the entire burial population are shown in Figure 16.3 and Figure 16.4 respectively.

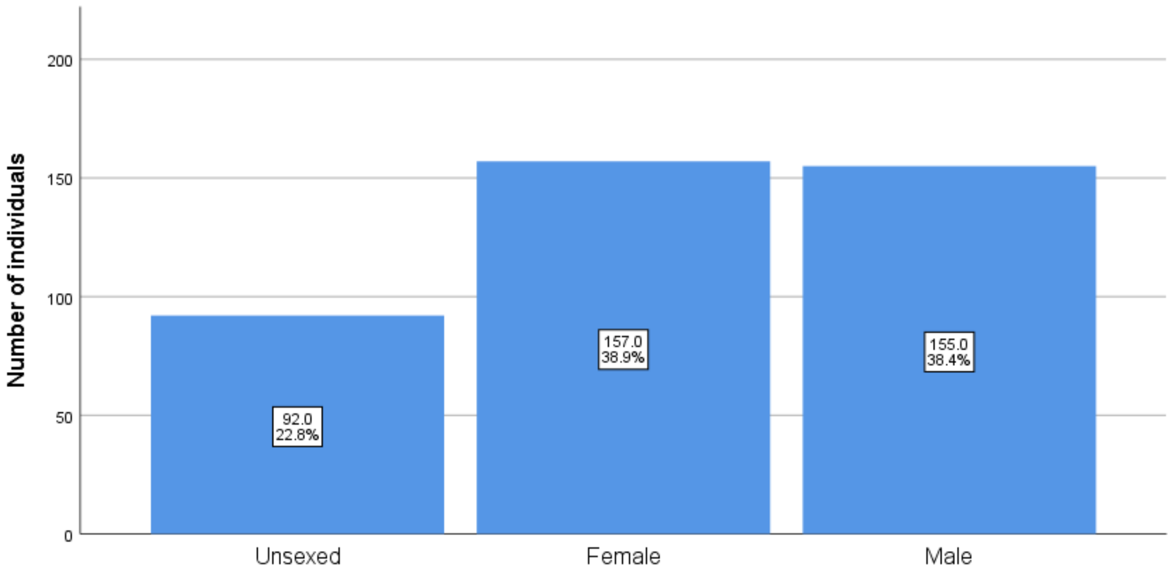

Figure 16.3- Sex distribution for the Black Gate adult burial population.

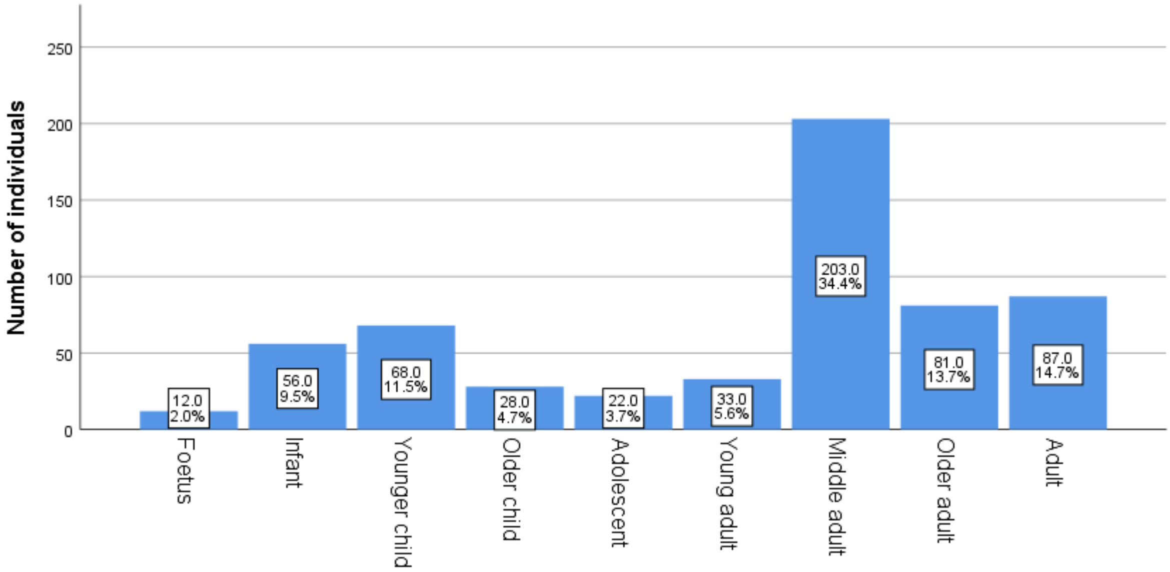

Figure 16.4- Age distribution for the entire Black Gate burial population.

17 Elstow Abbey

17.1 Comparison of age and sex data

There were 293 later Anglo-Saxon skeletons in the Elstow Abbey burial population, 196 (67%) of which had been analysed at the time of access (see Section 17.2 for an explanation of how the 97 individuals who were *not* analysed previously were included in this research). All individuals who had been categorised as “medieval” were excluded from analysis. Osteological work was previously performed by various researchers including Don Brothwell and Annie Grant in the 1970s and Anne Stirland in the late 1980s to early 1990s (Baker 2016). Anne Stirland analysed 104 individuals (35%), and almost always included a sex assessment, age estimation, and a description of pathologies. Adult sex was assessed utilising morphological attributes of the pelvis and skull and measurements of the femoral head, humeral head, and clavicle. Non-adult sex was recorded in some instances by Stirland, however there is no mention of which methods were used. Adult age was estimated utilising dental attrition, the pubic symphysis, and epiphyseal fusion. Non-adult age was estimated utilising dental eruption and epiphyseal fusion. No mention of specific methods for sex assessment or age estimation was included in these recording forms.

Don Brothwell and Annie Grant analysed 92 individuals (31%). The level of recording varied widely for these individuals, and in many cases, although an individual had a recording form, the sex or age was not included. One of the recording form templates utilised had a place to include the age and sex of the individual, but there was no indication about which methods the researcher was using to come to these conclusions. Another one of the recording form templates utilised included more detail: adult sex was assessed utilising morphological attributes of the pelvis and skull, adult age was estimated utilising dental attrition, and non-adult age was estimated utilising dental eruption, but no cited methods were mentioned.

Some adaptation of the previous osteological sex data was necessary to allow for statistical comparison with the current author’s data and for subsequent demographic analysis of the entire burial population. Stirland utilised sex categories including male/female, probable male/female, and possible male/female. If Stirland left the sex blank but an adult age was recorded, it is assumed that the individual was unsexed. The previous researchers also used the categories ?M and ?F, but it was not stated whether these individuals were probable or possible male/females. The original recording forms were consulted for these individuals and a probable or possible sex was assigned based on which features were analysed (Table 17.1).

Table 17.1-?M and ?F individuals from Elstow Abbey and their sex category translations for Cohen's weighted kappa test and for entire burial population demographic analysis.

Ind. no.	Previous sex category	Previous sex notes	Final sex category for demographic analysis
EA-112	?M	Skull: ?M; Other: ?M	M?
EA-120	?M	Skull: ?M	M?
EA-127	?M	"General size and robustness indicate …male"	M?
EA-144	F, M?, M	1: other: F 2: M 3: M skull, F?? pelvis, long bones: M	US (too conflicting)
EA-164	?M	Skull: ?M; Other: ?M	US (because third molars were erupting so probably not fully adult)
EA-175	?F	Skull: ?F; Other: F	F?
EA-193	?F	Skull: ?F	F??
EA-234	?M	Other: ?M	M??
EA-279	?M	Skull: M	M?
EA-322	?F	Skull: F	F?
EA-368	?M	Pelvis: M	M?

Some adaptation of the previous osteological age data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire burial population (Table 17.2). EA-39 and EA-53 were analysed multiple times and conflicting age estimates were recorded. The original recording forms were consulted, and an age category was assigned based on notes or sketches of dental attrition. The codes which were assigned for the different sex and age groups for Cohen's weighted kappa test are provided in Table 17.3. A qualitative comparison between the current author's and the previous researchers' age and sex data is provided in Table 17.4.

Table 17.2- Data categories and their translations for Cohen's weighted kappa test and subsequent demographic for Elstow Abbey.

