

Morphological Evaluation of Dental Diseases in Parion Chamber Tomb (OM 5) Roman People

Evaluación Morfológica de Enfermedades Dentales en la Tumba de la Cámara de Parion (OM 5) del Pueblo Romano

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SUMMARY: Most of the dental diseases occur due to tooth or jaw morphology or nutritional habits. Anatomical differences in the teeth and jaws of men and women can cause different dental diseases between the sexes. In this study, 33 skeletons obtained from the excavation of the ancient city of Parion, which are dated to the late Roman period, were examined. Dental diseases and possible causes were investigated on a total of 33 skeletons. In the evaluations, it was evaluated that some diseases were caused by the difference between the sexes, while some were classified as nutritional diseases. The rates of tooth decay are different between men and women with Parion. It has been determined that the most important reason for this is the different morphological structure of the jaws and teeth, but the nutritional differences also cause this. Other dental and jaw diseases were also evaluated in the Parion population.

KEY WORDS: Parion ancient city; Dental morphology; Dental diseases; Teeth; Jaws.

INTRODUCTION

Depending on the morphological structure and use of the teeth, it is inevitable that some diseases will occur. Dental diseases and anomalies, along with joint diseases, are the most common abnormalities seen in ancient peoples, and when combined with other types of evidence at an archaeological site offer important information about individuals and populations (Roberts & Manchester, 2012). It is thought that some pathologies will progress differently in both men and women depending on the tooth morphology. Diseases in both humans and animals are an expression of the stresses of life they are subjected to, in other words, a reaction to everything in their environment and behavior. Thus, the occurrence of diseases is a reflection of genetic heritage, climate and soil on which they live, and other fauna and flora that coexist with them (Park & Yacoob, 1991). In addition, sexual dimorphism is revealed with the morphological structure of the teeth (Staka *et al.*, 2016). Ortner (2003) states that there are many parallels between diseases affecting bone and diseases affecting teeth. In addition, growth disorders, neoplasms, infection, endocrine and metabolic diseases, and trauma are among the morbid conditions that affect both.

MATERIAL AND METHOD

The Ancient City of Parion, located in the south of the region called Propontis in ancient times, is an important port city of the Troas Region (Ergürer & Keles, 2018). It is located in Kemer Village, Biga district of Çanakkale province (Basaran, 1999). As a result of the surveys carried out in the region, 9 chamber tombs were found in the area called Toprak Towers (Sulan, 2018). The materials of the study in question are the morphological analyses made on the teeth of the skeletons obtained from Chamber Tomb 5 (Table I). A total of 33 individuals were captured in Parion Chamber Tomb 5 (Infant:2, Child:5; Female:13; Male:13) (Çırak *et al.*, 2019). The skeletons are dated between the 1st century AC and the 2nd century BC.

RESULTS

The evaluations made by considering the tooth morphologies are given below.

Tooth Caries: A total of 361 teeth belonging to Parion

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Roman Period Chamber Grave 5 (OM5) people were examined for dental caries (Table II). Caries examination of 3 teeth could not be performed. Tooth decay is grouped into 7 classes (Buikstra & Ubelaker, 1994; Caselitz, 1998).

Table I. Teeth Distribution of Parion Chamber Tomb 5 People.

Teeth	Female	Male	Child	Infant	Isolated	Total
I1	9	17	6	2	7	41
I2	9	12	9	2	12	44
C	11	21	10	2	10	54
P1	12	19	4	0	7	42
P2	15	17	1	0	9	42
M1	12	16	10	2	13	53
M2	14	25	13	0	14	66
M3	4	10	0	0	8	22
Total	86	137	53	8	80	364

I: Incisive, C: Canine, P: Premolar, M: Molar.

The rate of dental caries in the Parion Chamber Tomb 5 people was calculated as 3.6 %. The rate of dental caries in the mandible is 3.24 %, and the rate of dental caries in the maxilla is 3.97 % (Table II). While there is no dental caries in the anterior teeth, the tooth group with the highest caries rate is the second molar with 12 %. The most important reason for the incidence of dental caries in the posterior teeth is the morphological structure of the teeth. Due to the more intense bacterial accumulation between the fissures and crests on the occlusal surfaces of the teeth, dental caries is more intense in the posterior teeth (Roberts & Manchester; Ferreira Zandoná *et al.*, 2012). It is seen that there is a difference between the right and left sides of dental caries both in the mandible and in the maxilla. It is seen that caries formation is higher on the left side of the mandible and maxilla than on the right side.

