

THE HUMAN REMAINS

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Skeletal remains from four different periods were recovered at Tel Te'o: Pre-Pottery Neolithic, Pottery Neolithic, Chalcolithic, and Early Bronze Age. They included intramural burials as well as isolated bones from fills, presumably derived from disturbed burials. The remains were cleaned, identified, and measured as described in Bass (1987). For adults, age and sex determination were carried out using skeletal criteria defined in Bass and dental attrition scores where appropriate. For younger individuals age was based on dental development. For the infants two complementary methods were used. Since this is the first time as far as we know that these standards have been applied to the analysis of infant remains from archaeological sites in this region, they are described below in detail.

1. *Crown Length of the Tooth Germs and Teeth.* The crown lengths of each maxillary and mandibular deciduous first and second incisor, canine, and first and second molar and permanent teeth were measured from the tip of the tooth to the cervical margin, using digital calipers accurate to 0.01 mm (Fig. 12.1). The dental development was assessed by comparison of the crown height of the Tel Te'o sample with recent samples measured by Deutsch and Pe'er (1982) and with archaeological samples recovered of children of known age from a cemetery at Spittlefields, London, dated to 1729–1859 CE (Liversidge, Dean, and Molleson 1993).

2. *Humerus Measurements.* The anatomical length of the diaphysis (shaft) of the humerus was measured from the proximal extremity to the distal extremity using digital calipers. Diameter was measured in the anterior posterior direction at the midshaft region (Fig. 12.2). Where possible the right side was used; where

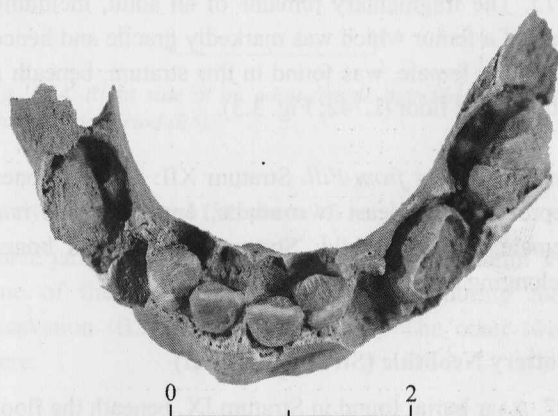


Fig. 12.1. Infant mandible with tooth germs in the jaws measured to determine age.

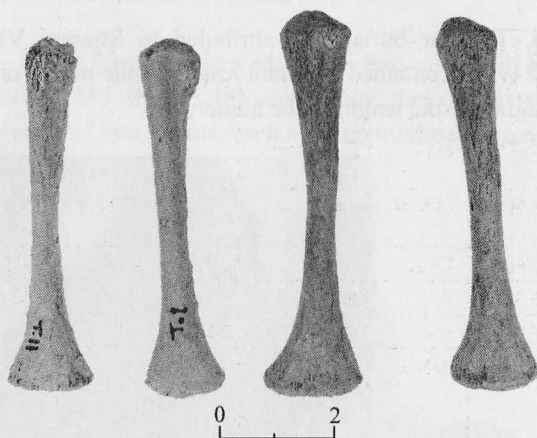


Fig. 12.2. Humeri from infants measured to obtain age estimation.

incomplete, the left side was used. Although there may be considerable differences between right and left limb bones in adults due to differential use of the right and left limbs, this was not considered important for age assessment in an infant sample. Age was estimated by comparison with long bone measurements of modern infants of European origin (Scheuer, Musgrave, and

Evans 1980). They differ markedly from the commonly used standards quoted in Bass, that are based on age assessment in Amerindian skeletal remains given by Johnston (1962).

INVENTORY

(see Tables 12.1, 12.2)

Pre-Pottery Neolithic (Strata XIII–XI)

B15. The fragmentary remains of an adult, including part of a femur which was markedly gracile and hence probably female, was found in this stratum, beneath a Stratum XI floor (L742; Fig. 3.3).

Isolated Bones from Fill. Stratum XII: isolated bones representing at least two adults, one male and one female, and one child; Stratum XI: isolated bones belonging to one neonate and one adult.

Pottery Neolithic (Stratum X–VIII)

B7. A jar burial found in Stratum IX, beneath the floor of L699 (Fig. 3.9). It contained an infant aged approximately one month, on the basis of limb length and dental development.

B8. This jar burial was attributed to Stratum VIII (L719). It contained an infant less than one month old, judging by the length of the humerus.

