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Contents

Spis treści

Fascicle A
MEDITERRANEAN AND NON-EUROPEAN ARCHAEOLOGY

Fascykuł A
ARCHEOLOGIA ŚRÓDZIEMNOMORSKA I POZAEUROPEJSKA

Chronicle of Excavations

Arkadiusz Sołtysiak

Paleopathology in Mesopotamia. A Short Overview

Archaeological excavations at sites of ancient Mesopotamia have been conducted since more than 150 years and after intensive works at remains of hundreds of cities, towns and villages we have now relatively good knowledge about Sumerians, Akkadians, Assyrians, Babylonians and other peoples inhabiting this region. Main source of this knowledge are cuneiform texts, frequently verified with use of archaeological finds. However, in spite of great progress in research, one important source of information – human remains – is still not sufficiently exploited. In contrast to ancient Egypt (Armelagos, Mills 1993; Aufderheide 2003), Greece (Grmek 1991) or many other regions, almost everything that we know about the diseases in ancient Mesopotamia comes from the texts, not from the research on human bones. Such under-development seems strange for first view, especially when we try to imagine how many thousands of skeletons were unearthed so far in Mesopotamian sites. However, it turns clear in the face of several conditions.

First, human remains are usually poorly preserved due to soil and climatic conditions in the Near East. After hundreds or thousands humid winters and extremely dry summers the bones usually become fragile which makes osteological studies much more difficult than in Egypt or Europe. The second problem is political instability in the region which sometimes discourages the physical anthropologists from fieldwork at Mesopotamian sites. Although it would be possible to deliver the bones to the laboratories in Europe or United States, great and increasing costs of transportation make this solution illusive. Combination of these problems made progress in research on human remains from Mesopotamia so slow that it still remains in a pioneer stage (cf. Sołtysiak 2006f).

More than twenty years ago Ted Rathbun (1984: 162) stated in his review paper about paleopathology of Mesopotamia and Iran that: *It is somewhat ironic that in this area that has received extensive archaeological investigation into the domestication and urbanization processes, so little is known about the physical aspects of the groups in general and their pathology in particular. When viewed in historical perspective, the early excavation process with minimal attention given to human remains can, perhaps, be understood; however, the vagaries of excavation, preservation, and less than proper analysis and reportage of osteological data preclude systematic comparisons required to understand temporal change*. Unfortunately, this opinion is only a bit less valid today.

Paleopathology

Each human skeleton excavated at an archaeological site can provide modern scholars with two general kinds of information: about the life of this specific individual, as well as about processes which took place after his or her death. The second kind of research is a part of general archaeological studies of post-depositional modifications at excavated sites, i.e. taphonomy. The first one includes various questions which are answered with the use of methods of physical anthropology. Those questions may concern one individual (individual diagnostics) or whole population observed through a more or less numerous sample available (population studies). Paleopathology is the sub-discipline of physical anthropology which includes studies on diseases in ancient human populations, both on individual and population level. Obviously, since soft tissues are usually not preserved in archaeological contexts, only those unfrequent kinds of disease which leave any traces on bones or teeth, may be recognised and studied.

There are many manuals of paleopathology in which detailed classifications of diseases may be found (e.g. Pinhasi, Mays 2008; Ortner 2003; Aufderheide, Rodriguez-Martin 1998). In practice, most of possible pathological bone or tooth alternations are not frequent or difficult to recognise, especially those due to congenital or metabolic factors, and most reports on human bones from archaeological sites mention or present frequencies of only few most common diseases. One of the most common pathological conditions is the broad class of **degenerative joint disease**, which includes osteoarthritis, spondylosis, ankylosis, osteochondritis dissecans and other less frequent pathological expressions. The frequency and degree of the degenerative joint disease is strongly correlated with age, but also with occupational stress, and sometimes unusual patterns of joint pathology are interpreted in terms of particular forms of human activity.

Another large class of pathological bone conditions is labelled as **chronic infections**, and they may be sometimes identified more precisely as related to a particular pathogen, as tuberculosis, treponomatosis or leprosy. In most cases, however, non-specific infections are divided into those which penetrate bone or bone marrow (osteomyelitis) and those which affect periosteum only (periostitis). In most cases they resulted in an injury and bone exposure to the pathogens. A very peculiar kind of infectious disease is dental caries which develops when teeth are demineralised by acid-producing bacteria feeding on sugars included in human diet. Also periodontal disease, i.e. infections of alveolar process, was frequent in pre-Modern populations.

The third important category of pathological conditions are **stress markers** of various kinds. Very common in pre-Modern populations and frequently studied are enamel developmental defects, especially linear enamel hypoplasia which is thought to reflect episodes of undernutrition in childhood, when the enamel was produced by ameloblasts. There are also more specified stress markers, as symptoms of red marrow expansion in skull (porotic hyperostosis and *cribra orbitalia*) which are usually linked with anaemia of congenital (thalassemia, sickle-cell anaemia), parasital (malaria, schistosomatosis) or nutritional background. Vitamin deficiency diseases as rickets or scurvy may also leave signs on bones.

In pre-Modern populations **injuries** of various kinds were not uncommon. Most frequent are fractures and dislocations, although traces of interpresonal violence such as healed cutmarks or even arrowheads in bones may be sometimes observed too. In some regions, but not in Mesopotamia, quite common are traces of medical treatment, as trephinations or amputations.

History of research

The history of research on paleopathology in Mesopotamia is very short. More or less complete reports focused on ancient diseases were produced for very few sites such as Zawi Chemi-Shanidar (Ferembach 1970; Agelarakis 1993), Abu Hureyra (Molleson 2000), Tell Mishrifeh/Qatna (Canci 2003), Tell Ashara/Terqa and Tell Masaikh (Jaskulska, Sołtysiak 2002), Nimrud/Kalhu (Schultz, Kunter 1998), and Tell Sheh Hamad/Dur Katlimmu (Witzel et al. 2000). There are also several papers by Theya Molleson focused on occupational stress (e.g. Molleson 2001; 2006), two diagnostic studies on rare diseases (Wada et al. 1987a; 1987b), one study on epidemiology of dental caries (Sołtysiak 2006a), and the already mentioned summary by Ted Rathbun (1984). Apart from these few pathology-oriented publications, some data are scattered in general reports on human bones, usually published as appendices to archaeological excavation reports.

Perhaps the most important obstruction in the research on diseases in ancient Mesopotamian populations is the fact that at most sites the osteological work must have been done in the dig house during the excavations, with only basic instruments and within limited time. There are but a few collections of bones transported out of Iraq or Syria and available for paleopathologists. The largest contains remains of more than 600 individuals from Tell Inghara/Kish which were excavated between 1922 and 1933 by Ernest Mackay and Henry Field. Most of them (551) were transported to the Field Museum of Natural History in Chicago and eventually studied by Ted Rathbun (1975), Christina Torres-Ruff and William L. Pestle (2007). Unfortunately, in many cases the chronology of the skeletons is uncertain. The smaller sample of 57 individuals dated to the Bronze Age was housed in the Oxford University and then moved to the Natural History Museum in London (Buxton 1924; Buxton, Rice 1931; Field 1947; Molleson, Blondiaux 1994).

Apart from the bones from Kish, the storage rooms of the Natural History Museum contain also skulls or whole skeletons of 17 individuals from ‘Ubaid (Late Chalcolithic; Keith 1927), 24 from Ur (Early and Middle Bronze Age, 11 additional skeletons are housed by the British Museum; Keith 1927; 1934; Molleson, Hodgson 2000; 2003), 12 from Tell Arpachiyeh (Halaf culture; Molleson, Campbell 1995), 102 from Abu Hureyra (Neolithic; Molleson 1994; 2000) and 4 from Tell Brak (Early Bronze Age; Molleson 2001).

