



Contents lists available at SciVerse ScienceDirect

HOMO - Journal of Comparative Human Biology

journal homepage: www.elsevier.de/jchb



The development of dental research in Argentinean biological anthropology: Current state and future perspectives[☆]

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ARTICLE INFO

Article history:

Received 10 March 2010

Accepted 27 May 2011

ABSTRACT

The aim of this paper is to conduct a historical analysis of the research-oriented studies related to dental anthropology in Argentina, evaluate its current state and discuss future expectations and perspectives. In this country, anthropological studies based on analysis of dentition have been scarce and even temporarily discontinued, since they began in the late nineteenth century, simply following the course of the predominant theoretical and methodological approaches over time. Early papers, guided mainly by evolutionary ideas, were oriented towards establishing the taxonomic position of humans through the description and comparison of morphological and morphometric aspects of the dental crown and root. Later studies mainly described types of intentional modifications (i.e. dental mutilations) and tooth wear in the context of Historic-Cultural School. However, they failed to constitute valid lines of research over time. In recent years, there has been a significant change in dental studies, mainly as a result of the interest in evaluating the adaptive aspects of human populations within bio-cultural settings. One of the most relevant lines of studies has been the bioarchaeological analysis of health and stress indicators, such

[☆] This paper was presented at the symposium “The development of dental research in Argentina. Biological Anthropology: current status and perspectives”, during the IX National Meeting of Biological Anthropology from Argentina, Puerto Madryn, 20th to 23rd October 2009.

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as enamel hypoplasia, caries and tooth wear in hunter-gatherer and farmer societies. More recently, the study of discrete and metric dental traits began, with a goal to contribute to the study of evolution and inter-populational biological relations among South American groups. Since teeth contain valuable information not only about the environment in which the individual lived, but also about the action of neutral and non-neutral factors on human groups, the consolidation of ongoing studies will contribute to knowledge of various aspects of the adaptation and evolution of native American populations.

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R E S U M E N

El objetivo de este trabajo es realizar un análisis histórico de las investigaciones sobre la antropología dental en Argentina, evaluar el estado actual de la disciplina en ese país y discutir las perspectivas futuras en su desarrollo. Los estudios sobre la dentición desde sus inicios, hacia finales del siglo XIX, fueron escasos y temporalmente discontinuos, siguiendo los desarrollos de las distintas aproximaciones teórico-metodológicas. Los trabajos más tempranos, basados en ideas evolucionistas, estuvieron orientados a establecer la posición taxonómica del hombre mediante la descripción y comparación de variables morfológicas y morfométricas de la dentición. Estudios posteriores focalizaron en la descripción de los diferentes tipos de modificaciones intencionales y en los patrones de desgaste dental, en el contexto de la corriente teórica histórico-cultural; sin embargo, no constituyeron líneas de investigación sostenidas en el tiempo. En fechas más recientes ocurrieron cambios significativos en los estudios dentales, principalmente como resultado del creciente interés en la evaluación de aspectos adaptativos de las poblaciones humanas en el marco de una aproximación biocultural. Una de las líneas de trabajo más relevantes estuvo orientada al análisis bioarqueológico de indicadores de salud y estrés, como las hipoplasias de esmalte, caries y desgaste dental tanto en sociedades cazadoras-recolectoras como agricultoras. Más recientemente, el estudio de rasgos dentales métricos y no métricos comenzó a desarrollarse como una vía que contribuye al estudio de la evolución y las relaciones biológicas interpoblacionales de los grupos humanos sudamericanos. Dado que los dientes contienen importante información no sólo acerca del ambiente experimentado por los individuos en el curso de la ontogenia sino también acerca de la acción de factores neutrales y no neutrales sobre las poblaciones humanas, la consolidación de los análisis actualmente desarrollados contribuirán al conocimiento de variados aspectos de la adaptación y la evolución de las poblaciones nativas americanas.

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Introduction

The beginnings of Argentine biological anthropology can be placed in the mid-nineteenth century. The few review papers that address its history show that initially two main lines of research coexisted (Carnese and Pucciarelli, 2007; Carnese et al., 1991–1992; Marcellino, 1985; Orquera, 1981; Politis, 1988, 1995; Schobinger, 1961, 1988). One of them was designed to describe the physical characteristics of the populations studied, to delineate basic classifications, to establish the number and the antiquity of racial groups and to infer relationships among American and non-American human populations.

