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Report on the Human Skeletal Remains - Charlton Plantation, Wilts

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The human skeletal remains from 43 inhumation burials and one cremation at Charlton Plantation were examined in the Laboratory. Bone preservation was generally poor and there were only three skeletons which could be described as being in a fair condition. Individual summaries are listed in Appendix 1; complete inventories of the bones and teeth present by individual are kept in the archive.

The material was examined for details of demography (sex, age and stature), health and skeletal and dental metrical and morphological variables. Analysis of this last category could not be considered justifiable with the small samples available. However it was noted that there was nothing unusual present: the observations fitted well within the bounds of the variability that might normally be expected. Individual results are listed in Appendix 4.

Demographic Results

Note: Individual results for sex, age and stature are given together with the method(s) used in Appendix 1. Appendix 2 is a simple list for quick reference.

Sex

Table 1 below gives the results for sexing for this site. Attribution of sex was either probable (male/female), possible (?male/?female) or impossible. The last category includes those adult individuals for whom data were unavailable and infants, juveniles and sub-adults for whom sexing was not attempted owing to the inaccuracies involved.

Table 1. Results for Sexing

Sex	Number
Male	8
?Male	3
?Female	4
Female	8
Not sexed	21 (includes cremation)
Total	44

There is very little that can be said about these results owing to the small size of the sample involved and the large number classified as "not sexed" (approximately half). However it may be noted that there was a relatively even distribution between the sexes with no predominance of one over the other.

Age

Table 2 below gives the results for ageing of this sample, together with a bar chart to illustrate the distribution. It should be noted that for the chart the results have been standardised: that is the infants, juveniles and sub-adults have been put into five-year groups so that there is statistical conformity with the adults. The exception is the 50+ group which therefore may be disproportionately large. Since ageing of older individuals is inaccurate this effect is difficult to avoid - therefore its presence should be emphasized. However it may be added that with the present sample the number of individuals is so small that it may be assumed to be of negligible importance.

Table 2. Results for Age

Age	No.	
0-5	2	::::::::::
5-10	4	::::::::::::::::::::
10-15	2	::::::::::
15-20	4	::::::::::::::::::::
20-25	6	::::::::::::::::::::::::::::::
25-30	3	:::::::::::::::
30-35	4	::::::::::::::::::::
35-40	4	::::::::::::::::::::
40-45	2	::::::::::
45-50	1	:::::
50+	3	:::::::::::::::
Adult	5	
35-45	1	
-	3	
Total	44	

The results of ageing this series showed a fairly even spread and although the age group 20-25 years was the largest with such small sample sizes this could not be regarded as significant. It was not considered justifiable to examine the age distribution by sex where such small numbers were involved.

Stature

Poor preservation of the material affected estimation of stature such that only 16 individuals out of a total of 44 could be assessed. With such a small number there was very little that could be said about the results. Those that were available are listed and illustrated below in Table 3. The sexual dimorphism shown, though marked, is similar to that which might be found in a larger sample although in that case more overlap between the sexes would be expected.

Table 3. Results for Stature by Sex

Stature	No.	
1.50-1.54	1	:::::
1.55-1.59	4	::::::::::::::::::::
1.60-1.64	2	::::::::::
1.65-1.69	-	
1.70-1.74	6	******************************
1.75-1.79	2	**********
1.80-1.84	1	*****
	16	

Key

: = Female
* = Male

Observations for Health

Evidence for health in this sample was very slight owing to the poor preservation of the bone. As a result most of the evidence came from the teeth and for this reason dental disease is discussed more fully here than bone pathology.

Dental Wear

The degree of wear on the occlusal surfaces of the dentition was observed in this sample principally for ageing purposes. As expected this was found to increase with age on all teeth. Further as has been found with other Anglo-Saxon population samples (Miles 1963) the rate of wear was generally high (suggestive of a coarse diet). It was also noted that amongst the younger individuals (in particular Burials 24,59, 75 and 93) there was a relatively greater degree of wear on the incisors, especially when compared to the molar teeth. It was not possible to examine older individuals for a continuation of this pattern nor was it feasible to discover the cause(s) although the most likely explanation was probably environmental (eg. diet).

Caries

Carious infection of the teeth was found to be present in four individuals. However since only 18 out of a total of 44 (41%) had teeth available for examination this could not be regarded as indicative of the proportion of the population likely to have suffered from caries. Instead the total teeth present were assessed - at Charlton Plantation there were 454 teeth present out of a maximum possible total of 576 (based on an adult dentition of 32 teeth) or 79%. 11 of those teeth had carious lesions (a rate of 2.42%). This seemed to suggest a low incidence so the DM rate was calculated (decayed + missing antemortem/total teeth %) which gave a result of 4.85%. (The advantage of this latter equation is that it makes some allowance for disease in teeth lost antemortem). Other authors working on Anglo-Saxon samples have reported caries rates of 5.6% (Brothwell 1966) and 8.1% (Hardwick 1960). By comparison therefore the overall rate at Charlton was low. This may have been in part the effect of small sample size but it is consistent with the finding

of Moore and Corbett (1971, 1973) of a lower caries incidence among Anglo-Saxons than in either Roman or Mediaeval times, the most likely cause of which was the relatively coarser diet of the period.

In other respects the situation was very similar to that observed by Moore and Corbett (1971) although similar detailed examination was not possible. Thus the molars were the teeth most commonly affected (only one caries was found on a tooth other than a molar - an incisor) and the most frequent site of attack was the cemento-enamel junction at the interstitial margins. Caries varied in size from small to large. On only one example (Burial 70) was there an abscess present which could probably be associated with a caries on the adjacent tooth.

Abscesses

There were only three abscesses present in this sample. However since only 369 sockets could be examined (64% of the maximum possible total for the 18 individuals observed) this could not be taken as a significant result. The three lesions all occurred on the buccal surface of the jaw and were in two cases small and in one case moderate in size. In one (Burial 4) there was antemortem loss of the adjacent tooth, in another (Burial 35) half loss of the tooth crown and pulp exposure and in the third (Burial 70) a caries was present in the tooth (see above). Thus in all three it seemed likely that there was contiguous dental disease associated with the lesion.

