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Skeletal Remains Of Ruminantia Uncovered In Excavations Performed In Ancient City Of Kibyra

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Abstract

Kibyra is an ancient city which is located in Golhisar township of Burdur province and hosted various communities. Starting in 2006, archaeological excavations for Kibyra have still been ongoing. The aim of the present study was to investigate skeletal remains of Ruminantia uncovered during archaeological excavations performed for Ancient City of Kibyra between 2006- and 2014. Bone remains uncovered in archaeological excavations of Bouleuterion / Odeion, Stadion, Agora, and Exterior Facade of Ancient City of Kibyra were examined in the present study. Remains in the form of the whole skeleton have not been found in the excavations performed in these regions. Remains of bones were observed to be scattered in various depths of the mentioned regions. Remains were evaluated in terms of animal species, modification and pathological. 1518 of the remains uncovered in Ancient City of Kibyra were identified to belong to ruminantia. In terms of this species, majority were observed to belong to bos (53.2%) and ovis (42.4%). In the study, it was determined that traces of cleaver were the most common (29.1%) trace of butchery seen on bones. Pathological traces such as metapodial asymmetry, metapodial and phalangeal exocytosis were observed. Consequently, the results obtained from the study are considered to contribute zooarchaeology literature of the region.

Keywords: Archeology, Morphometry, Ruminantia, Skeletal Remains.

INTRODUCTION

The Ancient City of Kibyra is located on three hills with 1100-1300 meters of altitude on the mountainside of Akdag to the west of Golhisar township on southwestern part of the province of Burdur in Turkey [1]. The city is located on the junction point of Lycia, Phrygia, Karia, and Pisidia regions [2]. The region was named as Kibyratis as a result of the city's becoming stronger under domination of the Roman Period [3]. Kibyra, name of which is written on Stadiasmus Patarensis (Patara Road) [4], was reconstructed by Tiberius after the earthquake occurring in 23 AD. The city was named as Caesarea Cibyra following the renovation. However, the city could not be repaired after the earthquake in 417 [5]. Kibyra which was exposed to assaults by Goth and Arabs was abandoned after 6th century [6].

From past to present, bovine and ovine-caprine animals have been the most important resources food of animal origin. Animals from the ruminantia family are primary for meeting socio-economic needs thanks to the yield of meat, milk, wool, skin, and fat (bone-organ). Skeletal remains of animals that are such involved in the daily life are among the materials frequently found in archaeological excavations. These remains allow for comments about nourishment, economic, and social life of their community [7]. Information obtained from archaeological bone material are also important for determination of fauna and comparisons with other historical processes [8, 9, 10, 11].

At this point, Stadion, Main Avenue – Agora 1. Terrace Street, Theatre and Bouleuterion / Odeion are the regions where archaeological excavations were carried out and bone remains were reached in Ancient City of Kibyra. The aim of the present study was to identify findings of skeletal remains of ruminantia uncovered during archaeological excavations in Ancient City of Kibyra between 2006 and 2014 within literature knowledge.

MATERIALS AND METHODS

Skeletal remains of various animals such as horse, cattle, sheep, goat, pork, cat, and dog were uncovered during archaeological excavations performed between 2006 and 2014 in Ancient City of Kibyra. Necessary permission was received from Department of Excavation for Ancient City of Kibyra to examine these bones. The present study was supported by Mehmet Akif Ersoy University Commission for Scientific Research Projects (Project No: 0304-NAP-16). Method of the study was based on Onar et al. [7]. Accordingly, skeletal remains uncovered from excavation site were recorded considering grid depth and date. Skeletal remains were stored in plastic cases in the excavation site. Skeletal remains kept inside plastic cases in the excavation storage were transferred to Osteology Laboratory at Department of Anatomy, Mehmet Akif Ersoy University, Faculty of Veterinary Science. The remains were washed elaborately and dried. Bones were classified considering species, skeletal part, pathological or modification traces.

