



Communities in **contact**

Essays in archaeology, ethnohistory & ethnography of
the Amerindian circum-Caribbean

edited by
Corinne L. Hofman &
Anne van Duijvenbode



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Foreground image: Coral artefact with human face in relief found at the site of Anse à la Gourde, Guadeloupe, AD 1000-1400 (Photo by J. Pauptit).

Background image: Detail of feature layer with postholes cut into the bedrock at the site of El Cabo, Dominican Republic, AD 1000-1500 (Photo by A.V.M. Samson).

Back cover, left to right: Artistic, life-sized interpretation of the archaeological site El Chorro de Maíta, Cuba , AD 1200-1600 (Photo by A. van Duijvenbode). / Wooden stool or duho recovered from the island of Dominica, dated between AD 1315-1427. Catalogue number ECB40669, Economic Botany Collection, Royal Botanic Gardens, Kew, UK (Photo by J. Ostapkowicz). / Clay Figurine found at the Lavoutte site, St. Lucia, AD 1200-1500 (photo by M.L.P. Hoogland).

Front cover, left to right: Map of Guadeloupe published by Champlain in 1859 (Photo by A.J. Bright). / The Trio-Okomoyana village of Amotopo in the midwest of Suriname in 2007 (Photo by J.L.J.A. Mans). / Frontal view of the upper incisors and canines of individual 72B from the site of El Chorro de Maíta, Cuba, AD 1200-1600, showing intentional dental modification (Photo by H.L. Mickleburgh).

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EL CHORRO DE MAÍTA

A diverse approach to a context of diversity

Roberto Valcárcel Rojas, Darlene A. Weston, Hayley L. Mickleburgh, Jason E. Laffoon and Anne van Duijvenbode

This paper applies an innovative, multidisciplinary approach to the human and cultural remains recovered from the cemetery of El Chorro de Maíta, Cuba. The study of this indigenous cemetery, dated to late prehistoric and early contact period, provides new insights into the issue of Indigenous-European interaction and processes of culture contact. The authors have used an integrated osteoarchaeological approach, combining a demographic study of the population, the study of intentional cranial modification, dental anthropology and strontium isotope analysis with a (re)analysis of the material culture encountered in the burial context. This dynamic period of contact and interaction between the indigenous population and Europeans appears to be characterized by a greater degree of cultural, social, and biological diversity than hitherto recognized in the Caribbean archaeological record.

Este papel aplica un acercamiento multidisciplinario innovador a los restos humanos y culturales recuperados del cementerio de El Chorro de Maíta, Cuba. El estudio de este cementerio indígena, fechado al período prehistórico tardío y al período de contacto colonial temprano, proporciona nuevas percepciones sobre el tema de la interacción entre amerindios y europeos y los procesos de contacto cultural. Los autores han utilizado un enfoque osteoarqueológico integrado, que combina un estudio demográfico de la población, el estudio de modificación intencional craneal, la antropología dental y el análisis de isótopos de estroncio con un (re)análisis de la cultura material encontrado en el contexto de los entierros. Este período dinámico de contacto y interacción entre la población indígena y los europeos parece caracterizarse por un mayor grado de diversidad cultural, social, y biológica hasta ahora reconocido en el registro arqueológico del Caribe.

Cet papier prend une approche pluridisciplinaire innovante aux restes humaines et matériels culturels retrouvés dans le cimetière d'El Chorro de Maíta, Cuba. L'étude de ce cimetière indigène, datant de la préhistoire tardive et du début de la période Coloniale, éclaire beaucoup sur la question de l'interaction entre Amérindiens et Européens et les processus de contact culturel. Les auteurs ont utilisé une approche intégrée ostéoarchéologique, combinant une étude démographique de la population, l'étude de la modification intentionnelle du crâne, l'anthropologie dentaire et l'analyse des isotopes de strontium avec une (nouvelle) analyse du matériel culturel rencontré dans le contexte d'inhumations. Cette période dynamique de contact et d'interaction entre la population indigène et les Européens semble être caractérisé par un degré plus élevé de diversité culturelle, sociale et biologique, que a été reconnu dans l'archéologie des Caraïbes jusqu'à présent.