Antemortem Tooth Loss

Teeth had been lost antemortem in five individuals. This produced a rate of loss for the sample of 2% (antemortem loss/maximum possible teeth %) much lower than that reported for Anglo-Saxons (14.15%) by Brothwell (1966). However given that many of the 18 individuals whose dentitions were examined lacked complete maxillae and mandibles and therefore could not be fully assessed this result for Charlton could not be regarded as highly significant.

Periodontal Disease

Alveolar recession of bone (generally associated with periodontitis during life) was recorded on a scale of 1-3 (slight -severe). As with dental wear this tends to show increasing severity with age and this was the finding with this sample. Thus slight periodontal disease was not found over the age of 25, moderate incidence ranged from 20-45 (with only one individual in the age bracket 40-45) and severity was seen in those aged 45+. It was possible that progression of the disease was relatively fast (two individuals aged 20-25 were scored as moderate) but with so small a sample detailed comparison could not be justified.

Other Observations of Dental Disease

These were largely confined to impacted teeth and partial anodontia (absence of teeth).

Two individuals (Burials 60 and 93) had impacted teeth present. In both cases one tooth was involved: the left

mandibular canine. There was no evidence (on x-ray examination) for resorption of the teeth involved. The finding was unusual in that although any tooth may be impacted those most commonly involved are the third molars followed by the maxillary canines (Shafer, Hine and Levy 1974). Further Shafer et al (ibid.) report the results of a study which found an incidence of third molar impaction of 22% (maxillary) and 18% (mandibular) and of maxillary canine impaction of 0.9%. Unfortunately there are no figures available for other teeth. The condition as observed here is rare by comparison with modern data, unfortunately a sample of only 18 individuals precludes comment on the level of incidence at Charlton Plantation.

Partial anodontia was present in two individuals: Burials 60 and 93. In Burial 93 there was absence of a maxillary third molar, a mandibular second molar and both mandibular third molars. In Burial 60 the teeth involved were both mandibular second premolars and third molars. In addition Burial 60 demonstrated retention of some deciduous teeth: a maxillary canine, a mandibular canine and both mandibular second molars. Absence of teeth is a fairly common condition, studies have shown an incidence of third molar absence of 35% (Shafer, Hine and Levy 1974) and those teeth mentioned here are those most frequently reported as missing. The deciduous retention seen in Burial 60 may be associated with this absence in the permanent dentition.

With such a small sample available for study it was difficult to comment on these observations of tooth impaction and absence. However it was noticeable that Burials 60 and 93 were involved in both instances and although this could not be taken as proof of a relationship between them it has been noticed that tooth absence, in particular, tends to show a familial tendency (Shafer, Hine and Levy 1974) and it is possible that this was the case here.

Bone Pathology

There was very little evidence for disease in this sample largely owing to its poor preservation. Thus there were no examples of major disease or trauma found and the only evidence for infection which had spread to the bone was on Burial 75 where there was some slight sub-periosteal deposition of new bone on the shafts of the right tibia and fibula. No further comment was possible on this.

The only other cases which could tentatively be identified were: Burial 41 (spondylosis deformans), Burial 60 (congenital fusion of cervical vertebrae) and Burial 89 (cribra orbitalia). Fuller details for all of these individuals are given in Appendix 6.

The Cremation

Individual details for this burial (36) have been included with the results for the inhumations. It is noted here that the sample was extremely small (a few grams only) and that there were no data available concerning cremation practice.

Summary

44 individuals from Charlton Plantation, Wilts. were examined in the Laboratory. Data were limited owing to poor preservation but nevertheless most of the sample could be assessed for sex or age and some for stature. Other information concerning anatomical variability and pathology was restricted to a few individuals. Morphologically the dentition produced the most interesting result where similar absence and impaction of teeth suggested the possibility of a relationship between Burials 60 and 93. Observations for health were also largely confined to the dentition and although only 18 sets of teeth could be examined the evidence seemed to indicate a low rate of dental disease.

Appendix 1. Individual Results - Bone Preservation, Sex, Age and Stature

Note:

1. Sex: The numbers attached to the sex attributions (eg. Female 1, 2, 4-10) refer to the methods listed in Appendix 2.

2. Age: Estimates of age are generally given in ranges of five years. Younger individuals (infants, juveniles and sub-adults) may be an exception to this as the greater accuracy afforded by using dental development may permit a closer approximation of age.

3. Stature: Correction for decrease in stature over 30 years of age was undertaken using Trotter's method (1970). The age used in the equation for each individual is given in brackets.

Burial 1
A very few fragments of human bone.
-
Adult: -
-

Burial 2
A very few fragments of human bone.
-
Adult: -
-

Burial 3
A very few fragments of human bone.
-
Adult: -
-

Burial 4
A few fragments of human bone in very poor condition.
-
20-25 years: Dental wear
-

Burial 5
A very few fragments of human bone.
-
Adult: -
-

Burial 6
A very few fragments of human bone.
-
30-35 years: Dental wear
-

Burial 7
Partial skeleton in poor condition (c.1/3 present)
-
15-20 years: Dental development, spheno-occipital synchondrosis
-

Burial 8/9
This was labelled "museum excavated fragments" - it was impossible to sort the material into two individuals (8 and 9) therefore it was noted that all the bone was adult and these numbers were excluded from further analysis.

Burial 10
A very few fragments of human bone
-
20-25 years: Dental wear
-

Burial 11
A very few fragments of human bone
?Female: 1, 3
40-45 years: Dental wear
-

Burial 12
A very few fragments of human bone
-
7-9 years: Dental development
-

Burial 13
A very few fragments of human skull
-
-
-

Burial 14
Partial skeleton in very poor condition (c.1/4 present)
Female: 1, 3
50+ years: Dental wear, antemortem tooth loss
-

Burial 15
A very few fragments of human bone
-
8-10 years: Dental development
-

Burial 16
A very few fragments of human bone
-
-
-

Burial 17
Partial skeleton in poor condition (c.1/3 present)
Female: 1-3, 8, 12
35-40 years: Dental wear
1.54m ± .0424 (c.5'1"). Left radius.

