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Study of Dental Occlusion in Ancient Human Remains: A Methodological Approach

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A B S T R A C T

The anthropological dental and maxillary study in human skeletal remains usually refers to alterations or conditions of the oral cavity. These alterations could have repercussions on life style, dietary habits and diseases. In this particular context, dental occlusion is not often analyzed due to the fragmented condition of the remains, and especially due to the lack of methodology adapted to study ancient remains. The aim of this study is to propose an anthropological method based on clinical dental practice. In the method presented in this work, odontological parameters such as overjet, overbite, and Angle's Classification of Malocclusion, are evaluated.

***Key words**: malocclusion, paleopathology, paleodontology, reconstruction of paleodiet, life style*

Introduction

There are various research projects on ancient populations that are focused on the reconstruction of dietary habits by the study of teeth and maxillary bones. In this particular context oral pathology, dental wear, dental calculi and their composition and other oral conditions must be taken into account, as well as skeletal markers of metabolic diseases and nutritional stress. Moreover, physical and chemical techniques are used in many studies, in order to determine the type of food consumed in the past. Nevertheless, the lack of studies based on dental occlusion should be highlighted. Thus, the authors propose to study the factors that could lead to malocclusion as well as other diagnostic features for the interpretation of health and lifestyle in an anthropological context.

Dental occlusion is the relationship between both dental arches, where the maximum number of contacts between upper and lower teeth are achieved. Occlusion is dependent on the morphology and function of the different stomatognathic system components[1] (bones, muscles and teeth). Therefore, in skeletal remains, occlusion usually refers to upper and lower teeth articulation. A correct dental occlusion »refers to how well the teeth are arranged individually and one-to-another within and between the dental arches«[2]. Conversely, malocclusion is considered a discrepancy between teeth that can modify the maxillary shape, sometimes affecting mastication.

Classifying the dental occlusion of ancient remains in normal (normocclusion) or altered (malocclusion) is not the only purpose of the study, but also to define the occlusion characteristics of a population when only skeletal remains are available. It is important to highlight that a slight variation in dental positioning is not enough to be considered malocclusion. Thus, discriminatory criteria must be applied in order to distinguish a slight variation of dental position from a true malocclusion.

The most influencing factors in dental position variation are genetic and environmental – mainly diet and dental wear. In physical anthropology, dental occlusion is not often included in maxillary analysis due to the fragmented and incomplete bone material, and in particular, due to the lack of suitable methodology for the study of ancient remains.

The aim of the present study is the development of a guide for dental occlusion analysis suitable for maxillary remains. The proposed methodology is a contribution to complete the dental data collection in anthropological studies.

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Methods

Archaeological remains do not always include complete skeletal elements, and they may not even be in a good preservation state. This disadvantage is really important in the study of dental occlusion, because sometimes maxilla or mandible are lost, dental arches are incomplete, or some teeth are missing. In addition to this limitation, there is a lack of soft tissue, which complicates the reconstruction of the movement between the dental arches. Even so, it is possible to gather relevant information about mastication and its interpretation.

In the clinical study of dental occlusion, different factors that guide the mandible movement, with or without dental contact, are evaluated, such as articular joints, teeth, arches and muscles. Conversely, in skeletal remains it is only possible to analyze teeth, dental arches and some aspects of the temporo-mandibular joint (TMJ). Hence, the study of the occlusion in skeletal remains may only be referred to only as »static« occlusion, which means the study of the jaws with maximum dental contact and maximum inter-cuspidation.

In this work, a lab sheet has been developed with dental and maxillary parameters that would be recommended to evaluate occlusion and its anthropological interest. Different biological traits, such as age, sex and preservation status have also been considered.

The lab sheet

Due to the limitations of the preservation status of skeletal remains, the evaluation of dental occlusion requires an accurate analysis of the maxillary and dental position, as well as other variables. To achieve a consensus in this analysis, differences between intra- and inter-observer must be previously calibrated. The lab sheet (Figure S1) includes different types of information grouped into five main sections: anthropological information, dental features, dental arches features, occlusal features and articulation characteristics.

