Show Me Your Teeth:

Dental Anthropology as Evidence for Biological Affinities and Cultural Practices in Urkesh (Syria) during the Middle Bronze Age

Arwa Kharobi[1,2], Martine Vercauteren[1] & Caroline Polet[1]

[1] Unité d'Anthropologie Biologique: Université Libre de Bruxelles (ULB) & Royal Belgian Institute of Natural Sciences, Belgium
[2] UMR 5199 PACEA, Université de Bordeaux, France

ISDM-IAPO-2017: 17th International Symposium on Dental Morphology & 2nd congress of International Association for Paleodontology

Background

- ✓ Lack of dental anthropology (pathology, non-metric & metric variations) syntheses in Northern Mesopotamia
- ✓ Atypical funerary practices in Mozan → Distinction related to biological identity, kinship and/or social status

Aims

- ✓ Contribute to the dental history of Mesopotamia
- ✓ Reconstruct diet of Urkesh's individuals
- ✓ Define biological distance between Mozan and other Mesopotamian populations

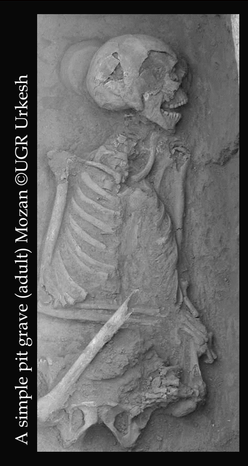
Tell Mozan (Urkesh)

In the Khabur plains of Northeast (NE) Mesopotamia (NE, Syria)
Known as Urkesh; large center for the ancient Middle Eastern Hurrian civilization (3rd millennium BCE)
Middle Bronze Age (MBA) funerary space (2000-1600 BCE)

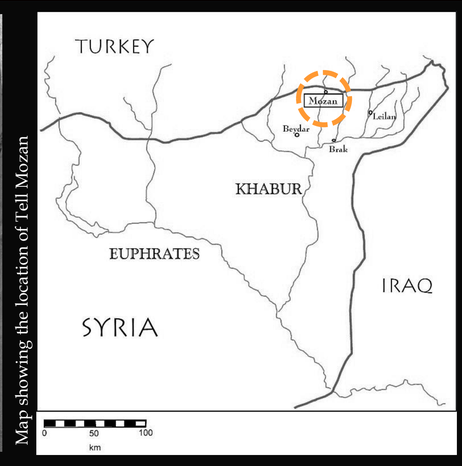
- ✓ Dug down to the foundations of the royal palace walls 1860 m² (Buccellati and Kelly-Buccellati 2001)
- ✓ 120 grouped tombs of 82 non-adults & 69 adults sexes pooled (Kharobi 2015)

Study's sample

- ✓ 75 human teeth from 10 specific areas: 26 skeletons (ages and sexes pooled)
- ✓ This chronicles only a small amount of the dental material at Tell Mozan



A simple pit grave (adult) Mozan ©UGR Urkesh



Map showing the location of Tell Mozan

A jar burial (child) Mozan ©UGR Urkesh

Metric dental traits

61 permanent & 13 decidual teeth (all types)

Methods

1. Left-sided teeth were measured. In cases of missing or poorly preservation, the right-sided were used instead
2. Three variables were calculated:

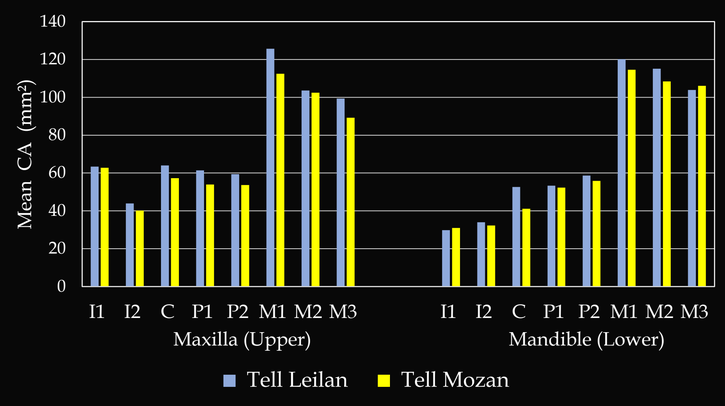
- ✓ FL: Maximum faciolingual diameter (mm). Mayhall (2000)
- ✓ MD: Maximum mesiodistal diameter (mm). Mayhall (2000)
- ✓ CA: Crown area (mm²) = (FL) x (MD). Wolpoff (1971)