Burial 18
Partial skeleton in poor condition (c.1/3 present)
Female: 1-3, 8, 12
15-20 years: Dental development, spheno-occipital synchondrosis, epiphyseal union
1.60m ± .0903 (c.5'3"). Left femur - segment 1.

Burial 24
Partial skeleton in very poor condition (c.1/4 present)
Female: 1-3, 8, 12
20-25 years: Dental wear
1.59m ± .0903 (c.5'3"). Left femur - segment 1.

Burial 26
A very few fragments of human bone
-
2-3 years: Dental development, skeletal ossification
-

Burial 35
Partial skeleton in very poor condition (c.1/4 present)
Male: 1-3, 10, 11
50+ years: Dental wear
-

Burial 37
Partial skeleton in very poor condition (c.1/4 present)
Female: 1, 3, 8, 11, 12, 14
20-25 years: Dental wear, dental development
1.59m ± .0903 (c.5'3"). Left femur - segment 1.

Burial 38
A very few fragments of human bone
-
5-6 years: Dental development
-

Burial 39
A few fragments of human bone
-
9-11 years: Dental development
-

Burial 41
Partial skeleton in poor condition (c.1/2 present)
Female: 1-3, 8, 11
25-30 years: Dental wear
1.58m ± .0372 (c.5'2"). Right femur.

Burial 59
Partial skeleton in poor condition (c.1/2 present)
Male: 1-3, 5, 8
25-30 years: Dental wear
1.76m ± .0327 (c.5'9"). Right femur.

Burial 60
Partial skeleton in fair condition (c.1/2 present)
Male: 1-3, 5, 8, 10, 12
20-25 years: Epiphyseal union, dental development and wear
1.71m ± .0327 (c.5'7"). Femora.

Burial 67
Partial skeleton in very poor condition (c.1/4 present)
?Female: 1-3
30-35 years: Dental wear
-

Burial 68
A very few fragments of human bone
-
15-18 years: Dental wear, epiphyseal union
-

Burial 69
A very few fragments of human bone
Male: 1, 3
25-30 years: Dental wear
1.73m ± .0879 (c.5'8"). Right femur.

Burial 70
Partial skeleton in very poor condition (c.1/4 present)
Male: 1-3, 8, 10
40-45 years: Dental wear
1.84m ± .0405 (c.6'0"). Right humerus.

Burial 75
A few fragments of human bone
Male: 1, 5
30-35 years: Dental wear
-

Burial 76
A few fragments of human bone
-
12-15 years: Dental development
-

Burial 77
A few fragments of human bone
?Female: 14
Adult: -
-

Burial 82
A few fragments of human bone
-
7-9 years: Dental development
-

Burial 83
A few fragments of human bone
-
3-6 years: Dental development
-

Burial 84
Partial skeleton in poor condition (c.1/3 present)
Male: 1-3, 5, 8, 12
45-50 years: Pubic symphysis
1.77m ± .0327 (c.5'10"). Right femur.

Burial 86
A few fragments of human bone
Female: 3, 8
35-45 years: Dental wear (it was only feasible to make a very approximate estimate of age for this individual)
1.60m ± .0903 (c.5'3"). Right femur.

Burial 89
Partial skeleton in very poor condition (c.1/4 present)
-
15-20 years: Dental wear, epiphyseal union
-

Burial 90
Partial skeleton in very poor condition (c.1/2 present)
Male: 1, 3, 5, 8, 12
35-40 years: Dental wear
1.71m ± .0327 (c.5'7"). Left femur.

Burial 93
Partial skeleton in fair condition (c.1/2 present)
?Male: 1-3, 8, 11, 12
20-25 years: Dental wear
1.70m ± .0327 (c.5'7"). Femora.

Burial 94
Partial skeleton in very poor condition (c.1/4 present)
?Female: 1, 8
35-40 years: Dental wear
-

Burial 102
Partial skeleton in fair condition (c.1/2 present)
Female: 1-3, 5, 8, 11, 12, 14
30-35 years: Dental wear
1.55m ± .0372 (c.5'1"). Femora.

Burial 103
Partial skeleton in poor condition (c.1/4 present)
?Male: 1-3, 8
30-35 years: Dental wear
1.70m ± .0327 (c.5'7"). Left femur.

Burial 113
A few fragments of human bone
?Male: 1, 3
50+ years: Antemortem tooth loss
1.74m ± .0895 (c.5'9"). Right humerus - segment 3.

Cremation 36
A very small sample of cremated human bone
-
-
-

Appendix 2. Results for Sex, Age and Stature

Number	Sex	Age(years)	Stature	
			Metric	Imperial
1	-	Adult	-	-
2	-	Adult	-	-
3	-	Adult	-	-
4	-	20-25	-	-
5	-	Adult	-	-
6	-	30-35	-	-
7	-	15-20	-	-
10	-	20-25	-	-
11	?Female	40-45	-	-
12	-	7-9	-	-
13	-	-	-	-
14	Female	50+	-	-
15	-	8-10	-	-
16	-	-	-	-
17	Female	35-40	1.54±.0424	c.5'1
18	Female	15-20	1.60±.0903	c.5'3
24	Female	20-25	1.59±.0903	c.5'3
26	-	2-3	-	-
35	Male	50+	-	-
37	Female	20-25	1.59±.0903	c.5'3
38	-	5-6	-	-
39	-	9-11	-	-
41	Female	25-30	1.58±.0372	c.5'2
59	Male	25-30	1.76±.0327	c.5'9
60	Male	20-25	1.71±.0327	c.5'7
67	?Female	30-35	-	-
68	-	15-18	-	-
69	Male	25-30	1.73±.0879	c.5'8
70	Male	40-45	1.84±.0405	c.6'0
75	Male	30-35	-	-
76	-	12-15	-	-
77	?Female	Adult	-	-
82	-	7-9	-	-
83	-	3-6	-	-
84	Male	45-50	1.77±.0327	c.5'10
86	Female	35-45	1.60±.0903	c.5'3
89	-	15-20	-	-
90	Male	35-40	1.71±.0327	c.5'7
93	?Male	20-25	1.70±.0327	c.5'7
94	?Female	35-40	-	-
102	Female	30-35	1.55±.0372	c.5'1
103	?Male	30-35	1.70±.0327	c.5'7
113	?Male	50+	1.74±.0895	c.5'9
Cremation				
36	-	-	-	-

Appendix 3. Demographic Methods

Each individual was assessed for sex, age and stature to enable demographic analysis of the population sample. The results together with the methods used for each burial are given in Appendix 1. Appendix 2 is a simple list of the results for easy reference. Note that this is a general appendix and therefore not all of the methods listed were necessarily employed in the analysis of the data.