Anthropological information

The individual's information is fundamental for the evaluation of dental occlusion, because dental parameters are influenced by biological and social status, and occupational habits. Moreover, this information must be temporally and geographically situated in order to understand it.

The lab sheet includes different levels of information. The archaeological data and biological profile are collected, including all potential information about the remains and their conservation (a maxillary fragment or a complete skull and mandible). Thus, the origin of the remains, its dating, the individual reference, as well as sex and estimated age at death, must be collected. The section of sex information is divided in four categories: masculine, feminine, ambiguous or undetermined. The age at death categories have been defined according to Vallois[3] and they are divided into six different groups: Infantile I (0–6 years old), Infantile II (7–12 years old), Juvenile (13–20 years old), Adult (21–40 years old), Adult Mature (41–60 years old), senile (more than 60 years old). The maxillary and mandible preservation status is separated into hemi-arch and it specifies the presence or absence of condyles, which are basic to analyze certain situations that can be observed in occlusal alterations.

Dental features

Dental and oral pathology analysis**:** Number of teeth, size, shape and position, as well as the associated pathology, have an important effect in causing an abnormal functional occlusion, in order to avoid pain or improve the masticatory function. Each dental status and the possible alterations that can be found in the teeth are collected in the dental sheet. The FDI system (ISO-3950 notation) has been used for teeth enumeration. Using that system, the presence or absence of the teeth is registered. In the case of teeth absence, it specifies if its loss took place *ante-mortem* (when an empty alveolar cavity can be observed) or *post-mortem* (when alveolar cavity has been obliterated due to bone healing). The registration of *ante-mortem* teeth loss is relevant because it can modify the dental arch morphology. For instance, a first molar loss can cause the mesial migration of the second and third molars, modifying not only the arch morphology, but also the occlusion type. Isolated teeth are not included in this study. Nevertheless, they are registered and described in order to complete the individual´s dental information.

Regarding oral pathology, dental decay (its location and degree of dental involvement), root fragments, possible abscesses and fractures are described according to Chimenos et al. criteria[4.] For decay, description number and letter are used. The numbers indicate the location of the decay: 0 absent, 1 present, 2 occlusal, 3 crown, 4 necks, 5 root and 6 others. The letters, associated with the numbers, describe the degree of the lesion: a – enamel, b – dentin, and c – pulp. Other variables that influence dental occlusion are also evaluated, such as dental crowding, rotation, and medial, distal, buccal and lingual dental movements. Moreover, abnormal dental eruption such as ectopic eruption, agenesis, supernumerary teeth and other conditions are also evaluated.

Dental wear: As mentioned, dental aspects are basic in the study of dental occlusion. Nevertheless, dental wear requires an independent evaluation as first evidence of the relationship between teeth, as well as evidence of the masticatory and para-masticatory functions. Its analysis is necessary to understand the position of the teeth in occlusion. In the proposed dental sheet, occlusal wear is evaluated according to Brothwell[5] and Lovejoy[6] (Figures 1 and 2). In this study the dental arch is divided in sextants, in order to achieve an accurate analysis of central and lateral dental wear (right and left). Furthermore the degree of dental wear is classified into 5 categories: absence (0), point of enamel wear (1), islands of visible dentine (2), confluence of islands (3), and absence of enamel (4).

Fig. 1. Categories of dental occlusal wear in anterior teeth. Modified from Brothwell (1981) and Lovejoy (1985).

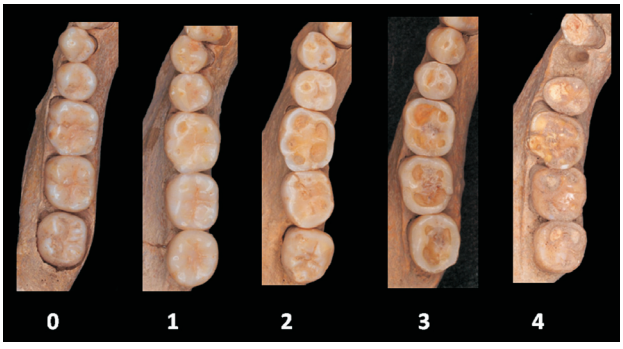

Fig. 2. Categories of dental occlusal wear in posterior teeth. Modified from Brothwell (1981) and Lovejoy (1985).