B9. The flexed burial of an adult female, lacking the skull, but with the mandible present, was found in Stratum X, L705, under the floor. There was an abscess cavity in the mandible, in the area of the left central and lateral incisors, and resorption of alveolar bone from periodontal disease. This together with attrition suggested an age of 45–55 years.

B10. In L724 of Stratum VIII, an empty burial jar was found 0.2 m below the floor. A neonatal left femur found below, in L728, might belong to this burial. The jar, like most of those found, was lying on its side, and the contents might have spilled out.

B11. This jar burial, found in L701 of Stratum IX (Fig. 3.12), contained a neonate, and was filled with a hardened sand matrix. The skeleton was complete, and lay on its side with knees flexed (Fig. 12.3).¹

B12. This jar burial (Fig. 3.16), found in L692 of Stratum VIII, contained a neonate.

B13. Two infant burials were found under the Stratum X occupation surface of L705. They were lying on—and covered by—broken sherds. One was a neonate and the other two months old.

B14. A neonate was found in the corner of L705, in Stratum X. Together with the infant, remains of a right



Fig. 12.3. A jar burial (B11) from the Pottery Neolithic period, with an infant skeleton in articulation.

phalange and a fibula from a second individual were found. These belonged to a child aged 5–10 years.

Isolated Bones from Fills. Stratum X: bones of a female adult/adolescent and adult; Stratum IX: remains of a child and neonate; Stratum VIII: one adult.

Chalcolithic Period (Stratum VI)

The remains of three individuals were identified from two burials (B4 and B5) situated below L563 and penetrating the floor of L597 of Stratum VII.

B4. This was the complete skeleton of a ten year old lying in a flexed position, facing east (Fig. 3.25). Associated with this burial were the fragmentary remains of an adult. The adult bones included fragments of the mandible and post-cranial bones. They were too fragmentary for more precise determination of age or sex. In view of the poor state of preservation of the bones we could not establish whether the two burials were stratigraphically contemporaneous, or whether the interment of the child postdated that of the adult and disturbed it.

B5. An adult, probably a female aged about 50 years, was also found beneath L563. Like the skeleton of the child from B4, this skeleton was flexed and facing east (Fig. 12.4). Caries and severe attrition, including exposure of secondary dentine, were observed in both the mandibular and maxillary teeth. Enamel hypoplasia was also present in the mandibular teeth, mostly in the cervical third. One phalange had been burnt. This appears to have been accidental, occurring some time after burial since although gray in color, suggesting a high temperature of firing, it showed no distortion or shrinking as would have occurred if burnt immediately after death.

B6. The fragmentary remains of an adult were found under a house floor, L555. Only post-cranial remains were identified in the laboratory. They included one broken femur and many unidentified fragments of long bones, fragments of a pelvis, the proximal parts of phalanges, a broken right calcaneus, and a right talus. The absence of cranial bones or teeth suggests that this was probably a disturbed primary burial.

Isolated Bones from Fill. Stratum VI: adult male(?) and child aged about 12 years.

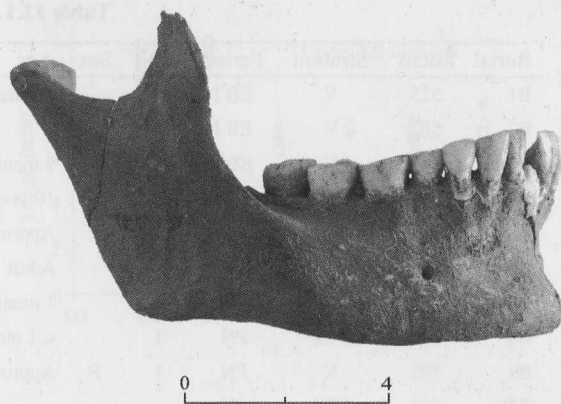


Fig. 12.4. Right side of an adult female mandible from the Chalcolithic period (B5).

Early Bronze Age I (Stratum V)

Three jar burials of infants were found in Stratum V. One of these was stolen in the field during the excavation (B2, from Building 557). The other two were:

B1. A jar burial uncovered under the floor of Building 525 (Fig. 3.34). The skeleton was found in articulation and was aged as newborn on the basis of limb bone length and dental development (Fig. 12.5).

B3. A jar burial recovered under the east wall of Building 557 (Fig. 3.38), containing the articulated skeletons of two infants, each aged approximately nine months old.