Previous researcher category (years)	Translated to
5-10; 6-10	Older child
10-15, 10-18	Adolescent
14+	Adolescent/adult
15-20	Young adult
15-23	Young adult
20-26; 20-30	Young adult
23-32, 23-35	Middle adult
24-30	Middle adult
35-59	Middle adult
36-87 (?middle-aged)	Middle adult
45+	Older adult

Table 17.3- Cohen's weighted kappa codes for sex and age groups at Elstow Abbey.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Possible male	3	Younger child	3
Unsexed	4	Older child	4
Possible female	5	Adolescent	5
Probable female	6	Young adult	6
Female	7	Middle adult	7
		Older adult	8

Table 17.4- Age/sex data comparison between current and previous researchers for Elstow Abbey.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
EA-1	F	F	32.6	MA	25-35	MA
EA-3	M	F	42.5	MA	20-25	YA
EA-13	M	M	37	MA	35-45	MA
EA-32	US	US	1-2	YC	c. 2	YC
EA-39	M	M	48.6	OA	40-45*	OA
EA-41	F?	F	77.3	OA	35-40	MA
EA-44/45	F	F	-	Adult	Adult	Adult
EA-47	M	M	36.1	MA	30-40	MA
EA-53	M	M	37.5	MA	40-45*, 51	MA
EA-59	F?	M	31	MA	17-25	YA
EA-60	F	F	28.1	MA	Adult	Adult
EA-121	M	M	32	MA	25-38	MA
EA-126	F?	M??	18.4	YA	17-25	YA
EA-138	M	M	33	MA	35-45	MA
EA-139	M	M	35.2	MA	c. 30	MA
EA-144	F	M, F, M?	65	OA	80?	OA
EA-151	M?	M	32.8	MA	27-32	MA
EA-156	US	US	25-35	MA	18-22	YA
EA-156A	US	US	17-25	YA	25-36	MA
EA-174B	US	US	4.5-5.5	YC	5-10	OC
EA-187	F??	F	20.4	Adult	Adult	Adult
EA-197	M	M	32.9	MA	24-30	MA
EA-198	US	US	2.5-4	YC	c. 3	YC
EA-214	M?	M	32.4	MA	33-45	MA
EA-234	US	M?	25-35	MA	25-35	MA
EA-243	US	M??	33-45	MA	45+	OA
EA-279	M?	M?	32.7	MA	25-35	MA
EA-322	M?	F?	-	Adult	Adult	Adult
EA-368	M	M?	39.1	MA	Adult	Adult
EA-370	US	F	-	Adult	Adult	Adult

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test.

There was substantial agreement between the current author and previous researchers with regards to age estimation (κ=0.76), but only moderate agreement between the current author and previous researchers with regards to sex assessment (κ=0.56). Although it is not ideal that there was only moderate agreement between the current author and previous researchers with regards to sex assessment, it is sufficient for inclusion in this project (see Volume 1, Section 6.1.8). The demographic data provided by previous researchers was used in all subsequent analysis.

17.2 Demographic analysis

Of the 97 individuals who had not been analysed previously, the current author was able to analyse 14 individuals utilising standard osteological methods (Volume 1, Section 4.31-4.3.3). The remaining 83 individuals who were not analysed by the current author or previous researchers were usually individuals that were not as complete or well-preserved, or from non-articulated burials. Fortunately, a review of the entire burial population had been performed between 2002-2004 included the photographing of the individuals who had been properly stored in labelled plastic bags (Baker 2016). The current author was able to utilise the photographs taken to discern as much information as possible from the individuals who had not been analysed previously. In many cases, the current author was able to determine if an individual was a non-adult (unerupted teeth, unfused epiphyses), an adolescent/adult (later fusing epiphyses), or an adult (fusion of annular rings, pathology such as vertebral lipping). It is highly likely that many of the individuals classified as adolescent/adult by the current author were actually adults, but without a complete osteological analysis it was impossible to determine a narrower age range. For the photographs which did not reveal any osteological information, the individual was recorded as unaged and unsexed.

A majority of the burials were distinct burials which, in general, consisted of the remains of a single individual (Figure 17.1). Some of these individuals were still articulated while others were highly jumbled, particularly by root action (Baker 2016). Eighteen individuals (6%) were identified post-excavation as their bones were mixed in with the bones of the primary burial. There were 16 individuals which consisted only of a skull, making it difficult to determine whether these were distinct graves or whether the skulls had been disturbed. Two individuals were identified by fragments only, four individuals were part of charnel pits, three individuals were possibly reburied, and there was not enough information to determine the nature of the grave for 17 individuals.

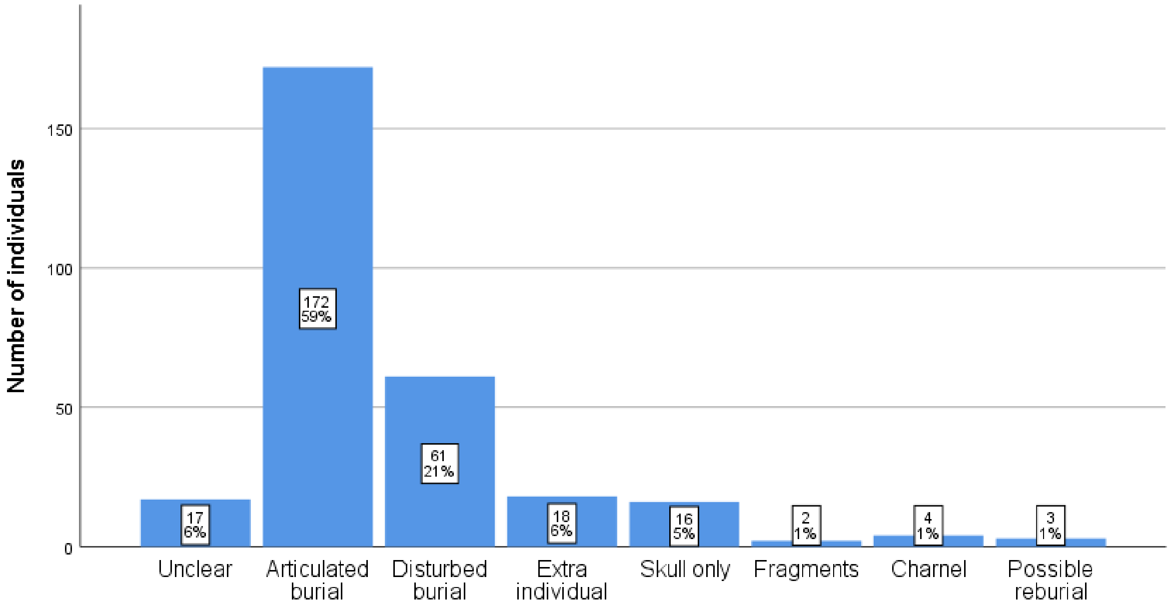

Figure 17.1- Distribution of burial types at Elstow Abbey.

Although many of the burials could be classified as articulated, there were few burials which represented an entire individual. There was an extreme amount of intercutting between the graves and damage to many graves by later buildings. Around 76 individuals (26%) represented an entire individual, or an individual either missing a skull or the feet. The remaining 217 individuals could not be considered complete individuals, with many burials consisting of only the feet, only the lower legs, or only the legs.

The Elstow Abbey later Anglo-Saxon burial population consist of 293 individuals (149 adults, 35 non-adults, 37 adolescent/adults, and 72 unaged individuals). The level of preservation varied and was only recorded for 110 individuals with a majority of them fairly well preserved or better (Figure 17.2).

