

**OSTEO-ARTHRITIS ON THE CONDYLAR PROCESS, THE  
VARIATION OF THE FOVEA CAPITULUM MANDI-  
BULAE OF THE ANCIENT ANATOLIANS  
OSTEO-PALAEOPATHOLOGY STUDY**

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**The locality of the lower jaw**

Ancient city of Sardis is on the Ankara-Izmir road and 70 kms. inland from the Aegean Sea.<sup>1</sup> The ancient city of Sardis was the center of Lidian and it was under the Byzantine rule 400 A. D. and the center had continued to maintain its importance.<sup>2</sup> The Byzantine people had lived in classical periods in the ancient city of Sardis. They were dolicocephals and Mesocephals in physical type and according long bones of these people have been studied by me, and The both sexes were of medium height and Mediterranean type in general.<sup>3</sup>

The ancient Sardis excavations has been conducted by Professor Dr. M. A. C. Hanfmann Fogg Art Museum of Harvard Univer-

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1 Hanfmann, 1961 3-11

Hanfmann, 1961 124-132

Hanfmann, 1962 3-15

Prof. Dr. G. M. A. Hanfmann, The Director of the Sardis excavation, has been regularly sending the skeletons to me for the Palaeoanthropological studies. For this I would like to thank him for his great help making our collections more available.

2 Hanfmann, 1961 PP. 8-11

3 Bostanci, 1963 PP. 121-131

According to study of Femurs from Sardis excavations, the average stature of the Byzantine people was 164.40 cm. for the males. The population have been examined, the measurements varied from 151 to 175 cms. Majority of these people they were Dolicocephals and Mesocephals. Bostanci, P. 124, 125; Bostanci, 1969. PP. 124, 125.

sity in United States and the Human Bones have been sent to me for examination in the laboratory of Palaeoanthropology.

### The lower Jaw of Byzantine Period

The lower jaw had been discovered in 1961 in summer excavation and it was numbered as 61.14 VII. 25, and the find spot is Pactolos North (PN) Pointed Tomb north side PN. II. P. 50. PN III. P. 92-100 bones P 58-9. In the tomb there were 4 skeletons on top of each other and they belonged to Byzantine period.<sup>4</sup>

The broken lower jaw only one Condylar Process and the other one has been lost in the excavation period. The cross section of the Corpus Mandibulae is fresh and whitish in colour. Foramen Mentalias are present in the both sides and the premolar  $M_1$  on the right and Premolar  $M_2$  on the left and rest of them two molars on the left and one molar on the right side are present and only one Canine on the left side is in the socket, others have been lost during excavations.

In the Byzantine jaw, The most interesting case is  $M_3$  had not come out at all during his life time and has no indication that  $M_3$  is inside the Corpus Mandibulae.<sup>5</sup> It is the fact that had been shown in the literature  $M_3$  had been lost in some people in various races as we can see it is the case for Byzantineans who had lived 900 years before our time.<sup>6</sup> Garn (1962) has been studied by 498 individuals and from this data he has estimated that over 75 % of all missing

<sup>4</sup> The report has been sent to me in September 7, 1961 by E. H. Kohler have recorded that 4 skulls there were in the boxes. Report P. 3 The Byzantine lower jaw which is examined in this article not belong to any of the skulls arrived to our Palaeoanthropology Laboratory.

<sup>5</sup> Lower third molars have reduced morphologically, Biometrically and Anatomically in the senescent on primates and it is obvious in modern man and they have 28 teeth in the various races. For example "Among the East Greenland Eskimos 36, 6 of the individuals examined lacked one or more  $M^3$ , while 66 % of the  $M^3$  lacked the hypocone. Moorrees 1957 found that in 40 % of fifty Aleuts both upper third molars were congenitally missing. At the other extreme of the range, the frequency of missing  $M^3$  falls to 0.2 % in Angolan Negroes In white Americans intraracial variation 9 % of missing  $M^3$  and it smedes 25 %" (Frisch, 1965 P. 74)

<sup>6</sup> Frisch, 1965 P. 72, 74, 75, 78

Hanfman, 1961. pp. 8-11.

teeth are associated with third molar agenesis. (Garn and Lewis 1962 P. 17).

The population incidence of agenesis of any mandibular third molar (11%) is approximately twice that for any comparable maxillary third molar 6 % in the present study. (Garn and Lewis 1962 P. 17.) According to Hellman, third molar agenesis is undoubtedly the most common dental reduction with up to 50 % of some groups affected. (Helman, 1936 pp. 750-762) (Garn and Lewis 1962 P. 14.)