Introduction

Understanding the process of contact between Europeans and indigenous peoples in the Caribbean is often difficult, since it does not always generate material evidence that is easily recognizable in the archaeological record. Certain details of the materiality of contact can elude detection by the traditional methodologies used to study indigenous sites; in order to elucidate details researchers must begin with an approach which is suited specifically to locating and identifying them (Deagan 2004:603-604).

Through the use of such traditional methodologies, an image of a distinct differentiation between the Native and the European has arisen, based on the implicit assumption that these cultural entities are homogenous. This approach reduces the ability to observe the inherent variability of both the indigenous and European worlds, which was so essential to the processes of contact and interaction. In this way we have also come to lose the diversity of the indigenous world, to one that is entirely reshaped by the European: a new and colonized being where multiple ethnicities are now grouped into social positions and categories which are solely dependent on the European schemes of control. In order to overcome these difficulties we must learn to perceive the process of contact as more than merely a significant presence of mixed cultural characteristics in archaeological sites. It is essential to use research tools that allow us to evaluate the diversity in processes, from various perspectives, in this way corroborating or completing the individual data sets in order to establish an integrated and coherent image.

In recent years, this approach has been the premise of archaeological investigations of the site of El Chorro de Maíta, in north-eastern Cuba. Our paper highlights the utility of a multidisciplinary approach as a resource to uncover rarely identified details of Indigenous-European interaction at this site and in this way better understand a society impacted by colonial actions. This study centres on the human and cultural remains of the cemetery situated at this site and reveals a universe both diverse and dynamic, as much in its schemes of interactions as in its social and ethnic structures. This provides a new perspective that contrasts with the predominant ideas on this cemetery and shows aspects hitherto unrecognized in the archaeological record of this region.

El Chorro de Maíta

The site is located in the present-day province of Holguín, about 4 km from the coast, on the slope of a hill commonly known as Cerro de Yaguajay. Preserved here are the remains of a large settlement of the cultural type known as *Etapa agroalfarera* (Tabío Rey 1984) or *Fase agricultores* (Guarch Delmonte 1990). Ceramics found at the site belong to a local variant of the Meillacan Ostionoid subseries (Rouse 1992:96; Valcárcel Rojas 2002:64). In 1941, Benjamin Irving Rouse explored the site and compiled a report on his observations on the site itself and the provenance of the archaeological materials found there (Rouse 1942:103-106). Between 1986 and 1987, archaeologists of the Departamento de Arqueología in Holguín, under the direction of José Manuel Guarch Delmonte, located and excavated a cemetery in the western central part of the site (Guarch Delmonte 1996:20). The cemetery was the only one reported to date for this type of community in Cuba.

During these excavations, non-funerary spaces were also investigated. Here, and in the cemetery, small quantities of materials of European origin were discovered together with indigenous materials. These primarily consisted of ceramics and pig remains (*Sus scrofa*).

The non-funerary contexts are thought to be the remains of a village that surrounded the area of burials (Guarch Delmonte 1996:16).

Previous research

From the cemetery the remains of at least 108 individuals were excavated (Guarch Delmonte 1996:17), including one burial (no. 36) of modern appearance, and a skull (no. 22) with facial and craniometric characteristics which some investigators interpreted as being European (Rivero de la Calle *et al.* 1990:85). In the latter case, no post-cranial remains were found (Guarch Delmonte 1996:17-20).

The initial investigation focussed on the physical characteristics of the human remains and the analyses of the materials associated with the burials. Physical anthropological and craniological analyses included a study of the presence of fronto-occipital cranial modification (also known as tabular modification), and an interpretation of racial origin based on cranial morphology and stature. The results of these studies indicated that most individuals had modified crania with the exception of burial no. 22 (the possible European), one adult (no. 45) and a number of juveniles. The practice of cranial modification is typical for Late Ceramic Age communities in Cuba and the Greater Antilles in general (Guarch Delmonte 1996; Tabío and Rey 1985:143). Furthermore, excluding burials no. 22 and no. 36, all skeletons were found to be Amerindian (Guarch Delmonte 1996:21). The recent re-investigation of the physical anthropological characteristics of the skeletal population at El Chorro de Maíta, however, has shed new light on the composition of the group with regards to number of individuals, ancestry and the practice of cranial modification, as is discussed below.

