Appendix 5- Analysis of physical impairment in the entire sample

List of Tables

1. Physical impairment in Anglo-Saxon England

From the 19 sites analysed, 86 individuals with potential physical impairment were identified (2.4%). There was a higher percentage of individuals with physical impairment in the EAS period than in the MAS and LAS periods (Table 1.1).

Table 1.1- Distribution of individuals with physical impairment in each period.

Period	N_{total}	$N_{impaired}$	%
Early	1261	40	3.2
Middle	548	11	2.0
Late	1837	35	1.9
Total	3646	86	2.4

Of the individuals with physical impairment, 81 (94.2%) were adult and five (5.8%) were non-adult. Of the 74 individuals with physical impairment for whom sex could be assessed, 51 (68.9%) were male and 23 (31.1%) were female. Therefore, of the entire female sample, 23 (2.5%) were physically impaired. Of the entire male sample, 51 (4.9%) were physically impaired. In the entire sample, the association between physical impairment status and sex was found to be statistically significant utilising Fisher's exact test for 2x2 contingency tables (p=0.004). However, when analysing the entire sample by period, although there were higher percentages of males with physical impairment in all periods, the association between sex and physical impairment status was only found to be statistically significant in the LAS period (p=0.004) (Table 1.2).

Table 1.2- Distribution of physical impairment status between the sexes in each time period.

Period	Sex	N_{total}	$N_{impaired}$	%	Fisher's Exact Test
EAS	Male	333	19	5.7	0.121
	Female	365	13	3.6	
MAS	Male	147	6	4.1	0.453
	Female	130	4	3.1	
LAS	Male	556	26	4.7	0.004
	Female	412	6	1.5	

NB: 165 (including four physically impaired individuals), 105 (including one physically impaired individual), and 245 (including two physically impaired individuals) unsexed adults were excluded from these statistical tests in the EAS, MAS, and LAS periods respectively.

Table 1.3 summarises the distribution of skeletal regions affected by physical impairment. Many individuals were affected in more than one region. Physical impairment involving the lower limb was the most common followed by physical impairment involving the upper limb. The thorax (spine and ribs) was relatively frequently involved: seven of the 12 cases demonstrate severe kyphosis which can confidently be attributed to tuberculosis. Physical impairment involving the skull was the least frequent, with 33.3% of these attributed to leprosy, and 16.6% attributed to neoplastic disease.

Table 1.3- Distribution of skeletal regions affected by physical impairment in the overall sample.

Region affected	N	%
Lower limb	49	57.0
Upper limb	35	40.7
Thorax	19	22.1
Skull	12	14.0

The individuals with physical impairment were also described by condition or disease type based on the most probable differential diagnosis. Several individuals fit into two impairment types due to multiple conditions. Some of the impairment types are not associated with a specific diagnosis, because in many cases, specific diagnosis was not possible. For example, different conditions can cause paralysis including cerebral palsy, poliomyelitis, traumatic injury, stroke, etc. Similarly, total or partial fixation of a joint was common, but in most cases the cause of the fixation (e.g. joint disease, infection, trauma) could not be ascertained. Individuals with non-specific periosteal new bone formation could not be given a more specific diagnosis, but due to the severity of the periosteal new bone formation, may have been affected by swelling and pain (see main text, Section 10.2.2.6). Trauma was by far the most common cause of physical impairment (30.2%) followed by joint fixation (17.4%), which in many cases, was likely caused by trauma (Table 1.4).

Table 1.4- Distribution of conditions or diseases associated with physical impairment.

Condition/disease	N	%
Trauma	26	30.2
Joint fixation (partial/full)	15	17.4
Tuberculosis	9	10.5
Paralysis	9	10.5
Non-specific PNB	8	9.3
Osteomyelitis	6	7.0
Joint disease	5	5.8
HOA	4	4.7
Leprosy	4	4.7
Congenital	3	3.9
Neoplastic	3	3.9
Soft tissue formation	3	3.9
Scoliosis	2	2.3
Unclear	2	2.3

NB: Percentage calculated from total number of individuals with physical impairment (N=86).

A Fisher's exact test was performed comparing the frequencies of physical impairment caused by trauma in the EAS and LAS periods. The MAS period was excluded as the sample size was comparatively small, and resulted in an expected value of less than five in a 3x2 contingency table for which Fisher's exact test could not be utilised. Utilising only the EAS and LAS period also allowed for the comparison of traumatic injury in predominately pagan Anglo-Saxon England and Christian Anglo-Saxon England, as the Conversion Period sites were excluded. A Fisher's exact test found that individuals in the EAS period were statistically significantly more likely to experience a traumatic injury that resulted in physical impairment than individuals in the LAS period (Table 1.5).

It should be noted that this test does not investigate the frequency of traumatic injuries in the EAS and LAS populations, but the frequency of traumatic injuries *causing physical impairment*. There certainly were many traumatic injuries identified in the LAS sample, but the scope of this research does not allow for a comparison between the frequency of traumatic injury in these two time periods. However, in many cases, the alterations to the bones in LAS individuals who experienced traumatic injury were not considered significant enough to have caused lasting affects in life because of how they healed, and therefore they were excluded from the sample (Appendix 3, Section 21). Although the sample size is relatively small compared to the actual population of Anglo-Saxon England, it is possible that this decrease in traumatic

injuries causing physical impairment can be related to improving medical care, or a decrease in interpersonal and warfare related violence, although these theories remain speculative.

Table 1.5- Frequencies of traumatic injury causing physical impairment in the EAS and LAS period and corresponding Fisher's exact test p-value.

Period	N_{total}	N_{trauma}	% period population	Fisher's exact test
EAS	1,261	15	1.2	p= 0.025
LAS	1,836	9	0.5	