During the Pleistocen Fossil man have had always  $M_3$  out, as we can see from the fossil evidens have discovered in the hominid evolution.<sup>7</sup> According to evidence in the hominid evolution, from the earliest fossils to recent man, there has been a slow marphological biometrical and anatomical reduction in both upper and lower  $M_3$  molars.<sup>8</sup>

The Byzantine lower jaw is comperatively large and long and menton properly developed forvered and foramen mentals are larger than normal cases. The anatomic, marphologic and the biometric characters had showed that the lower jaw belonged to a male. His teeth are large in size and veering is very much on the  $M_3$  in both sides occlusal surface is flat and the veering surface have a inclination outwards in both cases.

The morphology of lower jaw has shown that the muscles and ligaments were not developed as can be seen in normal modern man. The Coronoid Process had been developed outwards and the condyle of the caputulum mandibulae is forwards. The ridge of the Ramus towards the Angulus Mandibulae has developed inwards and the between linea mylohyoidea tuberositas prterygoidea makes a large hallow linguale side of the Ramus.

The linea mylohyoidea has developed very well and larger than the normal cases. The mandibular foramen is longer than

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<sup>7</sup> Reduction of the third molar in the Hominidae had been examined by Frisch. According the results Australopithecus, Homo erectus and Homo Neandertals have  $M_3$ , in. Frisch 1965 P. 76

<sup>8</sup> Frisch 1965 PP. 73-78

According to Garn third molar agenesis group while 24 % of such missing teeth are independent of third molar reduction on the 493 Americana.

the usual cases and more hollow towards the Condyle and the Mylohyoid groove large and long and deeper. The spina masculi genioglossi is large and Fossa Musculi beventris present. The corpus mandibulae bending more outwards than normal lower jaws and this characteristics are more obvious towards the Angulus Mandibulae.

The processus Mascularis or the Coronoid Process is unusually bending outwards and triangular in shape. When the picture I have been examined from above it is the case that the apex of the coronoid process is not on the same line with the condyle and corpus of the Mandibulae.

### Osteo-Palaeopathology

#### On The Coronoid Process of Byzantine lower jaw

The Coronoid Process of the Byzantine lower jaw is an interesting case because it is bending outwards more than normal modern man Coronoid processus. Far from this reason I have made some new measurements and Angles to explain the position of the Coronoid process and the relationship with the Carpus and Condyle of the Mandibulae.

#### *The Coronoid-Condyle-Symphysial Angle*

If we have drawn a line between Apex of the Coronoid process and middle of the Condyle and between the first incisures symphysial point between alveolars, it makes a triangle with the three points and the angle with the Coronoid process can give us the outwards inclination of the Coronoid process. If the angle on the apex of the Coronoid is larger it means it is closer to the normal cases, when the angle is smaller coronoid proces is bending outwards more than normal cases. The Coronoid-Condyle-Symphysial angle of the Byzantine lower jaw is  $140^{\circ}$  and the same angle of a lower jaw belonging to the Ottoman period is  $145^{\circ}$  and in the upper palaeolithic lower jaw recently discovered, the Homo sapiens Çevlikiyensis in normal case the angle is  $150^{\circ}$ . These examples Have shown that the Coronoid-Condyle-Symphysial angle is important, to find its normality with the Coronoid process and Condyle, the Carpus mandibulea and the Ramus

*The inclination of the Coronoid Process Angle:*

The inclination of the Coronoid Process Angle should give better result than the Angle Coronoid-Condyle-Symphysial and easier to take the angle. The method is: The underneath of the Corpus line should have crossed parallel to the middle of the Condyle and one line from the inner part of the Coronoid surface to the apex and one line with right angle to the line proposed paralel to the base of the Corpus. These two lines make one angle with apex of the Coronoid process and it should be called the inclination of the Coronoid process angle. This angle should have given us the Corolation between Ramus, Condyle and the Corpus mandibulae and the normality of the process.

The inclination of the Coronoid process of the Sardis Byzantine lower jaw is  $54^{\circ}$  and in the Ottoman period lower jaw same angle is  $78^{\circ}$  and in the Upper Palaeolithic lower jaw *Homo sapiens Çevlikiyensis* is  $80^{\circ}$ . These results can also give us the idea that Coronoids process among three jaws have been bending outwards but more on the Byzantine lower jaw than the *Homo sapiens Çevlikiyensis* and the Ottoman Jaw, because Byzantine man's Coronoid process was not normal and the Condyle with Arthritis had developed inwards and obviously it is an osteo-patological case as can be seen on the picture 1,2,3.

*Seperation diameter of the Coronoid Process*

The base of the Corpus line should cross in the middle of the Condyle, parallel to the base line of the Corpus and the distance with a right angle to the Apex of the Coronoid, should be measured and it is possible to call it, the seperation diameter of the Cornoid process. This method is very easy and practical one to optain the seperation degree of the Coronoid Process from the Ramus and to find the anomaly of the Coronoid with the Corpus and the Condyle.