When examined according to the areas of dental caries, it was determined that it was only seen on the occlusal surface and interproximal surface. While the rate of tooth decay on the interproximal surface is 1.94 %, the rate of tooth decay on the occlusal surface is 1.66 %. While dental caries was 3.5 % in female individuals, it was found as 5.1 % in male individuals. Many studies have found that dental caries is higher in females than in males. When the distribution of dental caries according to the age distribution between the sexes is examined, it is seen that the teeth belonging to the adult group whose age cannot be determined in male individuals, tooth decay is more common than the female individuals (Table III). In both sexes the tooth group with the highest level of dental caries is the second molar and no caries was found in the anterior teeth.

It is seen that the rate of caries is higher in young adult individuals among the age groups of the population. The rate of dental caries in young adults was 5.17 % in middle-adult individuals, 3.77 %, and 4.46 % in adults whose age could not be determined. While the rate of caries in children was 1.88 %, caries could not be detected in babies.

Table II. Tooth Caries Distribution of Parion Chamber Tomb 5 People.

Tooth Caries	Mandibula						Maxilla						TOTAL					
	Right			Left			Right			Left			Total					
	C	O	%	C	O	%	C	O	%	C	O	%	C	O	%			
I1	11	0	0	10	0	0	21	0	0	11	0	0	8	0	0	40	0	0
I2	12	0	0	15	0	0	27	0	0	9	0	0	7	0	0	43	0	0
C	12	0	0	14	0	0	26	0	0	16	0	0	12	0	0	54	0	0
P1	10	0	0	11	0	0	21	0	0	12	0	0	9	0	0	42	0	0
P2	12	0	0	9	0	0	21	0	0	12	0	0	9	0	0	42	0	0
M1	15	0	0	11	1	9.09	26	1	3.84	15	0	0	12	2	16.7	53	3	5.7
M2	18	1	5.55	14	3	21.4	32	4	12.5	16	1	6.3	17	3	17.6	65	8	12
M3	5	1	20	6	0	0	11	1	9.09	6	0	0	5	1	20	22	2	9.1
Total	95	2	2.1	90	4	4.44	185	6	3.24	97	1	1	79	6	7.59	361	13	3.6

1: Occlusal Surface; 2: Interproximal Surface; 3: Flat Surface (Buccal and lingual surface); 4: Cervical Caries (CEJ); 5: Root Caries; 6: Wide Bruises; 7: It is classified as caries descending to the pulp in which the crown of the tooth is completely destroyed (Buikstra & Ubelaker, 1994; Caselitz, 1998).

Table III. Caries distribution of Parion OM 5 people according to sex.

Teeth	Female			Male			Total
	C	O	%	C	O	%	C
I1	9	0	0	17	0	0	26
I2	9	0	0	12	0	0	21
C	11	0	0	21	0	0	32
P1	12	0	0	19	0	0	31
P2	15	0	0	17	0	0	32
M1	12	1	8,3	16	2	13	28
M2	14	2	14	25	5	20	39
M3	4	0	0	10	0	0	14
Total	86	3	3,5	137	7	5,1	223

Tooth Wear: 363 teeth belonging to Parion Chamber Grave 5 people were examined for tooth wear. There is minor wear on 35.26 % of Parion OM5 humans teeth. There is a small amount of advanced wear in the population. Erosion was not detected in 32.23 % of the teeth. It is thought that fish has an important place in nutrition in the Parion population. This has led to a low degree of wear on the teeth of the population. In addition, strong movements of the teeth and jaws to the right, left, front and back during bite cause wear (Çirak *et al.*, 2013). When the degree of tooth wear is evaluated according to gender, it is seen that low grade wear is the most in both sexes. The rate of minor wear in females is higher than in males. It is seen that moderate wear is higher in male individuals than in female individuals. It is seen that low-grade erosion (2nd degree) is high in young and middle adult individuals in the population. In advanced adult individuals, the rate of advanced degrees (6 and 7 degrees) is higher, as expected.

