Dental Non-Metric Traits in a Preconquest Sample from Tastil Region in Argentina, South America

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Abstract

Reconstruction of biological relationships between ancient human groups using teeth is an important research problem for South American bioarcheologist. The present study was carried out with a Tastil human pre-conquest sample from Northwest of Argentina, with the aim of exploring the dental morphology patterns in this population.

The sample of this study is composed by 19 skulls with partial dentitions from Santa Rosa de Tastil ruins (Salta Province, Argentina). 12 dental non-mtetric traits were recorded using the ASU Dental Anthropology System. Percentages >70% was not found. Values between 0,1 and 70% was found in 12 traits of upper dentition only. In spite of the frequencies finding in Tastil sample can be influences by a low sample size, we can conclude that shovel shape of the incisors in the population of Tastil suggest a Mongoloid origin.

Keywords: Dental Anthropology; Dental Non-Metric Traits; Preconquest Populations; Argentina

Introduction

Dental morphology trait expressions have been used in anthropology and forensic sciences for determination of biological and geographical affiliations. Variations in morphology of crowns may be manifest in the primary and/or permanent dentitions. Dental variation is heritable, is caused by multiple genes, and is little influenced by environmental factors (1). By mean of dental morphology analyses is possible an assessment to genetic population dynamics. Assuming the use of additive hereditary traits, the phenotypic differences among distinct groups or samples can be interpreted as differences in genotypic composition (2). Nonmetric dental traits are highly controlled by genetics and are relatively free of sex- and age-bias (3). Therefore, phenetic (phenotypic) similarity can be said to approximate genetic similarity. The analysis of biological relatedness using dental nonmetric traits has proven reliable even in commingled samples when standardized procedures are followed (4). For these reasons, reconstruction of biological relationships between ancient human groups using teeth is an important research problem for South American bioarcheologist.

The present study was carried out with a Tastil human pre-conquest sample from Northwest of Argentina, with the aim of exploring the dental morphology patterns in this population. Tastil is a region on Northwest of Argentina (Figure 1). Many researchers coincide to describe the people of this region like a group of aboriginal

populations: pulares, luracataos, chicoanas, tolombones, yocaviles, quilmes, tafis and hualfines named all them like “Diaguitas”. Some researchers refer to “Diaguitas” with the name of “Cacanos” because all of them use the aboriginal dialect “Cacan”. The Señorio de Tastil was an estrategic point of exchange between ancient human societies, and with the time was an important centre for the development of economic process in the region. Archaeologic evidence show how in this place, people establishing connections between La Puna, Valle de Lerna, Valle de Calchaquies, and Pacific coast. This process of socio-cultural change is sited in the Regional Development Period during the last ten centuries before spanish conquest (5). But with the years, the Señorio de Tastil colapse in times of Inka expanssion. Cigliano and Raffino (1977) suggest three hipothesis for the explication of this phenomena. First, over-explotation of natural resources take out to poverty, decreasing the productive potential gradually. Second, a change in ecologic conditions decrease normal pluvials and humidity take out to leave the production zones. Third, socio-politic conflicts with other populations take out to religion and administrative crisis. The record of dental non-metric traits can help us to contribute to this discussión by mean of comparative data of hereditary origin. The objective of this article is describe the presence of 12 dental non-metric traits in a pre-conquest sample from Tastil region in Argentina.

Materials and methods

Pre-conquest human dental remains with reasonably reliable stratigraphic contexts are relatively rare from Northwest of Argentina (Salta, Catamarca, and Tucuman Provincies). Marcellino and Colantonio (2000) suggest a Late Period between 0 and 1500 A.D for this sample (6). The sample belong to División de Antropología del Museo de Ciencias Naturales (La Plata, Argentina). The sample of this study is composed by 19 skulls with partial dentitions from Santa Rosa de Tastil ruins (Salta Province, Argentina): 20-28-27-31-39-36-13-33-18-29-1-22-37-30-3-35-8-24-26 (Museum Catalogue References). 12 dental non-mtetric traits were recorded. The ASU Dental Anthropology System was used to register the expression grade of all dental traits (7). The observation and record of all dental non-metric traits was difficult because some enviromental characteristics in the sample like ante-mortem tooth

loss, absence of mandibles, post-mortem fractures, and pathologies. Binary record system was employed, grouping all grade expressions into both "presence" (1) and "absence" (0) categories.

Results

Frequencies of trait presence is in Table 1. Percentages >70% was not found. Values between 0,1 and 70% was found in 12 traits of upper dentition only: shovel shape (UI2, UC), double shovel (UI2, UC), tuberculum dentale (UI1, UI2, UC), lingual cusp number >1 (UP1, UP2), hipocone (UM1, UM2), and paraconule (UM2).