In the Byzantine lower jaw the, seperation diameter is 13 millimeter and this is grater than diameters in the normal cases. In the lower jaw belonging to Ottoman period, the diameter of seperation of the Coronoid process is 7 millimeter. In this jaw, the Condyles are not normal as the *Homo sapiens Çevlikiyensis*. On the back part of the Condyle on the left side there is a deep groove dividing capitulum into two and on the right capitulum on the linguale side at the

back, one fossa and on the both sides two tuberculs are present. In the upper Paleolithic lower Aurignacien man's lower jaw Condyles and Coronoid processes and the Ramuses are normal and the seperation diameter on the left side is 5 millimeters. Compering the other two are smoller. It is clear that the seperation diameter of the coronoid process can explain the normality of the Ramuses, Corpuses and the Condyles. Three methods which have been explained in this article can give us normality or ubnormality conditions of the lower jaws and the relationships of the parts of Ramus, Condyle, Corpus and Coronoid process of the Mandibulae. Up to now nobody has paid attention to these measurments of the lower jaws aither normal or ubnormal cases and in my opinion examination of these measurments can give us important ideas about the mechanical problems of the skull and the face bones and the muscle variations and the variation of the bones of the skull and the lower jaws and the proportions of the parts of the face.

*Morphological Characteristics of the Coronoid Process of the Byzantine lower jaw*

The Coronoid process of the Byzantine lower jaw is thick and the Apex of the Coronoid has developed towards backwards which is forward in the living man. The processus Muscularis bends outwards and it makes a large halow with Ramus ridge, this is usually flat in the normal cases. (Picture III.). The seperation of the Coronoid process from the corpus is 13 mm. in this case. On the posterior part of the inner Coronoid has developed a large fossa which is four millimeters deep and seven millimeters in width and 13 millimeters in length. This fovea is very shollow in some cases which I have examined in the Ottoman period series and the majority of these series are not possible to be found in normal cases. In some cases the fovea Coronoides linguale posterior is very chellow and in some cases there is one small foramen. The foramen Coronoides linguale posterior and in some cases this area is flat and there is no anomaly to show and I believe majority of the lower jawes belong to the last group.

In the middle of the coronoid process a crista stiking towards the linguale side is usually present and it goes up to the apex of the coronoid. In the linguale side of the coronoid process must have an

extra muscule holding posterior part and in the middle of the coronoid. The crista on the medial surface of the coronoid is not seen in the normal cases and it is possible to call the "The Crista linguale Coronoides Mediale" and the fovea on the posterior side possible to call "The fovea coronoides linguale posterior"

The fovea coronoides linguale has a sulcus on the posterior edge of the coronoid four millimeters wide and six millimeters in length. The sulcus coronoides linguale posterior is a new name and a new case has been known in anatolian series.

The coronoid process of the Byzantine jaw (mandibulae) has a rather unusual formation on the linguale side, on the other half of the coronoid process there is a deep groove compered with the normal cases. This groove goes up to the apex and to the anterior edge of the coronoid, there is a pleat towards the tip. The groove on the linguale side is continuing down on the surface of the Corpus Mandibulae. This formation is not seen in any of the famous anatomy books I have examined.<sup>9</sup>

The coronoid process in normal cases is flat on the anterior side and the margin is sharp goes down to the surface of the Corpus Mandibulae. In some cases it is possible to divide into two and it is possible to call "The sulcus Coronoides linguale anterior" and the other one on the alveolar direction or on the side of the sockets of Corpus. The sulcus Corpus Mandibulae laterale is 9 mm. deep. The sulcus Corpus Mandibulae laterale is 49 mm in length and on the Ramus 8 mm. in width and on the level of M<sub>2</sub> 11 mm. width and 3 mm. in depth from the crista molare Corpus Mandibulae. This crista is continuation of "the Crista Coronoides linguale Mediale.

The coronoid process of the Byzantine lower jaw has a triangular surface and in the middle of the process, there is a small fossa 11 mm. in length and 5 mm. in width, it continuous down to the level of the linguale. It is possible to call it "Fossa Coronoides linguale mediale"

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<sup>9</sup> Gray's anatomy 1969 PP. 340-346

Inkster and Walsley and Lockhart, 1956 200-205

Sobotta 1944 80-83

I have seen Mandibulae, one from Mesolithic period which has been discovered by me with Belbaşıyen Culture and one Mandibulae from Byzantine period which has been found in ancient Sardis in west Anatolia and five Mandibulae which belonged to Ottoman period. Turks have shown Anatomic and morphologic and Biometric anomalies on the coronoid process and on the Condyles and on the Ramus.<sup>10</sup>

In this article, I have suggested new names for some of the cases they are discovered on the Ramus, Coronoides and Condyle of the Mandibulae as follows:

- 1- Canale Capitulum Mandibulae Mediale (Bostanci)
- 2- Fovea Capitulum Mandibulae Posterior (Bostanci)
- 3- Fovea Capitulum mandibulae Mediale (Bostanci)
- 4- Fovea Capitulum Mandibulae Anterior (Bostanci)  
(Formily fovea Ptergoidea)
- 5- Fovea Coronoides Linguale Posterior (Bostanci)
- 6- Foramen Coronoides Linguale Posterior (Bostanci)
- 7- Foramen incisura Linguale Mediale (Bostanci)
- 8- Foramen incisura Laterale Mediale (Bostanci)
- 9- Foramen incisura laterale Posterior (Bostanci)
- 10- Fossa Capitulum laterale Posterior (Bostanci)
- 11- Fossa, Coronoides Linguale Mediale (Bostanci)
- 12- Fossa incisura Mandibulae Laterale (Bostanci)
- 13- Fossa Coronoides laterale Posterior (Bostanci)
- 14- Sulcus Capitulum Mandibulae Mediale (Bostanci)
- 15- Sulcus Collum Capitulum Anterior (Bostanci)
- 16- Sulcus Coronoides linguale Anterior (Bostanci)

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10 I have study one Mesolithic lower jaw and one Turkish from Ottoman period. Both of them had anomalies on the condyles. The Ottoman period lower jaws have double condyles and fovea capitulum Mandibulae Posterior and Mesolithic man had only on the left side condyle with fovea capitulum Mandibulae Posterior slightly on the back part of the capitulum mandibulae. I have found more evidence among the Ottoman period lower jaw and all of them have different characteristics on their condyles have not examined here. They are anomalies and have connected with an extra muscle holding condyles and one of them have double condyles and one has Arthritis on the right side.

Bostanci, 1963 P. 258 Plate II

Bostanci, 1965 P. 23, 24, 25 Plate II and III

Hrdlička, 1941 85-89



- 17- Sulcus Coronoides linguale Posterior (Bostanci)
- 18- Sulcus Ramus linguale Mediale (Bostanci)
- 19- Sulcus Ramus linguale Mediale (Bostanci)
- 20- Crista Coronoides linguale Posterior (Bostanci)
- 21- Crista Coronoides linguale Mediale (Bostanci)
- 22- Crista Caputulum Mandibulae Mediale Posterior (Bostanci)
- 23- Crista Caputulum Mandibulae laterale Posterior (Bostanci)
- 24- Crista Coronoides laterale Posterior (Bostanci)
- 25- Fovea Collum Mandibulae anterior (Bostanci)
- 26- Crista Caputulum Mandibulae Mediale Posterior (Bostanci)

The names mostly have been used for the Osteo-Paleopathological cases and they have not been published in the Anatomical text books.<sup>11</sup>

### Osteo-Arthritis on Condylar Process in the different Races

The Osteo-Arthritis cases have been collected by A. Hrdlička in 1941 and have been published with the pictures. They were the best examples have been found they are belong to four different population.<sup>12</sup>

I have two cases from our series, one belonged to Byzantine period amale a bout 50 years old and one case have been found in the Ottoman period Turks, have belonged to a female and she is sixty years old other one 55 years old is belonging to a male and 65 years old male have had osteo-arthritis Illnesis. It is possible to compare these seven cases with the other races to see the differences. One American white fermale adult has double condyles and on the left side Articular surface has flat condyle and it has Arthritis on the right condyle.<sup>13</sup>

Second case belongs to an old Peru Indian male sub adult and having double condyles and both articular surface are flat with arthritis<sup>14</sup>. Third case is a Eskimo adult female who has double condyles articular surfaces flat and with Arthritis.<sup>15</sup>

11 Gray's Anatomy 1969 PP. 340-346 Inkster and Walmley and Lackaert, 1956 200-205. Sobotta 1944 80-83

12 Hrdlička, 1941 PP 75-89

13 Hrdlička, 1941 P. 81 Picture 5

14 Hrdlička, 1941 P. 82 Picture 6

15 Hrdlička, 1941 P. 82 Picture 7

Forth case is an old Peuble Intian adult female and with double condyles on the right side. The condyle is flat and articular surface comperatively large and the middle of the face is convex.<sup>16</sup>

According to Janssens "only one case mandibulae temporale Osteo-Arthritis is known, namely on one of the skulls from Krapina and the disease occurs a lot in the Pre-Columbians in Negroes, it occurs in 4,5 percent, while it occurs frequently in Melanesians, in the new Hebrides 5,6 percent of the people are effected of the New Caledonians 24.02 percent and of the inhabitants of the loyalty islands 26.4 percent. It is striking that the disease occurs almost exclusively a as a singular affection, which means that the while other localizations do exist. They are much less frequent than Mandibulo-Temporal Arthritis".<sup>17</sup>

The characteristic lesions consist of flattening of the joint face of the condyle with a corresponding flattening of the joint Cavity.<sup>18</sup>

According Ackerknecht "Temporo-maxillary arthritis was found in the Neanderthal man of Krapina but not in other European skeletons.<sup>19</sup> The umversality of arthritis in bones at all periods, climates and places does not confirm climatic theories of the disease."<sup>20</sup>

According to Brothwell, "in both modern and ancient peoples osteo-arthritis would seem to follow the same developmental course, begining with the destruction of the joint cartilage after which the bony joint surfaces become eroded by the movement of bone-on-bone and during this process, bonny lipping developes at the joint margins."