3. For interpopulational comparison, 2 units were used:

- ✓ TCA: Total crown area (mm²) = sum of mean cross-sectional (CA) for all teeth on one side. Lukacs (1985)
- ✓ MCA: Molar crown area (mm²) = sum of the mean cross-sectional (CA) for all molars on one side. Lukacs (1985)

Preliminary results

1. Except for the 3rd lower molar, CA of all permanent teeth from Mozan are inferior to ones from Leilan (Late Bronze Age (LBA), NE Syria, Haddow & Lovell 2003)



2. Comparing Mozan deciduous TCA to Smith's (1978); Haddow & Lovell's (2003) Near Eastern populations data, a clear reduction trend can be observed over time

	Natufian (Palestine)	Jarmo (Iraq)	Abou Gosh (Palestine)	Leilan (Syria)	Alaca Höyük (Turkey)	Mozan	Hasunlu (Iran)
TCA	1271	1246	1240	1189	1161	1113	-
MCA	722	679	685	668	643	633	605
	Mesolithic	Neolithic		LBA		MBA	Iron Age

3. Mozan falls in the gradual reduction of permanent tooth size over time, observed in Near Eastern populations
4. Closer to Alace Höyük (Turkey) than Leilan (Syria)

Discussion

MZ similarity with Alace Höyük & archaeological records: c. 1600 BC Hurrian migrations into Syria & Anatolian increase → Probable biological affinities with ancient Anatolian people

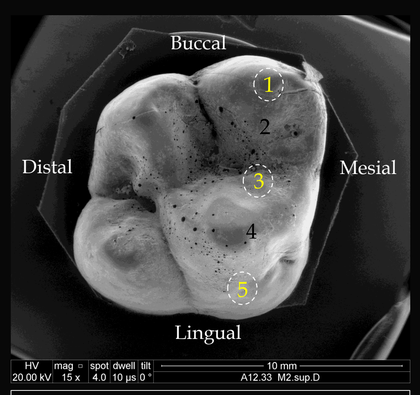
Dental microwear

29 permanent teeth (1st & 2nd molars)

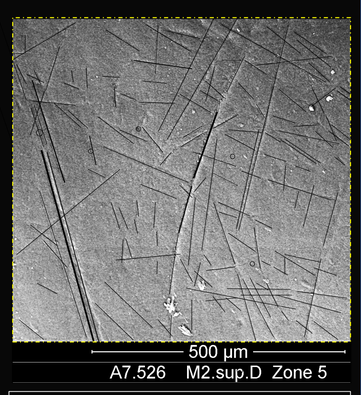
Methods

1. Impressions of occlusal surface using a rubber-based addition-curing (Coltène, President, light body®), then covered with a gold layer (15nm) using Sputter Coater SCD 050 Blazers
2. A Quenta 200 scanning electron microscope (SEM) is used following the protocol of Molleson & Jones (1991):

- ✓ Teeth's orientation: buccal side at the top of the screen
- ✓ The bucco-lingual cross-section is divided into 5 regions. Thus, only 3 regions (1, 3 & 5) were studied
- ✓ For each region, a suitable SE micrograph at 180x is chosen with an area of 0.33x0.33mm to denote, count & measure features



SE micrograph of a permanent M² showing regions used for analysis of microwear patterns. In yellow are the regions used in this study



Features in 0.33x0.33 mm area marked of 180x SEM photomicrograph of grinding region (5) of a permanent M²

Preliminary results

1. Two main types of features (based on the length: width):

- ✓ Linear features > 4: 1 with 3 possibilities: striation (width < 0.5mm), scratches (width btw 0.5-2.5mm) & gouges (width > 2.5mm). Pits < 4: 1