A small number of burials contained objects of bodily ornamentation, ear spoons, necklaces and bracelets composed of stone, coral, or vegetable resin (Guarch Delmonte 1996:21). But the cemetery's largest and most complex assemblage of ornaments was buried with skeleton no. 57, an adult female (Guarch Delmonte 1996:21). Beads of gold, quartzite, coral and pearl, as well as laminar pendants made of an alloy of gold, copper and silver, known as *guanín*, were recovered. Other objects made of these ternary alloys, a material of great value amongst the indigenous peoples of the Caribbean and handled mainly by *caciques* (Oliver 2000), included a small bell and a bird's head ornament with South American stylistic affinities (Guarch Delmonte 1996:21-22). In 17 graves, small metal tubes of about 29 mm in length were discovered, and were initially thought to have been made of copper (Guarch Delmonte 1996:20). In one case (burial no. 25) the tubes were attached to a metal disc covered in fabric, resulting in an ornament which was placed by the leg of the individual.

A great variety of burial positions, including extended burials were found. However, a supine position with the legs flexed to varying degrees was the most common, although some individuals, such as no. 72B, were interred face down. There was a certain tendency for orientation of the skeletons toward the north and the west. All burials appeared to be primary interments, although many burials had been disturbed. This occurred most frequently in the central part of the cemetery, where the largest number of burials was located. In some cases, rocks were placed on and around the bodies; in one burial the body was placed on a bed or base of stones.

Unlike other known burial contexts in Cuba, at this site no ceramic vessels containing food remains were reported, although in some burials ceramic and faunal (primarily pig bones and marine shell) remains were present but were considered to be intrusive (Guarch Delmonte 1988:163). In fact, there were no concentrations of remains to suggest domestic use of the cemetery area.

The picture generated by the previous studies underlined the importance of the site of El Chorro de Maíta for understanding indigenous funerary practices. The exceptional nature of the cemetery, not only its large size but also the presence of ceremonial objects, personal ornaments and its location in a settlement, is important as no others like it are known in Cuba to date. This suggests a pre-eminence of this place and indicates that it may have served as the seat or head of an incipient cacical organization. Supporting this interpretation is the possible existence of an elite group and of social differentiation inferred by the restricted distribution of bodily ornaments in burials. Furthermore the use of *guanín* and gold in one case is thought to be associated with the cacical elite (Valcárcel Rojas and Rodríguez Arce 2005:141,146). Although it was previously considered that contact with Europeans could have influenced certain visible aspects of the cemetery, such as the absence of cranial modification in certain (mainly juvenile) individuals and the practice of extended burial positioning (Guarch Delmonte 1996:22), this subject was not explored in depth and as a result the site became a symbol of the Native, and of indigenous religious practices and mortuary customs.

Recent research

In 2005 the Departamento Centro Oriental de Arqueología, of the Ministerio de Ciencias, Tecnología y Medioambiente, in Holguín, initiated a new investigation of the site under the direction of Roberto Valcárcel Rojas. This work, although still in process, has benefited from the collaboration of several international academic institutions, studying in parallel different aspects and areas of the site. At the start of this investigation, radiocarbon dates were obtained from the remains of two skeletons (Valcárcel Rojas 2002:142): burial no. 25 (conventional radiocarbon age 870 ± 70 BP, Beta – 148956; $\delta^{13}\text{C}/^{12}\text{C} = -19$ ‰; 2 σ calibration: Cal AD 1020 to 1280 (Cal BP 930 to 670)) and burial no. 39 (conventional radiocarbon age 360 ± 80 BP, Beta – 148955; $\delta^{13}\text{C}/^{12}\text{C} = -19$ ‰; 2 σ calibration: Cal AD 1420 to 1670 (Cal BP 530 to 280)). One additional date was secured from a space outside of the cemetery in Unit 5, which indicated the pre-Columbian use of this part of the site (conventional radiocarbon age 730 ± 60 BP; Beta – 148957; $\delta^{13}\text{C}/^{12}\text{C} = -25.0$ ‰; 2 σ calibration: Cal AD 1200 to 1320 (Cal BP 750 to 630) and Cal AD 1350 to 1390 (Cal BP 600 to 560)). In Unit 5, one skeleton was also found. In addition, the small metal tubes found in some of the graves were found to be made of brass (Valcárcel Rojas 2002a), a metal first brought to the Americas by Europeans.