The other line, closely linked to palaeontology and adopting an evolutionary perspective, focused on studying the origin and evolution of American fossil human remains.

These comparative studies, with a strong emphasis on morphology, employed very dissimilar techniques. In the first case, they were mainly based on qualitative and quantitative description of the skull as a racial diagnostic element (i.e. Bórmida, 1953–1954; Imbelloni, 1938, 1950; Lehmann Nitsche, 1907) and on the anthropometric measurements gathered during the course of scientific expeditions conducted to record biological variation in the aboriginal groups of Argentina (Lehmann Nitsche, 1908, 1915). In the second case, techniques of comparative anatomy, seriation procedures and the construction of phylogenetic trees were used (Ameghino, 1879, 1880–1881, 1937).

In the 1920s, Argentina was immersed in a theoretical and methodological shift characterised by the adoption of the hyperdiffusionist principles of the Historic-Cultural School. The influence of this scientific movement led to the consolidation of morphological studies and the development of the craniotrigonometric method as a tool to define racial types. Moreover, it also focused on the study of artificial cranial deformation, to which an ethnic value was attributed (i.e. Bórmida, 1953–1954; Dembo and Imbelloni, 1938; Imbelloni, 1924–1925, 1938). These studies prevailed until the end of the 1960s, when the development of the modern *evolutionary synthesis* began (Carnese, 1998; Carnese et al., 1991–1992). In this new theoretical perspective, which analysed biological variation at a population level, molecular genetic testing became of utter relevance both in serological and in genetic studies (Palatnik, 1966). Serological studies had been available since the 1930s, but the results continued to be interpreted in the light of the dominant typological background (Imbelloni, 1937).

In addition, anthropometric data previously obtained in order to gather information about the native people of Argentina, were subsequently employed in the context of a new research strategy oriented towards assessing population growth and development patterns (Pucciarelli et al., 1993). This kind of study was particularly innovative with the use of experimental methods and animal models (Pucciarelli, 1980; Pucciarelli et al., 1984).

In this context, as stated in the “received view” (Carnese and Pucciarelli, 2007; Carnese et al., 1991–1992), the collection and analysis of dental variation data did not get enough attention, except for some isolated papers such as by Abella (1910), Sachetti (1958), Bellota et al. (1966), Devoto et al. (1966) and Devoto and Perroto (1973). Also, in the two aforementioned review papers, it was affirmed that dental studies in Argentina have not been systematic and continuous over time, nor had they been developed under an integral dental perspective at a population level until the 1990s (Carnese and Pucciarelli, 2007; Carnese et al., 1991–1992).

Considering all these aspects, the present paper analyses the development of dental studies in the field of biological anthropology in Argentina, by the study and quantification of the scientific output in the area. In particular, it summarises the main issues that were addressed using dental evidence from the late nineteenth century to the present. It shows the temporal trends in the number and percentage of publications, the amount of published works in various geographical areas of the country, the specialisation of the researchers linked to the dental studies and the characteristics of the predominant point of view. This approach is intended to provide an overview of the current state of dental studies in Argentina, and to discuss future lines of research in the field as well.

Materials and methods

First of all, a database was generated. It contained information about published articles, abstracts from scientific meetings and dissertations that offered analyses of dental evidence in present or past human populations, and that were developed from an anthropological point of view. The inclusion of a paper in such a database – and therefore in the analysis – was based on one or more of the following criteria: (a) the author was a scholar who has developed his/her research in an Argentinean institution; (b) at least one local sample was used during the study. For each paper, the author's full name, institutional affiliation, professional training, title, year and volume of the journal, general topic addressed, and geographical origin of the samples were recorded.

The following international scientific journals between 1865 and 2010 were surveyed: *HOMO* (2001–2010), *Journal of Human Evolution* (1972–2010), *American Journal of Physical Anthropology* (1918–2010), *Journal of Archaeological Science* (1974–2010) *International Journal of*