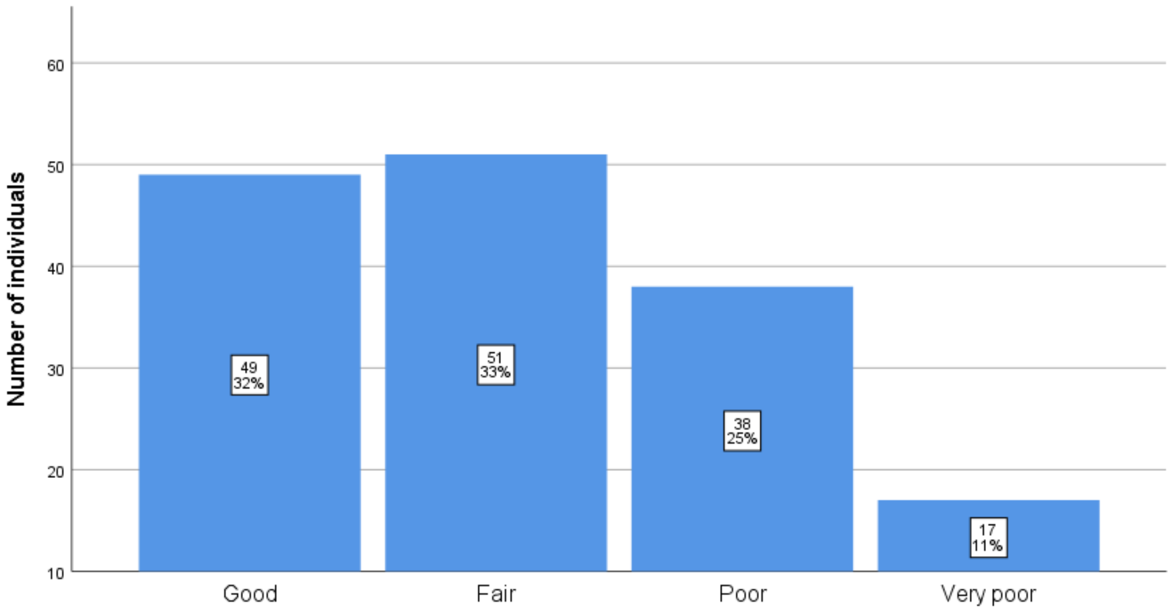

Figure 17.2- - Levels of preservation of the skeletal material from the Elstow Abbey burial population.

As mentioned earlier, there were several instances of age/sex conflict between previous researchers. In these cases, the current author utilised the details from the recording forms to try to determine the appropriate age/sex category. If the age/sex category conflict could not be resolved, the age/sex was recorded as unaged/unsexed. For the previously mentioned individuals which were labelled as ?M or ?F, but were not defined as either probable or possible male/females, the current author utilised the details from the recording forms to make a final determination (Table 17.1). It should be noted that probable male/females were considered male/females and possible male/females were considered unsexed for demographic analysis. All non-adults were considered unsexed even if a previous researcher had performed sex assessment because sex assessment of non-adults is inconsistent (Volume 1, Section 4.3.1).

In addition, some of the age categories provided by previous researchers overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 16.1). The sex distribution for the adult burial population and the age distribution for the entire burial population are provided in Figure 17.3 and Figure 17.4 respectively

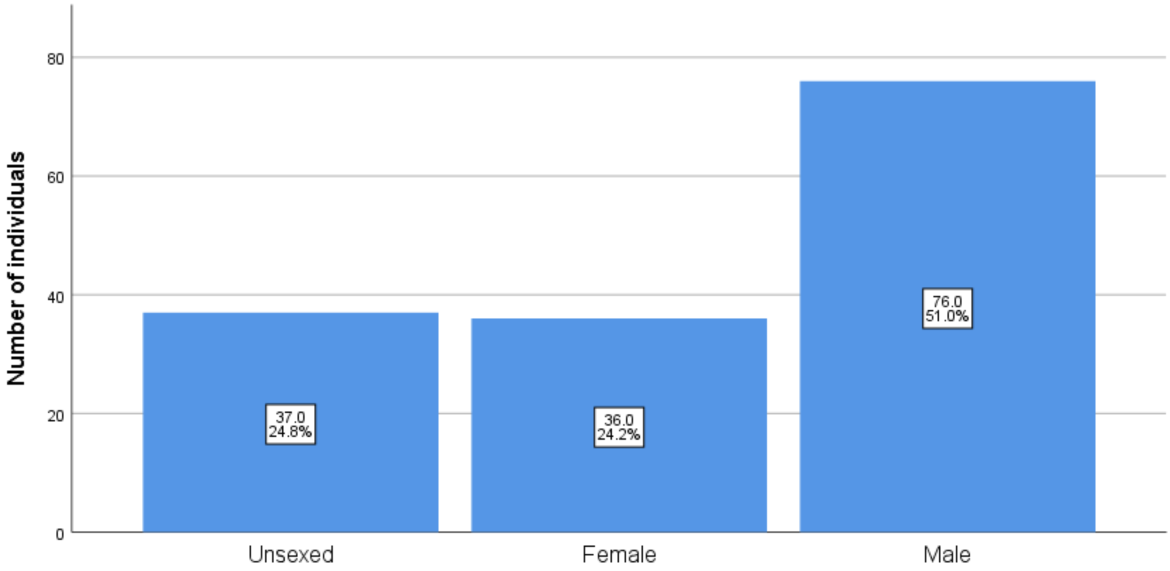

Figure 17.3- Sex distribution for the Elstow Abbey adult burial population.

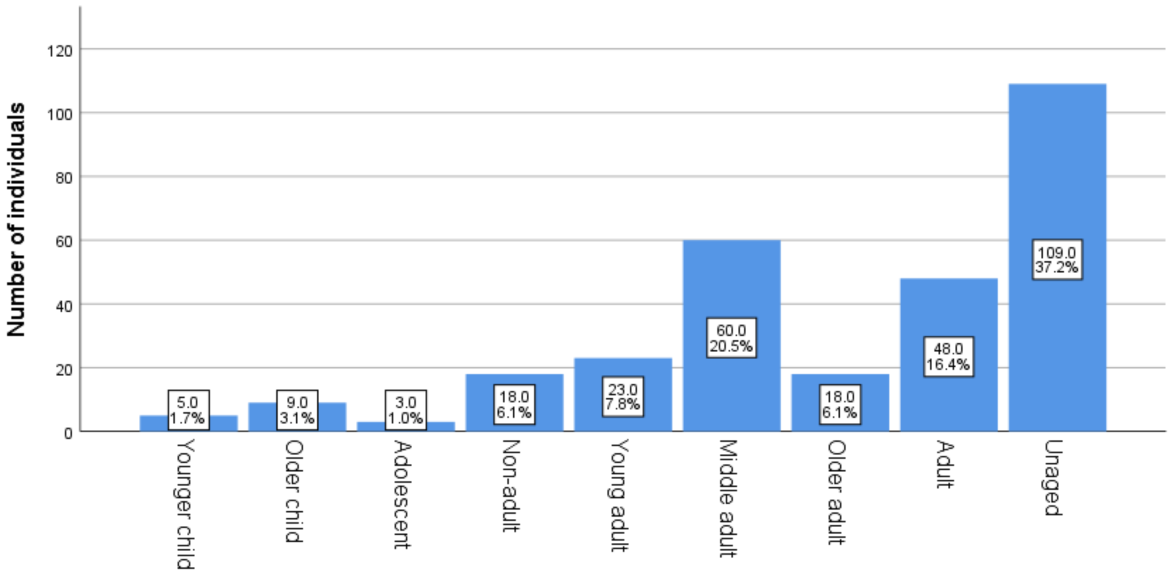

Figure 17.4- Age distribution for the Elstow Abbey burial population.

18 Priory Orchard

18.1 Comparison of age and sex data

Some adaptation of the previous osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire population Table 18.1. The codes which were assigned for the different sex and age groups are provided in Table 18.2. A qualitative comparison between the current author's and the previous author's age and sex data is provided in Table 18.3.

Table 18.1- Age ranges and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Priory Orchard.