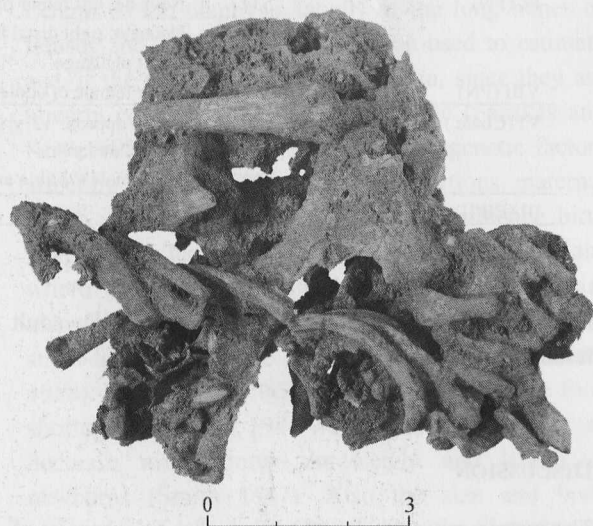


Fig. 12.5. Remains of an infant from an EB I jar burial (B1). The bones are set in a hardened sand matrix.

Table 12.1. Burials at Tel Te'o

Burial	Locus	Stratum	Period	MNI	Sex	Age	Remarks
B1	525	V	EB I	1		Neonate	Jar burial; Fig. 7.6:5
B2	557	V	EB I				Jar burial, stolen from excavation
B3	W646	V	EB I	2		9 months; 9 months	Jar burial; Fig. 7.5:11
B4	563	VI	Ch	2		10 yrs; adult	Child complete; mandible + post cranial bones of adult
B5	563	VI	Ch	1	F	Approx. 50 yrs	
B6	555	VI	Ch	1		Adult	Fragmentary
B7	699	IX	PN	1		1 month	Jar burial; Fig. 5.5:1
B8	719	VIII	PN	1		< 1 month	
B9	705	X	PN	1	F	Approx. 50 yrs	
B10	724	VIII	PN				Empty burial jar; Fig. 5.5:2
B11	701	IX	PN	1		Neonate	Jar burial; Fig. 5.5:3
B12	692	VIII	PN	1		Neonate	Jar burial; Figs. 5.4:9, 10; 5.7:1
B13	705	X	PN	2		Neonate; 2 mos	
B14	705	X	PN	2		Neonate; 5–10 yrs	
B15	758	XI	PPN	1	F	Adult	

Table 12.2. Skeletal Fragments from Fills

Stratum	Locus	Basket	Remarks
XII (PPN)	746	546	Adult phalange
		557	Adult male (?): clavicle
	755	548	Adult male (?): foot phalanges
		558	Child/adolescent: tibia shaft, humerus shaft distal end, fibula and phalanges; child 5–6 yrs: radius shaft
		567	Adult female (?): shafts of femur with periostitis
		591	Young child: skull fragments
XI (PPN)	737	529	Adult male (?): fibula, femur shaft, phalange with periostitis
X (PN)	725	485	Adult: radius shaft
	750	525	Adult female or adolescent: parietal fragment of very delicate skull
	700	432	Child: ulna shaft
IX (PN)	728	534	Neonate: left femur proximal end
	751	572	Neonate: right distal humerus, left proximal femur
	694	359	Adult phalange
VIII (PN)			Adult female or adolescent: right parietal fragment of very delicate skull
VI (Chalc.)	521	34	Child, approx. 12 yrs: left humerus, left radius distal end, left ulna shaft and distal end, sacrum and pubis
	597	220	Adult male (?) tibia and fibula distal end, radius and ulna distal end
III (EB II)	628	289	

Isolated Bones from Fill. Stratum III (EB II): adult female or adolescent.

DISCUSSION

The human remains identified from Tel Te'o consist of at least 17 specimens—10 infants, 2 children, and 5 adults, recovered from graves and jar burials. Some of

the adult and juvenile bones identified from the fills may belong to the disturbed primary burials. If each bone from the fill is treated as representing an additional burial, then there is a maximum number of 35 individuals buried at the site from the Pre-Pottery Neolithic to the Early Bronze Age (Tables 12.1, 12.2).