Numeric data obtained from the study were presented in tables in the results section. In addition, pathological or modification marks were photographed using Canon 600D digital camera. While "Nomina Anatomica Veterinaria [12]" was based to write anatomic terms, commonly used literature was based for some osteoarchaeological terms

RESULT AND DISCUSSION

Remains of bone revealed in archaeological excavations for Bouleuterion / Odeion, Stadion, Agora, and External Facade of Ancient City of Kibyra between 2006 and 2014 were examined in the present study. No remains in the form of the complete skeleton were found in the excavations made for these regions. Remains of bones were observed to be scattered in various depths of the mentioned regions. 1518 of bones examined were identified to belong to ruminantia. In terms of the species, the majority were observed to belong to bos (53.2%) and ovis (42.4%). The minimum number of individuals was also calculated from bone remains (Table 1).

Table 1. Distribution of bones in animal species and minimum number of individuals. NISP: Number of Identified Specimens

Species	NISP	NISP%	Individual
Cattle	808	53.2	42
Sheep	643	42.4	41
Goat	49	3.2	4
Camel	18	1.2	2
Total	1518	100	89

The study revealed that majority of bone remains (except for tooth) were mandibula (10.5%) and metacarpus (10.4%) (Table 2).

Table 2. Distribution of bones in animal species (Listed in alphabetical order)

Bone	Cattle	Sheep	Goat	Camel	Total	Percentage
Antebrachium	12	9	1		22	1.45
Atlas	3	8	2		13	0.86
Axis	5	3	1		9	0.59
Vertebrae cervicalis	4	13			17	1.12
Calcaneus	21	31			52	3.43
Costa	72	10			82	5.40
Cranium		1	2		3	0.20
Coxae	8	21	4		33	2.17
Femur	21	7	2	3	33	2.17
Os frontale (Processus cornualis)	27	14			41	2.70
Humerus	22	40	2		64	4.22
Dentes	95	58		8	161	10.61
Vertebrae lumbalis	2	17			19	1.25
Mandibula	70	81	5	4	160	10.54
Metacarpus	73	79	6		158	10.41
Metacarpus-Metatarsus	26	13	12	1	52	3.43
Metatarsus	46	49	7		102	6.72
Maxilla	2	3	2	1	8	0.53
Os occipitale	3	2			5	0.33
Patella	1				1	0.07
Phalanx distalis	16				16	1.05
Phalanx media	41	3			44	2.90
Phalanx proximalis	85	28	2	1	116	7.64
Radius	30	22			52	3.43
Sacrum		1			1	0.07
Scapula	30	24			54	3.56
Os sphenoidale		1			1	0,07
Talus	33	24			57	3.75
Tibia	43	70			113	7.44
Vertebrae thoracalis	5	8			13	0.86
Ulna	11	3			14	0.92
Os zygomaticum	1		1		2	0.13
Total	808	643	49	18	1518	100

Some modification (Figure 1- 8) or pathological traces (Figure 4.C, Figure 7. A and B, Figure 8.), particularly cleaver traces, were observed on ruminantia bones uncovered between 2006 and 2014 during the excavations made in Ancient City of Kibyra in the study. Table 3 shows the distribution of these traces based on species. Accordingly, cleaver trace (29.1%) was determined to be the most frequent trace of butchery on bones.

Figure 1. Traces of modifications on cornual process, A. Cleaver trace, B. and C. Saw trace (Photo by Y. Demiraslan)

