

# Preliminary Report on Human Remains Analysed in 2007

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## INTRODUCTION

The primary aim of this year's analysis of human remains from Kaman-Kalehöyük was to complete the hitherto excavated remains from the Iron Age (Stratum IIa). All individuals reported below have been provenanced in the site records as coming from this stratum.

Time also allowed the retrieval from the store of six individuals awaiting cleaning. These were all from either the Ottoman or the Hittite Periods, and will be analysed and reported on at a later point.

## METHODOLOGY

Analysis of human remains will always be influenced by the high degree of variation that exists between individuals. The main factors in such variation are sexual dimorphism, individual development, pathology and the influence of environmental factors such as nutrition. Each of these influences both overall development and that of more localised areas of the skeleton. Taphonomic factors must also be taken into account.

Because of the variation mentioned above it is unlikely that one will be able to pinpoint a specific age for an individual based solely on macro-inspection of his or her skeletal remains. Likelihood of arriving at a narrow age span decreases with the amount of material available for analysis. This is also true if the state of preservation is poor, and if the individual being assessed is likely to be a mature adult. Given the relatively fragmented and often friable condition of much of the remains, the results of this primary analysis should be seen as provisional only.

The following methodology was used for the primary analysis:

### Number of Individuals

Main indicators used (each indicator applies to entire bones and teeth as well as to fragments):

- difference in levels of maturity between different bones or teeth that would normally exhibit the same degree of development if belonging to the same individual;
- morphological and/or size differences between antimeres (bones or teeth), taking into account the possible influence of pathology;
- presence of "extra" bones or teeth;
- acceptable/unacceptable levels of articulation between adjacent bones in joints;
- presence/absence of occlusion between upper and lower dentition;
- presence/absence of observed anomalies in fragments of the same element;
- state of closure/obliteration of cranial sutures;
- differences in secondary sexual traits;
- levels of dental wear;
- differences in preservation/colour.

It should be noted that differences in preservation/colour may not always be a reliable indicator. The same bone may show different colours in different areas (*e.g.* in a cranium which had been partly buried, partly exposed to open air). Two fragments of the same bone may also show different colour if they were separated *post mortem* and subjected to different taphonomic events. This indicator was therefore always used in conjunction with others.

Given the often fragmentary nature of the remains, the listing of any one element should be seen as representative rather than an indication of completeness.

## Level of Maturity

### 1) Adult or juvenile

This report defines the term “adult” as an individual in whom

- the basi-occipital synchondrosis is complete (Warwick and Williams 1973);
- the 2<sup>nd</sup> molars are fully erupted and in occlusion, with the apex of the roots closed, and (where these exist) eruption of the 3<sup>rd</sup> molars is either complete or in progress (Buikstra and Ubelaker 1994);
- the epiphyseal union in paired long-bones other than the clavicle is advanced or completed (Brothwell 1981).

“Juvenile” indicates an individual where one or more of these developmental stages has not been reached. If no assessment could be made, the report uses “?adult” or “?juvenile”, depending on which was deemed to be more likely.

### 2) Age

The following indicators/traits were used to determine a likely age span at death:

#### A) adults

- dental development (Hillson 1996; Brown 1985)
- dental wear (Brothwell 1981)
- epiphyseal union (Warwick and Williams 1973; Brothwell 1981)
- age related changes in the auricular surface (Lovejoy *et al.* 1985; Buikstra and Ubelaker 1994)
- age related changes in the costo-condrial junction of the 4<sup>th</sup> rib (Angel *et al.* 1986)
- age related change in the pubic symphysis (Brooks and Suchey 1990)
- fusion in cranial sutures (Buikstra and Ubelaker 1994)
- presence/absence of vertebral osteophytes (Brothwell 1981)

It should be noted that all of these indicators provide a like age span only, and not a precise number of years. The fusion of cranial sutures and the presence of vertebral osteophytes are most useful as indicators of greater or lesser maturity rather than providing an age span.

#### B) juveniles

- dental development (Hillson 1996; Brown 1985)
- basi-occipital synchondrosis (Warwick and Williams

1973)

- epiphyseal union or lack thereof (Warwick and Williams 1973; Brothwell 1981)
  - development of epiphyses (Warwick and Williams 1973; Bass 1995)
  - union of the ilium, ischium and pubis (Warwick and Williams 1973; Brothwell 1981)
  - diaphyseal length (Bass 1995, after Trotter and Gleser 1952)
- In addition, in foetal material or that of very young infants:
- measurements of individual bones (Fazekas and Costa 1978)
  - presence/absence of open cranial fontanelles (Warwick and Williams 1973)
  - fusion of the tympanic ring (Warwick and Williams 1973)
  - fusion of other bones (Warwick and Williams 1973)

## Determination of Sex

This cannot always be done with certainty, as the remains may not include an adequate number of the relevant parts of the skeleton, or the skeleton may not show sufficiently marked secondary sexual traits. These latter only develop from puberty onwards, and it is therefore very difficult to determine the sex of juveniles with any degree of accuracy from the dry skeleton only. This report therefore uses “male”, “female”, “?male”, “?female” and “undetermined”, as appropriate.