Dental calculus: A total of 362 teeth belonging to Parion Chamber Grave 5 people were examined in terms of dental calculus. Dental calculus accumulation was found to be 17.95 % in Parion OM5 people. While the rate of calculus accumulation in the mandible is 21.2 %, it is 14.6 % in the maxilla. Dental calculus develops most commonly in the teeth closest to the salivary glands (tongue side of lower incisors and buccal side of upper molars) and is common in ancient people (Roberts & Manchester). It is seen that the most calculus among the tooth groups is in the 2nd premolars (Table IV). Premolars are anatomically assisted grinding teeth. Therefore, the contact with food is more than the anterior teeth, which causes the accumulation of tartar. Except for the second premolars, a lower rate of tartar accumulation was observed in the posterior teeth compared to the anterior teeth. While the calculus accumulation is 20 % in the first inciseve, it is 20.9 % in the second inciseve (Table IV). The tooth group with the least calculus accumulation is the third molar. Since the third molar is the last tooth to erupt in the mouth and it has less contact with food, calculus accumulation is less.

Table IV. Dental calculus distribution.

Teeth	Mandibula			Maxilla			Total		
	Total			Total			C	O	%
	C	O	%	C	O	%			
I1	20	8	40	20	0	0	40	8	20
I2	27	7	26	16	2	12,5	43	9	20,9
C	26	6	23	28	3	10,7	54	9	16,7
P1	21	3	14	21	4	19	42	7	15,7
P2	21	6	29	21	3	14,3	42	9	21,4
M1	26	2	7,7	27	8	29,6	53	10	18,9
M2	32	6	19	34	5	14,7	66	11	16,7
M3	11	1	9,1	11	1	9,09	22	2	9,09
Total	184	39	21	178	26	14,6	362	65	17,95

0: No calculus, 1: Less, 2: Moderate, 3: Advanced (Brothwell, 1981).

While dental calculus accumulation is 18.6 % in females, 20 % in males (Table V).

Table V. Dental calculus distribution according to sex.

Teeth	Female			Male			Total		
	C	O	%	C	O	%	C	O	%
I1	9	1	11,11	16	4	25	25	5	20
I2	9	0	0	11	6	54,54	20	6	30
C	11	1	9,09	21	3	14,28	32	4	12,5
P1	12	2	16,66	19	3	15,78	31	5	16,12
P2	15	3	20	17	2	11,76	32	5	15,62
M1	12	5	41,66	16	4	25	28	9	32,14
M2	14	4	28,57	25	4	16	39	8	20,51
M3	4	0	0	10	1	10	14	1	7,14
Total	86	16	18,6	135	27	20	221	43	19,45

It is seen that low and moderate calculus accumulation is more intense in young adult individuals. There was no tartar accumulation in the teeth of advanced adult individuals. One of the reasons for this is thought to be more intense wear on the teeth of advanced adult individuals. While low-grade tartar accumulation is 9.94 %, moderate tartar accumulation is 5.25 %, and advanced tartar accumulation is 2.77 %. The fact that the population is a fisherman has ensured that fish have an important place in their food. It is stated in the literature that the accumulation of tartar is relatively lower in societies that eat fish than in populations that consume other food groups.

Hypoplasia: The rate of hypoplasia in the teeth of Parion Chamber Tomb 5 people is 21.7 %. While hypoplasia is 18 % in the mandible, it is 25.7 % in the maxilla. Among the tooth groups, 59.3 % hypoplasia is present in the canine. No hypoplasia was found in the third molar. While hypoplasia levels are 21.17 % in female individuals, it is 25.19 % in males (Table VI). While hypoplasia was not observed in infants, hypoplasia was detected in only 2 children.

Table VI. Hypoplasia distribution.

