

DENTAL PATHOLOGY AND ALIMENTARY HABITS RECONSTRUCTION OF ETRUSCAN POPULATION

SUMMARY

Author examines a specimen of 119 Etruscans of late epoch for the most part originating from Chiusi and surroundings (Tuscany), with the intent of examining the morbidity of the various dental diseases. In such a way we establish the archaic character of the dental health state of the Etruscans studied. Significant, in fact, are the low frequency of dental caries and the high incidence of grave dental attrition. From the data obtained we therefore propose a reconstruction of the food diet.

INTRODUCTION

The interest for the dental pathology of the Etruscans is born from two main reasons. The first, is that for a detailed knowledge of the oral health state of these populations, scarcely studied from this point of view; and the second concerns the possibility of correlating the incidence of the various dental diseases with the nutritional habits, obtaining information on the food diet of the Etruscans, otherwise hard to reconstruct.

In this type of work there are also always possibilities of comparisons with other populations, of diverse ethnic origin, nutritional habits, geographical regions and origin and of the epochs they date back to. Such comparisons give us the possibility, on the one hand, to single out the mechanisms with which the nutritional habits influence dental health, and on the other hand, of studying the modifications suffered with time from the anatomical expression of the single diseases, to investigate their eventual epidemiological variations in order of age, sex and other. In other words, of studying the evolution of the single pathological form in time.

MATERIALS AND METHODS

For the present work we have studied skulls, calvarium and jaws belonging to 119 subjects: 74 males and 45 females: as a whole 95 upper jawbones and 86

mandibula were examined. We studied, as a whole, 1,430 teeth, that is, only those still in place in their relative alveoli. The alveoli present and examined were 2,702: of which 1,418 of the upper arcade and 1,284 of the lower.

All the material comes, for the most part, from Chiusi and surroundings and is of late epoch. The material belongs to the « Etruscan Collection » of the National Museum of Anthropology of the University of Florence and to the « osteologic collections » of the Superintendency of Northern Etruria (Archeological Museum of Florence).

We are dealing with a rather heterogenous population specimen, be it for origin and for age. However, the « Etruscan collection » of the National Museum of Anthropology of Florence represents, for the moment, the most consistent numerical concentration of Etruscan skeletal remains present in Italy. In fact, it gathers the remains of almost 300 subjects. For the present work we have examined only 119, inasmuch as many of the remains in collection in Florence are in or, a bad state of conservation (in some the skull is completely absent, in others damaged to the point of not being useful) or, they are catalogued as « dubious Etruscans ». For the present work, therefore, we examine only remains gathered in tombs with features and objects definitely Etruscan. We excluded from this study infantile subjects, rarely represented in the collection considered.

The major value of the specimen studied consists, therefore in the certain belonging of all the subjects to the Etruscan ethnia and in its truly considerable numerical consistence.

The study methods are those classical of paleostomatology and include mainly the morphological analysis of the lesions, a radiographic analysis of some dubious cases and sometimes the histologic analysis of bone or dental specimens. For details we refer to the specific paragraphs.

RESULTS

1 - Pathology of the dentition

A - Dysodontiasis

The lack of space, correlated to the shortening undergone by the jawbone in man in the last several million years (Gorlin - Goldmann, 1970) is the local factor that conditions the appearance of some anomalies of dental eruption, above all of those spots in the points that have undergone a major shortening or major modifications during the phylogenesis: the third molars and subordinately, the canines.

But it is above all the wisdom teeth that are struck, even actually, by dysodontiasis. The local pathogenetic factor, lack of space, causes a missing straightening of the germ of the eighth in its migration towards the gingival plane. The

tooth does not break through perpendicularly anymore with respect to this plane but, describing a curve, it wedges with the masticatory facies leaning against the posterior facies of the seventh, without reaching the gengival plane.

To this type of pathology are always associated local inflammatory processes that leave a trace under the form of horizontal bone reabsorption on the skeletal remains.