These data confirmed both the pre-Columbian origin of the occupation and use of the site and the post-contact dating of some of the burials. Taking this information into account, subsequent investigations focused on determining the incidence of all aspects of European influence in the development of the settlement and the cemetery. Investigations of non-funerary spaces at the site directed by Roberto Valcárcel Rojas with Vernon James Knight and A. Brooke Persons, of the University of Alabama (Persons *et al.* 2007; Valcárcel Rojas *et al.* 2007) uncovered indigenous elements dating to the thirteenth through the first half of the fifteenth century, and soil layers containing a range of European ceramics

known to have been used between 1490 and 1650 AD. Further investigations showed that the presence of animal and ceramic materials of both indigenous and European origins in the cemetery is more widespread than initially thought, and to date it is not possible to explain their presence in the graves. These details require further attention due to their potential for establishing a timeframe for certain burials. Some of the most revealing data, however, have been derived from the study of materials directly associated with individual graves, and from the re-analyses of the human remains utilizing new methods and techniques in collaboration with investigators from University College of London (UCL), and Leiden University.

Metals

In 2005 Valcárcel Rojas, Martín-Torres, Cooper and Rehren, analysed the small metal tubes found in a total of 17 graves in the Wolfson Laboratories of Archaeological Sciences at the Institute of Archaeology at UCL (Martín-Torres *et al.* 2007; Valcárcel Rojas *et al.* 2007). Six samples were investigated using energy-dispersive X-ray fluorescence (ED-XRF), optical microscopy and scanning electron microscopy with an attached energy-dispersive spectrometer (SEM-EDS). The analysis indicated that the samples were composed of brass – as opposed to copper as originally thought – with a composition similar to brasses obtained by cementation and produced in Central Europe during the fifteenth and sixteenth centuries, and were especially similar to brasses made in Nuremberg, Germany (Martín-Torres *et al.* 2007:200).

Considering the results of these analyses, specifically the similarity in composition between all of the analysed pieces, it is highly likely that the remaining metal tubes from this site were also made of this type of brass. There is no evidence for the production of this metal in the Americas using the technique of cementation before the arrival of Europeans (Martín-Torres *et al.* 2007:8). For this reason the tubes must have arrived at the cemetery following some form of contact between the local population and the Europeans. The shape of the pieces of metal also support this interpretation; a review of the pictorial sources, the data concerning European archaeological contexts from the fifteenth century (Martín-Torres *et al.* 2007:201) and the information from early colonial contexts in the Americas (Deagan 2002:174-175), reveal that the tubes are elements used in European clothing during the fifteenth and sixteenth centuries, known as *agujetas* (or aglets), and used in cords and shoelaces to fasten articles of dress.

Perhaps some individuals were buried with European clothes. The presence of fragments of cloth reported in burial no. 57 supports this idea; nevertheless the available evidence does not permit a clarification of the situation at this time. In the case of burial no. 25 it is clear that aglets were used to fabricate an indigenous ornament; in the other burials the location of the aglets suggests that they were originally positioned by the wrists, near the neck and chest, or next to the waist. These places coincide with the areas where aglets would have been used in sixteenth century European clothing, but also with places on the body where indigenous peoples wore ornaments. For this reason it cannot be excluded that the aglets were obtained separately from items of clothing and used as an independent piece of personal ornamentation. In fact, the aglets, as independent objects were used by the Spaniards after their arrival to the New World, in exchanges with indigenous inhabitants (Álvarez 1977:92; Colón 1961:149), who attributed sacred qualities to brass that made them practically as valuable as the alloy *guanín* (Oliver 2000:214). Possibly these ideas of

sacredness influenced the use of this metal to make the ornament found with burial no. 25.