Teeth	Mandibula			Maxilla			Total		
	C	O	%	C	O	%	C	O	%
I1	18	2	11	20	14	70	38	16	42,1
I2	25	7	28	16	6	37,5	41	13	31,7
C	26	16	62	28	16	57,1	54	32	59,3
P1	21	5	24	20	2	10	41	7	17,1
P2	21	0	0	20	1	5	41	1	2,43
M1	26	0	0	24	1	4,16	50	1	2
M2	30	2	6,7	28	3	10,7	58	5	8,62
M3	11	0	0	11	0	0	22	0	0
Total	178	32	18	167	43	25,7	345	75	21,7

Antemortem Tooth Loss: A total of 248 alveolar sockets belonging to 5 people in the Parion Chamber Grave were examined for antemortem tooth loss (Fig. 1). Antemortem tooth loss is 6.04 % in the general population. The rate of antemortem tooth loss in the mandibula is higher than in the maxilla (8.49 %). Among the tooth groups, the rate of antemortem tooth loss in the first molars is 12.5 %. The lowest antemortem tooth loss is seen in canines (Table VII).



Fig. 1. Antemortem tooth loss and alveolar bone loss.

Table VII. Antemortem tooth lose distribution.

Teeth	Mandibula			Maxilla			Total		
	C	O	%	C	O	%	C	O	%
I1	19	0	0	8	0	0	27	0	0
I2	24	0	0	9	1	11,1	33	1	3,03
C	23	0	0	11	1	9,09	34	1	2,94
P1	20	0	0	12	0	0	32	0	0
P2	15	2	13,3	12	0	0	27	2	7,4
M1	20	5	25	20	0	0	40	5	12,5
M2	21	3	14,3	17	0	0	38	3	7,89
M3	11	0	27,3	6	0	0	17	0	0
Total	153	13	8,49	95	2	2,1	248	15	6,04

There is antemortem tooth loss: 1; None:0 was entered in the form and antemortem tooth loss rate was found according to the obtained value.

While the rate of antemortem tooth loss was 7.69 % in female individuals in Parion OM 5 population, it was found as 7.3 % in male individuals. Antemortem tooth loss is most common in the second molars in females, while the rate of antemortem tooth loss in first molars is higher in male individuals (Table VIII).

Table VIII. Antemortem tooth lose distribution according to sex.

Teeth	Female			Male			Total		
	C	O	%	C	O	%	C	O	%
I1	5	0	0	14	0	0	19	0	0
I2	9	0	0	13	1	7,7	22	1	4,5
C	10	0	0	19	1	5,3	29	1	3,4
P1	11	0	0	17	0	0	28	0	0
P2	11	0	0	16	2	13	27	2	7,4
M1	14	2	14,28	18	3	17	32	5	16
M2	13	2	15,38	18	1	5,6	31	3	9,7
M3	5	0	0	9	0	0	14	0	0
Total	78	4	5,12	124	8	6,45	202	12	5,94

Among the age groups of the Parion OM5 population, the age group in which the most intense antemortem tooth loss is observed is middle adults with a rate of 13.26 %. While antemortem tooth loss was 6.89 % in advanced adult individuals, no antemortem tooth loss was observed in adult individuals whose age could not be determined.

Alveolar Bone Loss: The alveolar bone loss of Parion Chamber Tomb 5 people is 59.72 % (Fig. 1). Alveolar bone loss was 61.9 % in the mandible, while it was 56.7 % in the maxilla. When examined in terms of tooth groups, the tooth groups in which alveolar loss is most common are premolars and canines (Table IX).

When the distribution of alveolar bone loss degrees is examined, it is seen that the rate of "low-grade" alveolar bone loss is 28.47 %, the rate of "moderate" alveolar bone loss is 24.31 %, and the rate of advanced alveolar bone loss is 6.94 %. Alveolar bone loss is seen that the degree of moderate alveolar bone loss is higher. Advanced alveolar bone loss was detected with a rate of 31.25 % in advanced adults.

Table IX. Distribution of alveolar bone loss.

Teeth	Mandibula			Maxilla			Total		
	C	O	%	C	O	%	C	O	%
I1	7	3	42,9	2	2	100	9	5	55,55
I2	10	4	40	4	3	75	14	7	50
C	6	4	66,7	4	3	75	10	7	70
P1	9	8	88,9	5	3	60	14	11	78,57
P2	12	10	83,3	9	6	66,7	21	16	76,19
M1	17	10	58,8	18	11	61,1	35	21	60
M2	17	11	64,7	14	5	35,7	31	16	51,61
M3	6	2	33,3	4	1	25	10	3	30
Total	84	52	61,9	60	34	56,7	144	86	59,72

0: No, 1: Little, 2: Moderate, 3: Advanced (Brothwell, 1981).