In the Etruscan material studied we have found five cases of dysodontiasis, all relative to the wisdom teeth: two superior and three inferior. Only in one case there was the dysodontiasis bilateral. In all cases processes of horizontal reabsorption of the alveolar processes at the seventh-eighth level were revealed. With respect to the totality of the teeth examined, dysodontiasis struck only 0.34% of all the teeth. The frequency of the anomaly considering only the third molars (335 in place were studied) rises to 1.5% almost. The disease was present in nearly 3.3% of the population.

B - Defects of base and position - *Inclusion*

Also in these cases the dental germ does not reach the gengival plane. The anomaly strikes, actually, almost exclusively the eighth and third. Today the inclusion of the canines is rather frequent for the uppers but rare for the lowers. The causes of this anomaly are several, according to the topographical position of the included tooth. For the eighth the lack of space is the main cause while for the third it is believed that the continuing persistence of the corresponding deciduous tooth is the predisposing factor of the inclusion of the underlying permanent canine.

In our specimen we brought about the inclusion diagnosis with the radiographic method, and found nine included teeth belonging to seven subjects. In all cases we were dealing with eighths, six lowers and three uppers; in all subjects the anomaly as bilateral.

Inclusion struck, therefore, 2.7% of all molars and 0.6% of all the teeth examined. The frequency of the anomaly in the specimen examined is around the 5.9% value.

Position anomalies

Such are the dental anomalies, in absolute, most frequent and, according to Roccia (1960) strikes presently almost 60% of the population.

They consist in the eruption of one or more teeth in an anatomical base different from the normal one, be it in the area of the dental arcades or be it outside of them (for example, in the bony palate).

As far as the causes of these anomalies are concerned, we underline that deciduous teeth have, among other things, the task of occupying and conserving in the dental arcade area, the spot that will be taken by the corresponding perma-

ment tooth. An early falling of the milk tooth allows, therefore, for a reduction of the corresponding space due to the crowding of the adjacent deciduous teeth that tend to close the newly-formed diastema. In this way, the permanent tooth corresponding to the lost deciduous one, is deviated during its eruption and breaks through out of place.

In the specimen studied we found 18 teeth out of place, all erupted in the area of the dental arcades, in proximity of their normal topographic base. The subjects carriers of this anomaly are ten and eight of them have two teeth contemporaneously out of place.

In two cases of malposition of the upper eighths, the teeth erupted in latero-posterior position with respect to the normale position. The case of malposition of the seventh is due, probably, to a primitive anomaly in eruption, inasmuch as after the eruption of the sixth followed that of the eighth; the seventh could have in this case erupted afterwards in a lateral position due to a relative lack of space.

However, even in Etruscans the most frequent malposition is of the type called « crowding of the canine-incisive group ». The topographical distribution of this type of dysgnathia in our specimen is the following

| | | | |
|----|---------|---------|----|
| Dx | 0 cases | 3 cases | Sx |
| | 2 cases | 2 cases | |

Only in one case the lateral incisor was out of place but didn't involve the adjacent canine, but in this case the malposition is associated to a macrodonzia of an elevated degree.

As a whole, the dental malpositions struck 8.4% of the Etruscans studied and almost 70% of them were anomalies of the « canine-incisive crowding » kind. The damage produced on the chewing organ by this kind of anomaly, that is, the number of out of place teeth on the total of the examined teeth is around 1.25%.

As noted earlier, the incidence of malposition, actually, is very high even when case study varies, and it is believed that more than half of the populations of the civilized countries are struck. (Pappalardo, 1978).

In the dynastic Egyptians the anomalies of position were even more than among the Etruscans; Gabriele (1980) has evaluated, in fact, that nearly 2.6% of the individuals of those populations was a carrier of dental anomalies of position.

As we have seen, the main cause of the orthodontic anomalies lies in the early loss of the milk teeth. According to the thesis given the most credit presently, (Roccia, 1962) the most frequent cause today for the early loss of milk teeth is caries. From the data displayed above it seems plausible to deduct that the low frequency of the orthodontic anomalies found in our specimen can be correlated to the relative rarity with which caries affected deciduous teeth; what Gabriele (1980) had already supposed for the populations of dynastic Egypt.