Osteoarchaeology (1991–2010), *Journal of Dental Research* (1919–2010), *Journal of Forensic Sciences* (1955–2010), *Forensic Science International* (1973–2010), *International Journal of Dental Anthropology* (2000–2008), *Journal of Dental Anthropology* (1986–2008), *Revista de la Sociedad Española de Antropología Física y Revista Española de Antropología Física* (1979–2008), *Chungara* (1972–2008) and *Magallania* (1970–2009). Moreover, various foreign books whose topics were related to the content of the journals, and also the abstracts of the Congress of the Latin American Association for Biological Anthropology (Congreso de la Asociación Latinoamericana de Antropología Biológica) (2001–2008) and of the Palaeopathological Meeting in South America (2005–2009), were taken into account. The following Argentinean journals were also surveyed: *Relaciones de la Sociedad Argentina de Antropología* (1937–2010), *Intersecciones en Antropología* (2000–2009), *Revista Argentina de Antropología Biológica* (1996–2009), *Revista de la Sociedad de Ciencias Morfológicas de La Plata* (1996–2009), *Revista, Notas y Anales del Museo de La Plata* (1892–2000), *Revista Runa* (1948–2009), *Revista Arqueología de la Facultad de Filosofía y Letras de la Universidad de Buenos Aires* (1991–2009), *Archivos y Notas del Museo Etnográfico* (1929–1930), *Publicación de la Sección Antropología del Museo Etnográfico, Series A y B* (1906–1945), *Revista Cazadores Recolectores del Cono Sur* (2006–2009), *Cuadernos del Instituto Nacional de Antropología y Pensamiento Latinoamericano* (1960–2005), *Estudios Atacameños* (1973–2009), *Comechingonia* (1983–2008) and *Comechingonia Virtual* (2007–2009). The proceedings of the Meeting of the Association of Argentine Biological Anthropology (*Jornadas de la Asociación de Antropología Biológica Argentina*) (1993–2009) and the edited books derived from the National Congress of Argentine Archaeology (Congreso Nacional de Arqueología Argentina) (1988–2010), the Congress of Archaeology of the Argentina Pampas (Congreso de Arqueología de la Región Pampeana Argentina) (2004–2010) and Meeting of Archaeology in Patagonia (*Jornadas de Arqueología de la Patagonia*) (1995–2009), were also consulted. Finally, other national publications related to the subject, among which the detailed bibliography compilation on bioanthropological research in Argentina by Marcellino (2002) can be highlighted, were checked, as well as graduate and doctoral theses housed by the Faculty of Natural Sciences and Museum of the National University of La Plata (FCNyM, UNLP), the Faculty of Philosophy and Letters of the University of Buenos Aires (FFyL, UBA), the Faculty of Humanities and Arts at the National University of Rosario (FHyA, UNR) and the Faculty of Social Sciences at the National University of the Center of Buenos Aires Province (FACSO, UNCPBA).

The data obtained were used in the description of temporal trends by calculating the frequency of papers considered as appropriate in 10-year periods between 1880 and 2010, and ranging from 30 to 40 years. In each period, the number of national, international and total publications, as well as the number of papers by subject, was quantified. This variable was categorised taking into account the following divisions: phylogeny (Phy.), dental asymmetry (Assym.), mortuary behaviour (MB), sexual dimorphism (Dimorph.), anatomical studies (Anat.), general analysis (dental and skeletal) of health (HA), dental mutilation (DM), demography (Demog.), general bioarchaeological characterisations (Bioarch.), biological relationships (analysis of metric and nonmetric traits; BR) and studies of oral health and stress indicators (including caries, enamel hypoplasiae, attrition, periodontosis, etc., DH-S). The category 'general analysis of health' (HA) includes the bioarchaeological approaches that analyse the degree of prevalence of different dental and skeletal indicators of metabolic stress, mainly enamel hypoplasiae, hypocalcifications, porotic hyperostosis, *cribra orbitalia* and Harris lines (Buikstra and Ubelaker, 1994; Hillson, 2000; Larsen, 2000; Ortner, 2003; Stuart Macadam, 1991). In 'demography' all bioanthropological publications whose main objective was to generate demographic information from the analysis of dentition (estimation of age-at-death, sex determination, evaluation of the minimum number of individuals, mortality profiling, analysis of the demographic composition and structure, etc.) were included. The category 'general bioarchaeological characterisations' (Bioarch.) refers to papers that mainly perform descriptive analysis of the characteristics of osteological samples that, in turn, include superficial studies of dental remains. The category 'biological relationships' comprises studies that aim to generate inferences about biological distance through the analysis of discrete and/or continuous dental variables. Finally, the 'studies of oral health and stress indicators' (DH-S) focus on assessing prevalence of dental variables that allow inferring major aspects of infectious processes and mechanical stress (tooth wear, caries, abscesses, periodontosis, antemortem tooth loss, etc.).