According Mc Cawn and Keith, the madibulae of the skull V had arthritis on the right condyle and the left one was normal".<sup>21</sup>

According to the research which have been done up to now we know osteo-arthritis on the other part of the bones mainly verteb-

16 Hrdlička, 1941 P. 32 Picture 8

17 Janssens 1970 P. 84 Krapina J. has Arthuitis on the both condyles. Keith 1939 P. 220

18 Janssens 1970 P 84

19 Ackerknecht 1959 P. 123

Brothwell 1963 P. 145

20 Ackerknecht 1959 P. 123

21 Brothwell 1961 P. 359 Mc Cawn and Keith 1939 P. 220

ras, sacrum servical bones and on the fossa-glonoid have found on the Neanderthal man bones; La Chapella-aux-saints, Aurugnacien man, Cro-magnon, on the Neolithic man, on the ancient Egyptians and Pre-Columbian Americans.<sup>22</sup> Osteo-Arthritis have occur at all senozic times on the animal bones and in the Glacial and Inter glacial periods as is described above on the human bones.<sup>23</sup>

### **Osteo-Arthritis on the Byzantine Lower jaw Condyle**

The condyle with osteo-arthritis belongs to the left side and the right side has been lost in the excavation. The skull of this lower jaw is not among our collections, and it is not possible to say anything about the Morphology of the Glonoid fossa.

The person who had lived in the Byzantine period of the ancient city of Sardis had trouble from arthritis on the condyle and his condyle had developed in an unusual shape. The condyle has a flat surface on the apex and has elongated towards and downwards in linguale side. The articular surface of the condyle of the lower jaw with arthritis, instead of being medially, its long axis has developed slightly forwards. (Pictures I, II, III.)

The long axis 31 mm. in length and the largest width is 17 mm. and the neck of the condyle (collum condyle) anterior-posterior diameter is 14 millimeters transvers diameter of the collum is 7 millimeters The posterior side of the condyle has a triangle shape and articular surface diameter is 30 millimeters and on the left distal side is 35 millimeters and the linguale side of the the condyle is 27 millimeters in length.

The posterior part of the condyle is not flat and there is a large tubercule near the interial edge. It is possible to call it "Tuberculum Condyle Posterior" In the front of the "Tuberculum condyle Posterior" there is a small groove towards the articular surface of the condyle and this groove is more on the interial part of the posterior edge of the articular surface. The incisura mandibulae edge is continuing towards the anterior surface of the condyle and it reaches up

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22 Janssens 1970 PP. 83-89

23 Janssens 1970 P. 83-89

to the articular edge from the most internal side than the middle of the anterior surface of the condyle.

In the normal cases the edge of the incisura mandibulae usually goes upwards on the distal side of the condyle. The joining direction of the incisura mandibulae and the edge of the condyle surface varies in different cases. The variations must have been between distal edge and internal side of the anterior surface of the condyle.

The osteo-arthritis is surface of the condyle on the left side is flat and two small groove can be seen and on the internal side it has been developed. Like a big tubercule and between there is a groove on the anterior side of the edge and this groove continues towards the posterior edge and downwards towards the tuberculum mandibular which is on the posterior.

#### **Osteo-Arthritis on the Condyles, Ottoman Period**

In our Palaeoanthropological collection I have discovered a lower jaw belonging to a female about 65 years old who had lived between 100-300 years ago in Istabbul. The lower jaw is small and not very thick, high and long. The molar sockets of the lower jaw are closed. The anterior edge of the coronoid process and the trigonum retromolare makes one deep sulcus which is I have called "Sulcus Corpus Mandibulae" and one on the side of the corpus it is possible to give a name "Sulcus Corpus Mandibulae Laterale" The sulcus coronoides linguale anterior is not so deep and have not continuing up to the apex of the coronoid process.

The coronoid processes have been developed towards the backwards and Ramuses have not been wide and the condyles have also make large Gonian angle with Corpus Mandibulae. The gonion angle is 130 in both sides. Ottoman women's condyle of the lower jaw has osteo-arthritis on the right side. The condyle surface is flat on the right side and in the middle relatively deep. Sulcus in front 5 millimeters in width and 6 millimeters in length and not so deep on the posterior side. It is possible to call this sulcus "Sulcus Capitulum Medialis Anterior" when this sulcus divides the condyle into two than it is possible to call "Canal Capitulum Mandibulae Mediale." There is one example in our collections who had this formation on the right condyle.

le. The condyle is comparatively small and the transversal diameter 20 milimeters and the anterior-Posterior diameter is 10 milimeters.