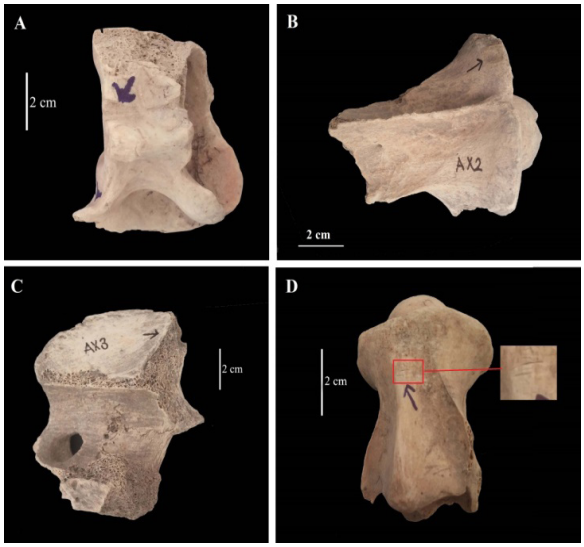

Figure 2. Traces of modifications on atlas and axis, A. B. and C. Cleaver trace, D. Knife trace (Photo by Y. Demiraslan)

Figure 3. Traces of modifications on radius, A. Saw trace, B. Cleaver trace (Photo by Y. Demiraslan)

Figure 4. Traces of modifications and pathological on metapodials, A. Saw and burn trace, B. Nibble trace, C. Shape loss stress-related (Photo by Y. Demiraslan)

Figure 5. Traces of modifications on metapodials, A. Knife trace, B. Saw trace, C. Cleaver trace, D. Saw trace and hole (Photo by Y. Demiraslan)

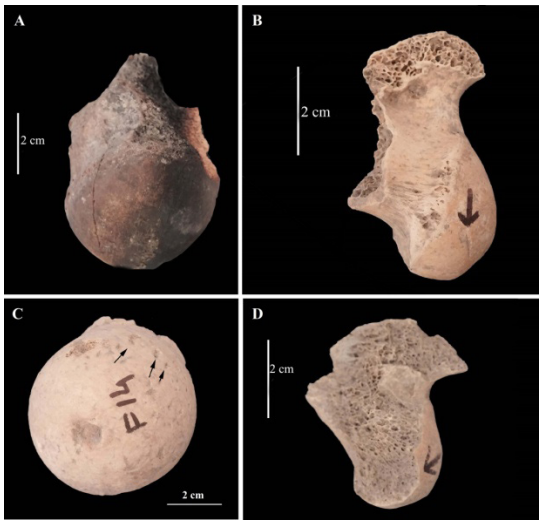

Figure 6. Traces of modifications on caput femoris, A. Burn trace, B. Knife trace, C. Nibble trace, D. Cleaver trace (Photo by Y. Demiraslan)

Figure 7. Traces of modifications and pathological on phalanx proximalis, A. and B. Form-exocytosis, C., E. and F. Cleaver trace, D. Burn and knife trace (Photo by Y. Demiraslan)

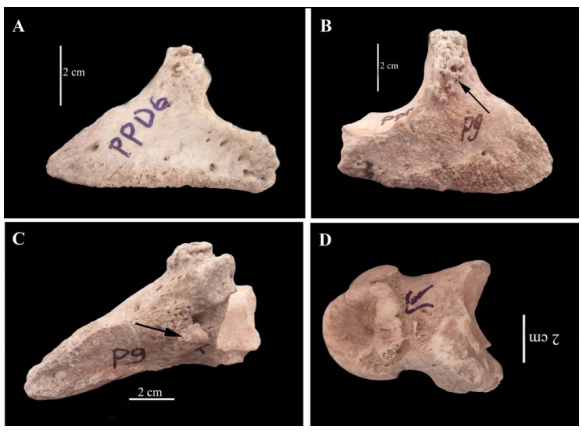

Figure 8. Form-exocytosis on phalanges, A. B. and C. Phalanx distalis, D. Phalanx media (Photo by Y. Demiraslan)

Table 3. The distribution of modification or pathological traces on bones based on species

	Cleaver	Knife	Saw	Nibble	Burn	Pathological	Total	Percentagee
Cattle	144	38	32	11	2	8	235	29.1
Sheep	36	43	7	28	8		122	19
Goat	1	1	1				3	6.1
Camel		1					1	5.6
Total	181	83	40	39	10	8	361	

In the study, traces of modifications were generally found on skeletal bones; on the other hand, pathological traces were observed on metapodial and phalanx bones. The pathological traces were metapodial and phalangeal asymmetry and exocytosis on the proximal or distal part of the bones.