Another large osteological collection was gathered by the Japanese team within the Hamrin Archaeological Project (1977–1980) in central Iraq. There were 584 individuals from 13 sites in the Hamrin basin, 3 sites in Haditha region, Assur and Babylon, most of them excavated in Islamic cemeteries. The bones were transported to the Department of Biological Anthropology and Human Ecology, Faculty of Human Sciences, Osaka University, Japan (Ishida 1981a; 1981b).

Bones of more than 100 individuals from Nemrik (Proto-Neolithic, Iraq) are stored in the State Archaeological Museum in Warsaw, Poland (Molleson 2006), 84 individuals from Nippur (Neo-Babylonian and Islamic Period, Iraq) in the University Museum of the University of Pennsylvania, USA (Swindler 1956; Rathbun, Mallin 1978), 21 skeletons from Tell Leilan (Bronze Age, Syria) were transported to the University of Alberta in Edmonton, Canada (Haddow, Lovell 2003). There were also bones of 8 individuals from Assur (Middle and Neo--Assyrian period) stored in the Vorderasiatisches Museum in Berlin, Germany (Grimm 1957). A still growing collection of teeth and selected bone samples is housed by the University of Warsaw, Poland (cf. Sołtysiak 2006g). It includes human remains from 10 sites in the Khabur basin (Tell Arbid, Tell Brak, Tell Barri, Tell Rad Shaqra), the middle Euphrates valley (Tell Ashara, Tell Masaikh, Tell Marwaniyeh, Gebel Mashtale) and the middle Tigris valley (Assur, Tell Rijim).

Since 2003 archaeological excavations are no longer possible in Iraq, so it is not likely that new data will be available for greater part of Mesopotamia in near future. However, the archaeologists moved to northern Mesopotamia and since a few years we may observe an increase in the number of reports on human bones, especially from the Khabur basin and the middle Euphrates valley. For many years this area was rather neglected by the archaeologists who preferred to focus on monumental ruins of ancient Sumerian, Babylonian and Assyrian cities, so it is evident that due to the sad political situation in Iraq we have now more data to reconstruct the disease pattern of anonymous dry farming and herding pre- and proto-historical populations of the north than paleopathologies of much better known Sumerians, Babylonians or Assyrians (see **Table 1**).

The present paper reviews all available reports (published prior to 2009) on diseases diagnosed on bones excavated at archaeological sites in Mesopotamia, irrespective their chronology, but with Neandertal remains from the Shanidar cave excluded.

Table 1. List of sites with human remains discussed in the present paper (E, M, LBA: Early, Middle and Late Bronze Age; N: number of individuals).

Tabela 1. Zestawienie omawianych w tekście stanowisk ze szczątkami ludzkimi (E, M, LBA: wczesna, środkowa i późna epoka brązu; N: liczba osobników).

Site	Location	Chronology	N	Reference(s)
Tell Abu Hureyra	upper Euphrates (Syria)	Neolithic	102	Molleson 2000a; 2000b; 2006
Tell Abu Shahrain (Eridu)	southern alluvium (Iraq)	Chalcolithic	8	Coon 1949
Tell Arbid	Khabur basin (Syria)	EBA	8	Sołtysiak 2006b
		MBA	19	
		Islamic	21	
Tell Arpachiyah	middle Tigris (Iraq)	Chalcolithic	13	Molleson, Campbell 1995
Tell Ashara (Terqa)	middle Euphrates (Syria)	EBA	28	Jaskulska, Sołtysiak 2002; Sołtysiak 2002a; 2007; Tomczyk, Sołtysiak 2007a; forthcoming [a]; [b]
		MBA	146	
		LBA	5	
		Neo-Assyrian	8	
		Roman/Parthian	1	
		Islamic	10	
		Modern	27	
Tell Barri (Kahat)	Khabur basin (Syria)	EBA	25	Sołtysiak forthcoming [a]
		EBA/MBA	13	
		MBA	27	
		LBA	5	
		Neo-Assyrian	15	
		Achaemenian	12	
		Roman/Parthian	1	
		Modern	5	
Tell Beydar	Khabur basin (Syria)	EBA	41	Charlier 2000; Bertoldi, Bartoli 2006
		Hellenistic	1	Charlier 2000
Tell Bi'a (Tuttul)	upper Euphrates (Syria)	MBA	2	Wolska 1994
Tell Brak (Nagar)	Khabur basin (Syria)	Chalcolithic	27	Sołtysiak forthcoming [b]
		EBA	4	Molleson 2001; Oates et al. 2008
Tell Chuera	Khabur basin (Syria)	EBA	2	Wahl 1986
Tell ed-Der (Sippar)	northern alluvium (Iraq)	MBA	121	Burger-Heinrich 1989a; 1989b
Dja'de	upper Euphrates (Syria)	Neolithic	2	Anfruns 1993
Tell Fekheriye	Khabur basin (Syria)	Neo-Assyrian	1	Sołtysiak 2006c

Site	Location	Chronology	N	Reference(s)
Tepe Gawra	middle Tigris (Iraq)	Chalcolithic	1	Krogman, Sassman 1950
Tell Gubba	Hamrin basin (Iraq)	Islamic	2	Wada et al. 1987b
Tell Halula	upper Euphrates (Syria)	Neolithic	40	Anfruns et al. 1996
Tell Inghara (Kish)	northern alluvium (Iraq)	EBA	36+7 +124	Buxton 1924; Buxton, Rice 1931; Penniman 1934; Rathbun 1975
		MBA	5	Rathbun 1975
		Neo-Assyrian	34	
		Sasanian	1	
Ishan Bahriyat (Isin)	northern alluvium (Iraq)	EBA	2	Ziegelmayer 1981; 1987; 1992
		MBA	26	
		LBA	2	
		Neo-Assyrian	25	
		Islamic	51	
Jarmo	middle Tigris (Iraq)	Neolithic	7	Dahlberg 1960
Tell Karrana 3	middle Tigris (Iraq)	Chalcolithic	7	Caselitz 1993
Kharabeh Shattani	upper Tigris (Iraq)	Chalcolithic	2	Bolt 1995
Tell Leilan (Shekhna)	Khabour basin (Syria)	Chalcolithic	1	Dawson 1999; McKenzie 1999
		EBA	19	
		MBA	3	
Tell Majnuna	Khabur basin (Syria)	Chalcolithic	>24	Karsgaard, Sołtysiak 2007
Tell Masaikh	middle Euphrates (Syria)	MBA	23	Sołtysiak 2002b; 2003; 2005; Tomczyk, Sołtysiak forthcoming [a]; [b]
		Neo-Assyrian	12	
		Hellenistic	1	
		Roman/Parthian	70	
		Islamic	205	
Gebel Mashtale	middle Euphrates (Syria)	Islamic	25	Sołtysiak, Tomczyk 2007
Tell Mishrife (Qatna)	upper Euphrates (Syria)	MBA	14	Canci 2003; Witzel 2006
		Neo-Assyrian	6	Canci 2003
Tell Mohammed ‘Arab	middle Tigris (Iraq)	Chalcolithic	8	Bolt 1991
		EBA	14	
		LBA	28	
		Sasanian	33	
Tell Muqayyar (Ur)	southern alluvium (Iraq)	EBA	10	Keith 1934; Molleson, Hodgson 2000; 2003
		MBA	7	Keith 1927; Molleson, Hodgson 2000; 2003
		Neo-Assyrian	1	Molleson, Hodgson 2000; 2003
Mureybet	upper Euphrates (Syria)	Neolithic	1	Ozbek 1976
Nemrik 9	upper Tigris (Iraq)	Neolithic	<120	Molleson 2006; Szlachetko, Zadurska 2006
Niffar (Nippur)	northern alluvium (Iraq)	Neo-Assyrian	57+16	Swindler 1956; Rathbun, Mallin 1978