Discussion

The observation and record of all dental non-metric traits selected for analysis was difficult because some characteristics in the sample like ante-mortem tooth loss, absence of mandibles, post-mortem fractures, and pathologies.

Devoto and co-workers describes high frequencies of shovel shape in UI1 and UI2 in early Atacama indians (8), pre-columbian Tastilian indians (9), and a Northwestern Argentinean population from Salta Province. Devoto describe 100% of shovel shape presence (UI1) in 13 specimens studied. Because of attrition, the tuberculum dentale of the maxillary first incisors not was studied, the same reason that Devoto describe in his study. The high prevalence of dental shoveling is considered one of the main components of the Mongoloid dental complex. For Devoto, in spite of the small size of the Tastilian sample, the data seem to be consistent enough to suggest the fact that the specimens showed well-defined, shovel-shaped maxillary incisors, similar to well-typified Mongoloid races (9). Tastil sample studied here is not near to these values in shovel shape expression, thus, the results of this study suggest that a Sinodont pattern is no clear for this sample. This consideration can be interpreted as a reflection of possible external factors in composition of total sample size. The use of morphological traits from the human dentition can create some problems of a methodological nature when studying archeological low size samples. One issue is the assumption of dental trait expression as individually immutable, in the sense of being morphologically symmetrical between homologous teeth. In bioarcheology, estimating the frequency of a dental trait is influenced by the availability of samples

and limited to availability, crown wear and the absence of caries (10). Some authors recommend scoring the higher grade of expression for each dental trait (11) or counting both the left and right sides for each individual (12). In spite of the frequencies finding in Tastil sample can be influences by a low sample size, we can conclude that shovel shape of the incisors in the population of Tastil suggest a Mongoloid origin. The present investigation provides additional, insightful elements for a biological description that can help us to identify more easily the possible biological factors in the process of dental morphologic diversification associated to regional and temporal ranges in this region of Argentina.

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Figure 1 Upper arcade of a Tastil skull

Table 1 Dental non-metric frequencies in the sample

Tooth type	Trait	Dichotomy	Presence	Absence	k	%
UPPER PERMANENT DENTITION						
UI1	Shovel shape	0 - 3	1 - 3	0	-	-
	Double shovel	0 - 4	1 - 4	0	-	-
	Tuberculum dentale	0 - 3	1 - 3	0	2	0,10
	Interruption groove	0 - 1	1	0	-	-
UI2	Shovel shape	0 - 3	1 - 3	0	3	0,15
	Double shovel	0 - 4	1 - 4	0	2	0,10
	Tuberculum dentale	0 - 3	1 - 3	0	3	0,15
	Interruption groove	0 - 1	1	0	-	-
UC	Shovel shape	0 - 3	1 - 3	0	5	0,26
	Double shovel	0 - 4	1 - 4	0	6	0,31
	Tuberculum dentale	0 - 3	1 - 3	0	6	0,31
UP1	Lingual cusp number	1 - 3	2 - 3	1	6	0,31
UP2	Lingual cusp number	1 - 3	2 - 3	1	5	0,26
UM1	Hipocone	0 - 3	1 - 3	0	11	0,57
	Carabelli	0 - 4	1 - 4	0	-	-
	Paraconule	0 - 1	1	0	-	-
	Metaconule	0 - 1	1	0	-	-
UM2	Hipocone	0 - 3	1 - 3	0	10	0,52
	Carabelli	0 - 4	1 - 4	0	-	-
	Paraconule	0 - 1	1	0	1	0,05
	Metaconule	0 - 1	1	0	-	-
LOWER PERMANENT DENTITION						
LI1	Shovel shape	0 - 3	1 - 3	0	-	-
	Double shovel	0 - 4	1 - 4	0	-	-
	Tuberculum dentale	0 - 3	1 - 3	0	-	-
	Interruption groove	0 - 1	1	0	-	-
LI2	Shovel shape	0 - 3	1 - 3	0	-	-
	Double shovel	0 - 4	1 - 4	0	-	-
	Tuberculum dentale	0 - 3	1 - 3	0	-	-
	Interruption groove	0 - 1	1	0	-	-
LC	Shovel shape	0 - 3	1 - 3	0	-	-
	Double shovel	0 - 4	1 - 4	0	-	-
	Tuberculum dentale	0 - 3	1 - 3	0	-	-
LP1	Lingual cusp number	0 - 3	1 - 3	0	-	-
LP2	Lingual cusp number	0 - 3	1 - 3	0	-	-
LM1	Entoconulid	0 - 1	1	0	-	-
	Metaconulid	0 - 1	1	0	-	-
	Protostilyd	0 - 1	1	0	-	-
LM2	Entoconulid	0 - 1	1	0	-	-
	Metaconulid	0 - 1	1	0	-	-
	Protostilyd	0 - 1	1	0	-	-

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