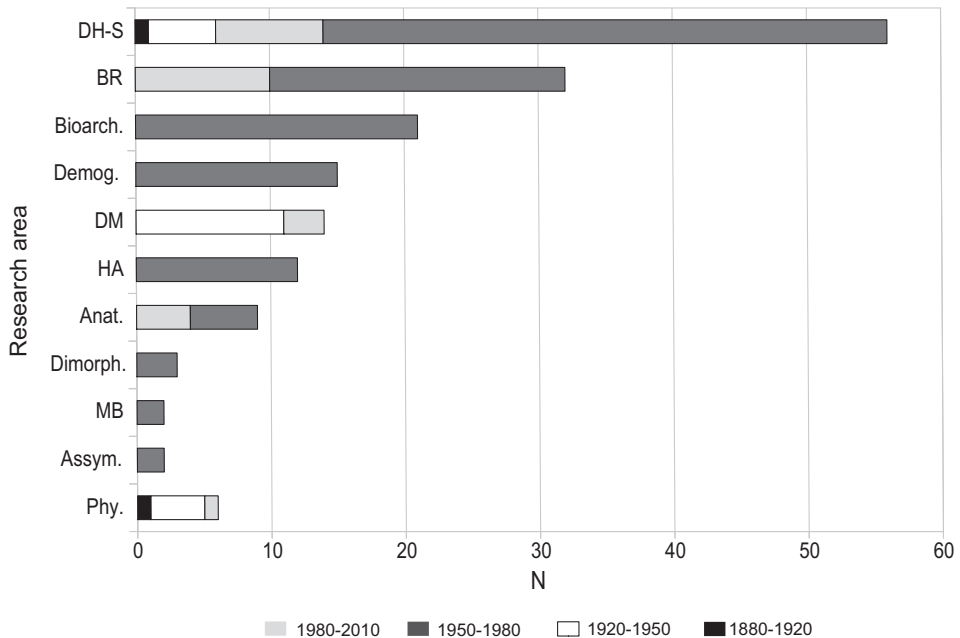


Fig. 1. Chronological variation of the different topics in dental research. Phylogeny (Phy.), dental asymmetry (Assym.), mortuary behaviour (MB), sexual dimorphism (Dimorph.), anatomical studies (Anat.), general analysis (dental and skeletal) of health (HA), dental mutilation (DM), demography (Demog.), general bioarchaeological characterisations (Bioarch.), biological relationships (analysis of metric and nonmetric traits; BR) and studies of oral health and stress indicators (including caries, enamel hypoplasiae, attrition, periodontosis, etc., DH-S).

Results and discussion

Subjects addressed

One hundred and sixty-eight papers that analyse dental evidence for the period 1880–2010 were identified. Fig. 1 shows the percentage of articles per subject for the four periods considered. Each period comprises 30 years, except for the first one that includes 40 years. It is remarkable that for the period 1880–1920 the only two subjects considered were phylogeny (Ameghino, 1937) and stress indicators analysis (Abella, 1910). From an evolutionary perspective, Carlos Ameghino focused on comparative analysis of dental formulae in order to reconstruct the phylogenetic relationships between modern man and fossil and extant apes. In this sense, the author conducted qualitative descriptions of crown size, form tooth implantation and number of roots present in incisors and molars (Ameghino, 1937).

These studies were subsequently taken up by Vignati (1923, 1935, 1941) who performed comparative studies of crown and root morphology, and of occlusal and interproximal wear using samples from different geographic regions of Argentina, as part of the study of the origin of American man. He conducted inter-species analysis based on the description of European fossil molars (*Palaeoanthropus heidelbergensis*, *Eoanthropus dawsonii*, *Sinanthropus pekinensis*, *Homo neanderthalensis*, etc.) and other species of primates (Gorilla, Pongo and Pan). Comparisons were based specifically on the distribution of discontinuous traits (e.g. number of cusps), pulp cavity and root implantation characteristics revealed by radiographic images, and tooth size described with the mesiodistal and buccolingual diameters (Vignati, 1923, 1935, 1941).