Spacing characteristics: Dental arch size, as well as teeth presence, position and size, can often explain the articulation between dental arch and teeth. Conditions of space are evaluated by the presence of a diastema or dental crowding. Diastema is the space separating two adjacent teeth. The arch length is higher than the sum of mesiodistal diameters of the teeth; hence there is an excess of space and some teeth are not in contact with the adjacent one. In archaeological studies central diastema (inter-incisal space in the upper arch midline), as well as between other teeth, are analyzed. Diastema is classified into 4 categories: absence of diastema (0), 2–3 mm diastema (1), ≥4 mm diastema (2), and un-recordable (9).

On the other hand, dental crowding is caused by the lack of space for proper teeth alignment in the dental arch, which can influence dental occlusion. It produces possible inclination, and position or rotation anomalies of erupted teeth. In the sheet, dental crowding is classified into 4 categories: lack of crowding (0), 2–3 mm crowding (1), ≥4 mm crowding (2), and un-recordable (9).

Dental arches features

Dental arch morphology: From an evolutionary point of view, dental arch morphology is highly influenced by the different masticatory movements, which are related to diet. The shape and size of the human dental arch has been modified through time, in association with a higher processed food intake. Dental arch morphology is evaluated according to Molnar and Molnar[7]. It is classified into: 1) parabolic, where the anterior curve is wide and divergent ramus, 2) oval, with wide anterior curve and convergent ramus in the last molars, and 3) squared, with nearly plane anterior curve and posterior ramus nearly straight[1,8,9].

The analysis of symmetry[8] is performed by the evaluation of dental arch morphology with a symmetrograph. This is a transparent squared pattern that is superimposed on the arch, where dental position as regards the midline can be observed; metric data are also collected. Asymmetry can be caused by different pathogenic mechanisms, and whether it is congenital or acquired (traumatic for instance) must be registered.

Dental arch measurements analysis provides the quantification of different parts of the masticatory system related to teeth. This analysis consists of an objective evaluation of each dental arch that can be compared between different individuals or populations. Measurements are sagittal (longitudinal), and transversal (in width)[1,10].

Sagittal measurements: Maxillary or superior depth (Figure. 3A): It is defined as the anterior-posterior distance taken in maxillary bone, from the inter-incisal point to the plane conformed by the tangent of first upper molars mesial contact point. In case of lack of one of the incisors the measurement is taken in the interproximal wearing facet, and in case of lack of both incisors the reference point is the most anterior part of inter-incisal alveolar crest. If there is a molar missing, the reference point is the inter-proximal distal wearing facet of the second upper premolar. If there are no molars or premolars, the reference point is central area of alveolar bone crest. Maxillary Length (Figure. 3B): It is defined as the anterior-posterior distance taken in maxillary bone, from the inter-incisal point to the plane conformed by the tangent of first upper molars distal contact point. Values are taken in the same way, and by applying the same criteria as in maxillary depth.

Mandible depth (or inferior depth) (Figure 3C): it is the anterior-posterior distance taken from the midpoint of the inter-incisal point to the plane conformed by the tangent of first lower molars mesial contact point. Values are taken in the same way, and by applying the same criteria as in maxillary depth. Mandible length (Figure 3D): It is defined as the anterior-posterior distance taken in maxillary bone, from the inter-incisal point to the plane conformed by the tangent of first upper molars distal contact point. Values are taken in the same way, and by applying the same criteria as in maxillary length.

Transversal Measurements: Superior and inferior intercanine width (Figure 3E): it is the distance between both canines (superior or inferior), measured from cuspid to cuspid; in case of marked wearing the reference point is the centroid (central point of incisal surface, lo-

cated in the intersection of mediodistal diameter with buccal-lingual diameter) or alveolar central point in case of lack of teeth. Superior and inferior intermolar width (Figure 3F): It is defined as the distance between the two centroid points of upper or lower first molars. In case of absence of molars, the alveolar central point can be used as reference.

