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Middle Bronze Age II Burials at Sasa, Upper Galilee (Tomb 1 and Graves 37, 39)

Patricia Smith

Introduction

In 1976–1977 salvage excavations were carried out at Sasa in the Upper Galilee, after construction work uncovered archaeological remains of a burial cave and two graves, that were attributed to the Middle Bronze Age II (Ben-Arieh, this volume).

The tomb (Tomb 1) was excavated by D. Davis. The shaft and upper part had been destroyed by bulldozers, but skeletal remains of at least 13 individuals were identified, together with animal remains (Kolska Horwitz 1987; see Ben-Arieh, this volume: n. 2) and associated burial goods (Figs. 1, 2). Two distinct burial layers were identified in the tomb, separated by a bedding of angular stones. The upper burial level, which contained remains of at least nine individuals, was dated to the late MB IIB, and the lower burial level, which contained remains of three adult males—to the transitional MB IIA/B period. In addition, one individual was found in a mixed context.

The two graves (L37 and L39; Figs. 3, 4 respectively) were excavated by E. Braun and are attributed to the transitional MB IIA/B period.

Fig. 1. Tomb 1.

Fig. 2. Close up showing position of skeletons in Tomb 1.

Fig. 3. Partially excavated Grave 37 (detail).

Fig. 4. Partially excavated Grave 39 (detail).

A detailed description of the tomb and graves and their associated finds appears in Ben-Arieh, this volume and Ben-Tor, this volume. This report focuses on the human remains from Tomb 1 and Graves 37 and 39. They may be associated with the MB II settlement at Sasa and so form part of a larger MB II burial complex, as at least one other rock-cut tomb from the same period is known from Sasa (Golani and Yogev 1996).

Methods

The bones and teeth were cleaned, measured and examined for gross pathology. Very few complete skeletons could be distinguished in the densely-compacted deposits (see Fig. 2). The minimal number of individuals was therefore based on body-part representation, and largely based on the cranial and dental remains. Age estimations in children were based on dental development, using standards presented in Moorrees, Fanning and Hunt 1963 and Liversidge 1995, supplemented by skeletal criteria provided in Krogman 1962. For adults, two independent age estimations were made. The first was based on cranial suture fusion and observation of joint surfaces, especially the pubic symphysis (Krogman 1962) and the second on dental attrition rates. This was extrapolated from attrition values in those juveniles whose age could be estimated from dental development as described by Miles (1963; 2001). The inventory of individuals identified by cranial and dental remains is presented in Table 1.

TOMB 1

The Upper Burial Level (Late MB IIB)

The upper burial level represents the last phase of interments in the cave. Although damaged by the bulldozers, the remains of at least nine individuals, including children and adults of both sexes were recovered (Table 1). The individuals identified were assigned a hominid number (H) and are described below. They comprised the centrally-placed articulated skeleton of a young woman (H7), who was lying on her back in an extended position with the head pointing to the south. The right arm appeared to be bent along the right side of the body; the left arm was poorly preserved, as were the lower limbs. Bones of a number of other individuals were found in close proximity to this skeleton, but no other articulated skeletons were identified from this level.

H1: Identified from cranial and facial bones as a young male aged 25–30 years. The frontal bone was thick (7 mm at bregma), and the metopic suture was patent. The maxilla and left portion of the mandible were also present.

H2: A 35–45 year-old female, represented by isolated bones.

H3: Comprises the calotte of an adult, with patent sutures estimated at 30–40 years old. The

Table 1. Inventory of Human Remains Recovered from Tomb 1 and Graves 37 and 39

Location	No.	Age	Sex
Tomb 1			
Upper Level	H1	25–30	M
	H2	35–45	F
	H3	30–40	M?
	H4	14–16	M?
	H5	35–45	M
	H6	3–4	?
	H7	35–45	F
	H10	35–45	F
	H13	50–60	M
Lower Level	H8	25–35	M
	H9	50–60	M
	H12	50–60	M
'Mixed Group'	H11	40–50	F
Grave 37	H14	50–60	F
	H15	2–3	?
	H16	4–5	?
Grave 39	H17	40–50	F
	H18	25–30	F?
	H19	7	?
	H20	20–40	F
	H21	3–4	?
	H22	3–4	?

shape and thickness of the cranial bones indicate that this individual was probably male.