In the period 1920–1950 dental studies experienced a significant increase under the influence of the typological racial perspective held by the Historic-Cultural School

(Imbelloni, 1938, 1950), typical of what Washburn (1951, 1953) has called the “old physical anthropology” (Fig. 1). During this period, papers focused on describing the types of intentional modifications (i.e., dental mutilations), the morphological and morphometric aspects of the crown and root, and the types of tooth wear in archaeological dental samples and in ethnographic groups from different areas of Argentina (Delfino, 1948; Dembo, 1937, 1939; Dembo and Imbelloni, 1938; Dembo and Paulotti, 1942; Dembo et al., 1949; Marcellino, 1972; Vignati, 1939, 1947, among others). The main objectives of these studies were to construct classification schemes based on the description of different types of mutilation, establish their geographical distribution and develop hypotheses regarding the techniques used to achieve the effects (i.e., fracture, filling, extraction) trying at the same time to elucidate the cause, intention and goals of such practices (i.e., aesthetics, group identification, prevention of diseases, passage rites, etc.). The interest in this subject slowly decreased, to be completely abandoned by the 1960s (Cigliano, 1962) (Fig. 1).

During the period 1950–1980, research began to diversify, but dental studies were still very scarce, barely more than 15% of all anthropological papers surveyed. The most explored subject, about 6% of total, was biological distance, which had not been discussed previously (Devoto, 1969, 1971; Devoto et al., 1968, among others). These studies focused on the frequency of shovel-shaped incisor and the grooves pattern on molars of prehistoric populations from Northwest Argentina. Indeed, this aspect was closely related to the beginning of the application of statistical methods for data analysis. The evaluation of dental stress indicators ranked second with 4.56% of the publications.

In the two previous periods, studies that addressed the analysis of dental wear and caries were developed. They used mainly descriptive approaches and were generally based on small samples (e.g. Devoto and Perrotto, 1973; Devoto et al., 1966, 1968; Dobrovsky, 1946; Rusconi, 1938; Vignati, 1941). In Fig. 1 they are grouped into the category “studies of oral health and stress indicators” (DH-S). Within these studies, the paper of Dobrovsky (1946) should be highlighted for both its sample size and the meticulous methods used. This author discussed the relationship between food eaten and the quantity of abrasion, the use of different classifications pertaining to form and degree of wear and the mechanisms responsible for such abrasion. It is also important to mention the contributions to the oral pathology of the prehistoric natives of Argentina, made by Devoto and colleagues in their various publications. These authors analysed the prevalence of caries in a sample of Araucanian subadult skulls from the provinces of Buenos Aires, La Pampa and Salta, and compared the values with a contemporary sample of European descent (Devoto and Perrotto, 1973; Devoto et al., 1968).

During the final period (1980–2010) there was remarkable development of dental research, not only regarding the amount of papers published (73.81% of all anthropological papers) but also in the variety of topics considered (Fig. 1). Of all topics categorised in this study, only those related to phylogeny and dental mutilation are absent. Several papers on asymmetry, mortuary behaviour, general anatomy and sexual dimorphism are identified, but they consist of a low percentage (less than 3%), while issues such as general analysis of health and demography are much more numerous. General bioarchaeological characterisations multiply, exceeding 12% of the total number of papers, and also, an increase in studies of biodistances based on dentition is noticed (13.10%).

During this period, the most explored subject, which showed a very significant increase in the number of papers, is the evaluation of health and metabolic stress indicators in order to study the adaptation process of the prehistoric peoples of Argentina (Aranda, 2007; Barrientos, 1997; Bernal et al., 2005, 2007; García Guraieb, 2006; Guichón, 1993, 1995; Kozameh, 1993, 2004; Kozameh and Barbosa, 1992; LiHeureux, 1998; Luna, 2003, 2008; Luna and Aranda, 2010; Mendonça, 1993; Novellino, 2002; Novellino and Guichón, 1997–1998; Pérez-Pérez and Lalueza, 1992; Restelli et al., 2002, among others). Clearly, the rise of this particular subject along with the development of new and varied lines of work within dental research, is closely related to the theoretical development of the biocultural perspective. This approach is intended primarily to answer questions about the overall health of a population in the dynamic interaction between itself, the environment and the cultural system, through the evaluation of various skeletal and dental indicators (Bush and Zvelebil, 1991; Goodman et al., 1984, 1988). In particular, the presence and prevalence of palaeopathological indicators, such as caries, abscesses, periodontal disease and dental enamel hypoplasia, have been studied in order to infer the oral health status and the degree of

systemic–metabolic stress that native groups could have been experienced. Also, the degree and pattern of macro and microscopic dental wear was recorded in order to contribute to knowledge about diet and nonmasticatory uses of dentition in hunter–gatherer and farmer prehispanic populations.