All the adults that could be aged appeared to be old. Signs of disease were noted on the two femurs recovered from the PPN fills. The femurs showed

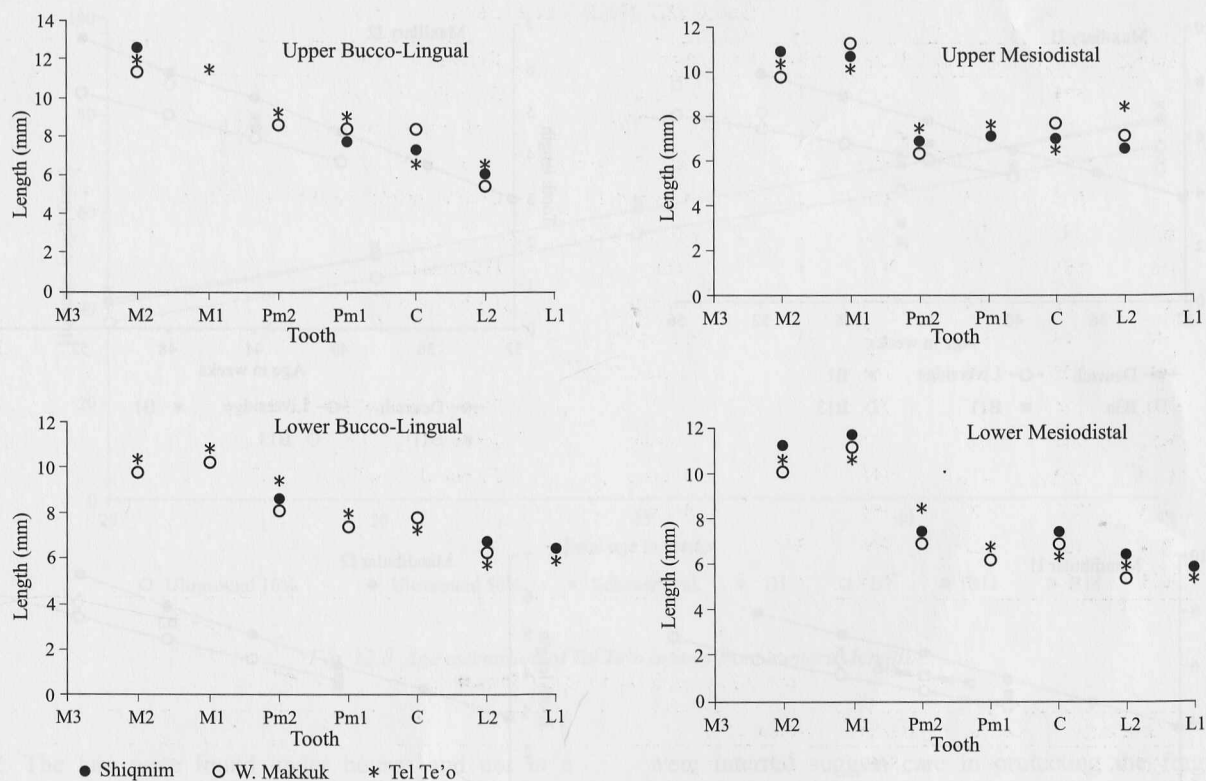


Fig. 12.6. Tooth dimensions from three Chalcolithic sites.

periostitis along the shafts, suggesting a chronic inflammatory condition. In addition, one adult female from a PN burial (B9) had severe resorption of the alveolar bone of the mandible plus a large abscess cavity in the molar region, apparently due to severe periodontal disease. Dental hypoplasia was found in the permanent teeth, indicating ill health in the children and adults in early childhood. However, radiographs of the long bones of the infants showed no Harris lines indicative of growth arrest before death, and no gross hypoplastic defects of the deciduous teeth. This suggests that the infants did not suffer prolonged ill health before death.

A comparison of the dental measurements of the Chalcolithic remains with those of specimens from two other Chalcolithic sites—Shiqmim and Wadi Makukh—shows no significant differences in tooth size, suggesting a common origin for all three samples (Fig. 12.6). Dental attrition was severe in the adults, particularly in the individual recovered in B5, presumably because of an abrasive diet.

It has long been appreciated that it is possible to determine adult stature with a reasonable degree of accuracy from measurements of a single bone, if sex and population group are taken into consideration. Length of the diaphysis (shaft) of the long bones of fetuses and infants can similarly be used to estimate age, if the population group is known, since they are linearly correlated with gestational age (Fazekas and Kos'c 1978). However, in addition to genetic factors affecting growth and limb trunk proportions, maternal health and socioeconomic status can influence birth weight and length. Poor socioeconomic conditions where disease and chronic malnutrition prevail are associated with a high frequency of premature and small-for-gestation-age at birth (Owsiey and Jantz 1985). For example during the period of extreme food shortage in Holland, 1944–45, a statistically significant decrease was reported in weight and length of newborns (Smith 1947). Also the size and body composition of the mother and the intrauterine environment are known to affect birth size of infants (Robson 1978).