The analysis of the metallic compositions of various objects of *guanín* and the smelting techniques used to make them confirmed details which are referred to in the ethnohistoric sources where such objects are mentioned (Martinón-Torres *et al.* 2007:197). The manufacture of alloys by smelting was not known in the Antilles at the time of the arrival of the Europeans, and the origin of the *guanín* is believed to lie in South America (Valcárcel Rojas *et al.* 2007:117,129). The bird's head ornament also displays certain iconographic elements that are commonly found on pectorals from the Tairona culture of Colombia (Valcárcel Rojas *et al.* 2007:121). The latter perhaps confirms the exotic origins of these goods, one of the reasons which must have contributed to their great value amongst these indigenous peoples (Oliver 2000:199).

These data not only change earlier interpretations of the nature of the metal tubes, but they also completely alter our perception of the cemetery by clearly demonstrating that a substantial number of burials (at least 17) date to after the arrival of the Europeans and thus that the process of contact between them and the indigenous peoples may have played a significant role in the formation and use of the funerary space. On the other hand, the presence of a set of *guanín* objects, the largest yet recovered in the insular Caribbean (although the precise dating of its arrival is unknown), indicates the important status of the individuals who were interred with brass objects, and suggests the existence of a community with well-defined social distinctions at the moment of contact.

Aspects of mortuary treatment

The presence of a substantial number of brass tubes shows that these burials definitely date to after the European arrival. A large number of individuals were found buried in an extended, typically Christian position, in which the body is placed on the back, with legs stretched, the hands crossed on the chest or the abdomen, and an east-west orientation of the body. A large proportion of the extended individuals (40 percent) were found with brass objects, enabling us to securely date them to after contact; however the remaining 60 percent could not be dated in this way. It is important to note, however, that this position is infrequently reported for pre-Columbian burial sites in Cuba or sites with “Meillacan” or “Chican” ceramics in the Greater Antilles in general (Crespo Torres 2000:157; Veloz Maggiolo *et al.* 1976:317, note 4). On the contrary, in early European towns this was the customary burial position, and it was even used to bury indigenous individuals at the contact period sites of La Isabela in the Dominican Republic (Guerrero 1999:108) and in Puerto Real in Haiti (Marrinan 1995:179). As many of the extended burials at El Chorro de Maíta conform more or less to this type, and a large number of them contain European brass, we suggest that the mortuary practices in these cases were influenced by relations with Europeans, and therefore that the number of post-contact burials at the site may be quite large. The presence of European burial positions at El Chorro de Maíta suggests substitution of local cultural practices (such as the typical indigenous flexed burial positioning) by new ones, tied to Christian burial rituals, perhaps an early expression of European attempts to Christianize the local peoples. Contrastingly, the majority of burials containing brass objects do not follow European burial traditions but indigenous ones, suggesting a situation of persistence and continuity of the local cultural traditions. In fact, burial no. 25, who was originally radiocarbon dated to the pre-contact period, was found with a brass

ornament but was interred in an extremely flexed position. The shape and appearance of the ornament are typical for indigenous culture and style, showing the adaptation of this metal to indigenous cultural norms. This demonstrates persistence of indigenous culture during the early contact period, and suggests dynamic interaction between indigenous and foreign actors in which the indigenous population maintains certain cultural aspects while adapting others according to European influences.

On account of the radiocarbon dating of burial no. 25 the cemetery was originally considered to be – in part – pre-Columbian (Valcárcel Rojas and Rodríguez Arce 2005:132). The presence of brass in this burial, however, disqualifies this date. The supposed pre-Columbian origin of the cemetery is somewhat ambiguous at this point, as we must consider the absence of similar cemeteries during this period in indigenous Cuban sites. Furthermore, the substantial number of clearly post-Columbian burials at the site means that we are confronted with the possibility that we are dealing with either an indigenous burial area transformed into a cemetery through interactions with Europeans, or a cemetery established entirely after contact.