Number anomalies

The number anomalies consist in an increase (presence of an supernumerary teeth) or in a decrease (hypodontia) of the number of dental elements. We'll overlook the tooth excess, inasmuch as no cases were found in our specimen.

Hypodontia cases are, actually quite frequent and regard the congenital absence (agenesia) of the eighth and more rarely of the third. The frequency is actually around 9 and 15%, according to the case studies, with an accepted unanimous mean of nearly 12% for Europe and the United States of America.

In the Etruscans we studied we found agenesia only regarding the eighth. Therefore, the damage that agenesia produced in our specimen as a whole on the teeth (i.e., the frequency of agenetic teeth with respect to the total teeth present), is about 0.88%, keeping in mind that we studied 2702 alveoli. 7.16% of all molars is agenetic.

Twelve subjects were carriers of the anomaly and the most frequent situation was that of a carrier subject of only one agenetic eighth.

The frequency of the disease is therefore about 8.4%.

We have compared this data of morbidity with other relative to different populations and obtained with the same methods of diagnosis and calculation. In *fig. 4* we visualize the comparison.

| TIPO DI ANOMALIA | TIPO DI DENTE | | | | | | | | Totale |
|------------------|---------------|---|---|---|---|---|---|----|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| DISODONTIASI | | | | | | | | 5 | 5 |
| INCLUSIONE | | | | | | | | 9 | 9 |
| MALPOSIZIONE | | 8 | 7 | | | | 1 | 2 | 18 |
| AGENESIA | | | | | | | | 24 | 24 |
| FORMA O VOLUME | | 3 | 1 | | | | | 5 | 9 |

fig. 1

Among dynastic Egyptians agenesia of the eighth struck nearly 17.3% of the population and 9.8% of all eighths was agenetic (Gabriele, 1980). We have compared this data and that relative to the Etruscans with data relative to a case study of a specimen of Europeans that lived during the 7th-8th century A. D. (French, Germans, Austrians, Spanish, Scandinavian) rather than with data relative to actual case studies. This because the latter are subject to the influence of modern therapies, including dental avulsions.

In the above mentioned European specimen of the 17th-18th century A. D. the agenesis of the eighths struck only 9.4% of the population and the damage produced by the agenesis on all the eighths is of nearly 10.9% (Capasso, 1982).

According to Gorlin & Goldmann (1970) the shortening of the jawbones is the main cause of agenesis of the eighths. In fact, the eighths are teeth in progressive involution, if not of a complete disappearance. They are, in absolute, the teeth most struck by anomalies of dentition in general and, when present, they are often microdont, disodont or out of place. It would be expected that the agenesis of these teeth would become less and less frequent in the more ancient populations, as Gorlin & Goldmann had supposed (1970). In fact, it seems that the involutive processes that regard the eighths began several mileniums ago. This is true also of the weakening of the molars in an anteroposterior sense: it is a very ancient phenomenon and can be found already in the fossil homids with a tendency towards the realization of a « human » dental situation (the first molar bigger than the second and the second bigger than the third, while in the anthropoidape the inverse condition is found: i.e., the first molar is the smallest of all). On the other hand, these involutive processes that will, in the long run, lead certainly to the disappearance of the eighth tooth, have undergone an acceleration in the last centuries, certainly correlated to the spreading of caries in the deciduous teeth and therefore, to their early loss. This leads to an increase in the speed of shortening of the jawbones, a considerable characteristic of the evolution line of man.

This means that the « involution of the eighths » phenomenon seems to have very ancient origins, as Gabriele (1980) had already supposed studying the phenomenon among dynastic Egyptians, even if it has recently undergone an acceleration. This seems to demonstrate also, the high frequency of agenesis of the eighths that was found in the Etruscans.

The agenesis diagnosis is radiographic and is generally quite simple, even in the case of differential diagnosis with inclusion. However, in cases when an eighth has been lost early in life, the alveolar reabsorbment can be complete and perfect, to the point of simulating an agenesis. In order to study this kind of differential diagnosis, we based ourselves on the study of the occlusal facets of attrition of the teeth of the antagonists. In fact, the absence of these facets demonstrates that the missing antagonist has never masticated.