2. More linear features than pits. The highest features density in region (1) & the highest pit density in region (5)

Comparison of SEM analysis: Mozan (MZ) vs Abu Hureyra (AH) Molleson & Jones 1991	Region 1		Region 3		Region 5	
	MZ	AH	MZ	AH	MZ	AH
Mean pit diameter	1.80	2.90	2.40	3.06	1.95	2.95
Features density	198	247	121	259	134	283
Pit density %	38.0	52.1	29.6	48.0	38.5	54.2
Linear feature: pit ratio	2.2	0.93	2.2	1.14	0.7	54.2

3. Comparison to AH (2B, Neolithic, NE Syria):

- ✓ Lower pit diameter, features density & pit density
- ✓ Higher Linear feature: pit ratio

Discussion

Small pit size → Ground grains
Low pit density → Soft food
Low feature density → Soft food
→ Agriculture, Cultivated plants, Cooked cereals & meat

Dental pathology

63 permanent & 13 decidual teeth (all types)

Methods

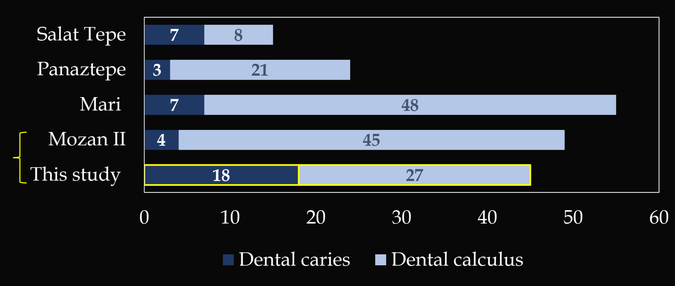
1. Hillson (2001) for dental caries
2. Brothwell (1981) for dental calculus

Preliminary results

1. Small sized lesions of caries on the occlusal surface (54.5%) or on the interproximal ones (45.5%)
2. Low formation's degree of calculus (stage 1) in 59% of cases & moderate (stage 2) in 35% of cases. Just one tooth with thick deposits (stage 3)

Dental pathology on Mozan's sample		
Frequency (%)	Caries	Calculus
Permanent teeth	17.7	26.9
Decidual teeth	0	0
Per individual	26.9	42.3
Per type of teeth		
I1	0	50
I2	0	66
C	0	0
P1	33	0
P2	0	33
M1	0	0
M2	17	26
M3	37	35

3. Teeth with caries (17.7%) & calculus (26.9%) are those of adults. No child is concerned
4. Except for canines & 1st molars, all teeth are affected arbitrarily



5. (↑) caries, (↓) calculus when compared to data the ones of other individuals buried out of the funerary space of Mozan (Wissing, in press)
6. Teeth from Syria (Mari, LBA, Nassar (2010)) & Anatolia (Salat Tepe; Başoğlu *et al.* (2013) & Panaztepe, MBA; Güleç & Duyar (1993)) show similar frequencies for calculus. But frequency of caries still relatively higher in Mozan

Discussion

Caries MZ → Diet with a relatively high sugar content
Calculus MZ → 1. Diet rich in fiber & abrasive material
2. Consumption of dried fish & crustaceans

Conclusions & Perspectives In the expectation of more exhaustive data, the hypothesis of the existence of a homogeneity of the oral state of the inhabitants of Mozan can be advanced. Metric dental traits favor the Anatolian trail. Analysis of dental microwear pattern confirmed an "agricultural & historical" type food. The dental pathology analysis suggest a diet rich in sugar. The consumption of dried fish is possible with the close distance with the upper Khabur. Other dental analysis are in progress (Hypoplasia, dental microwear on buccal surfaces). New dental samples from Bronze Age settlements in Syria are in hand in the objective of increasing the effective of our study.

Acknowledgments:
We thank Prof Giorgio Buccellati and Prof Marilyn Kelly-Buccellati for providing access to the collection of Mozan. This research is funded by Khaled Al'Asad Chair, Université Libre de Bruxelles (ULB). SEM images were obtained at Royal Belgian Institute of Natural Sciences in Brussels with the great help of Julien Cillis. Funding for the poster presentation: AVASA -- *Associazione per la Valorizzazione dell'Archeologia e della Storia Antica*.

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