Demography and ethnicity

A reanalysis of the El Chorro de Maíta skeletal population was undertaken in June 2010 by Darlene Weston and significant alterations were made to the minimum number of individuals, and age and sex distribution reported by the original investigators. Adults were aged based on morphological changes to the pubic symphysis (Katz and Suchey 1986; Todd 1921a, 1921b), auricular surfaces of the os coxae (Lovejoy *et al.* 1985), and sternal rib ends (Işcan and Loth 1986a, 1986b) as well as the degree of cranial suture closure (Meindl and Lovejoy 1985) and dental attrition (Brothwell 1981; Lovejoy 1985). Juvenile age was determined using the stage of dental development (Smith 1991), long bone length (Sundick 1978; Ubelaker 1989), and the degree of epiphyseal fusion (Scheurer and Black 2000). As it is not possible to determine the exact chronological age of an individual based on morphological changes to the skeleton and teeth, adult and juvenile skeletons were assigned to standard age groups.

The biological sex of the El Chorro de Maíta skeletons was estimated based on various morphological traits of the skull (Ascádi and Nemeskéri 1970; Buikstra and Ubelaker 1994) and pelvis (Buikstra and Ubelaker 1994; Phenice 1969), in addition to metric traits of the clavicle (Jit and Singh 1966), scapula (Iordanidis 1961), humerus (Stewart 1979), and femur (Pearson and Bell 1917/1919; Stewart 1979). As is common practice, biological sex was not assigned to the juvenile individuals due to a lack of secondary sex characteristics found in the skull and pelvis (Scheurer and Black 2000). Table 1 illustrates the revised El Chorro de Maíta age and sex distributions.

In total there were 90 adults (67.7 percent) and 43 juveniles (32.3 percent). Among the entire sample population, the majority (16.5 percent) were aged Adult (18+ years). The adults were spread fairly evenly among the adult (18+ years), 18-25 and 26-35 age categories (16.5, 14.3 and 14.3 percent respectively), while amongst the juveniles, most (13.5 percent) were aged between 5-9 years. In the adult population, females outnumbered males, with combined totals of 44 (48.9 percent) and 39 (43.3 percent), respectively. When the age and sex data for the entire skeletal sample are combined, the most commonly represented group is juveniles 5-9 years (13.5 percent) followed by males 26-35 (9.8 percent) and adult females (18+ years).

Age	Male (M + M?)	%	Female (F + F?)	%	Indeterminate	%	Total	%
>0 (foetus)	-	-	-	-	2	1.5	2	1.5
<1 yr	-	-	-	-	3	2.3	3	2.3
1-4 yrs	-	-	-	-	8	6.0	8	6.0
5-9 yrs	-	-	-	-	18	13.5	18	13.5
10-14 yrs	-	-	-	-	6	4.5	6	4.5
15-17 yrs	-	-	-	-	6	4.5	6	4.5
18-25 yrs	7	5.3	11	8.3	1	0.8	19	14.3
26-35 yrs	13	9.8	5	3.8	1	0.8	19	14.3
36-45 yrs	5	3.8	9	6.8	0	0.0	14	10.5
46+ yrs	9	6.8	7	5.3	0	0.0	16	12.0
adult ≥ 18yrs	5	3.8	12	9.0	5	3.8	22	16.5
Total	39		44		50		133	≈100

Table 1 Age and sex distribution for El Chorro de Maíta.

The most notable feature of the El Chorro de Maíta skeletal population is the relatively large proportion of children it contains. Typical attritional cemeteries, i.e. those that accumulate naturally over time, have a large proportion of infants, with a decreasing number of deaths through to adolescence, and an increasing number of deaths through adulthood to old age (Paine 2000). Mortality in the El Chorro de Maíta cemetery population peaks at the 5-9 year age group and then remains fairly steady among the adults. A cemetery with a large number of children is more consistent with a catastrophic cemetery, i.e. one where mortality is due to a single or short-term catastrophic event, such as a natural or man-made disaster or a disease epidemic. As the catastrophic episode typically strikes without regard for age or sex, the cemetery population usually mirrors the once living population (Paine 2000). In the case of the El Chorro de Maíta cemetery, the temporal context of the site, spanning the pre- and post-contact periods, suggests that epidemic disease may have been an important factor in the structuring of the site's mortuary profile.