Site	Location	Chronology	N	Reference(s)
Nimrud (Kalhu)	middle Tigris (Iraq)	Neo-Assyrian	17	Schultz, Kunter 1998
Qalat Sherqat (Assur)	middle Tigris (Iraq)	LBA	3+4	Grimm 1957; Sołtysiak 2002c
		Neo-Assyrian	5+8	
		Roman/Parthian	23	Sołtysiak 2002c
Tell Rad Shaqra	Khabur basin (Syria)	EBA	15	Sołtysiak 2006d
Tell Rijim	northern Tigris (Iraq)	Sasanian	2	Sołtysiak 2006e
Tell Rubeidheh	Hamrin basin (Iraq)	Chalcolithic	1	Downs 1988
Tell Sabra	Hamrin basin (Iraq)	EBA	2	Burger-Heinrich 1989c
		Roman/Parthian	7	
		Islamic	32	
Tell Sheh Hamad	Khabur basin (Syria)	Roman/Parthian	297	Witzel et al. 2000
Sheikh Hassan	upper Euphrates (Syria)	Neolithic	6	Clere et al. 1985
Tell Songor A	Hamrin basin (Iraq)	Islamic	1	Wada et al. 1987a
Tawi	upper Euphrates (Syria)	MBA	18	Kunter 1984
‘Ubaid	southern alluvium (Iraq)	Chalcolithic	17	Keith 1927
Warka (Uruk)	southern alluvium (Iraq)	MBA	2	Wittwer-Backofen 1983
		Neo-Assyrian	12	
Yorgan Tepe (Nuzi)	upper Tigris (Iraq)	Sasanian	27	Ehrich 1939
Zawi Chemi	upper Tigris (Iraq)	Neolithic	29	Ferembach 1970; Agelarakis 1993

Degenerative joint disease

In spite of its commonness, the degenerative joint disease, often described as osteoarthritis in mobile joints or spondylosis in vertebral bodies, may be rarely used for inter-group comparisons. First, it is strongly correlated with age, second, there are many different standards of description. Some authors just mention high or low prevalence of this pathology, others give detailed scores for whole population or even for sex and age categories. Due to this incompatibility it is possible only to give an outline of the changes in frequency of this disease in Mesopotamia.

In early Neolithic populations such as Zawi Chemi (Agelarakis 1993) and Hajji Firuz Tepe (Turnquist 1983) the frequency of degenerative joint disease seemed to be high, especially in lumbar vertebrae (L) (5/8 adults in Zawi Chemi), in contrast to Proto-Neolithic Nemrik 9 where both osteoarthritis and spondylosis were not common (Molleson 2006). Theya Molleson interpreted high frequency of spondylosis in lumbar and cervical (C) vartebrae in Abu Hureyra as the result of heavy loads porterage (Molleson 2000a). No data are available for the Chalcolithic except one case of spondylosis diagnosed in an individual from Tell Rubeidheh (Downs 1988).

It seems that during the Bronze Age the degenerative joint disease became less frequent, perhaps because of introduction of animals as additional labour and transportation force. In Tell Leilan (end of the EBA) there were 8/18 individuals with any instance of degenerative joint disease, although no severe case was noted except one case of ankylosis (joint ossification) of second and third cervical vertebrae (McKenzie 1999). Degenerative changes in C3 and C4 (once in a relatively young female), in lower part of thoracic (T) and in lumbar spine has been used in tentative identification of several individuals buried at the Royal Cemetery at Ur as porters (Molleson, Hodgeson 2000). Heavy loads were also a probable cause of spondylosis in cervical vertebrae of a relatively young male at Tell Chuera (Wahl 1986). Ankylosis in three cervical vertebrae was noted in one adult individual from Tell Ashara (Sołtysiak forthcoming [a]) dated to the transitional period between the EBA and MBA. Several cases of degenerative joint disease were reported also in EBA individuals from Kish (Rathbun 1975) and Tell Beydar (Charlier 2000). Osteoarthritis and spondylosis were not frequent in the MBA samples from Tawi (Kunter 1984), Tell ed-Der (Burger-Heinrich 1989a; 1989b) and Tell Ashara (Sołtysiak 2002a; Tomczyk, Sołtysiak 2007a). Heavy loads were proposed as interpretation of bilateral accessory sacroiliac facet on the auricular surfaces of the hip and sacrum observed in one woman in Qatna (Canci 2003).

In contrast with the Bronze Age, a small Iron Age II sample of human skeletons from Qatna presents mild compression fractures of the vertebral bodies, Hill-Sachs lesions (dislocation of the humeral head against the scapula) in as many as 4/6 individuals, and several instances of osteoarthritis and spondylosis – all this points to much harder work of these low status people in contrast to the MBA elite members buried at the same site (Canci 2003). However, at other Iron Age sites the frequency of degenerative joint disease was much smaller, 2/16 cases at Nippur (Rathbuh, Mallin 1978), and 3/12 cases at Uruk (Wittwer-Backofen 1983). Also in the sample of 17 individuals excavated in the royal cemetery at Nimrud there was only one case of rheumatoid arthritis and Queen Atalia with spinal pathology (Schultz, Kunter 1998).

Most detailed analysis of degenerative joint disease was included in the report on skeletons from large Seleucid, Roman and Parthian cemetery in Tell Sheh Hamad. Both osteoarthritis and spondylosis were widespread and their frequency clearly increased with age (18.1% in the age class up to 40 years, 34.5% in the age class of 40–60 years, 70.6% in older individuals), although not in the same way in both sexes. Young males suffered from this disease much more frequently than young females, but in old age an opposite tendency may have been observed (Witzel et al. 2000). Much higher frequency of the degenerative joint disease in older women is explained in social or hormonal terms; the same trend, but in a much smaller sample, was noted also in the Modern cemetery in Tell Ashara (Sołtysiak 2007). At Tell Sheh Hamad some difference in frequency of osteoarthritis and spondylosis occurred between individuals buried in constructed graves (they likely belonged to a higher class) and people buried in simple pits (lower class): 30% vs 54% in cervical, 36% vs 52% in lumbar vertebrae and 35% vs 43% in knee joint. Especially the difference in number of spine pathologies is striking and may reflect much harder work of lower class people. At the same site one peculiar case of ankylosis was found: most tarsals were completely fused and one of possible causes of such joint disease was advanced rheumatism (Witzel et al. 2000). One individual with skoliosis, all preserved mobile joints affected by osteoarthritis and spondylosis in C4–C7 and T9–S1 was found in the Seleucid layer at Tell Beydar (Charlier 2000).

Data from the Islamic Period are ambiguous. In Isin the degenerative joint disease was widespread, especially in males. Also two cases of skoliosis were noted (Ziegelmayer 1981; 1987; 1991). In Tell Sabra (Hamrin region) the frequency of osteoarthritis and spondylosis was quite high too (Burger-Heinrich 1989c), but – in contrast – the Early Islamic population from Tell Masaikh seemed to be relatively free of these pathologies (Sołtysiak 2002b; 2003; Tomczyk, Sołtysiak 2007b). However, these observations were based on small samples.

In a few cases a peculiar pattern of joint pathologies was interpreted as a result of definite activity pattern. Several instances of porter's tentative identifications were already mentioned. There is also one case of a skeleton from Tell Brak dated to ca. 2250 BC with dislocation of the right tibia-fibula joint and impact injury to the interphalangeal joints of the second and fifth toes, as well as heavy degenerative changes in C3 and C4. It is possible that this skeleton belonged to an acrobat called *ḫub* in Sumerian, a category of cult personnel mentioned in contemporary sources (Oates et al. 2008). Another more precise identification was proposed for female skeletons from Abu Hureyra (Neolithic) with joint pathologies in knee, metatarsals, lower thoracic vertebrae and hands: the pattern of osteoarthritis and spondylosis was expected for people kneeling for many hours each day in grinding position (Molleson 1994; 2000a). In the same site degenerative changes in mandibular condyles together with unusual tooth wear patern were interpreted as the result of basket-making and thus very early evidence of craft specialisation (Molleson 2006).