DISCUSSION

The dental pathology of Parion Chamber Grave 5 people was examined and as a result, dental caries; 3.6 %, tartar; 17.95, antemortem tooth loss 6.4 %, hypoplasia; 21.17, alveolar bone loss rate; 59.72 % has been found. It was determined that the tooth erosion of Parion Chamber Grave 5 people was low. Antemortem tooth loss rates are 6.45 % in males and 5.12 % in females. The fact that the rates of dental caries, antemortem tooth loss and tartar are higher in male individuals than female individuals indicate that the dental health of male individuals is worse than female individuals. It can be said that carbohydrate-based foods are more weighted in the diet of male individuals.

When the rate of dental caries is analyzed according to age groups, it is 5.17 % in young adults and 3.77 % in middle-adult individuals. No dental caries was found in advanced adult individuals. Tooth decay is 1.88 % in adults whose age cannot be determined. While caries was observed in one tooth (1.88 %) in children, no dental caries was found in infants. The high rate of dental caries in young adults is thought to be due to the low number of teeth. When the caries formation areas were examined, it was determined that there were not very advanced caries on the occlusal surface. Considering that the ancient city of Parion is a port city, it is possible to say that fishing has an important place in their diet. This explains fewer dental caries. The fact that this diet is mainly animal-based is also reflected in the degree of tooth wear, and the wear on the teeth is low. When the Parion Chamber Tomb 5 people are compared with other Anatolian societies whose dental pathologies are contemporary, it is seen that they are similar to those whose diet is namely seafood. When compared to Parion (Yavuz *et al.*, 2013), Smyrna Agora (Hellenistic / Roma) (Yasar, 2007), Kyzikos (Kırmızıoğlu Gözlük *et al.*, 2009), Iasos (Yılmaz Usta, 2013), Kyzikos (Sarbak & Çirak, 2019) populations, tooth decay rates are similar.

CONCLUSIONS

Morphological differences in teeth and jaw bones cause some dental diseases. These morphological differences between the sexes also show themselves in the Parion population. Dental pathologies belonging to ancient populations are important in terms of giving information about the dental morphology, health structure, diet and socio-economic levels of the population in question. It is known that the rate of tooth decay is lower in populations whose diet is predominantly animal products compared to

populations that feed mainly on carbohydrates. Tooth decay in Parion Chamber Tomb 5 was found to be 3.6 %. The fact that the ancient city of Parion is by the sea due to its location and its livelihood is mainly based on fishing explains the low rate of dental caries in the population. However, it is not correct to explain the different course of dental caries between men and women with diet alone. Morphological differences, especially between male and female individuals, also cause different rates of dental caries in the Parion Roman Period OM 5 population. In addition, the low degree of tooth wear indicates that the population is generally fed with animal products. It is seen that the antemortem and abscess rates, which reflect the oral health structure of ancient societies, are generally low. In general, it is possible to say that Parion Chamber Tomb 5 people have good oral health.

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RESUMEN: La mayoría de las enfermedades dentales se deben a la morfología de los dientes o la mandíbula o a los hábitos nutricionales. Las diferencias anatómicas en los dientes y las mandíbulas de hombres y mujeres pueden causar diferentes enfermedades dentales entre los sexos. En este estudio, se examinaron 33 esqueletos obtenidos de la excavación de la antigua ciudad de Parion, que datan del período romano tardío. Se investigaron las enfermedades dentales y las posibles causas en un total de 33 esqueletos. En las evaluaciones, se determinó que algunas enfermedades fueron causadas por la diferencia entre los sexos, mientras que otras fueron clasificadas como enfermedades nutricionales. Además se encontraron diferentes estimaciones de caries entre hombres y mujeres. Se analizó que la razón más importante de esto es la diferencia de la estructura morfológica de los maxilares y los dientes, sin embargo las diferencias nutricionales también es un factor que se debe considerar. Se evaluaron además, otras enfermedades dentales y de la mandíbula en la población de Parion.

PALABRAS CLAVE: Ciudad antigua de Parion; Morfología dental; Enfermedades dentales; Dientes; Mandíbulas.

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