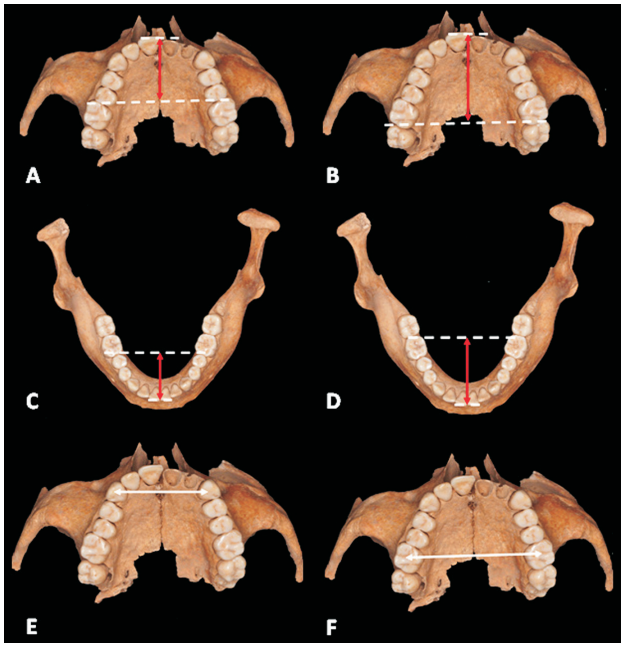

Fig. 3. Reference points of maxillary depth (A) and length (B); reference points of mandible depth (C) and length (D); Reference points of intercanine (E) and intermolar (F) distance.

Occlusal features

Occlusion is also analyzed through the inter-maxillary relationship in the three spatial planes (sagittal, vertical and transversal). The inter-maxillary relationship influences the maxillary movements, because they are directly related to oral activities, depending on whether they are masticatory or extra-masticatory. Its proper evaluation enables to hypothesize about diet and occupational habits, as regards the analysis of dental arch applied force, and type of movements done.

Overbite (Figure 4) consists of the vertical covering of lower incisors by upper incisors, which is considered normal when that covering is about 1/3[11]. So that the ranges used in the proposed dental sheet are: 1/3 of dental crown of lower teeth covered (0), from 1/3 to 2/3 of dental crown of lower teeth covered (1), more that 2/3 of dental crown of lower teeth covered (2), un-recordable (9).

Open Bite (Figure 4) is the occlusion characterized by the presence of a space between upper and lower anterior teeth incisal edges when jaws are closed. So that there is a lack of contact between upper incisor´s lingual surface and lower teeth incisal edges. The following criteria are

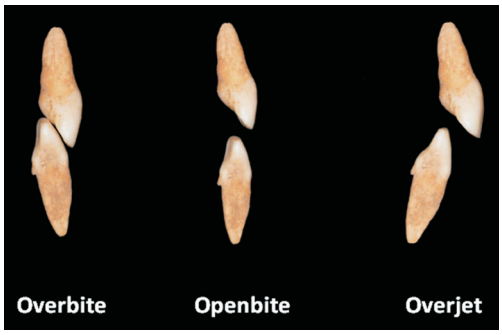

Fig. 4. Overbite, Open bite and Overjet.

considered: absent (0), present (1), and un-recordable (9).

In the same way, posterior open bite is caused by a lack of upper and lower posterior teeth contact. The criteria used are: no open bite (0), presence of open bite, indicating the number of non-contacting molars (1-2-3), un-recordable (9).

Overjet (Figure 4) quantifies the distance between lower incisor buccal surface and upper incisor incisal edge measured parallel to the occlusal plane considering the starting point of the measurement at the superior incisor. A measurement of +2 mm with ±2 mm of deviation is considered normal[12,13]. Overjet is classified into four categories: overjet from 0 to 4 mm (0), 4 to 8 mm overjet (1), more than 8 mm overjet (2), and un-recordable (9).

Anterior cross bite is a malocclusion by a mandible or maxillary bone sagittal displacement. Anterior cross bite can originate from a dental mal-position, dental hypoplasia, or diminished maxillary growth, which implicates maxillary retrusion, as well as prognatism or and advanced anterior mandibular, which causes upper incisors positioned behind upper incisors. It is classified into: absent (0), affecting just one tooth (1), affecting two teeth (2), affecting three teeth (3), and un-recordable (9).