H4: Comprises the corpus of the mandible of an adolescent, probably male, aged 14–16 years, with much calculus on the teeth. The lower right second premolar was congenitally absent and the lower left premolar was distally impacted against the lower first molar. The large amounts of calculus, unusual in such a young individual, suggest that chewing and swallowing were painful, limiting the usual self-cleansing action of the cheeks, lips and tongue.

H5: Comprises the occipital, part of left mastoid, parietal and mandible of a male 35–45 years old.

H6: A partial skeleton of a child aged 3–4 years.

H7: An articulated skeleton of a woman. The skull was almost complete, and the cranial bones were thin. All cranial sutures were patent, indicating a young age, but dental status was typical of an older individual. Many teeth had been lost *ante mortem*. The teeth that were present showed moderate attrition, with dentine exposed on the occlusal surface. Age was assessed as 35–45 years. The teeth showed an unusual pattern of attrition, with exceptionally severe attrition on the upper right premolar. This may indicate the use of the teeth as a tool for stripping fibers as in basket making.

Beneath this latter burial and separated from it by an incomplete layer of stones, was the fully articulated burial of a young male (H8), attributed to the earlier burial layer (see below).

H10: Consists of a very small partial cranium, comprising the occipital and part of the parietals of a female with extremely thin bones and partial fusion of the sagittal suture. Age was estimated as 35–45 years.

H13: Comprises the occipital, part of right temporal, mastoid, parietal and frontal bones and mandible with many missing teeth of a male aged 50–60 years.

The Lower Burial Level (Transitional MB IIA/B)

H8: At the top of the lower level was the articulated burial of a young male, aged 25–35 years. He was lying beneath H7 and aligned in the opposite direction, with his head pointing to the north. The skull had broken into numerous fragments, presumably because of the weight of overlying deposits. All cranial sutures were patent except for the lateral third of the coronoid suture. Cranial bones were thick, and the mastoid processes large (Fig. 5). A peg-shaped supernumerary tooth was present in the midline (Fig. 6) and the upper right first molar and lower first molars had been lost *ante mortem.* In addition, the crown of the upper left first molar was completely decayed, leaving only roots, and the lower left second molar had an abscess cavity around the roots, apparently from periodontal disease. All the teeth on the right side of the mouth were covered with calculus on their occlusal surfaces, indicating that the individual had been unable to chew on the right side of the mouth in the weeks before

Fig. 5. Side view of male skull H8.

Fig. 6. Frontal view of male skull H8 with supernumerary tooth.

death. This was probably the result of pain from the dental abscess. This individual appeared to have eaten soft non-abrasive foods throughout his life, since the teeth showed only minimal attrition with no dentine exposed—in contrast to the majority of adults recovered from this cave.

The other two individuals assigned to this level, H9 and H12, were both adult males. Their bones had been disturbed, presumably to make way for the later burial of H8, and were not in anatomical articulation.

H9: Represented by part of the facial, frontal and right temporal bones and mandible of an adult male, aged 50–60 years (Figs 7, 8). These were found wedged into one of the inner walls of the burial cave. Part of the roof of the orbit was present on one side and exhibited cribra orbitalia. The teeth, like those of the female H7, show an unusual pattern of attrition. The first molar and premolars show little wear, except for the right first molar, which is severely worn, with an abscess cavity around the root. This may reflect use of the teeth for stripping fibre or preparing reeds or grasses for basket making.

Fig. 7. Side view of partial male skull H9 on removal from tomb.