Sex - Methods

Sexing of the bones was based on both morphological and metrical methods. The following table is a list of the methods used and the authors from which they were taken.

Table 1: Methods and References used for the Attribution of Sex

Method	References
1. Skull morphology	Krogman (1962), Acsadi and Nemeskeri (1970), El-Najjar and McWilliams (1978), Ubelaker (1978), Stewart (1979) and Brothwell (1981)
2. Pelvic morphology	Krogman (1962), Phenice (1969), Stewart (1970), Houghton (1974), Putschar (1976), El-Najjar and McWilliams (1978), Ubelaker (1978), Stewart (1979), Suchey et al (1979) and Brothwell (1981).
3. General skeletal morphology: This was a subjective assessment of the whole skeleton, its size, shape and degree of robusticity or gracility. It was used as a guide only, except where absolutely no other indicators of sex were available.	
4. Discriminant function: Skull	Giles (1970)
5. Discriminant function: Mandible	Giles (1970)
6. Pelvis: Ischio-pubic index	Washburn (1948)
7. Discriminant function: Sacrum	Flander (1978)
8. Vertical diameter: Femoral head	Pearson (1917/19 in El-Najjar and McWilliams (1978) and Thieme and Schull (1957).
9. Discriminant function: Femur	Giles (1970)
10. Maximum diameter: Humeral head	Stewart (1979)
11. Epicondylar width: Humerus	Thieme and Schull (1957)
12. Scapula: Glenoid fossa length	Stewart (1979)
13. Sternum: Manubrium index	El-Najjar and McWilliams (1978)

14. Discriminant function: Talus and calcaneus — Steele (1976)

Age - Methods

Estimation of age for each individual was based on a number of independent variables. Since the methods used for ageing change with the growth and maturation of the skeleton, the preliminary step was taken of assigning individuals to one of the following four classes:

Infant:	Birth - six months (approximately the beginning of eruption of the deciduous dentition).
Juvenile:	Six months - the beginning of epiphyseal union (this coincides approximately with the completion of the dentition with the exception of the third molar, hence the end of its usefulness as an ageing method, at about fifteen years).
Sub-Adult:	Beginning of epiphyseal union - the completion of growth and maturation of the skeleton (approximately 15-25 years).
Adult:	Completion of skeletal growth and maturation - old age.

Table 2 below lists the methods and references used for each age category.

Table 2: Methods and References used for the Estimation of Age

Infant

Development of the deciduous dentition: Moorrees et al (1963), Schour and Massler (1941)

Long bone length/Stature: Olivier and Pineau (1960), Ubelaker (1978)

Juvenile

Development of the dentition: Moorrees et al (1963), Schour and Massler (1941)

Stature: Ubelaker (1978), Olivier (1969)

Skeletal ossification: Anderson (1960), Stewart (1979)

Epiphyseal union: McKern and Stewart (1957), Stewart (1979)

Sub-Adult

Development of the third molar tooth: Schour and Massler (1941) McKern (1970)

Closure of the spheno-occipital synchondrosis: McKern and Stewart (1957)

Epiphyseal union: McKern and Stewart (1957), Stewart (1979)

Metamorphosis of the pubic symphysis: McKern and Stewart (1957) Hanihara and Suzuki (1978)

Adult

Dental wear: Brothwell (1981)

Endocranial suture closure: Krogman (1962)

Metamorphosis of the pubic symphysis: McKern and Stewart (1957), Hanihara and Suzuki (1978), Gilbert and McKern (1973), Todd (1920) and Brooks (1955)

Degenerative changes in the cortex (humerus): Schranz (1959)

Stature

All individuals were assessed for an estimate of stature where possible. The methods used for adults were as follows:

1) Complete long bones: Trotter (1970)

2) Fragmentary remains: Steele (1970)

It was not feasible to estimate stature on any of the infant skeletons but for some of the juveniles the method outlined by Olivier (1969) was used. Individual results are listed in Appendices 1 and 2.

Appendix 4. Metric and Morphological Variables

Results for Cranial Metrics - Mandible

Charlton Plantation, Wilts.

Number	H1	ML	GoGo	W1	CrH	RB	RB'	ZZ	M1/2	M2
59	36.0	105.	109.0	-	77.0	43.7	34.0	43.7	29.6	18.5
60	38.0	100.	96.3	123.3	69.6	40.0	33.6	47.4	29.5	18.0
75	35.0	-	120.8	-	72.0	39.0	31.0	-	29.5	20.0
84	40.4	112.	119.5	121.7	70.5	43.6	30.7	49.0	32.7	21.9
90	34.0	100.	93.8	123.7	76.5	43.4	33.0	43.0	32.0	17.6
102	35.0	95.	75.0	105.4	63.7	39.0	32.0	41.0	29.0	15.0

Results for Post-cranial metrics - Table 1 - Clavicle, Sternum, Scapula

Charlton Plantation, Wilts.