Midline displacement can be observed by the asymmetry between the dental arch in the incisor area. The intercisal point, which is defined as the mesial contact point between both central incisors, must coincide with palatine midplane. Its possible displacement as regards to the midline is evaluated taking the palatine suture as reference. The possible values registered in the dental chart are: absent (0), present 2–3 mm (1), present ≥4 mm (2) and un-recordable (9).

Canine relation had been in the same way as registered for molar relation, Angle´s classification (I, II and III) are defined for the canine relationships. Class I or normocclusion is established when the upper canine cuspid is located between the lower canine and lower first premolar, when dental arches are occluding. The possible values for this variable are: Class I (0), Class II (1), Class III (3), and un-recordable (9).

Molar relationship: Angle's classification[14] has been used to describe molar relationships, distinguishing: class

I, class II and class III (Figure 5). Class I. Upper first molar mesiovestibular cuspid occludes in the lower first molar buccal sulcus. Class II. Lower first molar buccal sulcus is located distally as regards the upper first molar mesiovestibular cuspid. The whole maxillary arch is displaced forward, or mandibular arch is displaced backwards as regards the maxillary bone. Moreover, Class II is divided into Complete or Uncompleted Class II, according to the intensity of sagittal deviation. Complete Class II is considered when the upper first molar distovestibular cuspid is at the level of lower first molar buccal sulcus. Whereas Incomplete Class II is considered as a lower degree of this type of malocclusion, a cuspid to cuspid relationship exists when the mesial surface of both upper and lower first molars are in the same vertical plane. Class III. Lower first molar buccal sulcus is located mesially as regards to upper first molar mesiovestibular cuspid. The mandibular bone is displaced forward or maxillary bone is displaced backwards regards to the mandible. As in class II, there is a distinction between complete class III and incomplete class III, according to the degree of affectation. Thus anteroposterior molar relationships (or Angle classes) are registered as: Class I or normocclusion (0), Incomplete Class II (1), Complete Class II (2), Incomplete Class III (3), Complete Class III (4), and un-recordable (9).

Fig. 5. Angle´s Occlusion classification.

Posterior cross bite: Lingual posterior cross bite is caused by a transversal malocclusion, where the upper molar and premolar buccal cuspids occlude in the lower molar and premolar pits. This item can be classified into three categories: absent (0), present (1), and un-recordable (9).

Buccal posterior cross bite occurs when upper molar and premolar palatine cuspids contact with lower molar and premolar buccal cuspids. The different values of classification are: absent (0), present (1), and un-recordable (9).

Occlusal plane: Different combined factors determine inter maxillary teeth contact while masticating. Because mandible and teeth generally show a good degree of preservation in skeletal remains, occlusal plane can be studied through Spee curve and Wilson curve evaluations, as well as dental arch morphology.

The Spee curve[1,15] is a line defined by occlusal surfaces of the teeth of the mandibular hemiarch, joining anterior teeth incisal edges with posterior teeth buccal cuspids, this line draws a superior concavity curve. Its evaluation is performed with a thin rigid and slight scale (occlusal plane), estimating whether the concavity is normal (upside), plane or reversed. This curve permits the evaluation of proper dental root distribution in maxillary bones. The Spee curve is due to anteroposterior mandible movements (protrusion and retrusion).When an increased Spee curve is observed, there is root crowding, with a convexity in its curve. Consequently, there is a decrease in bone mass between those dental roots, which must properly support force and loading.

Wilson curve[1,15] is a transversal curvature in occlusal plane in frontal view. It is influenced by lower posterior teeth lingual inclination. This curve changes from the first to the third molars, and it also changes with occlusal dental wear. Mandibles where teeth showed a great dental wear have concave Wilson's curve and it evolves to convex as occlusal wear increases. The measurement is taken at lower first molars level using a flexible thin acetate layer, which lays on the lower first molar occlusal surface (right and left), observing the shape that the layer adopts: concave (or normal), plane, convex (or reversed). This curve originated from the requirement of the height cuspid difference compensation, due to buccal cuspids being higher than lingual ones. According to that curve, harmonious intercuspid displacement can occur with lateral movements. Thus, the significance of the Wilson curve evolution is based on lateral movements of the mandible.