On the other hand, special emphasis has been put on the application of techniques for age-at-death estimation from various dental characteristics in order to study the demographic profiles of the regional Argentine populations (Fig. 1). Some papers test the applicability of standards developed for populations of other regions of the world and used them in local samples, attempting to develop specific standards for South American populations (Barrientos and L'Heureux, 2001; Barrientos et al., 2002; Luna, 2008, 2010). Some research has been carried out using tooth wear, measured by the crown height, to estimate age-at-death in adult samples of Pampean hunter–gatherers (Barrientos and L'Heureux, 2001; Barrientos et al., 2002). More recently, Luna (2008) tested these methods on a sample of similar characteristics (hunter–gatherers of Western Pampas) and, in addition, used X-rays to estimate the age-at-death based on the morphological changes of the pulpodentinal complex of uniradicular teeth and studied their variations during life (Luna, 2006, 2008). Regarding sex evaluation by using metrics of dental crown and neck, this is a line of study with great potential that has hardly been taken into account (see an exception in Luna, 2008, 2010).

The theoretical and methodological renewal in biological anthropology that has occurred since the 1950s all over the world, involved the gradual abandonment of mere classification along with a growing interest in establishing the causes of the variation in the context of the synthetic theory of evolution (Washburn, 1951, 1953). Under this approach, several studies were developed in Argentina in the mid-1970s onwards that examined morphological differentiation in the dentition of the prehistoric peoples of the country. This topic has become of particular interest in more recent years. In this sense, studies of discontinuous trait variation in Argentinean populations have been performed in order to assess the degree of biological relationship between these and other non-American populations (i.e. Asian, European and African) in the context of American settlement studies (Bollini, 2004; Bollini et al., 2008a,b). From a regional perspective, Luna and Bernal (2005) presented the first results of the evaluation of dental metric variables showing the evolutionary relationships between late Holocene populations of Pampa and Patagonia. Again, this kind of analysis is only the beginning and promises to accumulate relevant and reliable information for the assessment of the biological dynamics of the prehistoric inhabitants of the country.

Interest in study of the evolution and diversification of the American populations has also stimulated the development of studies on morphometric variation by using linear measurements of the tooth crown. Samples from southern Argentina have been incorporated by Lahr and Wright (1996) who, in a context of global variation, assessed the relationship between tooth size and the degree of craniofacial robustness in populations of the continental and insular Patagonia. Hanihara and Ishida (2005) also analysed, on a global scale, geographical variation and interpopulation relationships in dental size and shape. In their study, they included a total of 72 samples, among which there was a sample of individuals from Tierra del Fuego. More recently, Bernal (2008) and Bernal et al. (2010) examined patterns of evolutionary relationships in human populations of southern South America. They assessed the factors responsible for dental variation in this region using linear measurements obtained at the dental neck (at the enamel and dentine junction). These particular measurement sites are less affected by tooth wear, and therefore allowed the expansion of the size of the samples of American populations characterised by high levels of attrition. From an intrasite perspective, Luna (2008) analysed the buccolingual and mesiodistal diameters of the dental crown and neck in order to test the hypothesis of the coexistence of two biologically different populations in the same native cemetery (Chenque I site, south of La Pampa, Argentina).

From a renewed methodological approach derived from geometric morphometry, Bernal (2007) analysed the variation in tooth size and shape of three prehistoric populations from Argentina, as described by landmarks and semilandmarks of the crown of the permanent molars, obtained from digital images. The use of these techniques has been expanded into the development of forensic applications. In this sense, Kieser et al. (2007) analysed the shape of the human anterior dentition in order