Form and volume anomalies

The fact that the major part of the sample of teeth examined was struck by a attrition of a high degree, impedes the study of the accessory cuspids. In addition, root anomalies were not considered, this due to the high cost that this investigation requires (exclusively radiologic).

The study of form and volume anomalies is therefore, based on the surveys of micro and macrodontism

In the Etruscans studied only six subjects were carriers of these anomalies, for a morbidity of nearly 5%; the anomalous teeth are in all nine, of which seven microdontic and two macrodontic. The microdontism regards the eighths (five cases) and the lateral incisives (two cases). Here too, we're dealing with a reduction of volume of the tooth that assume also, in its crown, a coneshaped morphology. Actually, these anomalies are not very frequent, however, the microdontism of the lateral incivives (coneshaped incisives) is the form anomaly of the crown most frequent and is present in nearly 1% of the European population (Pappalardo, 1978). Presently, microdontism of the eighths is much less frequent. In the Etruscans the opposite situation verified ieself and the microdontism of the eighths is more frequent than that of the lateral incisives.

The cases of macrodontism found in the specimen studied regard an upper canine and an upper lateral incisive, both very enlarged in volume, but with a preserved morphology.

In the specimen studied we also found a case of form anomaly not associated with volume anomaly in an upper canine that had assumed the morphology of an incisive.

2 - *Dental caries*

Among the Etruscans we studied, dental caries had a relatively low incidence. We found 33 subjects with at least one tooth decayed: of these 24 were males and 9 females. The disease had, therefore, an incidence of 27.73%. Of the 1430 teeth examined only 95 were decayed, so that the damage produced by the caries on the chewing organ is around 6.6%.

The tooth most struck of all by caries is the first molar and 27.7% of all decayed teeth are molars. According to frequence follow, the 3rd molar and the 2nd molar. Caries in the anterior teeth was very rare and of the 95 decayed teeth examined only 2 were incisive.

The major part of caries cases fall under the 5th class of Black (cavity of the flank); to be noticed also, the total absence of caries destroying the incisive corner and the low frequence of caries of the groove and fossula.

Also for dental caries we were able to make the comparisons only with specimen studied with analogous methods to those used here. Peluso (1980) found, among dynastic Egyptians, a frequence of 3.5% of caries while the damage produced by the disease on the chewing organ is also around 3.5%.

It is not possible to compare this data to actual one, mainly due to the already mentioned modifications introduced by the radically modern therapies for the actual epidemiological situation (nearly 80-90% of the population affected with caries). A more reliable comparison is possible with Europeans of the 7th-8th century A. D. In this case caries struck almost 30% of the population and the damage it produced on the chewing organ was of nearly 6.3% (Capasso, 1982).

DANNO DA MALATTIA SUL COMPLESSO DEI DENTI

| Malattia | % denti colpiti |
|----------------------------|-----------------|
| DISODONTIASI | 0.34 |
| INCLUSIONE | 0.62 |
| MALPOSIZIONE | 1.25 |
| AGENESIA | 0.88 |
| ANOMALIE DI FORMA E VOLUME | 0.62 |
| CARIE | 6.64 |
| GRANULOMI APICALI | 2.74 |
| DENTI PERSI IN VITA | 12.25 |

Sul totale di 1430 denti e 2702 alveoli.

fig. 2

The whole of this data consents come paleonutritional considerations. The low frequency of caries in Etruscans is certainly connected to the use of foods with a low content of carbohydrates. Besides, the long mastication that was necessary for the breaking down of hard foods was in these populations the cause of an effective and continuous usage of the masticatory surfaces, this is demonstrated by the rarity of occlusal caries and by the high frequency of pathological attrition. The absence of cases of caries destroying the incisive corner indicates, as a whole, that among Etruscans this disease had not yet reached an advanced degree of development; although the anterior caries were already known since the Iron Age (Messeri, 1981).