Infections and infectious diseases

Bone infections have been rarely observed in Mesopotamian populations, and noted differences in frequency between sites obviously result in the lack of scoring standards. In Ted Rathbun's opinion the chronic non-specific infections (periostitis and osteomyelitis) were always rare and their frequency even decreased from the Neolithic to later periods, but there is also possibility that in periods of developed urbanism the infections may have been more acute and thus left no traces in bones (Rathbun 1984). This opinion is confirmed by available data: the frequency of periostitis was relatively low in Neolithic populations of Nemrik (Molleson 2006) and Abu Hureyra (Molleson 2000a). Also in the Early Bronze Age there is only one case from Tell Brak (Molleson 2001) and as many as 12 cases at Tell Leilan, although at this last site each case of cortical striations, fine pitting or small regions of bone deposition were scored as periostitis (McKenzie 1999), so it is likely that most or even all instances were actually pseudopathologies. Periostitis was infrequent also in the Bronze Age sample from Tell Ashara (Sołtysiak 2002a) and in the Islamic sample from Tell Masaikh (Sołtysiak 2002b; 2003). People from Tell Sheh Hamad (Roman and Parthian Period) were perhaps more affected by non-specific infections, there were two cases of osteomyelitis and 15 cases of periostitis in the sample of 297 skeletons (Witzel et al. 2000).

Specific chronic inflammatory processes of the paranasal sinuses were noted in five adult individuals from Nimrud which may be interpreted as a result of several episodes of cold; in the same sample 6/7 adults suffered from untypical meningeal infection which left pathological changes on the internal lamina of the skull (Schultz, Kunter 1998). In the late cemetery at Tell Sheh Hamad 6 cases of inflammation in sinuses and three cases in palate were noted, both sexes equally affected. In five cases there were inflammations in the spine, but interpreted rather as non-specific spondylodiscitis than tuberculosis (Witzel et al. 2000).

It is quite strange that tuberculosis was so far never diagnosed in Mesopotamian pre-Modern populations, because recent research suggests that this infectious disease, which sometimes leaves distinctive traces on bones, was widespread in Egypt and Levant (Zink, nerlich 2003; Donoghue et al. 1998). There is also no case of leprosy and there are only two skeletons from the Islamic cemetery at Tell Gubba with lesions interpreted as late manifestation of endemic treponomatosis (Wada et al. 1987b).

A very peculiar case of specific osteomyelitis was noted at Tell Barri. The background of osteomyelitis and periostitis is not specific, although usually the bone and periosteum infection results in an injury. In case of a 6 years old child from the Middle Bronze Age cemetery at Tell Barri large osteomyelitis was observed in right mandible and to some extent also in cranial base and atlas. The radiograph revealed that this infection began in large cariotic pit in mandibular right second deciduous molar, then developed into large deformation of the mandible and was likely the cause of death (Sołtysiak forthcoming [a]).

Inflammation of gums and alveolar process is called the periodontal disease (paradontosis or periodontitis). Sometimes it leads to the tooth loss, although also dental caries or alveolar resorption in advanced age may cause the same effect. However, the increased frequency of *ante-mortem* tooth loss (especially molars) in younger adults may have been caused by the periodontal disease. There are almost no data from the Neolithic, only two cases of non-specific granuloma in the alveolar process at Nemrik (Szlachetko, Zadurska 2006) and one case of *ante-mortem* loss of molars at Zawi Chemi (Ferembach 1970) were mentioned. At some Chalcolithic sites high frequency of dental abscesses and AMTL was reported and associated with advanced dental wear degree both at Eridu (Coon 1949) and at ʻUbaid, where Sir Arthur Keith noted: *I have never seen in any race, ancient or modern, teeth worn to the degree shown by the men and women which Mr. Woolley unearthed at al-ʻUbaid* (Keith 1927). It is possible that hard food in this period accelerated the rate of dental abrasion and pulp cavities were exposed to infection more frequently than in later times. High rate of abrasion was observed at early Neolithic sites of Abu Hureyra (Molleson, Jones 1991; Molleson 2000a) and Jarmo (Dahlberg 1960) too. Single cases of AMTL were noted also at Tepe Gawra (Krogman, Sassman 1950) and Tell Rubeidheh (Downs 1988). Periodontal disease and AMTL was not frequent in the skeletons buried in the Royal Cemetery at Ur (Keith 1934; Molleson, Hodgeson 2003), but at Kish AMTL was widespread in the Early Dynastic II and III Periods (Rathbun 1975). Also the MBA sample from Ur showed higher frequency of the periodontal disease (Molleson, Hodgeson 2003). Single cases of paradontosis were noted also at Tell Chuera (Wahl 1986) and Tawi (Kunter 1984) in the north.

There are very limited data from the 2nd and 1st millennium BC. Many cases of AMTL and abscesses were noted in the small Iron Age sample from Qatna and interpreted as the example of poor oral hygiene in low class population (Canci 2003). However, high frequency of paradontopathy and dental abscesses was recorded also in the ruling class individuals from Nimrud (Schultz, Kunter 1998). Two cases of alveolar athrophy, unfortunately without clear diagnosis, occurred also at Assur (Grimm 1957). Dental abscesses were widespread in 3rd c. AD population from Yorgan Tepe (9/18 individuals; Ehrich 1939) and the periodontal disease was frequently noted in Islamic population from Isin (Ziegelmayer 1992). The only precise figures were published for Tell Sheh Hamad: 15.7% of paradontosis, 7.3% of marginal paradontitis, 4.9% of apical paradontitis, 7.0% of AMTL (Witzel et al. 2000). Obviously these data are too limited to allow any conclusion.

Deficiency diseases

There are no individuals with scurvy or rickets diagnosis, although this negative evidence was explicitly expressed only in the case of Abu Hureyra (Molleson 2000a) and the Royal Cemetery at Ur (Molleson, Hodgeson 2003). In one infant from Nippur (Neo-Babylonian Period) the left femur was extremely bent at the midshaft (Rathbun, Mallin 1978), although it may not necessarily have been caused by rickets. Much more frequent are symptoms usually associated with anaemia: *cribra orbitalia* (expansion of cancellous haematopoietic bone in orbital vault) and porotic hyperostosis (diploe expansion on cranial vault, most frequently on parietal). Even if the link between these symptoms and anaemia is widely accepted in the present literature, their background is not clear and several possibilities (thalassemia, iron deficiency in food, parasital infections) are discussed (for summary see Aufderheide, Rodriguez-Martin 1998: 348–351). All symptoms of anaemia are more frequently observed in sub-adults, although late manifestation of advanced but healed porotic hyperostosis may be sometimes preserved as symmetrical parietal thickening.

Data from the Neolithic Period are ambiguous. In the sample from Abu Hureyra there was only one case of acute *cribra orbitalia*, two instances of porotic hyperostosis and two of thickened parietal, interpreted as symptoms of the hemolytic anemia associated with malaria (Molleson 2000a; 2000b). In contrast, *cribra orbitalia* or porotic hyperostosis were observed in as many as 40% of people from Zawi Chemi (Ferembach 1970; cf. Rathbun 1984), although this figure was not confirmed by the later study where the expansion of diploe was reported for two neonatal individiuals (Agelarakis 1993). Small degree of *cribra orbitalia* was observed in two Neolithic children from

Dja'de (Anfruns 1993). Low frequency of *cribra orbitalia* occured in a child skeletal sample excavated in Chalcolithic layers at Tell Brak (Sołtysiak forthcoming [b]).

Observations of the anaemia symptoms in the Early Bronze Age are too few to be conclusive. There was one case of parietal thickening up to 12 mm in an older male from the Royal Cemetery at Ur (Keith 1934; Molleson, Hodgeson 2003), one case of *cribra femoris* in the small sample from Tell Brak (Molleson 2001), and one case of *cribra orbitalia* in a child from Tell Chuera (Wahl 1986). There was increase in the frequency of *cribra orbitalia* in Kish between the Early Dynastic II and III (Rathbun 1975), but both sample sizes were small. Surprisingly high frequency of the anaemia symptoms has been reported for Tell Beydar (Bertoldi, Bartoli 2006) and Tell Leilan (4/6 individuals; McKenzie 1999) in the north. In the Middle Bronze Age the anaemia seemed to be rare everywhere. There is no single case at Qatna (Canci 2003), only two cases of *cribra orbitalia* at Isin (Ziegelmayer 1987), relatively few cases in Terqa (Sołtysiak 2002a; 2007), also only one case in the Neo-Babylonian sample from Uruk (Wittwer-Backofen 1983).