The posterior side of the condyle with arthritis of the Ottoman women mandibulae is morphologically different than normal cases. There is a crista on the posterior side which has divided it into two. It is possible to call that crista "Crista Capitulum Mediale, Posterior" (Picture VI) That crista goes down to the end of the collum condyle on the right side of the condyle. There is a small fossa which is shallow and it is possible to call this fossa "Fossa Capitulum Mandibulae laterale Posterior".

The lower jaws Condyles and Coronoid Processus have been examined here they are osteo-pathological cases, and very rare morphological, anatomical and biometrical characteristics have been established. One of them is not mentioned above. It is a small foramen in the middle of the "sulcus coronoides linguale anterior" and in one case this foramen is comparatively large and has a little sulcus towards the coronoides on the linguale side. I think it is a variation not possible to find on the normal mandibula. The name of that foramen is "Foreman Coronoides Linguale Anterior". That foramen is 9 mm. close to M<sub>1</sub> on the left side. As can be seen from the pictures I have explained the most interesting Osteo-Paleopathological cases here not found among the ancient Anatolians skeletons by the research workers up to now.

Ottoman period's second lower jaw belongs to a male who has Osteo-Arthritis on the both condyles. The right condyle is divided in two with a Canal Capitulum Mandibulae Mediale and only on the right, one has a flat surface with an inclination towards inwards and other condyle is not so flat.

The condyle on the linguale side is small and the inclination towards innerside. The right condyle transvers diameter 21 milimeters, the width of the condyle is 9 milimeters. The largest condyle on the right side of the right Ramus, transvers diameter is 8 milimeters and anterior-posterior diameter is 7 milimeters.

The Canal Capitulum Mandibulae Mediale is 7 milimeters wide on the articular surface and 3 milimeters deep in the middle of the canal of the condyle. Double condyles of this lower jaw is quite

clear and it is very rare case among the ancient population. There are five examples among the Ottoman period Turks. These are very much similar to those which have been discovered among the United States whites and other races has been published by Hrdlicka in 1941.<sup>24</sup> The small condyle on the left side has inclined towards the linguale side and inner side is flat and smaller than the right one. Its transvers diameter is seven millimeters and anterior posterior diameter is also seven millimeters. The measurements have been taken not so large and it is possible to say that it is smaller than the average condyle.

The left condyle of the Ottoman lower jaw condyle has arthritis and the both sides are flat and articular surfaces incline inwards and outwards and in the middle it is protuberant. The skull of this jaw is not known to me and not possible to say anything about the Glonoid Fossa on the both sides.

### SUMMARY AND CONCLUSION

The lower jaw with arthritis had been discovered in 1961 summer in the excavation period and it was numbered as 61.14.VII.25. and locality is Pactolos North (PN) pointed tomb North side PN.11.p. 50.PN.III.P.92-100. Bones P.85-9 the lower belonged to Byzantine period. Other lower jaws are belonggin to Ottoman people who had lived in İstanbul, between 100-300 years.

The Byzantine lower jaw is very typical one with Osteo-Arthritis illnesses on the condylar process and there is a very interesting anomaly on the Coronoid process and the left Ramus is not normal when compared with the modern cases.

<sup>24</sup> Hrdlicka 1941 P. 81 Niekare 5 Number 441

The Arthritis of the condyles had been examined by Hrdlicka in various races on the lower jaws and typical cases are U. S. White, Old Peru Indian, Eskimo and old Pueblo Indian. Hrdlicka 1941 PP. 81-83 All these cases have double condyles and published with their pictures and it was possible to compare with Byzantine lower jaw Arteritic condyles. Two others have fovea capitulum mandibulae formation on the back of the condyles and they are comperable with the lower jaws condyles belong to Ottoman period Turks and Mesolithic man half lower jaw. I have discovered in Belbaya with Belbasiyen Culture on the coast of south Anatolia near Antalya Province.

Bostanci 1963 PP. 23-25

Bostanci 1963 P 253

The condyle with Osteo-Arthritis is flat on the articular surface and the articular surface inclination towards the linguale side elongated inwards. This lower jaw have belong to a man and he is sixty years old. The long axis is 31 millimeters and the anterior-Posterior diameter is 17 millimeters. The posterior side of the condyle is in the triangle shape and articular surface diameter is 30 millimeters and distal age is 35 millimeters and the linguale side edge is 27 millimeters.

The coronoid process of the Byzantine lower jaw is not normal and it is possible to examine it in three parts. In the posterior part there is a fovea which is not seen in the normal cases. I have called it "Fovea Coronoides Linguale Posterior". In the middle surface of the Coronoid process there is a crista which has been called by me "Crista Coronoides Linguale Mediale" and there is a sulcus on the anterior part it is given the name "Sulcus Coronoides Linguale Anterior". Inside the Ramus there is a hollow which I have called "Sulcus Ramus Linguale Mediale" and on the lateral side there is a Fossa Incisura Mandibulae Laterale which is also has been called by me.