Fig. 8. Frontal view of male skull H9.

H12: Comprises the occipital, part of left mastoid and parietal with fused sutures, of a male aged 50–60 years.

The 'Mixed Group'

H11: Found in the mixed deposits, it was identified as a female aged 40–50 years. Skeletal elements attributed to this individual included the frontal bone, both parietals and temporal bones and part of the occiput, the right side of the maxilla and left side of the mandible. The teeth were hypoplastic with a carious first premolar and recession of alveolar bone indicating periodontal disease.

GRAVES 37 AND 39

Grave 37

During the excavation the skeletons of a woman (H14) and small child (H15) with a necklace were identified (see Fig. 3). In the laboratory, the remains of the skeleton of a slightly older second child (H16; aged 4–5 years) were identified.

H14: Comprises the skull of a female 50–60 years old, with all sutures fused except for the temporo-parietal suture (Figs. 9, 10). Three circular lesions averaging 1.5 mm in diameter were present on the cranium. Two were on the frontal bone and one on the right parietal. All showed reparative bone growth, indicating that some healing had taken place. Such lesions may be attributed to the healing of incomplete fractures of the skull caused by a blow from a blunt instrument (Ortner and Putschar 1985). An alternative explanation, in the absence

Fig. 9. Side view of female skull H14.

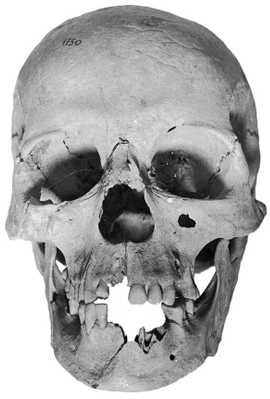

Fig. 10. Frontal view of female skull H14.

of signs of fracture of the outer table of the bone, is that the lesion results from a localized infection of the scalp. The upper right molars and lower left first molar, as well as both second premolars and lower left incisor, had been lost *ante mortem*. This individual suffered from periodontal disease and caries. There was much loss of alveolar bone around the teeth. Heavy deposits of calculus and a carious lower left second molar were also observed.

H15: The partial skeleton of an infant aged 2–3 years.

H16: The partial skeleton of a child aged 4–5 years.

Grave 39

At least six individuals had been interred in this grave.

H17: The partial skull and mandible of a female aged 40–50 years, with sagittal, coronal and lambdoid sutures almost completely fused. This specimen exhibits the same combination of severe dental disease and minimal attrition seen in H8. There is evidence of *ante mortem* loss of the upper right first molar, an abscess cavity around the roots of the upper left second molar, heavy deposits of calculus and some alveolar resorption.

H18: Represented by the left half of a mandible of an adult. The bone is gracile and teeth show minimal attrition. This specimen was tentatively sexed as a young female aged 25–30 years.

H19: Comprises cranial bones of a 7-year-old.

H20: A female, represented by the left femur and innominate bones, probably aged between 20 and 40 years.

H21 and H22: Children, both identified by innominate bones and cranial fragments as aged 3–4 years.

DISCUSSION

Population Biology

The number of individuals reported here is far too small for any estimates of paleodemography or rigorous evaluation of mortuary practices, but the absence of infants aged less than 2 years is in accordance with findings from other burial sites in the region. Separate burial locations for infants, usually in pots or beneath potsherds, appear to have been common in the Southern Levant between the Pottery Neolithic and the Iron Age, with the infants buried in domestic installations or at the entrance to tombs of older individuals (Smith et al., in press). While the majority appears to have been aged from birth to six months, children aged up to 3/4 years seem also to have been occasionally buried in this fashion (Smith et al., in press).