Articulation

Temporo-mandibular joint (TMJ) is examined in order to determine the presence or absence of condyle pathology that could induce an occlusion anomaly, such as asymmetries or arthropathies. It can be classified as: absent (0), present (1), and un-recordable (9).

Discussion

The study of malocclusion arises from the practice amongst the current population of adjusting incorrect alignment of teeth that could cause many mastication and aesthetic problems. Indeed, in modern populations the predominance of malocclusions is about 40 to 80%[16]. The main aetiological factors of malocclusion are of genetic and environmental origin. Some of the genetic factors are the evolutionary reduction in jaw and tooth size, or defects of embryological development[17], whereas some examples of environmental factors are trauma, habits, anomalies of postnatal development, as well as physical agents and malnutrition. Different methodologies to describe, measure and classify various typologies of malocclusion have been developed to understand the problem and to apply correct treatment. Any method including quantitative and qualitative analysis, has to be universally accepted, applicable to distinct populations, and should allow inter-populational comparison.

There is a lack of studies on dental occlusion in the anthropological literature. In general, orthodontic methodologies are not applied on skeletal remains, especially on archaeological material. Works usually conducted on ancient skeletal material agree that prehistoric popula-

tions exhibited a correct or ideal, dental occlusion but, with the passing of centuries and changing of diet, there is an increase of malocclusion[16]. This tendency is too simplistic, because multiple factors are involved in the development of the maxillary system structure.

Dental wear, for instance, plays an essential role in explaining the evolution of occlusion changes. In the 1950's, Begg hypothesized that the human teeth are »designed« in order to cope with extensive tooth wear, and consequently have developed compensation mechanisms[18]. This theory coincides, in part, with the studies conducted on prehistoric populations and on the modern hunter/gatherers. These groups were and are vulnerable to the heavy wear of the surfaces caused by an abrasive diet and the use of teeth as a tool. Starting from this assumption, it is accepted that the modern population has inherited the same dental model. Hence the different use of teeth has generated, together with the change of eating habits and the decrease of the dental arches, a proliferation of problems related to dental misalignments[18]. It is important to highlight that some points of Begg's theory are criticized by anthropologists and orthodontists. In particular the absence of dental wear in modern population does not mean that an increase of malocclusion and attritional occlusion is not a treatment model for contemporary dentistry[18,19].

A study recently carried out on a Copper Age population[20] has underlined the presence of dental crowding in 100% of lower jaws analysed. The results contrast with the proposed trend, and suggest that malocclusion is due to genetic factors instead of excessive tooth size and environmental change. This conclusion is supported by several data: mesiodistal diameters of the lower teeth are similar to modern equivalents, dental wear is comparable to other prehistoric populations, and generally the third molar is on the occlusal plane or absent[20]. Another research study performed on skulls of Xia dynasty dated 4000 years ago shows that the malocclusion is 27.6%[21]. Considering these, and other articles about malocclusion, some questions arise, such as: is dental crowding a genetic problem or are more factors involved? Is the important change of malocclusion related to industrial society, or also with the passage of the hunter/gatherer world towards a farmer society? Does the decrease in jaw and dental size have an important role in malocclusion? The increased study in this area could partly change the current view suggesting other hypotheses in relation to the presence or the absence of the malocclusion in ancient populations.

In this framework, it is proposed to create a straightforward lab sheet in which the main methodologies used by orthodontists are employed. The lab sheet was created taking into account some of the classifications used in epidemiological studies, like the Angle's classification[14], the basic method for recording occlusal traits[22] and the method for epidemiological registration of malocclusion[23]. This is a multidisciplinary work adapted to the needs and the peculiar characteristics of anthropological observation.