The following traits were used in determining sex:

the pelvis: ischio-pubic ramus, sub-pubic concavity, ventral arc, sub-pubic angle, morphology of the sciatic notch, sacro-iliac morphology, presence/absence of pre-auricular sulcus, overall pelvic morphology (Phenice 1969; Washburn 1948; Bass 1995; Brothwell 1981)

the cranium: development of the nuchal crest, occipital protuberance and external occipital crest, development of the mastoid process, prominence of brow-ridge, degree of incline in the frontal bone, morphology of the superior orbital edge, relative size of the dentition (Brothwell 1981; Bass 1995; Scott and Turner 2000)

the mandible: development of the gonial area, angle of the ascending ramus relative to the body of the mandible; general robusticity, relative size of the dentition (references as for cranium);

general development of muscular insertions points, overall robusticity, metric measurements *e.g.* length of long-bones, diameter of the femoral head (Bass 1995, using Trotter and Gleser 1952).

Levels of sexual dimorphism can vary between populations as well as between individuals. As with indicators of maturity and age, therefore, as many of the sexual traits as possible were used in the analysis of any one individual.

Dental pathology identification mainly draws on Hillson (1996). Dental identification uses the FID system.

Osteological pathology mainly uses Roberts and Manchester (1995) and Brothwell (1981).

Formulae for estimating stature are those published in Bass (1995).

Non-metric traits are taken from Mays (1998) and Brothwell (1991).

## RESULTS OF PRELIMINARY ANALYSIS

### Individual AZ

**Co-ordinates:** KL 940722 North XV XXXVIII – 52 P1087

Adult female aged 25-30 years.

**Skeletal elements present:** Skull: Cranium (all except L and central occipital bone and the basis cranii), R and L mandible, dentition (11-14, 16-17; 21-24, 26-27; 31-37, 41-47). Post-cranial: Body of hyoid, R and L scapula, R and L clavicle, sternum, R and L humerus, R and L radius, R and L, ulna, all R carpals, L trapezium, all R and L metacarpals, 8 *manus* (unsided) proximal phalanges, 8 (unsided) medial phalanges, 7 (unsided) distal phalanges, cervical vertebrae 3-7, thoracic vertebrae (all), lumbar vertebrae (all), sacrum, 1<sup>st</sup> coccygeal vertebra, ten R, nine L and one unsided ribs, R and L ilium, R and L ischium, R and L pubis, R and L femur, R patella, R and L tibia, R and L fibula,

R calcaneous, R talus, five R tarsals, 2 (undetermined) distal ends of L metatarsals.

**Observations:** The skeleton was found in the foetal position, on its R side but with the torso twisted towards the L resulting in a partly prone deposition. The L arm was flexed at the elbow with the hand by the face. Orientation of torso: SW-NE, head towards W, facing E. Based on measurements of the R radius, L femur and L fibula, this individual will have been approximately 153 cm tall (range: 151.86 - 156.89 cm).

The longbones are badly cracked and very brittle, with breaks still occurring. Much of the bone has splintered into long slivers due to excessive drying, and the cranium, longbones and ilia all have long, recent cracks.

The cranium is partly compressed; this is probably how it was found on excavation. The sagittal suture is slightly splayed as is the L half of the coronal suture, neither displacement being recent. The damage is consistent with pressure having been exerted on the L half of the cranium while the bone was still relatively fresh, possibly from the large boulder - one of several - found partly above and partly covering the cranium.

Ankylosis of an (unsided) medial and distal phalange (*pes*) was observed. There is *spina bifida occulta* in the 5<sup>th</sup> and 4<sup>th</sup> sacral vertebrae, with a central bone “tap” at the distal end of the sacrum. Ossification of the *ligamentum flavum* can be seen in thoracic vertebrae 5 and 7-11.

The R sacro-iliac joint has an unusual semi-circular shape and differs in morphology from the L joint.

There are large amounts of supra-gingival calculus on the anterior mandibular teeth, with a trace deposit on anterior maxillary teeth.

Non-metric traits: Possible agenesis of all 8s.