Cranial measurements are provided in Table 2. Sample sizes are small, but the measurements fall within the range of measurements recorded for other MB II sites in the Southern Levant, and differ significantly from those of MB I samples (Acreche 2001). Physical characteristics of MB I and MB II populations from all sites so far analyzed appear to differ markedly (Acreche 2001; Arensburg 1973; Hughes 1965; Hrdlicka 1938). The Sasa population, like MB II samples from elsewhere in the region, were more robust than those present in the region in the MB I or Early Bronze Age (Smith 1989; 1998). They have rounder, shorter heads and broader, shorter faces than their predecessors, with wider noses, and thicker bones with more pronounced muscle attachments. The facial differences are maintained in the mandibles and teeth. The ramus height is shorter, but the gonial angle is more obtuse, the mandibular corpus is longer and teeth are larger (Peretz and Smith, this volume). All these differences are in the

Table 2. Cranial Measurements and Indices of the MB II Samples from Sasa

	Male			Female		
Measurements	N	X	Range	N	X	Range
Maximum length	1	181.0		4	182.5	175.0–188.0
Maximum breadth	1	133.0		4	136.5	134.0–143.0
Basion-bregma	1	143.0		3	137.0	132.0–142.0
Basion-nasion	1	102.0		3	99.0	92.0–108.0
Porion-bregma	1	123.0		4	114.2	100.0–127.0
Biasterion	1	110.0		4	103.2	99.0–109.0
Minimum frontal	2	96.5	94.0–99.0	4	94.5	93.0–96.0
Frontal chord	2	108.0	105.0–111.0	4	112.7	109.0–107.0
Parietal chord	1	114.0		4	113.5	106.0–107.0
Occipital chord	1	96.0		3	94.0	93.0–95.0
Frontal arch	2	121.0	115.0–127.0	4	131.0	125.0–136.0
Parietal arch	1	130.0		4	128.2	114.0–135.0
Occipital arch	1	116.0		3	117.0	115.0–120.0
Basion-prosthion length	1	97.0		2	89.0	88.0–90.0
Bi-orbital breadth	2	96.5	96.0–97.0	3	94.6	93.0–96.0
Inter-orbital breadth	2	21.5	21.0–22.0	3	22.0	20.0–23.0
Bizygion	2	124.0	120.0–128.0	3	123.7	120.0–128.0
Bizygomatic breadth	2	90.0	87.0–93.0	3	87.3	84.0–93.0
Nasion-posthion height	1	66.0		3	65.0	62.0–68.0
Left orbital breadth	2	40.0	40.0–40.0	3	40.3	40.0–41.0
Left orbital height	2	34.0	33.0–35.0	3	33.7	32.0–35.0
Nasal breadth	2	24.0	22.0–26.0	3	22.7	21.0–24.0
Nasal height	2	50.0	50.0–50.0	3	49.3	45.0–54.0
Palate breadth	2	42.0	41.0–43.0	3	36.0	33.0–40.0
Palate length	2	46.0	41.0–51.0	2	43.5	41.0–46.0
Palate depth	1	11.0		3	13.3	12.0–16.0
Cranial index		73.5			74.8	
Cranial length-height index		79.0			75.1	
Cranial breadth-height index		107.5			100.0	
Nasal index		48.0			46.0	

opposite direction from those expected as part of a micro-evolutionary trend, or the level of environmental stress described below. Stature at Sasa could be estimated from intact lower limbs of only one individual—the young male (H8). Maximum femur length in this individual was 45.5 cm and maximum tibia length was 35.6 cm, indicating a stature of 169 cm (Trotter and Gleser 1958; values for Caucasian males). Like the cranial measurements this falls within the range of variation previously reported for the MB II.

Bone recovery was too poor for a detailed study of skeletal pathology or trauma, but a detailed comparison of the teeth and jaws of the Sasa sample with that of an MB I sample from Jebel Qa'aqir has been carried out by Peretz and Smith (this volume). That study showed that at Sasa there is a higher prevalence of enamel hypoplasia, indicative of stress from chronic disease or malnutrition in infancy, alveolar resorption, indicative of periodontal disease, and *ante mortem* tooth loss than at Jebel Qa'aqir. At the same time attrition is less severe at Sasa than at Jebel Qa'aqir. The association of severe disease with minimal attrition at Sasa indicates a poorer diet, with more carbohydrates than that of the earlier, MB I population of Jebel Qa'aqir.