Previous researcher category	Translated to
3.5-7.5 years	Younger child
6-8 years	Older child
11.5-14 years	Adolescent
15-18 years	Adolescent
15-20 years	Young adult
17-20 years	Young adult
20-28, 20-30 years	Young adult
20-35 years	Middle adult
40-60 years	Older adult
45-55 years	Older adult
35-70 years	Adult
"Adult, not very young"	Adult
Mid-older adult	Adult
>45; >40; >35; >30 years	Adult
?Adult; "young adult or older subadult"	Unaged
Current author category	**Translated to**
Possible male/female	Unsexed

Table 18.2- Cohen's weighted kappa codes for sex and age groups for Priory Orchard.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 18.3- Age/sex data comparison between current and previous researchers for Priory Orchard.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
PO-140	US	US	-	UA	UA	UA
PO-1005	F	F	27.5	MA	20-30	YA
PO-1016	US	US	ADO or adult	UA	UA	UA
PO-1022	M	M	32.7	MA	Adult	Adult
PO-1023	M	M	25-45	MA	35-70	Adult
PO-1027	US	M	-	Adult	20-30	YA
PO-1032	US	US	<18	ADO	11.5-14	ADO
PO-1033	M	M	25-45	MA	45-55	OA
PO-1038	M	M	25-35	MA	25-35	MA
PO-1040	US	M?	-	Adult	Older adult	OA
PO-1042	M?	M?	33-45	MA	>40	Adult
PO-1048	US	US	ADO or adult	UA	15-18	ADO
PO-1049	M	M	39.5	MA	32-45	MA
PO-1052	US	F?	17-25	YA	17-20	YA
PO-1058	US	US	15+	Adult	Adult	Adult
PO-1063	F?	F	76.8	OA	35-50?	MA
PO-1064	M?	M	-	Adult	Adult	Adult
PO-1068	US	US	14+	Adult	Adult	Adult
PO-1072	M?	M	17+	Adult	Young adult	YA
PO-1092	M?	M	17-25	YA	Young adult	YA
PO-1108	US	US	14+	Adult	Adult	Adult
PO-1113	M?? (US)	M?	17-25	YA	18-23	YA
PO-3107	US	F?	17-25	YA	20-30	YA
PO-3248	F?	F	25.7	YA	18-25	YA
PO-3258	M	M	31.3	MA	30-45	MA
PO-3283	M?	M	25-35,	MA	25-35	MA
PO-3328	US	M	25-35	MA	20-35	MA
PO-3331	F??(US)	M	36.1	MA	35-45	MA
PO-3336	US	US	-	Adult	Young adult	YA
PO-3391	M?	F	32.6	MA	40-50	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

There was substantial agreement between the current author and previous researchers with regards to age estimation (κ=0.74), but only moderate agreement between the current author and previous researchers with regards to sex assessment (κ=0.51). Although it is not ideal that there was only moderate agreement between the current author and previous researchers with regards to sex assessment, it is sufficient for inclusion in this research (see Volume 1, Section 6.1.9). The demographic data provided by previous researchers was used in all subsequent analysis.

18.2 Demographic analysis

A total of 611 contexts containing human remains were identified at Priory Orchard. Osteological analysis was performed on 291 of these (47%). The human skeletal remains came from a variety of contexts, but only 49% of these came from inhumations. The researchers at the University of Roehampton's Department of Life Sciences analysed the human remains from a variety of contexts, but much of this analysis must be excluded as this research focuses only on the inhumation burials. Of the 297 inhumations, 121 (41%) were analysed by the University of Roehampton's Department of Life Sciences researchers and are included in the following research.

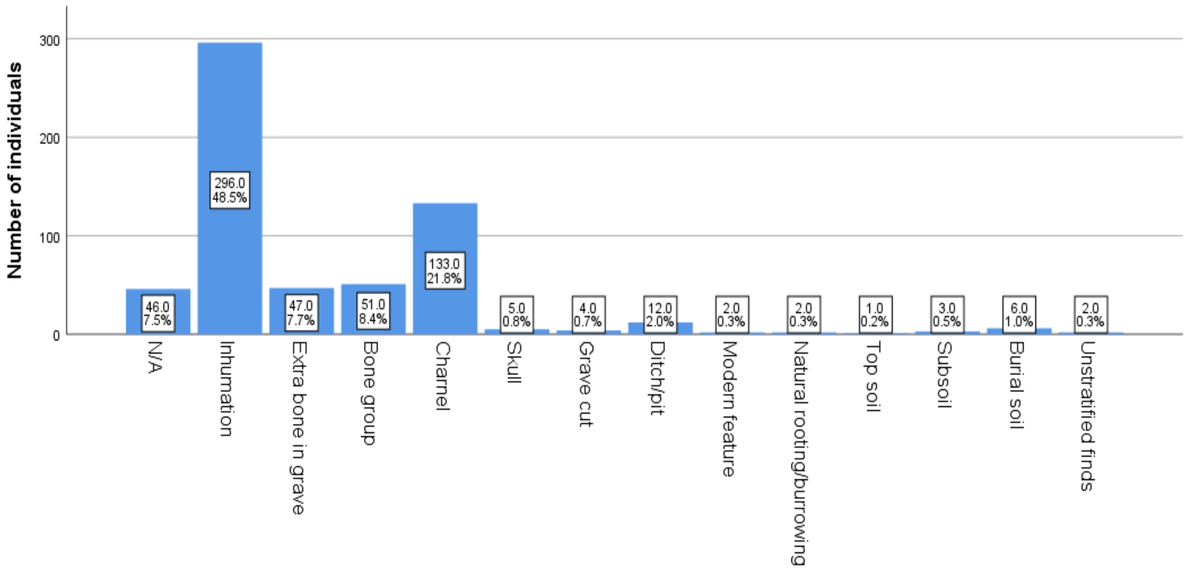

Figure 18.1- Context type distribution for the entire Priory Orchard burial population.

The analysed inhumations from Priory Orchard consisted of 121 individuals (113 adults, four non-adults, and four unaged individuals). The bone preservation data was collected from Randall (2014; 2016): a majority of the sample was in fair or good condition, although surface erosion was certainly a limiting factor in terms of osteological analysis (Figure 18.2).

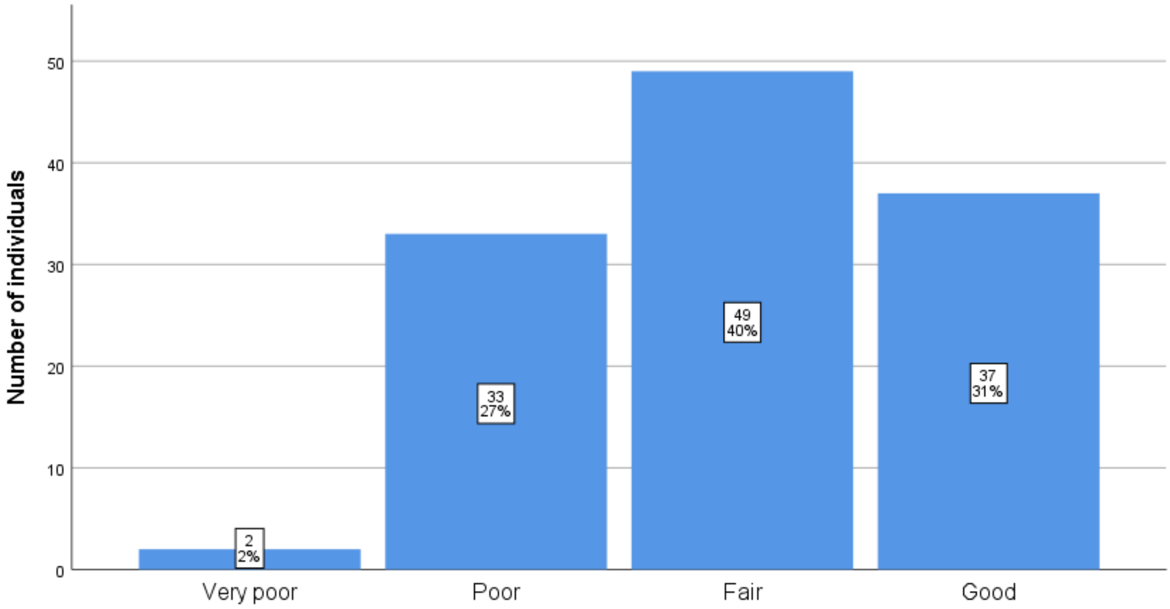

Figure 18.2- Levels of preservation of the skeletal material from the Priory Orchard analysed burial population.

Individuals defined as ?M or ?F by previous researchers were included in the male and female categories respectively, while individuals defined as ??M or ??F were included in the unsexed category. Some of the age ranges provided by previous researchers overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 18.1). The sex distribution for the analysed adult burial population and the age distribution for analysed burial population are provided in Figure 18.3 and Figure 18.4 respectively.