### Individual BA

**Co-ordinates:** KL 910725 North XII XLV-54 P492

Adult male aged c. 18-20 years.

**Skeletal elements present:** Skull: Cranium (all except occipital and R temporal bones), R and L mandible, dentition (complete), R incus. Post-cranial: Body and both greater horns of hyoid, R and L scapula, R and L clavicle, sternum, R and L humerus, R and L radius (including unfused distal epiphyses), R and L ulna

(including unfused L distal epiphysis), R and L carpals (all except both pisiforms and L hamate and triquetral), R 2<sup>nd</sup>-5<sup>th</sup> metacarpals (including unfused distal epiphysis for 2<sup>nd</sup> and 3<sup>rd</sup>), L metacarpals (including unfused distal epiphysis for 5<sup>th</sup>), all R proximal phalanges (*manus*) (including unfused proximal epiphysis for 5<sup>th</sup>), four L proximal phalanges, 6 medial phalanges (including two unfused proximal epiphyses), two distal (unsided) phalanges, all cervical and thoracic vertebrae, 1<sup>st</sup> - 4<sup>th</sup> lumbar vertebrae, all R and L ribs, 24 loose epiphyses for vertebral processes and rib heads; fragment of sacrum, 1<sup>st</sup> coxygeal vertebra, one R and one L (unfused) segment of superior iliac crest, one medial phalange (unsided, *pes*).

**Observations:** The skeleton was found truncated at the level of the joint between the 4<sup>th</sup> and 5<sup>th</sup> lumbar vertebrae. It was lying on its R side, with the R arm straight at a slight angle to the torso, and the L lying alongside the rib case and bent at approx. 90 ° at the elbow, with the lower arm pointing forward. The head was resting on a stone.

Based on measurements of the L radius and ulna (diaphyses only), this individual would have been 161 cm tall.

Inter-vertebral disc disease can be seen in all thoracic vertebrae and in cervical vertebrae 4-7. There is a single, small, irregularly shaped pit with well rounded edges in the R superior facet of cervical vertebrae 2 and 7, thoracic vertebra 5 and lumbar vertebra 3. The cause is not known, but may be a form of strain injury. The R inferior articular facet in the 3<sup>rd</sup> lumbar vertebra is truncated.

Faint linear enamel hypoplasia in teeth 11 and 21. Calculus present in most teeth.

Non-metric traits: Bipartite transverse foramen in the 6<sup>th</sup> cervical vertebra, both sides.

#### Individual BB

**Co-ordinates:** KL 900810 North II XLII-54 P413

A neonate; sex could not be determined.

**Skeletal elements present:** Skull: None. Post-cranial: One metacarpal (undetermined), L ilium.

**Observations:** One of two individuals from the same co-ordinates. Found among fragments of animal bones, among them the articulated R scapula, foreleg and part vertebral column of an apparently adult dog. No record of the human remains were made at the time of

excavation, and it cannot therefore be determined if they represent a purposely made interment or stray deposits from another context.

#### Individual BC

**Co-ordinates:** KL 900810 North II XLII-54 P413

Infant aged c. 9-12 months; sex could not be determined.

**Skeletal elements present:** Skull: None. Post-cranial: Body and L arch of a cervical vertebra, probably C6; two rib fragments (unsided, body only).

**Observations:** As for Individual BB.

#### Individuals BD - BH

The site documentation shows that none of the elements recovered were in articulation with any other. The deposition appears to have been random. Based on this and the total absence of any small bones in the assemblage, this is likely to have been a secondary burial.

**Co-ordinates:** KL 940908 North XXVII XLVI - 52 P1156

Multiple burial, consisting of 5 individuals, *viz*

#### Individual BD

Adult female aged 21-24 years.

**Skeletal elements present:** Skull: None. Post-cranial: R radius, thoracic vertebrae 1, 2 and 12, lumbar vertebrae 4 and 5, sacrum, two R ribs, probably 4<sup>th</sup> and 6<sup>th</sup>, R and L ilium (including loose section of unfused iliac crest) R and L ischium, L pubis, R and L femur, R and L tibia.

**Observations:** Based on measurements of the femora and tibiae, this individual would have been approximately 161 cm tall.

*Spina bifida occulta* in 4<sup>th</sup> and 5<sup>th</sup> sacral vertebrae.

#### Individual BE

?Adult male aged 16-18 years.

**Skeletal elements present:** Skull: Calvaria, R nasal bone. Post-cranial: R scapula, L clavicle, lumbar and sacral vertebrae, R innominate, R and L femur, R and L tibia.