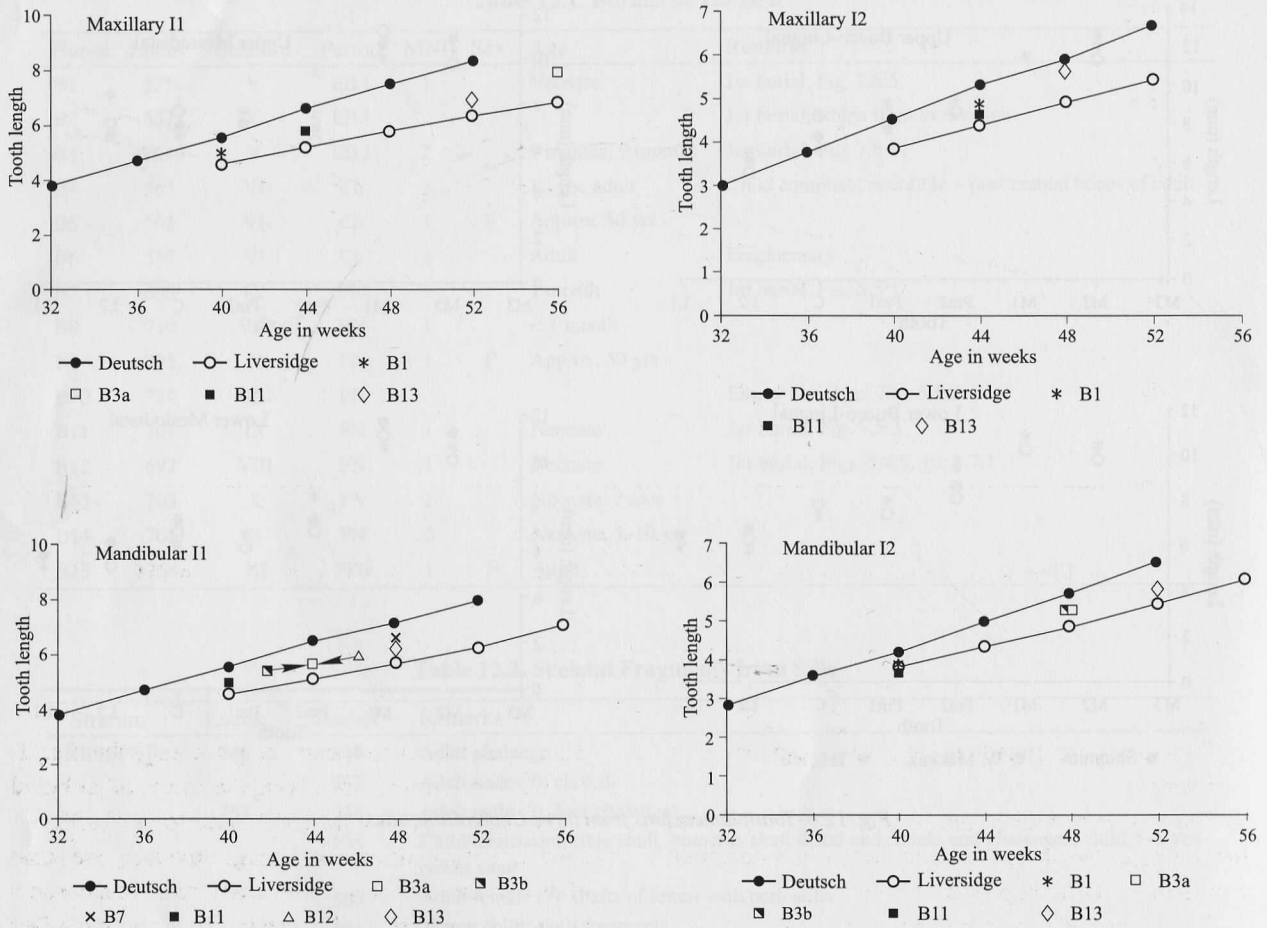


Fig. 12.7. Age estimation of Tel Te'o infants from tooth length.

The number of infant skeletons recovered from the Pottery Neolithic and EB I strata at Tel Te'o is unique for a single site in Israel. It was therefore considered essential to analyze them in detail and specifically to determine their age at death as accurately as possible.