Firstly, it is essential to contextualize the skeletal remains in order to evaluate the genetic and environmental factors. Therefore, the lab sheet includes data related with geographical and historical background. Information about sex and age at the death of the individual has also been included. To begin the dental report, the alveolar status is described. Often the material analyzed presents alterations like *ante mortem* (during life) and *post mortem* (after death) tooth loss. Another very significant element is the description of dental wear. In this work, modified methodologies of Brothwell[5] and Lovejoy[6] have been used. Tables are created to be able to observe the five typologies of dental wear. Usually, in archaeology or in forensic anthropology it is normal to find a fragment of dental arch; for this reason dental wear in the lab sheet is studied, dividing the arch into the anterior and posterior sextants.

A complete description of the state and pathologies of teeth is provided in the proposal of Chimenos et al.[4]. For this reason, pathologies are absent in the present lab sheet, with the exception of those that can interfere with or be explained by dental occlusion. Also, fractures are recorded only when they developed during the life of the individual.

It is also fundamental to collect data concerning possible pathologies affecting dental arches, for example, mandibular torus or an asymmetry of the superior arch that could indicate a congenital cranial asymmetry or a probable fracture. Both cases may affect the position or morphology of teeth and arches, and also the typology of occlusion. Also a temporo-mandibular joint disorder and bruxism could include an occlusion alteration. A correct position of the arches is also necessary to ascertain whether dental wear is unusual or not, and if it is related to occlusion or with a non-alimentary use of the teeth, as in the case of chipping marks or notches. Once the cause is detected, it is possible to collect more information, for instance, the correct orientation of an instrument used for a particular activity.

In the sections related to the characteristics of arches, occlusion, occlusal plane and temporo-mandibular joints, current odontological methodologies adapted to skeletal remains have been used. To assist in the identification of occlusal variables, a score classification is applied for each item. Also, a space has been reserved to specify diastema, crowding, overjet, cross bite, overbite and open bite measurements in millimeters. Some of the principal measurements of dental arches are also included, because some occlusion analyses require them, for instance for discerning sexual dimorphism and changes of molar class occlusion[24]. These measurements are also of interest in human masticatory evolution. Generally, the hypothesis, in which the transition from a diet composed of food that is hard to chew to more mild and elaborate food has contributed to the decrease in teeth and jaw dimensions, is accepted.

The study of dental occlusion in skeletal remains is also important in forensic contexts. In this field, reconstruction of maxillary occlusion has different applica-

tions, for example to recreate the face of a person, or to characterize deceased individuals, as well as historical characters by using known defects or dentistry cures. Although different disciplines (medicine, anthropology, art) collaborate together in this field, they can run into various problems. The main difficulties are due to the fragmentation of bones. The lack of the condyles, for instance, certainly complicates the analysis of the type of occlusion. Therefore physiognomy reconstruction may differ radically if arches are assembled in class II or III. For this reason orthodontic methodologies adapted for skeletal remains generate improved information regarding occlusion.

Conclusions

Good occlusion is necessary for a correct mastication, health and diet. Occlusion is relevant to the acquisition of food and has changed during evolution, in relation to the adjustment to the availability of the food. In spite of this, occlusion is often overlooked in anthropological studies (evolutionary, historical and forensics). This entails the loss of many data that could be useful for the reconstruction of the occlusal characteristics of an individual or a population, both proto-historical or pre- or post-industrial. Furthermore a proper evaluation of dental occlusion could be employed in forensic areas to identify a minor feature that could be fundamental for the reconstruction of the face of a recently deceased individual or a historical character.

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STUDIJA DENTALNE OKLUZIJE NA DREVNIM LJUDSKIM OSTACIMA: METODOLOŠKI PRISTUP

SAŽETAK

Antropološka stomatološka i maksilarna studij ljudskih skeletnih ostataka obično se odnosi na promjene ili stanje usne šupljine. Promjene mogu biti posljedice životnpg stila, prehrambenih navika i bolesti. U ovom kontekstu, stomatološka okluzija nije često analiziraana zbog različitie očuvanosti skeletnih ostataka, a posebno s obzirom na nedostatak metodologije prilagođene studijama drevnih ostataka. Cilj ovog rada je predložiti antropološku metodu koja je temeljena na kliničkoj stomatološkoj praksi. U metodi prikazanoj u ovom radu, vrednuju se stomatološki parametric, kao što su zagriz, pregriz i Angleova klasifikacija malokluzije.