The present study examined 1518 bone remains which were uncovered in archaeological excavations for Bouleuterion / Odeion, Stadion, Agora, and Exterior Facade of Ancient City of Kibyra between 2006 and 2014 and identified to belong to ruminantia. Majority of these bone remains were observed to belong to bos and ovis in terms of species and mandibula and metacarpus in terms of diversity. Indeed, if it was considered that above-mentioned excavation sites were in the position of the center of the city, it could be said that these bone remains were obtained from the places where the people could eat together (restaurant, feast, etc.). The present study is the first one in Mediterranean region for these aspects.

Studies on archaeological bone material, which was the closest to the ancient city of Kibyra in terms of region, were conducted by Prof. Dr. Vedat Onar (Istanbul University) and his team in Istanbul. Skeletons of animals uncovered as a result of archaeological excavations made in Ancient Harbor of Theodosius were subjected to discrimination of species by Onar et al. [13]. They stated in their study that 32.64% of total number of bones belonged to horses. In another study, Onar et al. [14] evaluated approximately 21000 remains of animal skeleton uncovered as a result of excavations of Yenikapı Metro and Marmaray starting in 2004. Skeletal remains obtained in this study were indicated to belong to about 54 species. Pazvant et al. [15] investigated Sheep and Goat metapodial bones uncovered in the same excavation site. In conclusion, sheep of Byzantine Age were determined to be similar Demircag sheep in terms of shoulder height and to resemble Tuj sheep from modern sheep.

Allentuck [16] obtained findings on bone remains of cattle uncovered in excavation site of South Levant (Eastern Mediterranean coasts) region. This study revealed that metacarpus was the most frequent bone in 12 determination localities. In the present study, it was determined that phalanx proximalis had the highest number among bone remains of cattle (Table 2).

Silibolatzlar [17] examined 1743 animal bone remains revealed in excavations for Ancient Datca and indicated that 40.16% (NISP: 700) of these remains belonged to cattle, 18.42%(NISP: 321) sheep-goat, 5.28% (NISP: 92) goat, and 4.8% (NISP: 78) sheep. Markovic et al. [18] examined

(Sirmium-Serbia) 13599 bone remains and stated that 4930 of these bones were from cattle and 3967 from sheep-goat. Pavao-Zuckerman and LaMotta [19] determined (Pimeria Alta-USA) that 344 of 9024 bone remains were from cattle and 23 were from sheep-goat. Hill et al. [20] stated that among the mammal bones uncovered in excavations of Marj Rabba (Israel), 53% (NISP: 2080) belonged to sheep-goat and 13.6% (NISP: 532) belonged to cattle. Vega-Maeso et al. [21] investigated bones of cattle (% NISP: 23) and sheep-goat (% NISP: 17) from zooarchaeological remains uncovered during excavations of El Abrigo de la Castanera (Spain). Kara et al. [22] investigated a total of 1375 animal bones found during excavations Thyateira. They identified that 568 of these bones were from cattle (NISP%: 54.15%), 220 from sheep-goat (NISP%: 20.97%), 30 from sheep (NISP%: 2.86%) and 32 from goat (NISP%: 3.05%). In the present study, 53.2% (NISP: 808) of 1518 bone remains belonged to cattle, 42.4% (NISP: 643) belonged to sheep, and 3.2% (NISP: 49) belonged to goat.

Pathologies, butchery traces, and modifications on archaeological bones were also investigated by numerous authors and findings were given in details [7, 23, 24]. Pathological changes of bones were examined under 3 different groups by some authors. These changes have been categorized as dental anomalies, skeletal changes based on age, and effects of trauma [23]. Commonly observed pathological findings were as follows; osteoarthritis, osteitis, healed fractures, spondylosis ancylopoetica, luxations, periostitis, and occipital dysplasia [25]. In addition, some pathological findings on the skeleton were associated with carrying heavy load [26-32]. Some of the pathologies observed on limb bones were reported as exocytosis in the scapula, eburnation of pelvic acetabulum and caput femoris, exocytosis and lipping on proximal surfaces of metapodium and phalanxes, enlargement and asymmetry in distal epiphysis of metapodia [26-30, 33, 34].