When Europeans colonized the New World, they brought with them a plethora of infectious diseases previously unknown in the indigenous populations. Having no immunity to these new diseases, the local populations often rapidly succumbed (Verano and Ubelaker 1992). A preliminary palaeopathological analysis of the skeletal population corroborates the possibility that acute infection may have affected the population.

Through the use of craniometrics, it was possible to estimate the ancestry of three of the El Chorro de Maíta individuals: no. 22, 45, and 81. Standard cranial measurements from these three individuals were compared to Howells' (1973, 1995) reference populations using the *FORDISC 3.0* software package (Jantz and Owsley 2005). Cranium no. 22 scored most similar to a White male, cranium no. 45 scored most similar to an African male, while cranium no. 81 scored both equally similar to an African female and an Hispanic female, suggesting that this individual may be of mixed ancestry. These results are interesting as they reflect the types of ancestral groups recorded as being present on Cuba in the historical records at this time.

Intentional cranial modification

Intentional cranial modification has previously been defined as “the dynamic distortion of the normal vectors of infantile neurocranial growth through the agency of externally applied forces” (Moss 1958:275). The source of these forces can range from natural – due to a genetic defect or disease – to artificial modifications, in which human actions create a different shape of the cranium. A key distinction is made between intentional and unintentional modification. In the first instance, an altered head shape is created deliberately using a modification device made of bandages or boards. In cases of unintentional modification the resulting head shape is an unexpected side effect of child rearing practices, such as the use of cradle boards in North American indigenous societies or a prolonged supine sleeping position in modern infants (Gerszten and Gerszten 1995:375; Littlefield *et al.* 2005:45-46).

Intentional cranial modification is practised in various cultures throughout the world. Each society has different reasons for altering the head shape of their infants, but general motivations can be deduced from archaeological, anthropological and ethnohistorical literature. Aesthetic reasons and gender differentiation can play a role. Occasionally, religious motivations are mentioned, such as the desire to resemble the mountain of origin in certain Andean societies (Blom 2005:4; Schijman 2005:947). The expression of social rank or status is often cited as a motivation (Dingwall 1931; van Duijvenbode 2010). Among the Chinook of North America, an altered head shape expressed freedom and slaves were expressly forbidden to modify the heads of their children (Dingwall 1931:165-166). Finally, the presentation of group identity can also be an important reason, as has been demonstrated among several Andean populations (Torres-Rouff 2003). Since intentional cranial modification is a permanent alteration which must be initiated almost immediately after birth, these group identities are often based on kinship: family, clan, lineage or ethnic identity (van Duijvenbode 2010). Essentially, all motivations mentioned here are expressions of identity on a different level, representing parts of either individual or group identities.

An analysis of the practice of intentional cranial modification at El Chorro de Maíta was executed by Anne van Duijvenbode in July 2009. This study used a sample of the entire burial assemblage, based mainly on the preservation of the crania. The sample consisted of 54 individuals: 42 adults, 5 adolescents and 7 children. The sex distribution is relatively equal with 20 males and 19 females whilst the remainder of the sample could not be sexed.

Table 2 shows that intentional cranial modification is present in approximately 80 percent of the sample. Furthermore, 82.5 percent of the modified group has the same head shape: fronto-occipital parallel modification (see Table 3). Figure 1 shows an example of

Intentional Cranial Modification	Percentage of Population	Number of Individuals
Yes	79.6%	43
Possibly	3.7%	2
No	16.7%	9

Table 2 Prevalence of intentional cranial modification in El Chorro de Maíta.

Type of Modification	Percentage	Number of Individuals
Fronto-Occipital Parallel	82.5%	33
Fronto-Occipital Vertical	2.5%	1
Occipital Flattening	7.5%	3
Frontal Flattening	7.5%	3

Table 3 Distribution of shapes encountered in El Chorro de Maíta.

the fronto-occipital parallel modification which is typical for this sample. Overall, the pattern at El Chorro de Maíta shows a large percentage of the population undergoing the practice and little variation in the type of head shape. Further analysis of the data revealed no significant correlations between head shape and sex or grave goods. A potential correlation between age and intentional cranial modification was observed. When the sample is divided into age groups, 90 percent of the adult individuals have an altered head shape. However, among the adolescents this is only 60 percent and among children 57.1 percent. (van Duijvenbode 2010).