3 - *Odontogeneous cysts of the jawbones*

The communication of the pulpal cavity with the outside is the cause of the apical localization of germs that give way to the formation of apical granuloma. The main causes of these communications are caries and a perforating attrition.

We found 33 subjects carriers of at least one apical granuloma, consequently the incidence of the affection is 27.7%. Of the 2702 alveoli examined only 74 had granuloma, for a percentage of 2.74%.

The tooth which was, in absolute, most struck by this kind of pathology is the first molar (29.7% of all granuloma); the granuloma of the three molars together represent more than 74% of all granuloma found.

In all the cases observed the granuloma were externalized through a bony gap, however, only in one case did I observe the presence of a perforating granuloma the thickness of the alveolar process (apical granuloma of the 3rd).

In cases of apical granuloma comparisons are not possible inasmuch as studies do not exist performed with the same methods on other populations.

| MORBILITÀ | |
|---------------------------------------|-------|
| DISODONTIASI | 3.3% |
| INCLSIONE | 5.9% |
| MALPOSIZIONE | 8.4% |
| AGENESIA | 8.4% |
| ANOMALIE DI FORMA E VOLUME | 5.0% |
| CARIE | 27.7% |
| GRANULOMI APICALI | 27.7% |
| PARAODONTOPATIE SUPERFICIALI CRONICHE | 4.2% |
| DENTI PERSI IN VITA | 49.6% |
| USURA DI 3° E 4° | 50.4% |
| CALCOLI DI TARTARO | 13.4% |

fig. 3

As far as the cause of the granuloma is concerned, I considered three possible associations: granuloma and dental caries, granuloma and perforating attrition and granuloma associated with both dental caries and perforating attrition. In addition, there exist considerable numbers of sets of teeth in which the granuloma are not associated either to dental caries or pathologic attrition. The results of this pathological investigation are summarized in the following table.

| | Associated to caries | Associated to 3rd° & 4th° attrition | Associated to caries & attrition | Non Associated | Total |
|-----|-------------------------|--|-------------------------------------|-------------------|-------|
| No. | 7 | 6 | 12 | 8 | 33 |
| % | 21.2 | 18.2 | 36.4 | 24.2 | 100.0 |

As we can see the most frequent association is that takes place in mouths in which the granuloma were caused by perforating caries and attrition. However, we can affirm that among Etruscans the most frequent cause of granuloma is dental

caries (57.6% of the granuloma can be found associated to this pathology) rather than attrition (54,6% of the associations).

4 - Superficial chronic parodontopathia

The phlogosis of the superficial parodontium leave signs on the bone only if they are of chronic character. They are characterized by a reabsorbment of the superficial bony parodontium.

Among the Etruscans I found only five subjects carriers of these affections and their morbidity is therefore, nearly 4.2%, (three females and two males).

The teeth around which these phlogosis developed are seven (0.48% of all teeth present); of these six are wisdom teeth.