Mortuary Practices

The damage to the tomb and graves caused by the building activities, which resulted in their discovery, probably destroyed some of the skeletal material, so that any attempt to reconstruct burial patterns from the loci described here is necessarily tentative. Even the number of individuals reported probably underestimates the number originally interred. The individuals recovered from Tomb 1 include at least six and possibly eight men and four women, as well as one small child. Grave 37 yielded one woman and two children, while Grave 39 contained three women and three children. In all burial locations adult age showed a wide range (see Table 1). The material finds indicate that Tomb 1 was in use for several generations, while the skeletal finds show that men and women, as well as children, were buried there. The interred then represent several generations, although it was not possible to determine if they represent members of one lineage. Certainly there was a preponderance of older males and relatively few women. The two primary burials, surrounded by non-articulated bones, indicate displacement of earlier burials to make way for later ones. The relatively small number of individuals recovered indicates either selective use of the tomb or removal of at least some of the bones from earlier burials to make room for later arrivals.

Graves 37 and 39, which on the basis of the pottery recovered, appear to have been contemporary with at least some of the burials in Tomb 1, contained only females and young children. Again, some of these had been disturbed in the past and both graves had probably been reused, rather than all individuals being buried at the same time.

However, the fact that in these two graves only women and children were identified is not characteristic of MB II graves of this type. At other MB II sites where skeletal remains have been studied in relation to tomb type, such as Kabri and Yoqne'am, both sexes as well as children have been recovered from all known burial types encountered (built tombs, rock-hewn tombs, cist graves and pit graves; see Smith, Nebel and Faerman, forthcoming).

The differences reported here between MB II Sasa and MB I samples from other sites in the region, are associated with what Mazar (1992: 175) calls "an almost total revolution in all aspects of material culture" affecting the entire fabric of society in the southern Levant. This is also reflected in animal husbandry practices and choice of food offerings in the tombs (Kolska Horwitz 1987; 1989). The changes in settlement patterns and exploitation of food resources characteristic of the MB II are among the factors that may have directly contributed to changes in health status and diet. Changes in settlement patterns, and especially the greater number and density of people in urban environments is associated with an increased prevalence

of infectious diseases (Cohen 1989). Market economies, as opposed to subsistence farming, tend to increase the risk of food spoilage as well as limiting the variety and quality of food available to many. Even the introduction of wheel-made pottery may have contributed to the more widespread use of pots for cooking, so that boiled as opposed to roasted or baked foods became more common, increasing the rate of calculus accumulation, periodontal disease and prevalence of caries (Smith and Kolska-Horwitz 1998).

Most bio-anthropologists since Hrdlicka (1938) have interpreted the changes observed between MB I and MB II populations in the Southern Levant as due to gene flow reflecting population change rather than differences in environmental pressures during growth (secular trends). The intensity of such pressures throughout life can be monitored from the examination of developmental defects of the teeth (hypoplasia) and long bones (Harris lines and cortical thickness), which provide a record of the age, duration and severity of the growth insult (Saunders and Katzenberg 1992; Smith and Kolska-Horwitz 1998).

The dental findings, specifically hypoplasia, indicate that the MB II individuals from Sasa suffered more severe environmental stress than those of the MB I (Smith 1989; Peretz and Smith, this volume). Under such circumstances, reduction in size and decreased robustness are among the changes usually noted. In the present case, the reverse changes are found. This supports the hypothesis of genetic change in the MB II, while the data collected from other sites (Acreche 2001) suggests that such changes were widespread, and are probably due to widespread population movements between the MB I and MB II.

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