Number	CLAVICLE		STERNUM				SCAPULA					
	ClLl		MaLl	MaBl	CoLl	Index	ScLl		ScBl		ScLg	
17	-	-	-	-	-	-	-	-	-	-	-	31.7
18	-	-	-	-	-	-	-	-	-	-	34.6	-
24	-	-	-	-	-	-	-	-	-	-	-	32.6
37	-	-	-	-	-	-	-	-	-	-	34.3	-
60	-	-	-	-	-	-	-	-	-	-	36.6	-
84	-	-	-	-	-	-	-	-	-	-	41.7	-
90	-	-	-	-	-	-	-	-	-	-	-	38.0
93	-	-	-	-	-	-	-	-	-	-	36.8	36.0
102	-	-	-	-	-	-	-	-	-	-	32.4	32.4

Results for Post-cranial Metrics - Table 2 - Sacrum

Charlton Plantation, Wilts.

Number	SACRUM								Sacral Indices				
	SaL1	SaB1	SaD1	SaC1	SaAB	SaTB	SaTB'	SaDC	1	2	3	4	5
41	-	121.7	-	-	30.5	44.2	32.7	-	-	36.32	-	61.38	-

Results for Post-cranial Metrics - Table 3 - Humerus, Radius, Ulna

Charlton Plantation, Wilts.

Number	HUMERUS										RADIUS				ULNA		Brachial Index	
	HuL1		RHD		HuD1		HuD2		HuE1		RaL1		RHD		UlL1		1	
17	290.	-	-	-	-	-	-	-	-	-	-	210.	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	56.2	-	-	-	-	-	-	-	-
41	-	304.	-	-	-	-	-	-	-	53.8	-	227.	-	-	-	247.	-	74.67
60	334.	-	46.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	369.	-	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	262.	-	-
93	-	-	-	-	-	-	-	-	59.6	-	-	-	-	-	261.	-	-	-
102	-	294.	-	-	-	18.8	-	14.2	-	64.0	-	210.	-	-	-	-	-	71.43

Results for Post-cranial Metrics - Table 4 - Femur

Charlton Plantation, Wilts.

Number	FEMUR																				Indices									
	FeL1		FeL2		FHD1		FHD2		FeD1		FeD2		FeD3		FeD4		FeD5		FeD6		FeE1	1		2		3		4		5		6	
17	-	-	-	-	42.4	-	39.0	38.6	21.6	22.2	30.7	32.3	-	-	-	-	-	-	-	-	-	70.36	68.87	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	40.0	39.6	22.5	22.0	32.3	33.0	-	-	-	-	-	-	-	-	-	69.66	66.66	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	42.6	-	40.4	-	22.6	-	30.0	-	-	-	-	-	26.0	-	39.0	-	-	75.33	-	-	-	66.66	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	24.0	-	28.6	-	-	-	-	-	-	-	-	-	-	83.92	-	-	-	-	-	-	-	-	-	-
41	422	-	-	-	-	-	-	39.3	23.0	24.6	31.0	31.0	-	-	-	-	-	26.0	-	40.0	-	74.19	79.35	-	-	-	65.00	-	-	-	-	-	-
59	480	-	475	-	54.5	54.0	51.8	-	27.0	-	36.5	-	28.0	-	28.5	-	35.6	-	47.0	-	-	73.97	-	98.25	-	75.74	-	16.80	-	10.91	-	-	-
60	460	460	456	458	47.0	46.4	44.2	-	27.0	27.4	34.4	35.0	-	27.4	-	28.7	31.7	31.8	44.2	44.0	-	78.49	78.29	-	95.47	71.72	72.27	-	17.17	9.69	-	-	-
70	-	-	-	-	49.0	-	45.0	-	31.5	-	35.7	-	-	-	-	-	-	-	-	-	-	88.24	-	-	-	-	-	-	-	-	-	-
77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64.0	-	-	-	-	-	-	-	-	-	-	-
84	488	-	-	-	52.4	-	46.3	-	29.0	-	36.4	-	-	-	-	-	-	-	-	-	-	79.67	-	-	-	-	-	-	-	-	-	-
86	-	-	-	-	39.6	-	37.0	-	22.5	-	32.8	-	-	-	-	-	-	-	-	-	-	68.60	-	-	-	-	-	-	-	-	-	-
90	-	460	-	-	46.2	-	45.0	44.4	25.7	-	36.0	-	-	-	-	-	-	28.4	-	33.7	-	71.38	-	-	-	-	84.27	-	-	-	-	-	-
93	456	454	455	451	48.4	47.3	45.3	-	26.5	24.0	31.8	33.0	26.7	29.0	27.6	27.0	28.4	29.0	41.0	42.0	-	83.33	72.72	96.74	107.41	69.27	69.05	16.20	17.36	9.96	-	-	-
102	408	411	406	408	41.4	41.4	38.4	38.7	21.0	21.0	31.7	29.0	-	22.4	-	25.4	23.5	24.0	34.0	34.3	-	66.25	72.41	-	88.18	69.12	69.97	-	13.95	9.46	9.49	-	-
103	-	457	-	-	-	48.2	44.3	44.6	24.0	24.5	32.3	33.5	-	28.4	-	27.0	28.4	27.4	37.8	38.0	-	74.30	73.13	-	105.19	75.13	72.11	-	-	-	-	-	-

Results for Post-cranial Metrics - Table 5 - Tibia, Fibula

Charlton Plantation, Wilts.

Number	TIBIA				FIBULA	Indices		
	TiL1	TiD1	TiD2	TiE1	FiL1	1	2	3
93	346.	- - -	31.4	- 24.0	- - - - -	-	75.88	- - -

Results for Post-cranial Metrics - Table 6 - Calcaneus, Talus

Charlton Plantation, Wilts.

Number	CALCANEUS					TALUS				
	CaL1	CaB1	CaH1	CaL2	CaB2	TaL1	TaB1	TaH1	TaT1	TaT2
37	- -	- -	- -	- -	- -	- 50.6	- 39.4	- 28.6	- 26.2	- 29.3
77	- -	- -	- -	- -	- -	50.6 -	35.8 -	29.8 -	29.8 -	30.8 -
102	- -	- -	- -	- -	- -	- 47.0	- 39.4	- 30.0	- 30.8	- 28.7

Results for Post-cranial Morphological Observations - Sternum, Scapula, Vertebrae, Innominate

Charlton Plantation, Wilts.