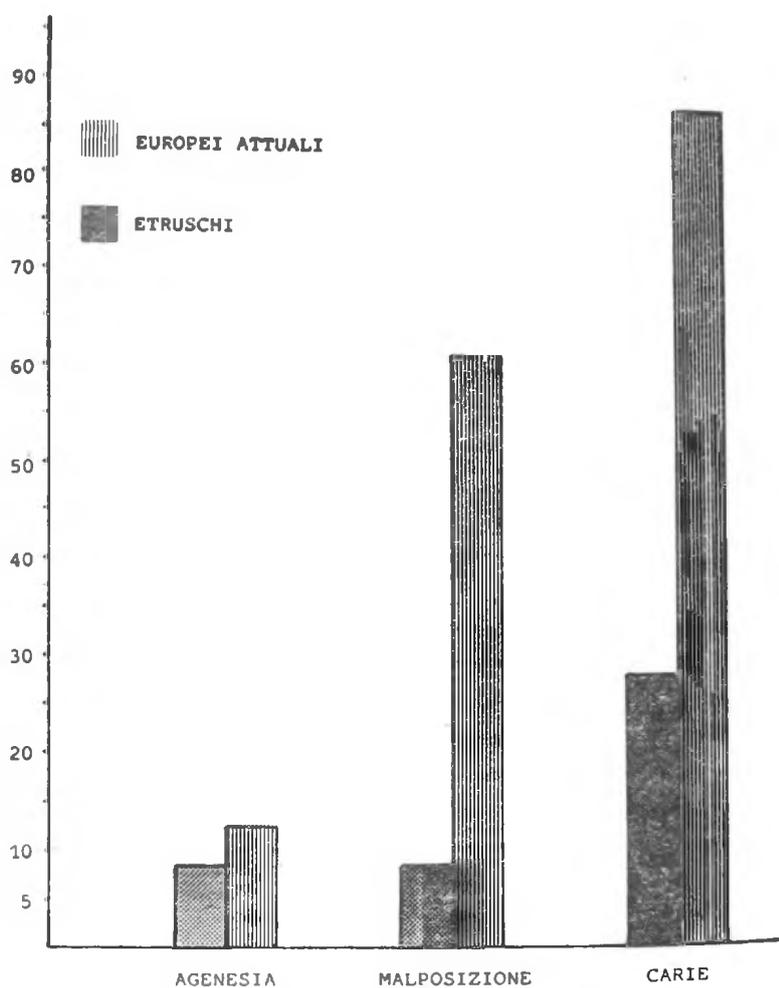


fig. 4

5 - Teeth lost in life

We consider lost in life those elements missing and whose alveoli show traces of reabsorbment and a tendency to closure.

This diagnostic criterion is the only plausible one even if it excludes those teeth lost shortly before the death of the subject and whose alveoli did not have the necessary time to undergo the above mentioned modifications.

In this way I was able to ascertain that of 2702 alveoli studied a good 331 belonged to teeth lost in life, for a percentage of 12.25%. As far as the morbidity is concerned, 59 of the 119 subjects studied lost at least one tooth in life, so that 49.6% approximately of the Etruscans examined had lost a tooth in life.

The tooth that in absolute was lost most frequently in life is the eighth, more often the uppers than the lowers.

As far as the exam of the causes of the loss of teeth in life is concerned, we proceeded as with pathogenetic investigation done on apical granuloma, that is, taking in exam a series of associations between the various kinds of pathologies present at the same time in the various diseased mouths. The associations taken in consideration are those between teeth lost in life, dental caries and grave attrition (3rd and 4th degree). The results we obtained are outlined in the following table.

SUBJECTS WITH TEETH LOST IN LIFE

| | Associated to caries | Associated to 3rd° & 4th° attrition | Associated to caries & attrition | Non Associated | Total |
|-----|-------------------------|--|-------------------------------------|-------------------|-------|
| No. | 11 | 15 | 19 | 14 | 59 |
| % | 18.6 | 25.4 | 32.2 | 23.7 | 100.0 |

Grave dental attrition seems, therefore, to be the cause most frequently in play in the loss of teeth in life among the Etruscans.

On the other hand, even in this case a certain number of mouths with missing teeth were found with no elements affected by caries or by perforating attrition. For these teeth we can very likely suppose dental traumas.

Comparing the topographical development of caries, of the apical granuloma and teeth lost in life, we note that in all three cases the most struck teeth are the posterior ones, while the anterior are less and less struck. As far as the teeth lost in life are concerned, however, the topographical distribution curve has a correspondence minimum at the canine and then proceeds in rising in correspondence of the incisives (*fig. 5*). This development can be explained, as a matter of fact, admitting a certain influence of traumas, that, as known, strike above all the anterior teeth.

7 - Traumatic pathology of teeth

A - Occlusal attrition

Occlusal attrition is a physiological process tied to the employment of teeth in their normal function, i.e., during chewing. Naturally the degree of dental attrition depends on the number of the masticatory acts completed, and also, on the age of the subject. This relation between age and occlusal attrition has also been employed by some authors to determine the age of death.