At Tell Sheh Hamad (Roman/Parthian Period) *cribra orbitalia* were noted in 30/47 sub-adults and in 13 adults, porotic hyperostosis was observed only in 4 infants (6%). Such a difference in frequencies points to food deficiency rather than parasitic infections as the reason of these pathologies (Witzel et al. 2000). Much lower frequency of *cribra orbitalia* was noted in the Late Roman sample from Tell Masaikh (Sołtysiak 2005). In the Early Islamic sample from the same site there were 28% of individuals with small degree and 28% with medium degree of *cribra orbitalia*. Only one instance of porotic hyperostosis was observed (Sołtysiak 2003).

Although the data are again ambiguous and it is obvious that the porosities related to anaemia were scored in many different ways, it seems likely that the general level of iron deficiency pathologies was rather low in the whole history of Mesopotamia and even if higher frequency was noted in some samples, actually there were very few cases of advanced porosity.

Enamel hypoplasia

Enamel formation defects are more useful as stress markers than *cribra orbitalia* or porotic hyperostosis, because teeth in Mesopotamia preserve better than bones (especially the orbital roof is usually heavily damaged). In the case of linear hypoplasia the episodes of stress may be dated in individual's lifetime, and at last both hypoplasia and hypocalcification are not associated with a particular deficiency, but reflect general metabolical disorders during the enamel formation period (up to the 14th year of life) due to malnutrition, infection or other factors. For that reason enamel defects are often treated as proxy indicators of the general quality of life. Because of diagenetic processes, hypocalcification is rarely studied in archaeological tooth samples, but linear enamel hypoplasia is so easy to observe that many authors report this pathology. However, again the lack of scoring standards makes the comparisons between sites very difficult.

At Zawi Chemi the enamel hypoplasia was observed in 6/8 individuals (Agelarakis 1993), also at Tell Halula the frequency of this defect was higher than 50% (Anfruns et al. 1996). At Dja'de two upper first molars of one individuals showed enamel hypoplasia (Anfruns 1993). A completely different situation was reported for Nemrik, where Krystyna Szlachetko and Małgorzata Zadurska (2006) observed only 6 cases of hypoplasia. Also children buried in the Chalcolithic levels at Tell Brak had very few hypoplastic teeth (Sołtysiak forthcoming [b]).

Such an ambiguity lasted also in the Early Bronze Age. The frequency of enamel hypoplasia was low in the Royal Cemetery at Ur (Molleson, Hodgeson 2003) and at Tell Rad Shaqra (Sołtysiak 2006d), but high at Tell Beydar (Bertoldi, Bartoli 2006) and at Tell Leilan where as many as 121/153 teeth (79%) display hypoplasia and 105/153 (68%) show hypocalcification. These figures are much higher than in any other Bronze Age sample. In the Middle Bronze Age elite individuals from Qatna no case of macroscopic enamel hypoplasia was found (Canci 2003) but microscopic examination revealed a number of developmental disturbances in dental tissues (Witzel 2006). By analogy to the degenerative joint disease, the frequency of hypoplasia and hypocalcification was much higher in the Iron Age II sample from Qatna (Canci 2003).

The Middle Bronze Age populations from Tell Ashara (Jaskulska, Sołtysiak 2002; Sołtysiak 2002a; 2007) and Tell Arbid (Sołtysiak 2006b) were moderately affected by enamel hypoplasia and the frequency of this defect did not exceed 25%. Conversely, in the Neo-Assyrian Period the hypoplasia was frequent and even in the royal cemetery at Nimrud 5/8 individuals were affected by this defect (Schultz, Kunter 1998). Also the only skeleton from Tell Fekheriye had teeth with advanced linear hypoplasia (Sołtysiak 2006c). A quite interesting pattern has been found at Tell Barri where samples from the Early Bronze Age, the transitional period between the EBA and MBA, the Middle Bronze Age, the Neo-Assyrian and Achaemenian Periods could have been compared. In the Neo-Assyrian Period (9th c. BC) the frequency of enamel hypoplasia was much higher than in other temporal samples and simultaneously the frequency of dental caries was lower. Similar but weaker tendency was observed in the transitional period between the EBA and MBA. It may be concluded that the increased frequency of enamel hypoplasia in the Neo-Assyrian Period likely reflect the agricultural crisis which occurred in the whole Near East in the Early Iron Age (cf. Neumann, Parpola 1987). The lowest frequency of enamel hypoplasia (and the highest frequency of dental caries) at Tell Barri was observed in the Achaemenian Period (Sołtysiak forthcoming [a]).

At Tell Sheh Hamad enamel hypoplasia was not frequent (11.5% of teeth), but due to the large sample size it was possible to study sex and social status differences. The enamel defects were a bit more frequent in males (20/61) than in females (17/66) and more frequent in children (14/28) than in adults. One case of enamel defect was observed even in a deciduous tooth. The frequency of hypoplasia was lower in skeletons buried in constructed graves than in individuals deposed in simple pits (23.1% vs 32%) and a small increase in the frequency may have happened in the last phase of the cemetery (100–250 AD), although this sample size is very small (Witzel et al. 2000). This observation has been however confirmed by the sample of 132 adult skeletons excavated in the middle Euphrates valley and divided into five chronological samples: MBA, Neo-Assyrian, Late Roman, Early Islamic and Modern. Again, there was no difference between males and females and the frequency of enamel hypoplasia was quite stable in pre-Modern samples (a bit more than 15% of teeth) and only in the Late Roman Period it increased up to more than 25%. In the Modern sample the enamel hypoplasia was very rare, about 5% of teeth (Tomczyk et al. 2007).

This rise in frequency of the defect in the Late Roman Period in the middle Euphrates and the lower Khabur regions may have been caused by general instability in this frontier area between the Roman Empire and the Parthians/Sasanians. It seems likely that in the Early Islamic Period the frequency of enamel hypoplasia at Tell Masaikh was a bit higher than in the Bronze Age (Sołtysiak 2002b; 2003; Tomczyk, Sołtysiak forthcoming [b]), although there is a possibility that some Late Roman skeletons were included in the Early Islamic sample (for the dating difficulty cf. Frank 2006) and in some parts of the Islamic cemetery the hypoplasia is rare (Tomczyk, Sołtysiak 2007b).

Dental caries

Obviously the dental caries is the pathology most frequently reported in Mesopotamia, chiefly due to the fact that cariotic lesions are very easy to observe. There are also some differences in scoring methods used by various authors, but – otherwise as in the case of enamel hypoplasia or degenerative joint disease – at least the inter-observer differences are much smaller. The frequency of dental caries points to the abundance of sugars in the diet (especially sucrose, but also glucose, fructose and to some extent starch), so it may be used as an indicator of the nutritional behaviour.

The frequency of dental caries in early Neolithic populations was very small: no case in Sheikh Hassan (Clere et al. 1985), Tell Ramad (Ferembach 1969), Mureybet (Ozbek 1976), 2/96 lesions in permanent and 1/30 in deciduous teeth in Jarmo (Dahlberg 1960), one individual with caries in Tell Halula (Anfruns et al. 1996), also one case in Nemrik 9 (Szlachetko, Zadurska 2006; Molleson 2006). Only in Zawi Chemi there were 3/7 individuals with lesions (Ferembach 1970), also advanced ones (Agelarakis 1993). A more detailed picture comes from Abu Hureyra where Theya Molleson observed that small but clear increase in the frequency of dental caries coincided with the oldest pottery and it is likely that new food preparation techniques and especially cooking of the cereals made the diet more cariogenic and less abrasive, which is reflected also by slower rate of dental wear (Molleson 2000a). In spite of this invention, the frequency of dental caries remained low in the Chalcolithic, three lesions per 16 individuals in ʿUbaid (Keith 1927) and no lesions in the sample of child remains at Tell Brak (Sołtysiak forthcoming [b]).