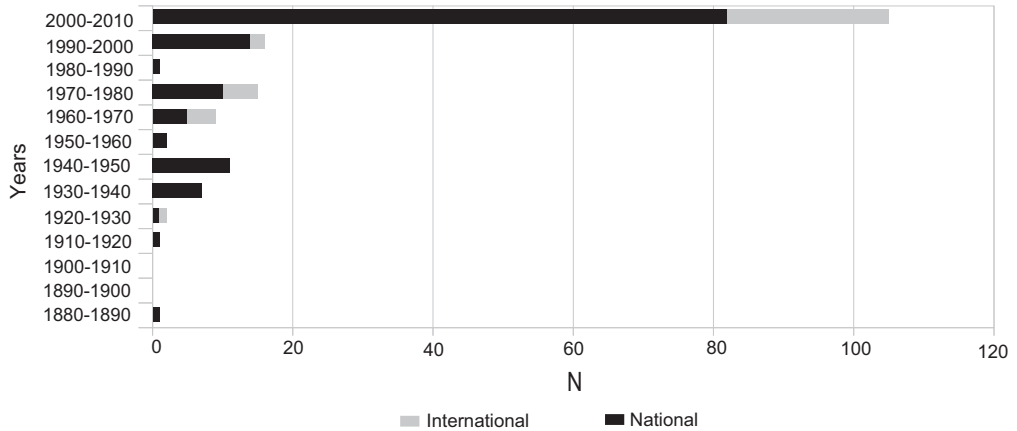


Fig. 2. Number of publications based on dental analysis per decade.

to determine whether the differences between individuals are large enough to identify bite patterns in forensic cases.

Number of papers published

When reviewing the number of articles published on dental analysis per decade (Fig. 2) there is a clear increase during the twentieth century, beginning with a minimal representation in 1930 and reaching 19 papers in the decade of 1990–2000. This trend becomes even more pronounced during the first decade of this century, with an explosion of articles on dental anthropology, surpassing the 100 papers published during that period. During all the periods considered in this paper, most publications have appeared in national books or journals; only 20.83% of the total ($N = 35$) corresponds to papers presented at the international level, most of which (13.69%; $N = 23$) are grouped in the last decade.

Based on this analysis, we conclude that, until the end of the twentieth century, anthropological studies of the dentition were limited, compared to the study of other morphological structures such as the skull. This is made clear, for example, in the extensive review of biological anthropology literature for the period 1865–1995 conducted by Marcellino (2002). From a total of 1098 papers published in national and international journals, this author found 160 papers based on the analysis of craniofacial morphology and only 40 on dental evidence.

Finally, we refer briefly to the academic background of the Argentinean researchers who published in dental anthropology during the studied period. The first researchers had a broad background in different areas included under the field of natural sciences such as palaeontology, geology and zoology, as well as in anthropology. By the second half of the 20th century, when anthropology was established as a career in different national universities (Carnese et al., 1991–1992), most of the research was conducted by professionals with a university degree in archaeology or physical anthropology, although there have also been contributions from researchers trained in medicine and dentistry. This illustrates the relevance of interdisciplinary approaches in the study of dental evidence in order to discuss anthropological problems.

Geographical areas

Finally, when analysing the geographical origin of the dental samples studied, it is obvious that most of them are from different areas of Pampa (27.19%) and Patagonia (23.81%), followed by the northwest of Argentina (19.34%). The investigations have been carried out in Pampa and Patagonia since the first period and maintained during every period with increasing percentages, while those from the Northwest show a similar trend, although they had a later start. Moreover, it should be highlighted

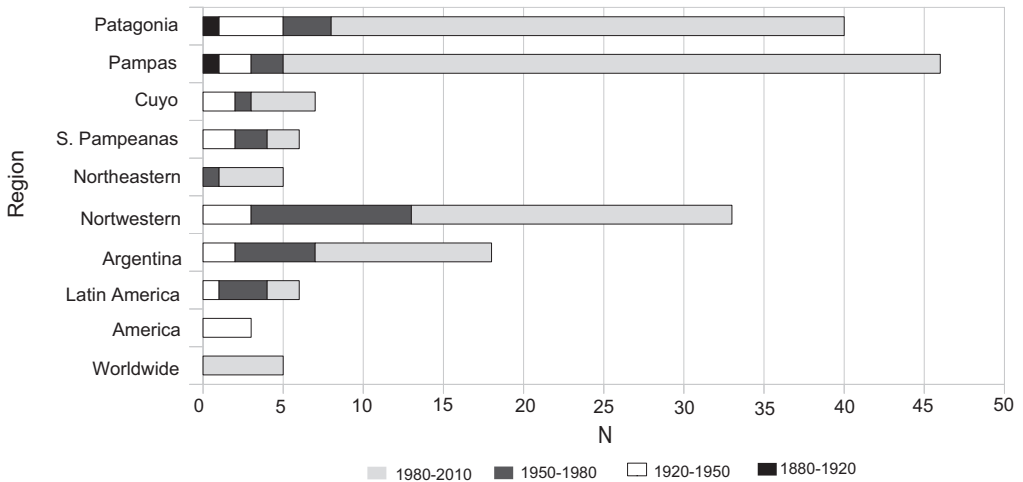


Fig. 3. Percentages of articles referring to dental studies for the different geographical regions considered by chronological period.

that a percentage of the articles considered larger areas. These included samples from different regions of the country (10.71%), Latin America (4.07%), America (1.79%) and the world (2.97%). It should be noticed that the latter studies did not begin until the last decade, indicating a trend towards the development of worldwide scale studies (Fig. 3).