However, occlusal attrition of the teeth depends also on the degree of « refinement » of the mouthfulls. Coarse foods, tough and lengthy and laborious to chew, or even mixed with abrasive substances such as sand, produce a major attrition than that we would expect in a given age. In these cases we can speak of a pathological attrition.

In the Etruscan specimen I did not study quantitatively the attrition of single teeth but limited myself to the analysis of the morbidity due to « grave » occlusal attrition. As grave, I intend attrition of the 3rd degree (with apposition of yellow reactive dentine) and of the 4th degree (perforating occlusal attrition).

In all the specimen I found 60 mouths with teeth with grave attrition; 43 of them male subjects and 17 female.

The morbidity of these forms is, therefore, very high, superating 50%. We can calmly assert that grave occlusal attrition is the most frequent dental disease among Etruscans and its incidence superates by far even that of dental caries.

This situation is typical of populations with a coarse nutrition, composed of tough mouthfulls, cooked little or not at all, poor in carbohydrates, and laborious to chew (Capasso e Milanesi, 1981).

B - Fractures

I did not find any case of a dental fracture. However, as we have seen with teeth lost in life, there are elements existing that make us believe that at least a part of the anterior teeth lost in life had undergone a trauma.

In a population in which caries of the anterior teeth is rare and grave usury strikes, above all, the posterior teeth, the loss in life of the incisives is very likely tied to traumas; this is supported also by the development of the topographical distribution curve of teeth lost in life.

The anterior teeth are, on the other hand, those actually most subject to this kind of pathology, frequent, above all, in persons that practice dynamic physical activities.

8 - Tartar stones

The tartar incrustations of the gengival pocket are very frequent in the Etruscan specimen, but true tartar stones can be only in 16 mouths (9 males and

7 females) located on the lingual surfaces and for the most part of the anterior teeth, in correspondence of the gingival pocket of the first molar.

The calculable morbidity of this pathology is therefore, of nearly 13.4%.