**Observations:** A brachycephalic calvaria with a notable "African" (Bass 1995) norma occipitalis.

The sutures on the R and inferior parts of the cranium appear splayed, possibly caused by external

pressure. The anterior R parietal has been pushed inwards and to inferior, with the R coronal suture and to a degree the squamosal suture being forced open, leaving the frontal bone in an elevated position. A slight distortion can also be seen in the L coronal and the sagittal sutures, near bregma. What was probably a R ossicle at asterion is missing (no evidence of recent damage).

It seems likely that the external pressure was exerted while the bone was still relatively fresh and retained some flexibility.

There is bilateral thinning in both anterior parietals, with the R side being thin enough for external movement to be visible from the interior side. Thinning can also be seen in the superior and L occipital bone, in a large part of the L temporal bone with a small patch in the R one. This thinning may be due to a metabolic disease.

There is *spina bifida occulta* in sacral vertebrae 4 and 5.

#### Individual BF

Adult female aged 18-22 years.

**Skeletal elements present:** Skull: R and L maxilla, R zygomatic bone, fragment of L frontal bone, dentition (14-17, 22, 24 and 25, the latter three incomplete) Post-cranial: L humerus, R ulna, R ilium, R ischium, R and L femur, R and L tibia, R fibula, L talus.

**Observations:** Some ?gnaw marks could be seen in the

distal L femur.

A degree of refitting was possible in the badly fragmented ilium and ischium.

Based on measurements of both femora, L tibia and R fibula, this individual would have been approximately 156 cm tall.

A small amount of non-specific osteophytic activity could be seen at the edge of the L lesser trochanter.

Supra-gingival calculus was observed in all R quadrant teeth; also some in 24 and 25, gr. 1.

Non-metric traits: The humerus has a small septal aperture. The first sacral vertebra is lumbarised; due to deteriorated bone around the alae the degree of fusion could not be ascertained. There is an os trigonum in the talus.

#### Individual BG

Adult male aged c. 25 years.

**Skeletal elements present:** Skull: Mandible, dentition (35-38, 43, 46-48). Post-cranial: L scapula, R and L humerus, R ulna, R femur, R and L tibia, R and L fibula.

**Observations:** A very robust individual, with good preservation. A double, recent break in the shaft of the R tibia was attempted refitted, although the result was not good enough to use this bone for measurements.

Based on measurements of R femur, L tibia, both fibulae and both humeri, this individual would have been approximately 171 cm tall.



Cranium of individual BE, showing splayed sutures probably caused by external pressure.

Caries is present in the occlusal surface in both 8s and both 7s. There is gingival disease present at 47, 46, 36 and 37, especially marked in 46 (buccal side). Traces of supra-gingival calculus can be seen in all teeth.

Non-metric traits: None observed.

#### Individual BH

Adult ?male aged 22-30 years.

**Skeletal elements present**: Skull: Mandible, dentition (32-38, 46-48). Post-cranial: R scapula, L clavicle, L radius, R tibia, R and L fibula.

**Observations**: Given the absence of any clear evidence to the contrary these elements were deemed to belong to one individual, to facilitate recording.

A small amount of reconstruction of the central mandible was possible.

Traces of supragingival calculus were seen in 46-48 and in all teeth from the 3<sup>rd</sup> quadrant. Linear enamel hypoplasia can be seen in 32 and in 36

Non-metric traits: There is a small ?supernumerary socket between the main roots of tooth 37, lingual side. The antimere does not show this trait.

#### Individual BI

**Co-ordinates**: KL 940711 North XV XXXVI – 52 P1056 PL ⑩

Juvenile aged 5-6 years; sex could not be determined.

**Skeletal elements present**: Skull: Cranium (all except basis cranii and L facial bones), mandible, mixed dentition (deciduous: 54-55, 74-75, 85-85; permanent: 11,



Part of cranial vault of individual BI showing extensive porotic hyperostosis.

16, 36-37, 41, 46, all unerupted). Post-cranial: L clavicle; thoracic vertebrae 9-12, lumbar vertebrae 2-5, sacral vertebrae 1 and 2, four R and seven L ribs, R and L femur.

**Observations**: The remains of this individual were found in a series of unlabelled bags in one of the boxes normally used for anthropological specimens and stored with other such boxes, but containing general small finds, including pottery sherds and animal bones. The box was labelled “KL 940801 Kuzey XII - O, XLVII-54 (KK) - XLVIII-54 (MM), P1102 and P1025 - Araduvar”. This location may refer either to the non-human finds in the box, or to possible earlier box contents. The co-ordinates are very different from those recorded for this individual. However, comparison of the actual remains with those appearing in a photograph copied into the relevant field diary entry showed that the two are likely to be the same. No formal drawing of the remains was made at the time of excavation, and the only photograph was taken at an early stage in the uncovering and therefore only gives indications of some of the elements.