Scarcity of cariotic lesions remained through the Bronze Age both in northern and southern Mesopotamia, although there were teeth from very few sites studied so far: in the Early Bronze Age Ur (Keith 1934; Molleson, Hodgeson 2003) and Kish (Rathbun 1975; Carbonell 1965) in the south, Tell Ahmed al-Hattu in the Hamrin basin (less than 5.5% of teeth; Wittwer-Backofen 1983), Tell Beydar (Charlier 2000), Tell Chuera (Wahl 1986) and Tell Rad Shaqra (Sołtysiak 2006d) in the north, in the Middle Bronze Age Sippar (Burger-Heinrich 1989b) and Isin (Ziegelmayer 1987) in the south, Terqa (Jaskulska, Sołtysiak 2002; Sołtysiak 2002a; 2007) and Tell Arbid (Sołtysiak 2006b) in the north, and in the Late Bronze Age only one skeleton from the royal grave at Tchoga Zanbil (Ferembach 1968). The only observation not consistent with this pattern is relatively high frequency of caries in older children at Tell Arbid, which perhaps reflects local dietary habits (Sołtysiak 2006b). The lack of differences between southern and northern Mesopotamia is unexpected, because there was intensive date palm cultivation in the alluvial plain and the dates, which are highly cariogenic, were frequently mentioned in cuneiform texts. It seems likely then that the consumption of dates was not so common as we could expect.

The picture changed in the later periods. High frequency of dental caries was observed in the small Iron Age II cemetery at Qatna (Canci 2003) and in the Neo-Babylonian cemetery at Uruk (22.5% in 116 teeth; Wittwer-Backofen 1983) as well as in the small contemporary sample from Kish, especially in women (Rathbun 1975). On the other hand, there were still only two individuals with lesions at contemporary Nippur (Swindler 1956; Rathbun, Mallin 1978), no case at Assur (Sołtysiak 2002c) and in one individual found at Tell Fekheriye (Sołtysiak 2006c), and only one individual per four in the royal cemetery at Nimrud (Schultz, Kunter 1998). Increased frequency of cariotic lesions at Uruk may be confronted with historical documents which mentioned that Chaldeans inhabiting this city had been interested in date palm cultivation (Brinkman 1968: 261).

Such an increased variability in the frequency of dental caries may be noted also in later periods. In Yorgan Tepe (3rd c. AD) there were as many as 10/11 individuals with cariotic lesions, 1/2 skeletons at Tell Rijim (Sołtysiak 2006e), but only 1/7 at Tell Sabra (Burger-Heinrich 1989c) and less than 5% of teeth at Tell Sheh Hamad (Witzel et al. 2000). In the Roman/Parthian cemetery at this site the frequency of caries was higher in upper class individuals (29.5% vs 23.1% of individuals) and the intensity of the disease seems to be highest between 100 BC and 50 AD and much lower after 100 AD (decrease from almost 28% to 7% of individuals). Obviously the frequency of caries was consistently much higher in the Islamic Period, and this has been observed at Isin (Ziegelmayer 1992), Tell Arbid (Sołtysiak 2006a) and at Tell Masaikh (Sołtysiak 2002b; 2003; Tomczyk, Sołtysiak forthcoming [b]).

Most complete data on dental caries come from the Khabur basin where the sample of 1573 permanent teeth from three sites (Tell Arbid, Tell Barri and Tell Brak) and seven periods (Chalcolithic, EBA, MBA, LBA, Neo-Assyrian, Achaemenian, Islamic) was collected to check the hypothesis that the increase in the frequency of dental caries in this region reflects greater mobility of peoples and resources (Sołtysiak 2006a). The results were consistent with such a model, because in the early periods the frequency of dental caries was constantly low (less than 5% of teeth) and only in the age of super-regional empires increased to more than 10% and even to more than 25% as in the sub-sample from Tell Barri dated to the Achaemenian Period. The only anomaly is the small cemetery of three individuals from the Early Bronze Age (ca. 2700–2600 BC) cemetery at Tell Barri where as many as 11/19 cariotic molars were scored.

Injuries and medical treatment

Most common categories of trauma detected on bones are fractures (usually healed ones, because it is very difficult or even impossible to distinguish between *peri-mortem* and *post-mortem* fracture), infections due to breakage of soft tissues (already discussed above) and enthesopathies related to musculoskeletal stress. Bone fractures were relatively infrequent in ancient Mesopotamia. The oldest known cases are two sacral fractures and many cases of compressive fractures of vertebral bodies at Zawi Chemi (Agelarakis 1993), metacarpal bone fracture at Nemrik 9 (Molleson 2006), greenstick fracture of the ulna with associated hematoma causing periosteal new bone growth on the left elbow of a juvenile from Abu Hureyra (Molleson 2000b).

One healed fracture of the humerus was observed in the Royal Cemetery at Ur (Molleson, Hodgeson 2003), and a fracture of right calcaneus with a cyst close to superior articular surfaces occured in a 4 years old child at Tell Barri (Sołtysiak forthcoming [a]). Quite high frequency of traumatic conditions occured in the Early Bronze Age sample from Tell Leilan: there was one fracture of left ulna, 2 rib fractures and 2 toe fractures with dislocations (McKenzie 1999). At Sippar (21st c. BC) one male broke his left tibia and right ulna and one old female broke left clavicle (Burger-Heinrich 1989b). Multiple fractures were noted in a male individual, 40–45 years old, found in the MBA cemetery at Terqa: he had at least ten ribs and left clavicle broken and completely healed, sometimes with evident horizontal or vertical dislocation. A healed fracture was likely present also in left tibia, although this bone was fragmented *post-mortem* and only a part of fracture area was present. This pattern was accompanied by large expansion of left *malleolus lateralis* in fibula (Sołtysiak 2002a). Such case of multiple fractures must have been a result of a really forceful traumatic event and the fact that the individual was completely recovered from severe trauma in the thorax suggests effective social care. Apart from this peculiar case, there was also one instance of broken clavicle in a roughly contemporary old woman (Tomczyk, Sołtysiak 2007a).

There are equally few examples of fractures in the Iron Age: several mild compression fractures of the vertebral bodies at Qatna (Canci 2003), one fracture in the Neo-Babylonian sample from Kish (Rathbun 1975), perhaps a broken wrist bone at Uruk (Wittwer-Backofen 1983) and spiral fracture in a finger segment at Kahat (Sołtysiak forthcoming [a]). As many as 13 broken or possibly broken bones were found in the Roman/Parthian cemetery at Tell Sheh Hamad (Witzel et al. 2000). At the Islamic sites single fractures were found at Isin (compression fracture in C5; Ziegelmayer 1992), Terqa (humerus; Sołtysiak 2007), Tell Sabra (humerus; Burger-Heinrich 1989c) and Tell Masaikh (one rib; Sołtysiak 2002b). In the whole sample of evident fractures in postcranial skeleton observed in ancient Mesopotamia more traumas occurred in upper limb (17 cases, 6 in clavicle, 5 in hand bones) than in lower limb (6 cases, 3 in foot bones) which suggests that downfalls with unsuccessful attempt to hold were the major cause of bone fractures.