Number	STERNUM		SCAPULA				VERTEBRAE										INNOMINATE	
	1		1	2	3	4	1	2	3	4	5	6	7	8	9	10 11	1	2
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	0	0
59	-	-	-	-	-	-	2	3	0	0	-	-	-	-	-	- -	-	-
60	-	-	-	-	-	-	1	1	2	0	-	-	0	0	0	0 0 0	-	-
70	-	-	0	-	1	-	-	-	-	-	-	-	-	-	-	- -	-	-
90	-	-	-	-	-	-	2	2	2	2	-	-	-	-	-	- -	-	-
93	-	-	-	0	-	-	1	1	0	0	-	-	-	-	-	- -	0	- 0
102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7 0 0	0	0 1

Results for Post-cranial Morphological Observations - Clavicle, Humerus, Radius, Ulna, Hands

Charlton Plantation, Wilts.

Number	CLAVICLE	HUMERUS			RADIUS	ULNA	HANDS	
	1	1	2	3	1	1	1	2
17	- -	0 0	0 0	0 -	- -	- -	- - - -	
18	- -	1 1	0 0	- 0	- -	- -	- - - -	
24	- -	1 1	0 0	- -	- -	- -	- - - -	
35	- -	0 -	0 -	0 -	- -	- -	- - - -	
37	- -	1 0	0 0	- 0	- -	- -	- - - -	
41	- -	- 0	0 0	- 0	- -	- 0	- - -	0
59	- -	0 -	0 0	0 -	- -	- 0	- 0	0 -
60	- -	0 0	0 0	0 0	- -	0 -	- -	0 0
70	- -	0 0	0 0	- 0	- -	- -	- - - -	
84	- -	- -	0 -	0 -	- -	- -	- - - -	
90	- -	- 0	- 0	- -	- -	- -	- - - -	
93	- -	0 0	0 0	0 -	- -	0 0	- - - -	
102	- -	- 1	0 0	- 0	- -	- 0	- - - -	

Results for Post-cranial Morphological Observations - Femur, Patella, Tibia, Feet

Charlton Plantation, Wilts.

Number	FEMUR										PATELLA						TIBIA				TALUS				CALCANEUS						FEET			
	1		2		3		4		5		1		2		3		1		2		1		2		i		2		3		1		2	
17	0	0	2	2	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	0	0	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	0	-	0	-	3	-	-	-	-	-	-	-
37	1	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	2	0	0	-	-	2	2	-	-	-	-	-	-
41	-	0	-	3	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	4	-	2	2	-	-	1	-	0	-	0	0	0	0	0	0	0	0	-	-	-	1	-	0	-	-	2	2	-	-	-	-	-	-
60	5	5	2	2	-	-	-	-	0	0	-	0	-	0	-	0	0	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-
70	3	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	-	-	-	1	1	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-	3	3	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-
90	-	-	2	2	0	0	2	2	-	-	-	-	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
93	1	1	3	3	0	-	2	-	2	-	0	-	0	-	0	-	0	0	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-
102	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	-	-	1	1	-	-	-	-	-	-
103	0	0	2	2	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Results for Dental Observations - Morphology

harlton Plantation, Wilts.

Number	OCC	R/C		VARIATIONS NO. OF TEETH					VARIATIONS TOOTH SIZE					SUP.CUSPS			C/P	D
4	-	0	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
14	-	0	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
18	-	0	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
24	-	-	-	0	-	-	-	-	1	4,8	-	-	-	1	4,8	-	-	-
35	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
37	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	1
41	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	1
59	-	0	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
60	-	0	-	1	3,5	4,5	3,8	4,8	0	-	-	-	-	0	-	-	-	-
70	-	0	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
75	-	1	3,3	0	-	-	-	-	1	1,7	2,7	1,8	2,8	0	-	-	1	-
84	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	1	-
89	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	1	1
90	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
93	-	-	-	1	1,8	3,8	4,7	4,8	0	-	-	-	-	0	-	-	-	-
102	-	0	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-

Results for Dental Observations - Pathology

Charlton Plantation, Wilts.

Number	TOTAL		AM		SOCKETS		W	CARIES					ABSCESS/CYST					IMPACT.		DECID.		P	EH	C
							1	1	2,3	4	5	6	1	2,3	4	5	6	1	2,3	1	2,3	1	1	1
4	-	14	-	1	-	13	2	-	-	-	-	-	1	4,4	1	3	1	-	-	-	-	2	-	-
7	13	5	-	-	9	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
14	3	10	-	4	3	10	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
18	14	14	-	-	7	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
24	16	16	-	-	5	15	1	2	3,6	1	1	1	-	-	-	-	-	-	-	-	-	2	-	-
24	-	-	-	-	-	-	-	-	4,6	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
35	-	12	-	2	-	12	4	-	-	-	-	-	1	3,6	1	3	2	-	-	-	-	-	-	-
37	15	13	-	-	14	13	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	16	14	-	-	11	11	2	1	1,2	3	4	2	-	-	-	-	-	-	-	-	-	2	-	-
59	16	16	-	-	15	16	2	2	2,7	3	4	1	-	-	-	-	-	-	-	-	-	2	-	-
59	-	-	-	-	-	-	-	-	2,8	2	4	1	-	-	-	-	-	-	-	-	-	-	-	-
60	16	11	-	-	13	14	1	-	-	-	-	-	-	-	-	-	-	1	3,3	4	6,3	1	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,3	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,5	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,5	-	-	-
68	8	9	-	-	2	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
70	16	15	-	-	10	9	4	6	1,7	3	3	1	1	2,7	1	3	2	-	-	-	-	2	-	-
70	-	-	-	-	-	-	-	-	1,8	2	3	1	-	-	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	2,7	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	2,8	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	3,7	3	4	1	-	-	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	4,7	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
75	16	16	-	-	12	13	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
84	13	16	1	-	6	16	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
89	14	16	-	-	7	15	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
90	12	14	1	2	9	13	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
93	12	12	-	-	16	13	2	-	-	-	-	-	-	-	-	-	-	1	3,3	-	-	1	-	-
102	16	15	-	-	7	14	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
	216	238	2	9	146	223		11					3					2		4				