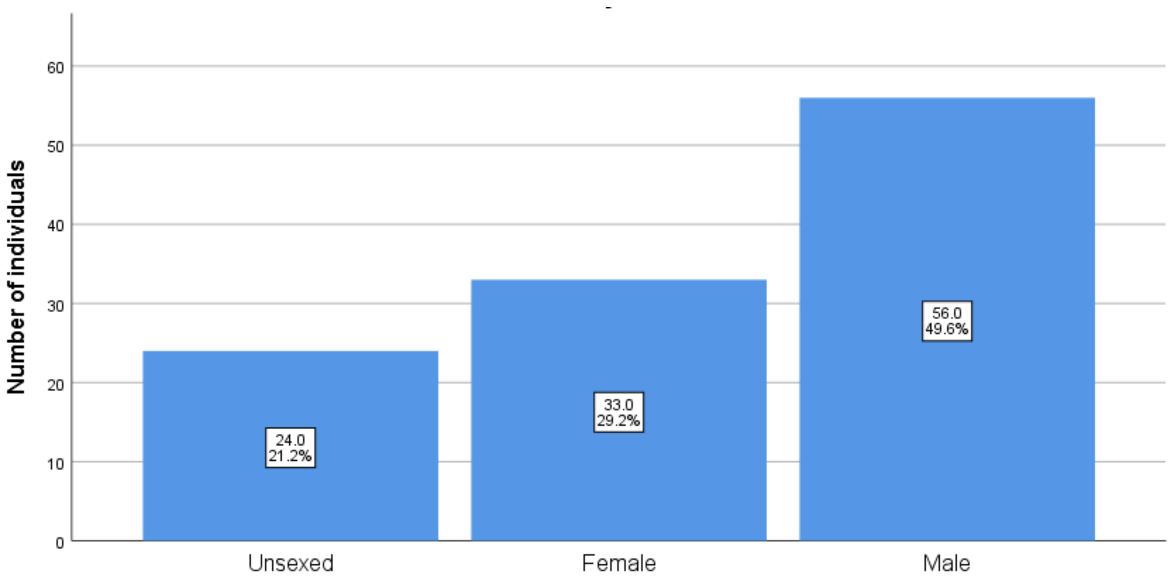

Figure 18.3- Sex distribution for the Priory Orchard analysed adult population.

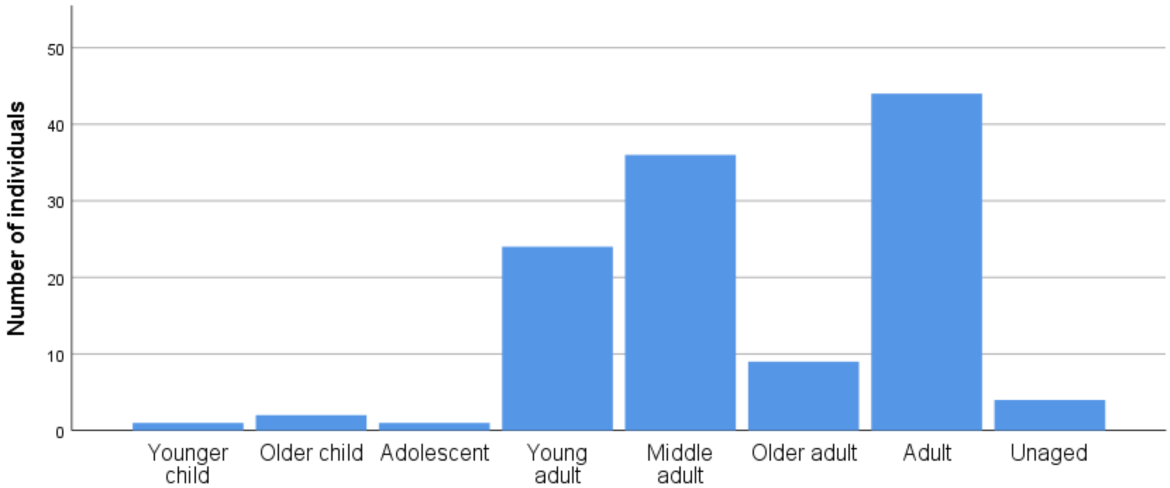

Figure 18.4- Age distribution for the Priory Orchard analysed burial population.

There was considerable underrepresentation of non-adults in the analysed burial population with only one younger child, two older children, and one adolescent. It should be noted that 11 further non-adults were identified from the non-inhumation contexts, and four more non-adults were recorded by the original excavators among the individuals who had not yet been osteologically analysed (and confirmed with relatively good certainty by the current author from excavation photos).

19 Raunds

19.1 Comparison of age and sex data

Some adaptation of Craig's (2006) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire population (Table 19.1). The codes which were assigned for the different sex and age groups are provided in Table 19.2. A qualitative comparison between the current author's and Craig's (2006) age and sex data is provided in Table 19.3.

Table 19.1- Age ranges and their translations for Cohen's weighted kappa test and subsequent demographic analysis for Raunds.

Current author category	Translated to
Possible male/female	Unsexed
Craig (2006) category	Translated to
12-18 months	Infant
6-7 years	Younger child
6-8, 6-12 years	Older child
11-13 years	Older child
12-13, 12-14, 12-15, 12-18 years	Adolescent
16-19 years	Young adult
46+ years	Older adult

Table 19.2- Cohen's weighted kappa codes for sex and age groups at Raunds.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 19.3- Age/sex data comparison between current author and Craig (2006) for Raunds.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
RD-5006	M	M	45.1	OA	36-45	MA
RD-5011	US	US	2-3	YC	2-3	YC
RD-5013	US	US	14.5-15.5	ADO	12-14	ADO
RD-5042	F	F	25-32	MA	26-35	MA
RD-5051	F	F	62.3	OA	36-45	MA
RD-5064	M	M	32.4	MA	26-35	MA
RD-5071	F	F	72.5	OA	46+	OA
RD-5073	US	M?	45+	OA	46+	OA
RD-5090	F?	US	67.0	OA	Adult	Adult
RD-5092	F	F	81.2	OA	46+	OA
RD-5115	US	US	12.5-14.5	ADO	10-11	OC
RD-5125	US	US	7.5-9.5	OC	8-9	OC
RD-5162	US	US	13.5-15.5	ADO	12-15	ADO
RD-5168	US	US	10-12	OC	11-13	OC
RD-5175	US	US	14-16	ADO	14-15	ADO
RD-5183	M	M	29.6	MA	26-35	MA
RD-5184	M	M	27-29	MA	18-25	YA
RD-5189	US	US	0-2m	IN	0-1m	IN
RD-5191	US	US	2-3	YC	3-5	YC
RD-5199	US	US	4-5	YC	3-4	YC
RD-5201	M	M	73.1	OA	46+	OA
RD-5226	F?	F	36.3	MA	18-25	YA
RD-5269	US	US	0-1m	IN	1m	IN
RD-5279	US	US	0-1m	IN	0	IN
RD-5286	M	M	75.0	OA	46+	OA
RD-5292	US	US	2.5-4.5	YC	2-3	YC
RD-5336	US	US	4.5-7.5m	IN	1-1.5	YC
RD-5350	US	US	0-4.5m	IN	0	IN
RD-5365	US	US	<1	IN	3-6m	IN
RD-5366	F?	F	76.5	OA	46+	OA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test.

As there was substantial agreement between the current author and Craig (2006) with regards to sex assessment (κ=0.85), and almost perfect agreement between the current author and Craig (2006) with regards to age estimation (κ=0.92), the demographic data provided by Craig (2006) was used in all subsequent analysis.

19.2 Demographic analysis

The Raunds burial population consists of 379 individuals (196 adults, 177 non-adults, and six unaged individuals). It should be noted that individuals identified by Craig (2006) as probable male/females were included in the male/female categories. The sex distribution for the adult burial population and the age distribution for the entire burial population are provided in Figure 19.1 and Figure 19.2 respectively.