Pathological deformation in cattle bones uncovered from archaeological excavation sites of Anatolia such as Demircihoyuk, Bogazkoy-Hattusa, Sirkeli Hoyuk, Lidar Hoyuk and Sagalassos was reported to be in limited number [28, 35-38]. It was reported that there were traces of metapodial and phalangeal pathology on cattle bones excavated from Sagalassos located close to ancient city of Kibyra [28]. Bartosiewicz et al. [26], Onar et al. [34] found pathological traces such as metapodial asymmetry, metapodial and phalangeal exocytosis, metapodial and cornual depressions, distal lipping, nuchal perforation, and dehorning on skeletons of Byzantine cattle which were uncovered in excavations of Yenikapı Harbor/Istanbul and were exposed to carrying load. The present study revealed pathological traces such as metapodial asymmetry, metapodial and phalangeal exocytosis.

As skeletal remains of ruminantia uncovered during excavations made in Ancient City of Kibyra were examined in terms of developmental levels, it was remarkable that the number of offspring was very low and there were generally adult individuals. It should be remembered that this situation could occur because it is easy for carnivorous animals to consume bone remains of offspring and juvenile individuals. Since skeletal remains obtained were mostly residuals of consumption, several traces of butchery-processing were found. Particularly cleaver trace is at the top among the traces identified. In addition, saw cutting traces were found on remains of horn or long bones (tibia, radius) of cattle. These bones were likely to be used as ring (ornament, accessory) or equipment (handle, war tool, etc.).

Trixl et al. [39] presented NISP values of cattle and sheep-goat bones, uncovered from archaeological excavations in Germany, in tables (Table 4). Compatible with the present study, these data made us think that cattle had a greater place in dietary regimen compared to sheep and goats. Consequently, the present study revealed the characteristics of animals that consumed by people and dietary of people in the Ancient City of Kibyra.

Table 4. NISP values of cattle and sheep-goat bones uncovered from archaeological excavations in Germany [39]. NISP: Number of Identified Specimens

Site	NISP		
	Cattle	Sheep-Goat	Total
Birgitz	1062	1949	3011
Faggen	60	93	153
Brixen-Elvas	20	61	81
Brixen-Stufels	107	156	263
Colognola ai Colli	698	486	1184
Leifers	315	233	548
San Giorgio di Valpolicella	81	160	241
Schluderns	2482	2646	5128
St Ulrich	62	74	136
Tartsch	356	391	747
Aubing	306	42	348
Heimstetten	814	101	915
Poing	238	49	287
Berching-Pollanten	1235	613	1848
Holzhausen	468	195	663
Kelheim	492	331	823
Manching	183997	88370	272367
Munich	148	71	219
Aislingen	1375	346	1721
Auerberg	519	205	724
Biberwier	833	450	1283
Kempten	1961	1042	3003
Langweid	5760	1653	7413
Regensburg-Harting	126	84	210

Vukovic and Bogdanovic [39] examined a skeleton revealed at the Viminacium Amphitheater in Serbia of camel often seen in the cities of the Roman Empire. The camel skeleton was. As a result, it was decided that the ride was hybrid and monotonous. In the present study, a total of 18 camel bones (NISP%: 1.2, Individual: 2) were identified (Table 1). It was observed traces of knife in the one of the bones (Table 2)

It is a fact that bones of consumption animals studied are needed to be evaluated as a zooarchaeological material with specific terminology besides being a simple remain. Furthermore, since this examination was carried out rigorously by zooarchaeologists, this can contribute to increasing its scientific quality. We think that the data obtained from the study will contribute to the limited number of zooarchaeological studies in Turkey.

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