Appendix 5. Index of Abbreviations - Metric and Morphological Variables

METRICS

Mandible

H1: Symphyseal height
ML: Condyle-symphyseal length
GoGo: Bigonial diameter
W1: Bicondylar width
CrH: Height of ascending ramus
RB: Maximum ramus breadth
RB': Minimum ramus breadth
ZZ: Foramen mentalia breadth
M1/2: Body height at M1/2
M2: Body thickness at M2

Clavicle

ClL1: Maximum length

Sternum

MaL1: Manubrium - length
MaB1: Manubrium - breadth
CoL1: Corpus - length
Index: Sternal index

Scapula

ScL1: Scapula - length
ScB1: Scapula - breadth
ScLg: Length of glenoid fossa

Sacrum

SaL1: Sacrum - length
SaB1: Sacrum - breadth
SaD1: Sacrum - greatest diameter of articular surface
SaC1: Maximum curved length
SaAB: Anterior-posterior breadth of S1
SaTB: Medio-lateral breadth of S1
SaTB': Medio-lateral breadth of S1 (inside annular ring)
SaDC: Depth of curvature

Indices
1: Sacral index
2: Corporo-basal index
3: Curvature index
4: S1 index
5: Depth index

Innominate

IlB1: Iliac breadth
InL1: Innominate length
PuL1: Pubic length
IsL1: Ischial length

Indices
1: Coxal index
2: Ischio-pubic index

Humerus

HuL1: Maximum length
HHD: Maximum diameter of the humeral head
HuD1: Maximum diameter at the mid-shaft
HuD2: Minimum diameter at the mid-shaft
HuE1: Epicondylar breadth

Radius

RaL1: Maximum length
RHD: Maximum diameter of the radial head

Ulna

UlL1: Maximum length

Femur

FeL1: Maximum length
FeL2: Oblique length
FHD1: Maximum diameter of the femoral head
FHD2: Vertical diameter of the femoral head
FeD1: Sub-trochanteric antero-posterior diameter
FeD2: Sub-trochanteric medio-lateral diameter
FeD3: Mid-shaft antero-posterior diameter
FeD4: Mid-shaft medio-lateral diameter
FeD5: Supracondylar antero-posterior diameter
FeD6: Supracondylar medio-lateral diameter
FeE1: Bicondylar breadth

Indices

1: Platymeric index
2: Pilastric index
3: Popliteal index
4: Shaft robusticity index
5: Femoral head index
6: Condylar breadth index

Tibia

TiL1: Maximum length
TiD1: Nutrient foramen antero-posterior diameter
TiD2: Nutrient foramen medio-lateral diameter
TiE1: Bicondylar breadth

Indices

1: Platycnemic index
2: Crural index
3: Intermembral index

Fibula

FiL1: Maximum length

Calcaneus

CaL1: Maximum length
CaB1: Minimum breadth
CaH1: Body height
CaL2: Load arm length
CaB2: Load arm width

Talus

TaL1: Maximum length
TaB1: Talar breadth
TaH1: Body height
TaT1: Trochlear length
TaT2: Trochlear breadth

MORPHOLOGY

Sternum

1: Manubrium-body synostosis
2: Sternal aperture

Scapula

1: Os acromiale
2: Acromion form
3: Acromial facet
4: Shape of suprascapular area

Vertebrae

1: Atlas - facet shape
2: Atlas - posterior bridge
3: Atlas - lateral bridge
4-8: Transverse foramen bridging - cervical vertebrae 3-7
9: Cervical spines (single/double)
10: Sacral hiatus height
11: Accessory sacral facets

Innominate

1: Accessory sacral facets
2: Acetabular crease

Clavicle

1: Sterno-clavicular insertion

Humerus

1: Septal aperture
2: Supracondylar process
3: Medial epicondylar shape

Radius

1: Shape of distal facet

Ulna

1: Olecranon spurs

Hands

1: Metacarpal 3 - separate styloid process
2: Fusion of lunate and triquetral

Femur

1: 3rd trochanter
2: Shape of fovea capitis
3: Allen's fossa
4: Poirier's facet or plaque
5: Trochanteric fossa exostosis

Patella

1: Vastus notch
2: Patella spurs
3: Bipartite patella

Tibia

1: Nutrient foramen position
2: Squatting facets (tibia and talus)

Talus

1: Shape of talar facet
2: Os trigonum

Calcaneus

1: Calcaneal spurs
2: Calcaneal facet - shape
3: Peroneal tubercle

Feet

1: Navicular - accessory bone
2: Bipartite medial cuneiform

Appendix 6. Bone Pathology - Individual Details

Burial 41

There was some evidence on this individual for changes to the lumbar spine. The cervical and thoracic vertebrae were not present for examination. The bones most affected were the first and second lumbar vertebrae: these had depressions suggestive of disc herniation in the region of the anulus fibrosus on the inferior surfaces with fairly marked osteophytic development on the superior and inferior borders of the centra. The third lumbar vertebra also had a similar depression on the superior surface of the centrum. This was even more marked than that on the first or second lumbar vertebrae. Measurement of the first and second lumbar vertebrae suggested a marked degree of kyphosis.

Diagnosis of the condition was difficult, since, without the whole spine, it was impossible to tell whether the changes had been confined to the first and second lumbar vertebrae or not. Such alterations may be associated with a number of processes: developmental, degenerative or infective. In this individual it was considered unlikely that the cause was developmental because there was no evidence for that type of condition on the vertebrae. Degenerative changes in the spine have been associated with age and occupation (trauma and stress). Infective processes (eg. tuberculosis) may involve the spine. Either of these could have been contributory to the condition observed here. It should be noted that it might be suggested that the individual was too young (25-30 years) for a degenerative process to have been this developed but trauma or stress could have led to an early appearance in this individual.