Other kinds of trauma were noted in Mesopotamian skeletal samples only incidentally. There is one case of subperiosteal hematoma in a juvenile at Abu Hureyra (Molleson 2000a), implantation cyst due to injury in calcaneus from Nemrik 9 (Molleson 2006), two cases of *myositis ossificans* at Kish, one close to the *linea aspera* in an adult male from Early Dynastic Period, and the second in the small Neo-Babylonian sample (Rathbun 1975). Very high frequency of entesopathies (5/6) was observed in patellae from Tell Leilan, but all bony outgrowths in the superoanterior surface were scored. In the same site bony spurs in posterior calcaneus were noted in 2/11 individuals and also three entesophytes on the radial tuberosity (McKenzie 1999). However, pathological character of all these bony outgrowths seems to be unlikely.

In several sites some skulls show depressed fractures, which may be interpreted as signs of interpersonal violence. The oldest example is the Neolithic site of Zawi Chemi, where as many as four such well healed fractures were observed (Agelarakis 1993). These fractures were interpreted by Denise Ferembach as trephinations, but this diagnosis is less likely (cf. Ferembach 1970). Three similar healed fractures in parietal and temporal bones were found in the large secondary deposit of bones at Tell Majnuna, dated to ca. 3800 BC and interpreted as the result of a massacre of local populations inhabiting nearby Tell Brak (Karsgaard, Sołtysiak 2007). Two cases of alleged trephination were noted in the cluster of skeletons found at Tuttul (Middle Bronze Age) and interpreted as bodies of city defenders (Wolska 1994). One of them is more likely a well healed compression fractures, the second seems to be *peri-mortem* trauma, perhaps with attempt of medical treatment. Three skeletons found at Assur and dated to the end of the Neo-Assyrian Period show examples of possible *peri--mortem* trauma. One of these skulls belonged to a young male, and a strong depression fracture without any traces of healing was located on left frontal bone. Also the left frontal bone was broken in an adult woman, and a possible cutmark has been observed in tibia of an adult male whose bones were scattered and mixed with partially articulated skeletons of two other individuals. Unfortunately, all these skeletons were found close to the surface and eroded (Sołtysiak 2002c). One case of healed compression fracture in left parietal was observed in a young male at Tell Sheh Hamad (Witzel et al. 2000). There is also one trephination reported in the Islamic sample from Tell ed--Der, although it may have been also *post-mortem* mutilation (Ziegelmayer 1981). The overall frequency of skull fractures in Mesopotamia is low and limited to few sites and periods. Ted Rathbun observed that cranial injuries were more common in Iran where males were often affected, while in Mesopotamia no sex differences occurred (Rathbun 1984).

There is no sure example of trephination in Mesopotamia and the only clear case of medical treatment is an old male from Tell Barri (Modern cemetery on the top) whose left leg was amputated in upper 1/3 of femur. There are some signs of bone reaction, but the individual died soon after this operation. In some Chalcolithic populations artificial cranial deformations were quite popular, as in Tell Arpachiya (6/13 skulls; Molleson, Campbell 1995), Eridu (Meiklejohn et al. 1992) and Chogha Mish (one case; Ortner 1996); this kind of modification was widespread in the Neolithic and Chalcolithic chiefly in Levant and in Cyprus (Meiklejohn et al. 1992).

Rare diseases

Few authors mentioned some rare diseases, but in many cases the diagnosis was proposed as a possibility and not based on well grounded evidence. Most common and safely diagnosed rare diseases are congenital and developmental abnormalities and benign-like tumours.

Abnormalities in teeth were noted in three cases: first lower premolars were not developed in one 13–14 years old child at the Chalcolithic site Tell Karrana (Caselitz 1993), there was delay in eruption of premolars in a 10–12 years old child from MBA Sippar (Burger-Heinrich 1989a), and in a roughly contemporary child from Tell Barri the upper central incisors were doubled. Both couples already partially erupted and blocked lateral incisors and canines, which had thus deformed and underdeveloped roots (Sołtysiak forthcoming [a]). At Abu Hureyra congenital fusion of two cervical vertebrae occurred for two times (Molleson 2000a).

Benign-like tumours were noted only in relatively late populations. There is one case in Tell Sheh Hamad (Witzel et al. 2000), three individuals per 27 with button osteomata on skull in Yorgan Tepe (Ehrich 1939), and one Neo-Assyrian 40–45 years old male from Tell Barri with multiple button osteomata, at least 10 in frontal bone, three small in right parietal and five in left parietal (Sołtysiak forthcoming [a]).

In two individuals peculiar kinds of degenerative joint disease were diagnosed: Scheuermann's disease at Abu Hureyra (Molleson 2000a) and perhaps diffuse idiopathic skeletal hyperostosis (DISH or Forestier disease) in a Middle Bronze Age probably male adult from Tell Barri. However, the last case is not sure, because vertebral bodies were not preserved, only a calcified irregular structure which resembled flowing spurs and included small fragments of three following vertebrae (Sołtysiak forthcoming [a]). Two another pathologies observed in the postcranial skeleton were expanded cortex of left fibula and reduced medullary cavity in an adult male from Nippur (Rathbun, Mallin 1978) and strong demineralisation associated with deformation by large bony spurs in one leg of a female buried in the Islamic cemetery at Tell Masaikh (Tomczyk, Sołtysiak forthcoming [a]). Because of local character of the pathology, it was preliminarily diagnosed rather as *dysplasia epiphysealis hemimelica* than thalassemia, although it needs further histological confirmation. Dianna Bolt diagnosed osteoporosis in two Chalcolithic individuals from Kharabeh Shattani (1995), although bone demineralisation may have been more likely caused by postdepositional processes.

One Islamic skeleton (young male) excavated at Tell Songor A revealed large and multifocal osteolytic defects in the entire skeleton: skull mandible, scapulae, humeri, ribs, sternum, vertebrae, hip bones and femora. Most likely diagnosis was eosinophilic granuloma, alternatively it may have been a metastatic carcinoma (Wada et al. 1987a).

There are two reported cases of *hyperostosis frontalis inferna* or Morgagni syndrome, one at Nimrud (Schultz, Kunter 1998) and one at Tell Sheh Hamad (Witzel et al. 2000). At Zawi Chemi some irregular holes were detected in one of skulls and Denise Ferembach suggested a possibility of Hand-Schüller-Christian disease (1970). This was however not confirmed by the independent examination (Agelarakis 1993), similarly as osteolysis in cranium and atlas interpreted as a symptom of tuberculosis, syphilis or metastatic cancer (Ferembach 1970). However, at Zawi Chemi there were as many as four cases of hyperplastic conditions in the external ear canals and two cases of ear exostoses, which was interpreted as familial trait by Denise Ferembach (1970) or consequence of exposure of ear canals to cold stress conditions by Anagnostis Agelarakis (1993). One instance of *hypertrophia conchae nasales* was observed at Islamic Tell Sabra (Burger-Heinrich 1989c). Also two individuals with parietal thinning were noted, one again at Tell Sabra (male, Islamic Period; Burger-Heinrich 1989c), the second in Tell Masaikh (female, Islamic Period; Sołtysiak 2003). The background of this pathology is not clear, but it may be a symptom of osteoporosis.

Conclusion

This review of available data, in spite of their scarcity, allows to conclude that the populations of ancient Mesopotamia were relatively healthy. However, some weaker or stronger temporal trends may be detected (see **Table 2**). The frequency of almost all kinds of diseases is lowest in the Early and Middle Bronze Ages, and it coincides with the documents which suggest that it was time of prosperity of farming populations both in southern and in northern Mesopotamia. Unfortunately, almost no data are available for the Late Bronze Age due to relatively smaller number of excavated cemeteries dated to this period. Some evidence from Tell Barri and Tell Leilan suggests that the transitional period between EBA and MBA was less favourable.

The early periods of human settlement in Mesopotamia differ from the Bronze Age chiefly by higher frequency of joint disease which points to more heavy loads, of dental diseases which were related chiefly to worse food quality, and of injuries, including signs of interpersonal violence at Zawi Chemi and at Tell Majnuna. The beginning of the Iron Age and the Neo-Assyrian Period were obviously the most difficult time in the history of Mesopotamian populations and the symptoms of agricultural crisis are evident with higher rate of enamel hypoplasia and dental diseases, as well as decline (with some exceptions) in the frequency of dental caries. The development of dental caries during and after the Achaemenian Period is evident and it may be related to many factors, such as spread of date palm cultivation, increase of mobility and change in dietary habits. The quality of life declined once again in northern Mesopotamia in the Late Roman Period, due to prolonged conflicts in this border area. The Islamic populations were again as healthy as Bronze Age people, and the only exception is prevalence of the dental caries and perhaps more rare diseases.