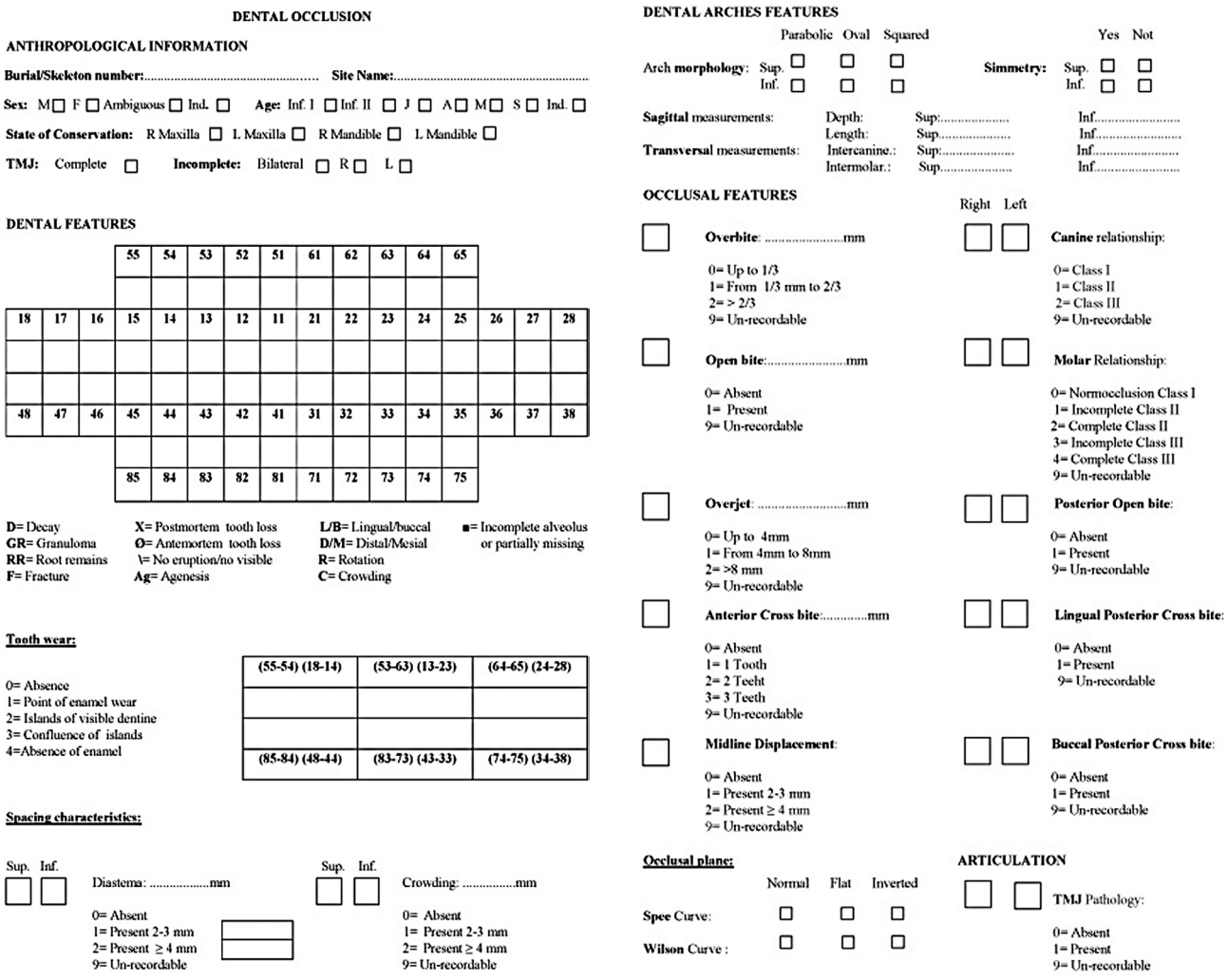

Figure S1. The Lab sheet