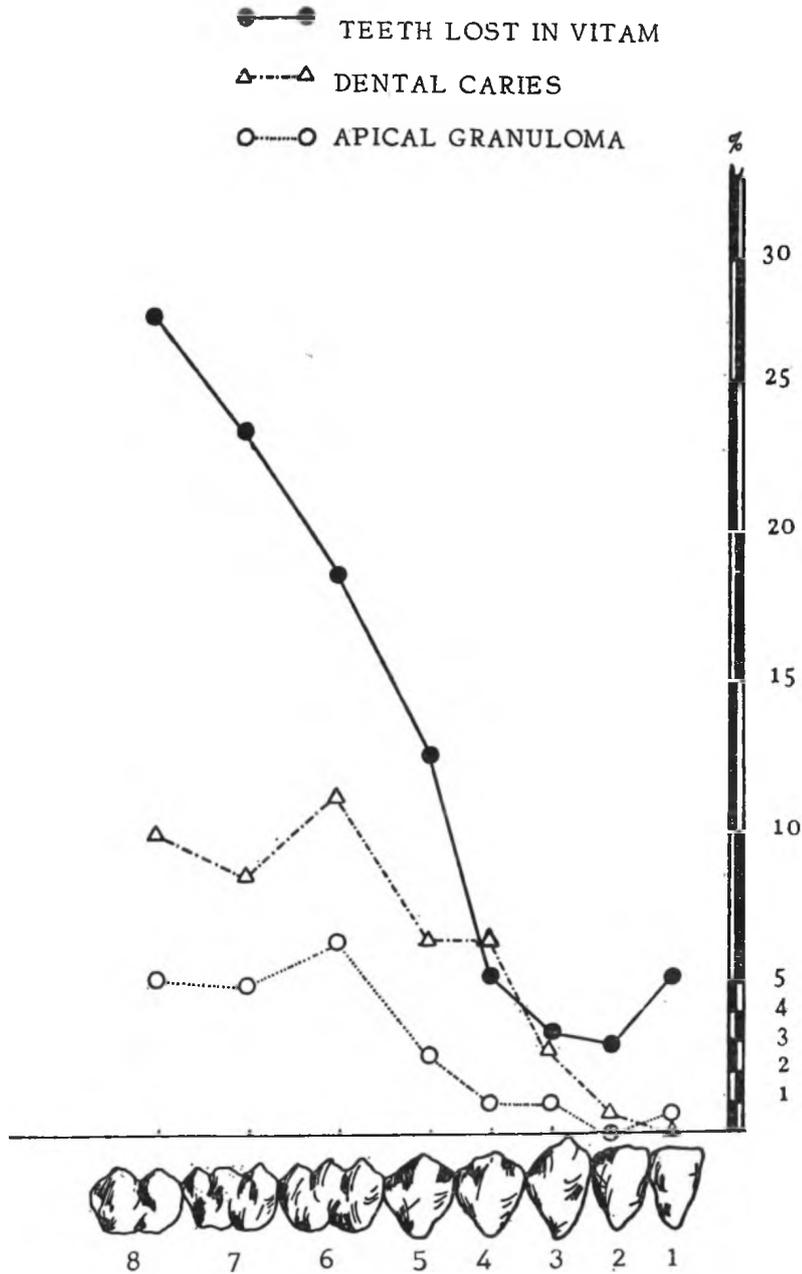


fig. 5 - Topographic distribution in dental hemi-arch of the caries, apical granuloma and teeth lost « in vitam ».

9 - Temporomandibular arthritis

Of the whole specimen studied only one case, very grave at that, of temporomandibular arthritis was found of probable infective origin.

The lesion belongs to a male adult and is monolateral, and therefore, not comprised in those cases of « Costen Syndrome » that are today quite frequent although found also among ancient populations affected with grave attrition (Peluso, 1980).

The mandibular condyle is made up of totally rearranged bone, bordered by big osteophytes; the glenoid cavity of the temporal bone is widened both frontwards and backwards, with margins doubled by neoformed bony rings. Grave osteoporosity is present both at the condyle and at the glenoid cavity.

The origin of the infection is uncertain inasmuch as the neighbouring bony structures are undamaged; we do not find bony signs of purulent otitis or mastoiditis and even the occipital squama and the sphenoidal wing do not show signs of traumatic lesion.

Conclusions

From what we have observed to this point on the bases of comparison of the data obtained and other data relative to the different populations, it is possible to draw some general conclusions both on the dental health state specifically oral of the Etruscans and on their particular food diet. Also, we can draw some conclusions on the evolutive type of some affections.

1. The high incidence of agenesis of the eighth among Etruscans confirms Gabriele's thesis (1980) whereby the tendency towards disappearance of this tooth is further away in time than we may have supposed up to now.

2. Among the Etruscans the dental caries morbidity, the human disease most widespread today, is relatively low. Caries of the anterior teeth is rather exceptional. Caries of the deciduous teeth is rare, as shown by the rarity of the orthodontic anomalies of the permanent set of teeth.

3. Grave dental attrition is the oral pathology with the highest morbidity among Etruscans.

4. Perforating dental caries and grave attrition are the causes in play in the loss of teeth in life also among Etruscans; however, in a certain number of cases it can be demonstrated that the anterior teeth had been lost in life due to traumatic causes. This indicates that at least a part of this population practiced « dynamic » activities, for example warlike.

5 - The general dental health state shows an « archaic character » in the nutrition of these populations: the low incidence of caries both in the deciduous set of teeth and in the permanent ones indicates a low standard of simple carbohydrates in the diet and in addition a good wearing away of the masticatory surfaces; surely tied to the long and laborious masticatory acts. The high incidence of grave attrition indicates a nutrition that consisted in large mouthfuls, raw for the most part, and requiring lengthy chewing.

Acknowledgment

I thank professor Piero Messeri for having directed some of the diagnoses, the technician Vitaliano Rossi for having advised and assisted me in the analysis of the material. A special thank to professor Maetzke, superintendent of Northern Etruria, for having allowed me the access to the osteologic collections of the Florentine Museum of Archeology.

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