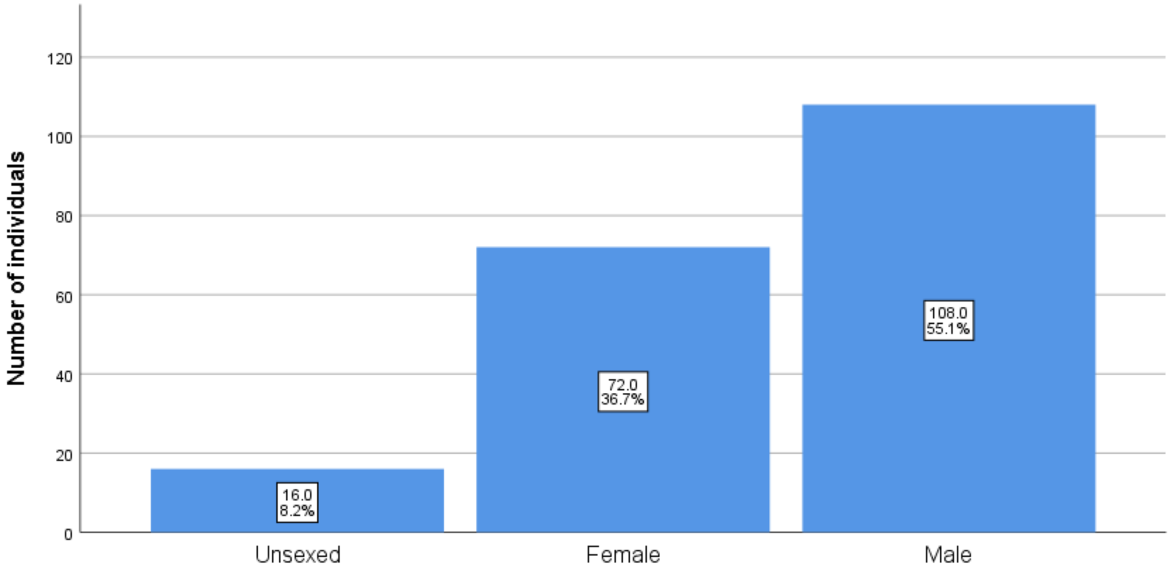

Figure 19.1- Sex distribution for the Raunds adult burial population.

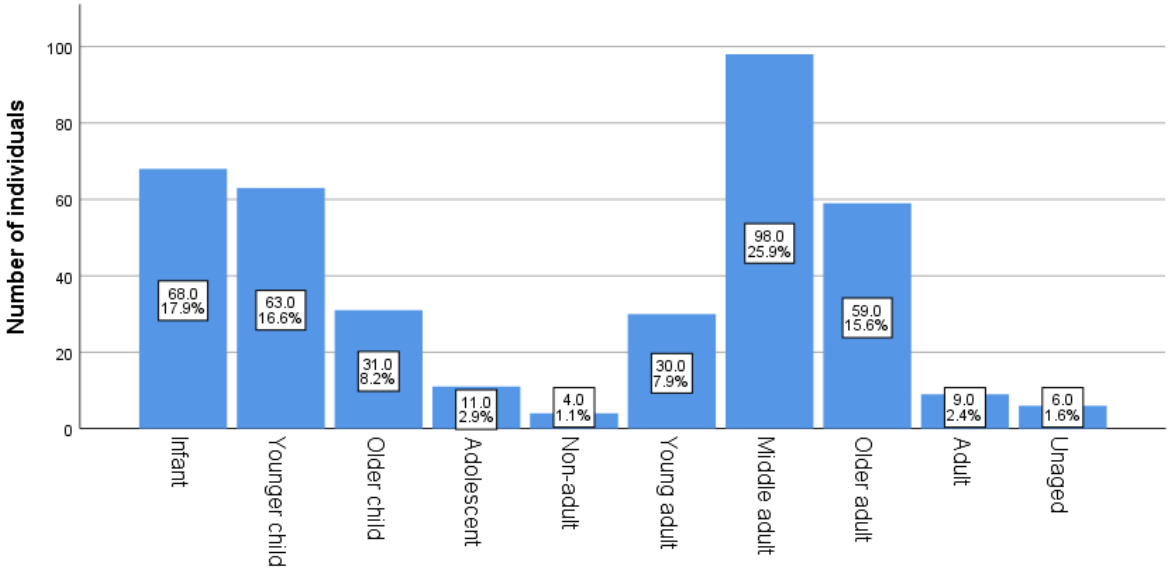

Figure 19.2- Age distribution for the entire Raunds burial population.

20 St. Peter's Church

20.1 Comparison of age and sex data

Waldron (2007) states that "standard methods…employing as many criteria as were available" were utilised for the assessment of sex and the estimation of age of the St. Peter's cemetery population, and suggests the methods described in Ferembach et al. (1980), Jurmain (1986), Bass (1995), Reichs (1997), and Katzenberg and Saunders (2000). He notes that adult sex can be assessed with morphological features of the pelvis and skull, and with the metrical analysis of specific elements. He also notes that the age of an adult individual can be estimated utilising age-associated changes in the pubic symphysis, auricular surface, sternal ends of the ribs, and dentition, specifically mentioning Miles (1962). Finally, he notes that the age of a non-adult individual can be estimated utilising dental development and eruption patterns, the length of the long bones, and the state of epiphyseal fusion. Although no specific methods were noted, the recording forms used for osteological analysis mention features of the pelvis (sub-pubic angle, sciatic notch, pre-auricular sulcus), features of the skull (brow, mastoid projection, occipital ridge), and the diameters of the femoral and humeral heads as criteria by which sex could be assessed. Although no specific methods were noted, the recording forms mention epiphyseal fusion, tooth eruption, diaphyseal lengths, tooth attrition, and age-associated changes of the pubic symphysis as criteria by which age could be estimated.

Some adaptation of Waldron's (2007) osteological data was necessary to allow for statistical comparison with the current author's data and for subsequent demographic analysis of the entire population (Table 20.1). The codes which were assigned for the different sex and age groups are provided in Table 20.2. A qualitative comparison between the current author's and Waldron's (2007) age and sex data is provided in Table 20.3.

Table 20.1- Age ranges and their translations for Cohen's weighted kappa test and subsequent demographic analysis for St. Peter's Church.

Current author category	Translated to
Possible male/female	Unsexed
Waldron (2007) category	**Translated to**
?M/?F	Probable male/female
Infant, with no age given	Non-adult
Child under 5	Non-adult
Juvenile	Non-adult
Under 15 years	Non-adult
Born, neonatal, 0 months	Infant
1 year ±3 months	Infant
12-13 years	Adolescent
16-20 years	Adolescent
20-30 years	Young adult
45+ years	Older adult
Young	Unaged
Young person/child	Unaged

Table 20.2- Cohen's weighted kappa codes for sex and age groups for St. Peter's Church.

Sex group	Code	Age group	Code
Male	1	Foetus	1
Probable male	2	Infant	2
Unsexed	3	Younger child	3
Probable female	4	Older child	4
Female	5	Adolescent	5
		Young adult	6
		Middle adult	7
		Older adult	8

Table 20.3- Age/sex data comparison between current and previous authors for St. Peter's Church.