Conclusions and prospects for the future

Since its beginnings in the late nineteenth century, the research carried out in Argentina in the context of biological anthropology, have incorporated morphological, morphometric and pathological dental data for the discussion of different problems. This may be due, on one hand, to the good preservation of the dentition in the archaeological record because of the structural properties of teeth. On the other hand, it may be because dentition contains highly valuable information about biological and cultural aspects of human populations (Hillson, 1996). Early work, guided by evolutionary ideas, was oriented towards establishing the taxonomic position of man through the description and comparison of morphological and morphometric aspects of the dental crown and root. Then, for a period of about 60 years, the investigations regarded the description of types of intentional modifications (i.e. dental mutilations) and tooth wear in the context of Historic-Cultural approaches. In recent years there has been a significant change in dental studies, mainly as a result of the new interest in evaluating the adaptive aspects of human populations in the context of biocultural approaches. One of the main directions concerns the study of oral health and stress indicators (both metabolic and functional), such as enamel hypoplasia, caries and tooth wear. Over the past three decades, a dynamic process of development within the discipline took place in Argentina, producing a greater flow of information and the maturation of research teams that systematically study dentition. Greater emphasis on the study of inter-population relationships, by using metric and non-metric dental traits, has also been observed in recent publications.

However, in general, the field of dental studies has been reduced, when compared with other lines of osteological studies to date. Some topics have also been discontinued in time and the entire discipline clearly followed the pulses of the theoretical and methodological approaches prevailing in each period. The result has been a lack of consolidation of research directions based on dental evidence. The consolidation of a line of research implies an organised scholarly activity, bounded by the same interests, experiences and expectations, that revolve around the same problems and phenomena and interact in the search for answers to the questions that arise from such problems (Escontrela and Saneugenio, 1993). This is in order to generate knowledge in an open space in which the

discussion of the relevant issues can contribute to elucidate the questions raised with the advancement of the discipline (Escontrela and Saneugenio, 1993). None of this has occurred in the field of dental anthropology in Argentina, as is observed by the lack of national journals specialising in this area, and the absence of professional associations, which could bring together anthropologists working in dental topics in Argentina. This becomes a particularly relevant indicator when comparing this situation to the proliferation of specialised associations and journals worldwide, such as the Dental Anthropology Association (The Ohio State University), the Dental Anthropology Journal (published by the University of Tennessee), the International Journal of Dental Anthropology and the International Association for Paleontology (University of Zagreb, Croatia) with its Bulletin of the International Association for Palaeontology. Sociopolitical context and the academic organisation are two relevant aspects that require further study in order to better understand the lack of consolidation of dental studies in our country. Although such analysis is beyond the objectives of this paper, we refer the reader interested in the history of Argentinean anthropology, to some of the many contributions made on this subject (Boschin, 1991–1992; Boschin and Llamazares, 1984; Carnese and Pucciarelli, 2007; Carnese et al., 1991–1992; Crivelli Montero, 1990; Podgorny, 2004; Politis, 1992, 1995).

Nowadays, the study of health and metabolic stress indicators, and the development of research focused on the study of inter-population relationships in the context of evolutionary studies, are the areas that present the main contributions to dental anthropology in Argentina. The consolidation of these studies will deepen the understanding of the biological and cultural processes of prehistoric societies and will include knowledge generated at a continental and global scale. Likewise, the expanding field of dental studies requires the definition of a research agenda that includes complementary and interdisciplinary approaches. In this sense, the development of studies that systematically incorporate data on inter-population variation in dental development, dental metrics, micro- and macroscopic methods of observation (such as radiographs, computed tomography among noninvasive techniques, and electron microscopy) and the application of new techniques for the quantification of dental morphology (geometric morphometrics, geographic information systems) would greatly contribute to strengthening the field of dental research in Argentina.

Acknowledgements

We thank Héctor Pucciarelli and an anonymous reviewer for their comments on a previous version of this paper, and Rocio Garcia Mancuso for her help with the bibliographical review.

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