It should be noted that the photograph in the field diary appears to show a total of 6 limb bones, whereas the lifted remains appear to have only two. It is possible that the other four may have been misplaced after lifting.

The remains were found lying on top of a bed of large stones, orientation N-S with the head towards the S, facing S.

Although the cranium was severely fragmented, some refitting was possible.

Both orbits show pronounced cribra orbitalis. The interior surface of the cranial vault also shows advanced porotic hyperostosis, especially broadly distributed in the central occipital bone and in both parietal bones. This is probably an indication of a metabolic disorder, possibly anaemia.

Traces of supragingival calculus were seen in 75 and 54.

#### Individual BJ

**Co-ordinates**: KL 070816 South L LII - 54 N baulk HS 07-01

Adult ?male, older than 22 years.

**Skeletal elements present** (but see below): Skull: None. Post-cranial: R radius, R ulna, all R medial phalanges

(*manus*), all R distal phalanges.

Further remains of this individual are probably still in the baulk, but cannot be excavated for structural reasons. It is also possible that further hand bones may be retrieved from among other processed bone at a later date.

**Observations:** Since only the lower R arm is present, to date, it is not possible to make orientational observations.

Based on measurements of the radius and ulna, this individual would have been approximately 175 cm tall.

There is a small amount of non-specific periostitis around the edge of the styloid process.

#### Individual BK

**Co-ordinates:** KL 070816 South L LII - 54 N baulk HS 07-02

Adult ?male aged 33-45 years.

**Skeletal elements present:** Skull: L and central mandible, dentition (36 and 43).

A 4<sup>th</sup> lumbar vertebra from the same co-ordinates was retrieved from a bag of animal bones. It is likely to be from a mature male, but its precise origins have been lost. It is included here for the purpose of recording only.

**Observations:** There may be more remains of this individual in containers from the early years of excavating the South Sector. Any further elements still in the baulk are unlikely to be excavated for structural reasons.

Severe gingivitis was seen in 36, with the distal root being almost entirely exposed. 31, 41 and 38 were lost ante-mortem relatively close to death, with some resorption of the sockets evident. Also lost ante-mortem were 47 and 44-45, where the resorption is complete.

A large amount of both supra- and sub-gingival calculus remains, enough to indicate that the 36 was probably completely covered. A small amount can also be seen around the superior edge of the gingivum (broken post-mortem) in 43.

The occlusal surface in 36 is unevenly worn, with a marked hollow in the centre.

The lumbar vertebra shows asymmetrical fusion of the central process to the two arches. It is not known if this is a non-metric trait or was caused by unknown influences in childhood.

## CONCLUSION - SUMMARY OF STRATUM IIA

With the exception of one burial from the South Sector, excavated in 1988 (KL 880621 South III LXII - 57) which could not be located in the store, all human remains from the Iron Age uncovered up to the end of August 2007 have now been excavated and lifted. The breakdown is as follows:

Adult females: 9 (all ages)

Adult males: 9 (all ages)

Juveniles (sex undetermined): 10

Burial positions (adults):

Prone, extended: 3

Prone, legs flexed: 8 (6 of these are from the same multiple burial)

Flexed, lying on R side: 4

Flexed, lying on L side: 1

Undetermined: 7 (multiple and/or secondary burial)

Burial positions (juveniles):

Flexed, lying on L side: 1

Undetermined: 9

The juvenile material, especially when intermingled with adult bones and masonry, did not retain their articulation well enough to determine burial position.

Head orientation: (adults and juveniles):

East: 1

West: 1

South-East: 1

North-East: 3

Undetermined: 22 (14 of these were from multiple and/or secondary burials)

Cranium facing (adults and juveniles)

East: 1

West: 1

South: 2

South-East: 1

South-West: 1

North-West: 2

Upwards (recumbent burials): 2

Undetermined: 18 (11 of these were from multiple and/or secondary burials).

As can be seen from the above there is an even distribution of the sexes, and of adults and juveniles. There does not appear to have been any marked

preference either for orientation or position. The multiple burial at KL 910820 North IX XXIX - 55 and individuals BD-BG (above) dominate the figures because of their large total number of individuals. Since the former of these contained individuals probably deposited at the same time, these cannot be used as an overall indicator for the entire period. Where burial position could be determined, none of the individuals, in the writer's view, showed any relative alignment that could not be accounted for by normal articulation and common taphonomic processes.

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