Table 2. Summary of results. Stars indicate that particular condition was common (✱) or very common (✱✱) in particular period.
Tabela 2. Podsumowanie wyników. Gwiazdki oznaczają wysoką (✱) lub bardzo wysoką (✱✱) częstość danego rodzaju zmian patologicznych w danym okresie.

Chronology	**Joint disease**	**Infections**	**Dental diseases**	**Deficiency diseases**	**Enamel hypoplasia**	**Dental caries**	**Injuries**
Neolithic	✱✱	—	✱✱	✱	✱	—	✱
Chalcolithic			✱✱		✱	—	✱
Early Bronze Age	✱	—	✱	✱	✱	—	—
Middle Bronze Age	—			—	—	—	—
Late Bronze Age							
Iron Age	✱		✱✱		✱✱	✱	✱
Hellenistic/Roman	✱	✱	✱	✱	✱	✱	✱
Islamic	✱	—		✱	✱	✱✱	—

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Arkadiusz Sołtysiak

Krótki przegląd badań paleopatologicznych na terenie Mezopotamii

Artykuł zawiera przegląd dostępnych informacji na temat chorób w starożytnej Mezopotamii, uzyskanych dzięki badaniom szczątków ludzkich pochodzących z 44 stanowisk archeologicznych (**Tab. 1**). Mniej lub bardziej szczegółowe raporty na temat chorób w dawnych populacjach są dostępne tylko dla bardzo niewielu stanowisk: Zawi Czemi-Szanidar, Abu Hureyra, Tell Miszrife/Qatna, Tell Aszara/Terka i Tell Masaich, Nimrud/Kalchu oraz Tell Szeh Hamad/Dur Katlimmu. Poza tym Theya Molleson opublikowała wiele artykułów na temat wzorców aktywności fizycznej (np. 2001; 2006), są również dostępne dwie diagnozy rzadkich chorób z regionu Hamrin (Wada et al. 1987a; 1987b), jeden artykuł na temat epidemiologii próchnicy zębów (Sołtysiak 2006a) oraz bardzo ogólne podsumowanie badań paleopatologicznych w Mezopotamii i Iranie autorstwa Teda Rathbuna (1984). Oprócz tych niewielu publikacji poświęconych wyłącznie lub głównie paleopatologii, sporo danych jest rozproszonych w rozmaitych ogólnych sprawozdaniach z badań kości ludzkich, najczęściej publikowanych jako dodatki do raportów wykopaliskowych.

Prawdopodobnie najpoważniejszą przeszkodą w badaniach historii chorób w populacjach starożytnej Mezopotamii jest to, że na większości stanowisk analizy osteologiczne muszą być wykonane na miejscu podczas wykopalisk, kiedy czas jest ograniczony, a dostępny sprzęt umożliwia tylko podstawową diagnostykę. Nieliczne kolekcje kości ludzkich zostały wywiezione poza Irak lub Syrię i mogą zostać przebadane w bardziej wyrafinowany sposób. Najliczniejsza z nich liczy szczątki ponad 600 osobników z Tell Inghara/Kisz, z wykopalisk przeprowadzonych w latach 1922–1933 przez Ernesta Mackaya i Henry'ego Fielda. Większość z nich (551) trafiła do Field Museum of Natural History w Chicago i została tam przebadana przez Teda Rathbuna (1975), a następnie Christinę Torres-Rouff i Williama Pestle (2007). Niestety, w większości wypadków szkielety nie są wydatowane. Mniejsza kolekcja szczątków 57 osobników datowanych głównie na epokę brązu trafiła na uniwersytet w Oxfordzie, a następnie do Natural History Museum w Londynie. Oprócz kości z Kisz, to ostatnie muzeum posiada w swojej kolekcji również czaszki lub całe szkielety 17 osobników z Ubaid (późny chalkolit), 24 z Ur (wczesna i środkowa epoka brązu, poza tym 11 szkieletów w British Museum), 12 z Tell Arpaczija (kultura Halaf), 102 z Abu Hureyra (neolit preceramiczny) i cztery z Tell Brak (wczesna epoka brązu).

Kolejna znaczna kolekcja osteologiczna została zgromadzona przez ekspedycję japońską w ramach projektu ratowniczych badań archeologicznych w basenie Hamrin w środkowym Iraku (1977–1980). Szkielety 584 osobników pochodzą z 13 stanowisk na terenie zalewu Hamrin, trzech stanowisk z okolic Haditha, Aszur oraz Babilonu; większość jest datowana na okres islamski. Ten zbiór został przewieziony na uniwersytet w Osace. Kości około 100 osobników z Nemrik (wczesny neolit, Irak) znajdują się w Państwowym Muzeum Archeologicznym w Warszawie, 84 osobników z Nippur (okres nowobabiloński i islamski, Irak) – w muzeum University of Pennsylvania, 21 osobników z Tell Leilan (wczesna epoka brązu, Syria) – w University of Alberta w Edmonton w Kanadzie, 8 osobników z Aszur (okres średnio- i nowoasyryjski) – w Vorderasiatisches Museum w Berlinie. Wciąż rosnąca kolekcja zębów i próbek kości znajduje się w Instytucie Archeologii Uniwersytetu Warszawskiego; są tam szczątki ponad tysiąca osobników z 10 stanowisk w dorzeczu Chaburu (Tell Arbid, Tell Brak, Tell Barri, Tell Rad Szakra), w środkowej dolinie Eufratu (Tell Aszara, Tell Masaich, Tell Marwanije, Dżebel Masztale) oraz w środkowej dolinie Tygrysu (Aszur, Tell Ridżim).

W roku 2003 badania archeologiczne w Iraku zostały przerwane, a archeolodzy przenieśli się do syryjskiej części północnej Mezopotamii, w związku z czym zwiększyła się liczba raportów z badań szczątków ludzkich, zwłaszcza z dorzecza Chaburu oraz środkowej doliny Eufratu. Przez wiele lat regiony te były słabo przebadane przez archeologów, którzy woleli prowadzić wykopaliska na terenie dużych miast sumeryjskich, babilońskich i asyryjskich. Ze względu na sytuację polityczną w Iraku paradoksalnie lepiej został zrekonstruowany stan zdrowia w rolniczych i pasterskich populacjach zamieszkujących marginalne obszary północnej Mezopotamii niż w miastach Sumeru, Akadu, Babilonii i Asyrii.

Ze względu na różnorodność stosowanych standardów diagnostyki i opisu zmian patologicznych możliwe jest tylko bardzo ogólne podsumowanie dotychczasowego stanu badań. Częstość niemal wszystkich rodzajów zmian patologicznych (choroba zwyrodnieniowa stawów, stany zapalne, choroby zębów i przyzębia, w tym próchnica, specyficzne i niespecyficzne wskaźniki stresu, w tym hipoplazja szkliwa, urazy) jest najniższa we wczesnej i środkowej epoce brązu. We wcześniejszych okresach wyższa była frekwencja choroby zwyrodnieniowej stawów, chorób przyzębia oraz urazów. Symptomy kryzysu w rolnictwie stały się widoczne na początku epoki żelaza (przede wszystkim wyższa częstość liniowej hipoplazji szkliwa oraz chorób jamy ustnej). Jakość życia znów spadła w północnej Mezopotamii w późnym okresie rzymskim. Po podboju muzułmańskim miejscowe populacje wykazywały zbliżoną częstość zmian patologicznych do populacji z epoki brązu i jedyną różnicą była znacznie wyższa częstość próchnicy zębów.