Ind. no.	Sex (Bohling)	Sex (Previous)	Age (Bohling) (years)	Age category (Bohling)	Age (Previous) (years)	Age category (Previous)
SPC-558	F??(US)	F	37.9	MA	45+	OA
SPC-579	F?	F	-	Adult	Adult	Adult
SPC-870	M	M	33-45	MA	45+	OA
SPC-926	US	US	6.5-7.5	YC	6-8	OC
SPC-977	US	F?	-	Adult	Adult	Adult
SPC-1036	M?? (US)	M	-	Adult	Adult	Adult
SPC-1176	M	M	43	MA	35-44	MA
SPC-1183	M	M	27.1	MA	45+	OA
SPC-1263	M	M	41.1	MA	45+	OA
SPC-1270	US	US	1.5-2.5	YC	*c.*2	YC
SPC-1290	M?	M	-	Adult	Adult	Adult
SPC-1320	F?	F	72.5	OA	Adult	Adult
SPC-1782	US	US	-	Adult	Adult	Adult
SPC-1832	US	US	ADO or adult	UA	Adult	Adult
SPC-1834	US	US	<16	Non-adult	Non-adult	Non-adult
SPC-1841	M?	US	-	Adult	Adult	Adult
SPC-1861	US	US	8.5-9.5	OC	6	YC
SPC-1876	US	F?	14-18	ADO	16-20	ADO
SPC-1896	US	US	15+	Adult	Adult	Adult
SPC-1899	US	US	6.5-8.5	OC	*c.*8	OC
SPC-1909	US	US	8.5-10.5	OC	8-10	OC
SPC-1922	M	M	40.9	MA	45+	OA
SPC-2394	F?	F	26.7	MA	25-34	MA
SPC-2428	F	F	26.3	MA	35-44	MA
SPC-2471	M	M	39.8	MA	45+	OA
SPC-2488	F	F	25-35	MA	Adult	Adult
SPC-2519	F	M	29.2	MA	25-34	MA
SPC-2559	M	M	22.8	YA	17-25	YA
SPC-2772	US	F?	-	Adult	Adult	Adult
SPC-2801	F	F	30.6	MA	25-34	MA

NB: green shading indicates perfect age/sex category agreement; grey shading indicates individual was excluded from Cohen's weighted kappa test; (sex) indicates which category individual was included in for statistical analysis.

As there was substantial agreement between the current author and Waldron (2007) with regards to sex assessment (κ=0.63) and age estimation (κ=0.64), the demographic data provided by Waldron (2007) was used in all subsequent analysis.

20.2 Demographic analysis

The Phase E burial population from St. Peter's Church consisted of 453 individuals (351 adults, 99 non-adults, and three unaged individuals). Data regarding bone preservation and completeness levels were gathered from the original unpublished osteological recording forms. Although bone preservation was variable, a majority of the individuals (62%) were categorised in the fair, good, or excellent preservation categories (Figure 20.1). A distribution of the percentage completeness for each individual is provided in Figure 20.2, and a majority of the individuals were more than 51% complete (Figure 20.3).

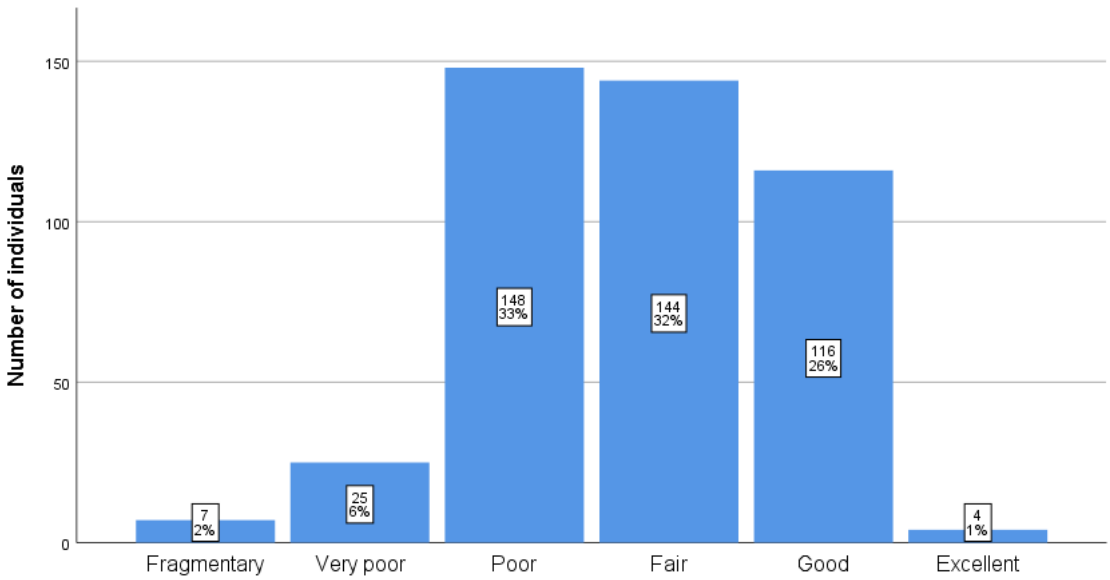

Figure 20.1- Levels of preservation of the skeletal material from the St. Peter's Church burial population.

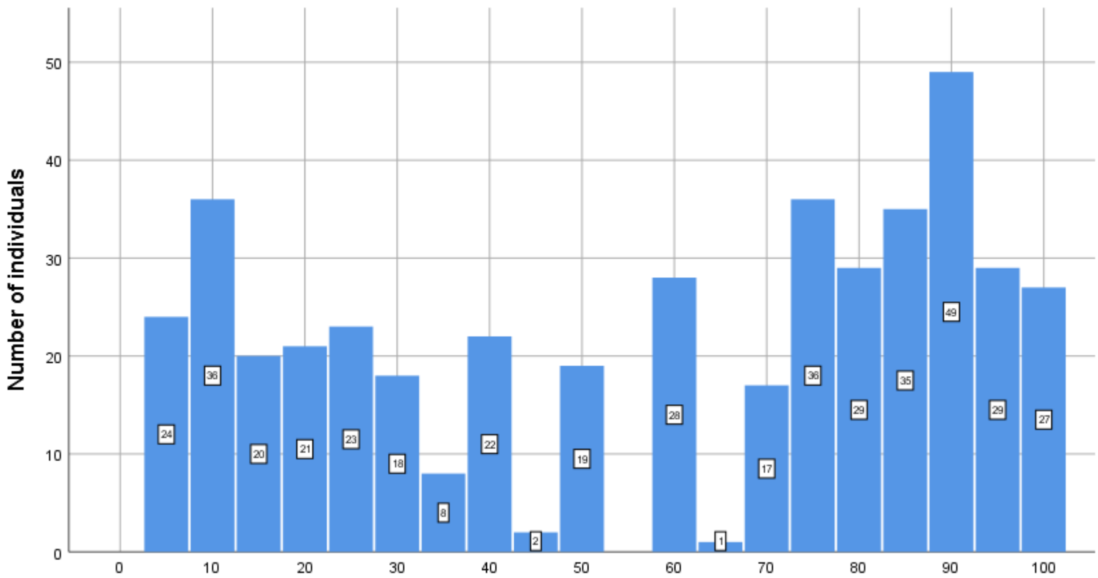

Figure 20.2- Levels of skeletal completeness in the St. Peter's Church burial population.

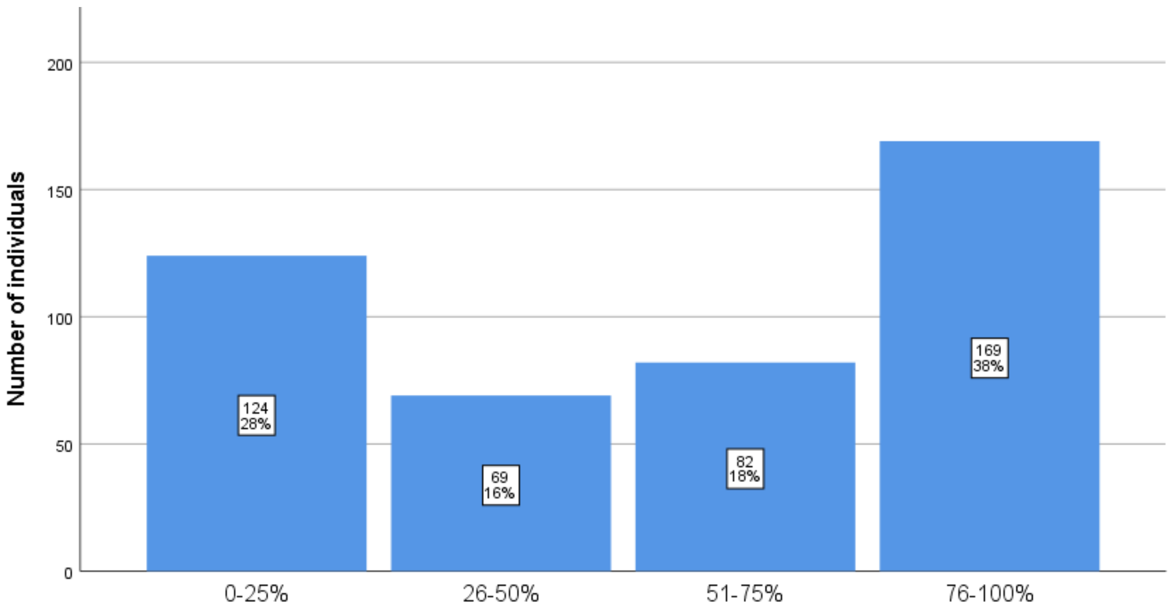

Figure 20.3- Distribution of completeness categories in the St. Peter's Church population.