A lower jaw belonging to Ottoman period a male 55 years old and on the both condyles there is Osteo-Arthritis. The articular surface of condyle are flat and the inclination towards forwards but not so much elongated and flattened as can be seen on the other cases. In the both condyles there are small fovea on the posterior side of the articular surface and I have called this before "Fovea Capitulum Mandibulae Posterior" on the Mecalithic lower jaw belonging Belbasiyen culture have lived fifteen thousand years ago From our time.

Now I have discovered one fovea in the Middle of the condyle and for this reason I have classified, Fovea Capitulum Mandibulae Mediale and Fovea Capitulum Mandibulae Posterior.

Another lower jaw belonging to Ottoman period Turk women 65 years old who have lived in Istanbul about 100 - 300 years ago has Osteo-Arthritis illness on the both condyles. The condyle on the right side is very typical one with a flat surface and a sulcus in the middle and a small condyle on the interial side which is quite narrow and inclined towards the inner side. The sulcus has been called by me "Sulcus Capitulum Mandibulae Mediale" which is when the sulcus is deep it is possible to wall "Canal Capitulum Mandibulae Mediale".

A lower jaw belonging to Ottoman male 65 years old and one condyle is double and the other single but both sides have Osteo Arthritis illnesses (Picture VIII). The right condyle is a very unusual case having double condyle and their articular surfaces are towards interior side have been inclined and in the middle of the condyles there are "Canal Capitulum Mandibulae Mediale". All of these examples, they are phylojeneticly important cases which have been found in Paleolithic man and Aciçant Anatolians. Only the Byzantine and Ottoman Lower jaws are osteo-palaeopatological cases.

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TABLE I

The measurements of the Byzantine Lower Jaw

Sex-Male	Age-55	Locality	PN Sardis 61.14
Measurements			
Mandibular Corpus length		from left	99
Mandibular Greatest length (Symphysium line)			116
Symphysium height of the Mandibular			34
Corpus smallest height of the Mandibular			36
Corpus PM <sub>2</sub> - PM <sub>1</sub> height		1	46
Corpus PM <sub>1</sub> - PM <sub>2</sub> height			47
Ramus height			99
Coronoid height			28
Corpus Thickness by M <sub>2</sub> of Mandibular			14
Coronoid Thickness			9
Condyle collum anterior-posterior diameter			14
Condyle collum transversal diameter			7
Condyle long axis diameter			31
Condyle anterior-posterior diameter			17
Ramus Thickness diameter			12
Genia thickness diameter			6
Symphysium thickness diameter			14
Corpus thickness from C <sub>1</sub> level			12
Corpus thickness from I <sub>1</sub> level			14
Corpus diameter PM <sub>1</sub> level			12
Foramen mental diameter		left	7
Foramen mental diameter		right	4
Foramen Mandibular diameter transvers left side			11
Mylohyoid groove length			23
Ramus smallest width			27
Ramus greatest width			32
Coronoid-Condyle Diameter			
Anterior-Posterior			36
Symphysium Anterior diameter			
Symphysium linguale diameter			
Coronoid process separation diameter			14
Genian Angle			55°
Menton angle			56°
Condyle inside inclination angle			60°
Condyle outside inclination angle			56°
Coronoid Process angle			140°
Coronoid Process inclination angle			54°
Coronoid Process triangle angle			73°

## EXPLANATION OF THE PICTURES

Picture I- Byzantine Period lower jaw, Condyle from above articular surface. Osteo-Arthritis.

Picture II- Byzantine period lower jaw. Condyle, Coronoid process and Ramus from lateral surface and sulcus incisura laterale.

Picture III- Byzantine period Lower jaw. Condyle from the posterior part and sulcus incisura laterale on the side.

Picture IV- Ottoman Period Türk's lower jaw. Showing the righth side condyle belong to a femal with Osteo-Arthritis on the articular surface.

Picture V- Ottoman Period Türk's lower jaw with Osteo-Arthritis illness on the right side condyle, have taken from the front.

1- Double condyle

2- Crista Capitulum Mandibulae Mediale anterior

3- Fovea Capitulum Mandibulae Anterior

Picture IV- Ottoman period Türk's lower jaw condyle with Osteo-Arthritis illness on the righth side, Picture has been taken from the posterior part of the condyle. Showing the Crista Capitulum Mandibulae Mediale.

Picture VII- Ottoman period Türk's lower jaw condyle with Osteo-Arthritis illness on the articular surface.

Picture VIII- Ottoman Period Türk's lower jaw condyle with flat surface. Showing Osteo-Arthritis illness.

Picture IX- Ottoman period Türk's lower jaw condyle with Osteo-Arthritis on the articular surface.