The results of age estimation of the Tel Te'o infants are given in Figs. 12:7 and 12.8. Determination of age from dental data and length of humeri suggests a range from eight months in utero to three months after birth, when compared with the modern, healthy, well-nourished individuals used as our reference population. Health status for the periods represented at Tel Te'o was probably far inferior to that of the reference population (Smith and Kolska-Horwitz 1998), suggesting that the Tel Te'o infants were 1–2 months older than modern infants of similar length and stage of dental development.

At least three other Pottery Neolithic sites with infant burials are known in Israel—Sheikh 'Ali, Tel Dan, and Tel Qatif. The Sheikh 'Ali infant was described by Haas (1974) as 3–5 months old. D. Zorich examined the Neolithic jar burial from Tel Dan in the field. The remains consisted of fragments of long bones, a few ribs, a vertebral arch, some phalanges, a left radius and a left ulna. The age of the infant was determined to be 6 months from the lengths of the radius (57 cm) and ulna (66 cm; Gopher and Greenberg 1987). However, according to our data these measurements represent a much younger infant, probably a neonate. The Tel Qatif infant, placed in a broken pot, with knees flexed (Epstein 1984), was aged by us as one month old.

The Pottery Neolithic jar burials have five points in common:

1. All were of extremely young infants (less than 6 months old).

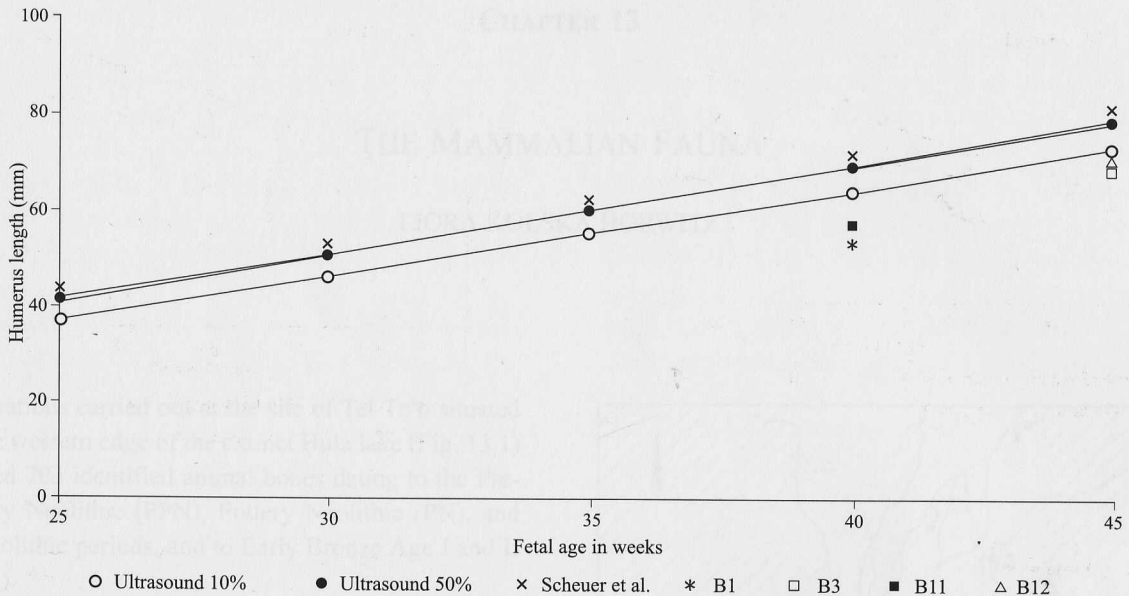


Fig. 12.8. Age estimation of Tel Te'o infants from humerus length.

- The jars were found under houses and not in a cemetery.
- The jars were broken and without gifts in or near them, unless the faunal remains found in association represent food offerings (see Chapter 13).
- They contained one or, at most, two infants.
- The skeletal posture indicates that they were placed in the jars shortly after death, and the bones show no signs of disease or violence.

We propose therefore, that the infants buried in the jars died of natural causes and that the vessels in which they

were interred suggest care in protecting the fragile corpses. The reasons underlying the choice of jar burial for some but not all infants still need to be clarified—gender, primogeniture, and lineage obviously are some of the features that need to be considered. We have now begun using ancient DNA techniques for sexing infant remains. At Tel Te'o all of those so far examined are male (Smith et al. 1999), but further examination of large samples needs to be carried out before we can reach any conclusions on this subject.

NOTES

¹ The jar containing the skeleton was taken for exhibition at the Israel Museum after some bones were removed for measurement. The bones removed were the right half of the

mandible with deciduous central and lateral incisors, canine, first and second molar tooth germs, the left humerus and the left femur (Fig. 12.3).