Individuals defined as ?male or ?female by Waldron (2007) were included in the male and female categories respectively. Some of the age ranges provided by Waldron (2007) overlapped two of the current author's age group definitions, and adaptation was necessary for demographic analysis that is consistent with the rest of this research (Table 20.1).

There was some confusion with the ages of the non-adult individuals. In Waldron (2007), only a single age number was assigned for each non-adult (e.g. 1, 2, 3), but upon further investigation, the original unpublished recording forms provided more general age ranges for each of the non-adult individuals. It also appears as if a separate researcher had analysed the non-adult individuals at St. Peter's Church, as many of the non-adult individuals had two associated recording forms with two separate ages. In many cases, the second researcher, who only focused on the non-adult individuals, was able to x-ray the dentition, thus providing more accurate age ranges. When the age ranges provided by the two separate researchers differed, or when the ranges provided overlapped than one of the current author's age categories, adaptation was necessary (Table 20.4).

Table 20.4- Comparison of non-adult age ranges between two researchers for St. Peter's Church.

Ind. no.	Previous Researcher 1 age range (years)	Previous Researcher 2 age range (years)	Bohling age category
SPC-1061	6-12m	1 ± 3m (dent x-ray)	IN
SPC-2571	*c.*1	0-6m (lbl)	IN
SPC-891	5-6 (lbl)	5-8 (lbl)	YC
SPC-944	6-8 (dent, lbl)	6 (dent)	YC
SPC-956	5-7 (dent, lbl)	6 ± 9m (dent x-ray)	YC
SPC-1055	6-18m	2 ± 6m (dent x-ray)	YC
SPC-1069	6-7 (dent, lbl)	4-6 (dent), 5-7 (lbl)	YC
SPC-1135	7 (dent, lbl)	6 (fusion/dent), 4-6 (lbl)	YC
SPC-1252	6-18m (dent)	12-18m (dent)	YC
SPC-1306	Over 6m	2	YC
SPC-1764	4-9 (dent, lbl)	5-7 (dent), 3-4 (lbl)	YC
SPC-1861	6-8 (dent, lbl)	6 (dent x-ray), 5-7 (lbl)	YC
SPC-635	*c.*8	6-7 (dent), 7 (dent) 5-6 (lbl)	OC
SPC-926	6-8 (dent)	7-9 (dent x-ray)	OC
SPC-1016	*c.*7(dent, lbl)	7 ± 9m (dent)	OC
SPC-1067	6-8	8-9 (dent)	OC
SPC-1196	8-10	5-6 (dent), 7 ± 9m (dent), 3-5 (lbl)	OC
SPC-1230	*c.*8 years (dent)	6-8 (dent), 5-8 (lbl)	OC
SPC-1244	11-13 (dent, lbl)	10 (dent), 7-10 (lbl)	OC
SPC-2794	<6 (dentition)	7 (dent x-ray)	OC
SPC-2795	9-10	6-9 (lbl)	OC
SPC-545	*c.*14	9-12 (long bone length)	ADO

NB: dent= dentition, lbl= long bone length.

The sex distribution for the adult burial and the age distribution for the entire burial population are provided in Figure 20.4 and Figure 20.5 and respectively.

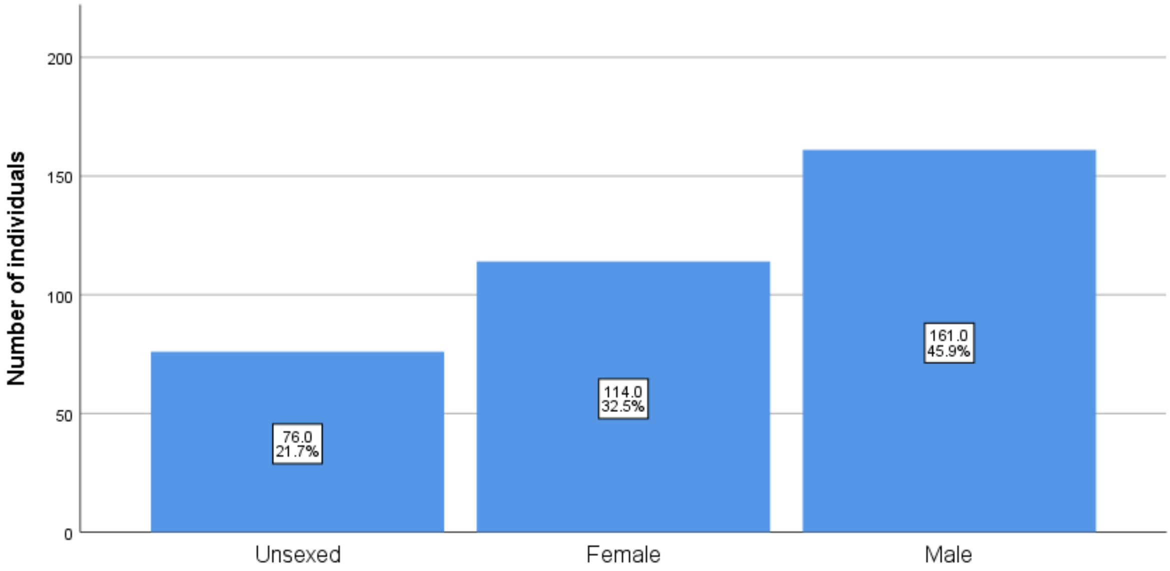

Figure 20.4- Sex distribution for the St. Peter's Church adult burial population.

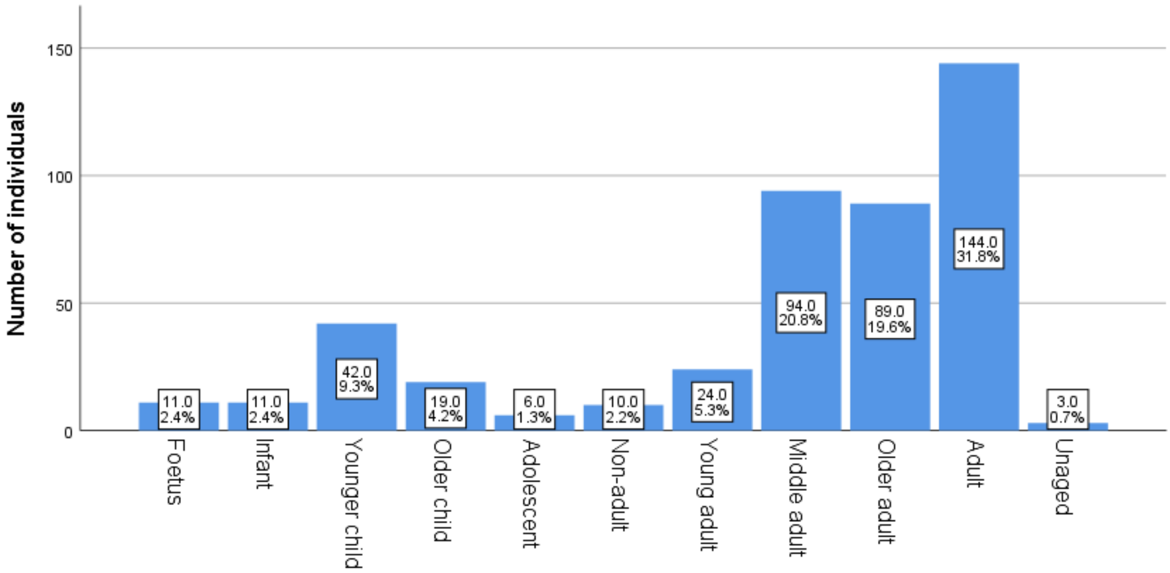

Figure 20.5- Age distribution for the St. Peter's Church burial population.

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