Burial 60

There was congenital fusion of the axis and third cervical vertebrae in this individual. The condition was thought to be of congenital origin because the fusion was complete but there was no attendant pathology present. Nor was there any evidence for loss of height

Burial 75

There was evidence for sub-periosteal depositioning of new bone on the shafts of the right tibia and fibula. The bones were too fragmentary for the cause to be discovered.

Burial 83

Both right and left orbits in this individual showed evidence of a mild form of cribra orbitalia - a condition generally thought to be associated with an iron deficiency anaemia. There was no further evidence for this in the rest of the population sample, largely because of the poor preservation, therefore it was not possible to make any general inferences about diet.

Bibliography

Acsadi G. and Nemeskeri J.: A History of Human Life Span and Mortality. Akademiai Kiado, Budapest. 1970.

Anderson J.E.: The Development of the Tympanic Plate. National Museum of Canada. Bulletin no.180. Contributions to Anthrop. Part I. 1960.

Brooks S.T.: Skeletal age at death: The reliability of cranial and pubic age indicators. Am.J.Phys.Anthrop.13:567-597. 1955.

Brothwell D.R.: Digging Up Bones. 3rd ed. British Museum (Natural History). 1981.

El-Najjar M.Y. and McWilliams K.R.: Forensic Anthropology. Charles C. Thomas, Illinois. 1978.

Flander L.B.: Univariate and multivariate methods for sexing the sacrum. Am.J.Phys.Anthrop.49:103-110. 1978.

Gilbert B. Miles and T.W. McKern: A method for ageing the female os pubis. Am.J.Phys.Anthrop.38:31-38. 1973.

Giles E.: Discriminant function sexing of the human skeleton. In Stewart T.D.(ed.): Personal Identification in Mass Disasters:99-109. Washington, National Museum of Natural History. 1970.

Hanihara K. and Suzuki T.: Estimation of age from the pubic symphysis by means of multiple regression analysis Am.J.Phys.Anthrop.48:233-40. 1978.

Hardwick J.L.: The incidence and distribution of caries throughout the ages in relation to the Englishman's diet. Brit.Den.J.108.1:9-17. 1960.

Houghton P.: The relationship of the pre-auricular groove of the ilium to pregnancy. Am.J.Phys.Anthrop.41:381-390. 1974.

Krogman W.M.: The Human Skeleton in Forensic Medicine. Charles C. Thomas, Illinois. 1962.

McKern T.W.: Estimation of skeletal age: from puberty to about 30 years of age. In Stewart T.D.(ed.): Personal Identification in Mass Disasters: 41-56. Washington, National Museum of Natural History. 1970.

McKern T.W. and Stewart T.D.: Skeletal Age Changes in Young American Males, Analyzed from the Standpoint of Age Identification. Environmental Protection Res. Div.(Quatermaster Res. and Div. Center, U.S.Army, Natick, Mass.) Tech.Rep.EP-45. 1957.

Miles A.E.W.: The dentition in the assessment of individual age in skeletal material. in Brothwell D.R.(ed.): Dental Anthropology, 191-209. Pergamon Press. 1963

Moore W.J. and M. Elisabeth Corbett: The distribution of dental caries in Ancient British populations. I: Anglo-Saxon period. Caries Res. 5:151-168. 1971.

Moore W.J. and M. Elisabeth Corbett: The distribution of dental caries in Ancient British populations. II: Iron Age, Romano-British and Mediaeval periods. Caries Res. 7:139-153. 1973.

Moorrees C.F.A., Elizabeth A. Fanning and E.A. Hunt Jr.: Formation and resorption of three deciduous teeth in children. Am.J.Phys.Anthrop.21:205-213. 1963.

Olivier G.: Practical Anthropology. Charles C. Thomas, Illinois. 1969.

Olivier G. and H. Pineau: Nouvelle determination de la taille foetale d'apres les longueurs diaphysaires des os longs. Ann.Med.Leg.40:141-144. 1960.

Phenice T.W.: A newly developed visual method of sexing the os pubis. Am.J.Phys.Anthrop.30:297-301, 1969.

Putschar Walter G.J.: The structure of the human symphysis pubis with special consideration of parturition and its sequelae. Am.J.Phys.Anthrop.45:589-594, 1976.

Schour I. and M. Massler: The development of the human dentition J.Am.Dent.Assoc.28:1153-60, 1941.

Schranz D.: Age determination from the internal structure of the humerus. Am.J.Phys.Anthrop.17:273-277, 1959.

Steele D. Gentry: Estimation of stature from fragmentary remains of long limb bones. In Stewart T.D.(ed.): Personal Identification in Mass Disasters:85-97. Washington National Museum of Natural History, 1970.

Steele D. Gentry: The estimation of sex on the basis of the talus and calcaneus. Am.J.Phys.Anthrop.45:581-588, 1976.

Stewart T.D.: Identification of the scars of parturition in the skeletal remains of females. In Stewart T.D.(ed.): Personal Identification in Mass Disasters:127-135. Washington,National Museum of Natural History,1970

Stewart T.D.: Essentials of Forensic Anthropology. Charles C. Thomas, Illinois, 1979.

Suchey Judy M., D.V. Wiseley, R.F. Green and T.T. Noguchi: Analysis of dorsal pitting in the os pubis in an extensive sample of modern American females. Am.J.Phys.Anthrop.51:517-540, 1979.

Thieme F.P. and Schull W.J.: Sex determination from the skeleton Hum.Biol.29:242-273, 1957.

Todd T.W.: Age changes in the pubic bone.I.The male white pubis Am.J.Phys.Anthrop.3:285-334, 1920.

Trotter M.: Estimation of stature from intact long limb bones. In Stewart T.D.(ed.): Personal Identification in Mass Disasters:71-83. Washington, National Museum of Natural History, 1970.

Ubelaker D.H.: Human Skeletal Remains. Aldine, Chicago. 1978.

Washburn S.L.: Sex differences in the pubic bone. Am.J.Phys.Anthrop.6:199-208, 1948.