Picture X- Ottoman period Türk's lower jaw condyle has been taken from the posterior part and it is showing a normal case.

Picture XI- Ottoman Period Türk's Lower jaw Condyle with Fovea Capitulum Mandibulae Mediale (Bostantı)



Picture 1  
Byzantine Lower jaw Condyle with Arthritis.



Picture II  
Byzantine Lower jaw Condyle.



Picture III  
Byzantine Lower jaw Condyle.



Picture IV  
Lower jaw Goodye with Arthritis.





Picture V  
Lower jaw double Condyle.

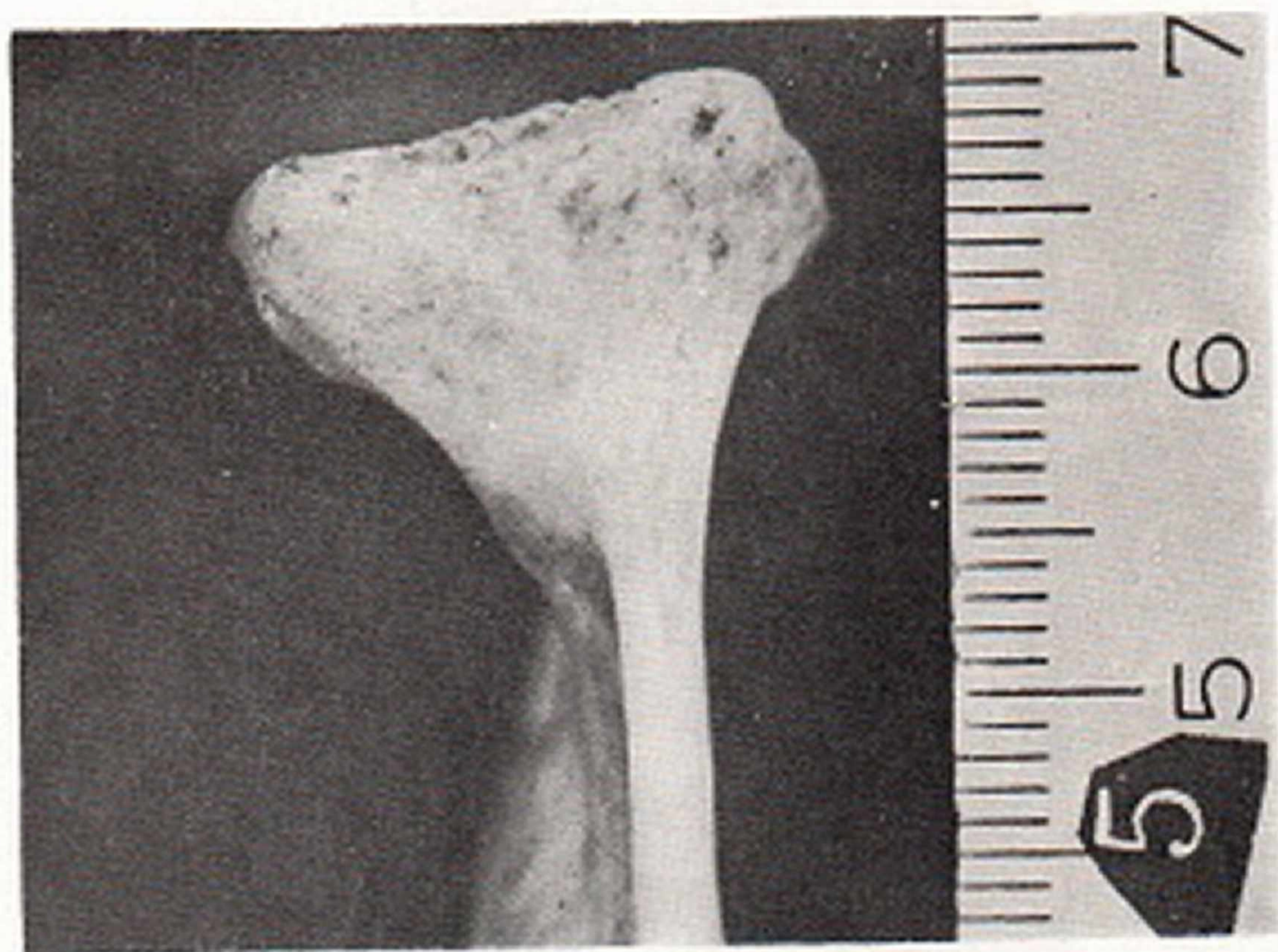


FIGURE VI  
Lower jaw Condyle From Posterior.



Picture VII  
Lower jaw Condyle with Arthritis.



Picture VIII  
Lower jaw Condyle with Arthritis.



Picture IX  
Lower jaw Condyle with Arthritis.



Picture X  
Lower jaw Normal Condyle.



Picture XI

Favra Capitulum mandibulae Mediale (Bostanci).