Individual 72B is the only exception in the homogeneity of shapes in the sample. This female has fronto-occipital modification of the vertical subtype (see Figure 3). She was buried in an unusual position: facing down with a large stone on top of the legs. The different shape of the skull suggests that this individual may not have been born in the region of El Chorro de Maíta.

A number of motivations for intentional cranial modification were discussed earlier. Gender differentiation can be ruled out, since no significant correlation was found between sex and head shaping. The presentation of social status or rank is also unlikely. There was no relation between grave goods and intentional cranial modification and the high incidence of similar shapes would mean that the status or rank would have to be shared by at least 80 percent of the population. Only one source was found discussing potential religious motivations. Cuban researcher Herrera Fritot suggests that head shaping was an attempt to mimic the head shape of a turtle, an important animal in indigenous Caribbean mythology (in Rivero de la Calle 1960:252). No evidence supporting this hypothesis was found.

Aesthetic reasons are a possible motivation, since the altered head shape is considered beautiful by indigenous informants in several colonial sources on the circum-Caribbean (Davies 1666:338; Roth 1924:412; Stedman 1988:314). An alternative reason behind the

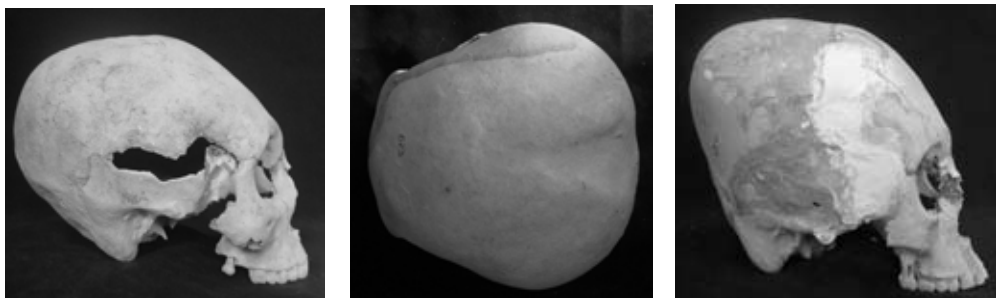


Figure 1 A: Lateral view of individual 51, B: Superior view of individual 91, C: Lateral view of individual 72B.

practice is the expression of kinship-based group identities. The relatively high percentage of modification among the population combined with one main type of modification is connected to the expression of group identity in societies with a higher level of social organization (Torres-Rouff 2003). The pattern of intentional cranial modification in El Chorro de Maíta encountered during this research is similar to her results and the relation to group identity in the Greater Antilles, which had already been suggested based on ethnohistoric sources and earlier archaeological research (Crespo Torres 2005:62), was confirmed by this investigation.

Finally, the question remains why there is a significantly lower percentage of altered crania amongst the children and adolescents. This unequal distribution was also noted by the original investigators and Guarch Delmonte (1996:21) suggested that it might be related to a discontinuation of the practice due to European influence. This explanation is in line with the known effects of intercultural contact on the practice from ethnographic and ethnohistoric sources (van Duijvenbode 2010). However, without a sound internal chronology for the burials in the cemetery, this hypothesis was difficult to test as there was no evidence that the children and adolescents concerned were contemporaneous. The recent reanalysis of the skeletal assemblage has concluded that the demography of the population suggests that the cemetery was the result of a single or short term event. This is the first evidence that these burials could be considered contemporaneous and that the discontinuation of intentional cranial modification might indeed have been due to European influence on the local population.

Intentional dental modification

Individual 72B has been mentioned above for her remarkably different type of intentional cranial modification in comparison to the rest of the persons interred at El Chorro de Maíta, most likely indicating that she did not originate from that area. In addition to the dissimilar type of intentional cranial modification, this individual presents a clear case of intentional dental modification, which was identified during a dental anthropological study of the human remains from this cemetery, conducted by Hayley L. Mickleburgh in July 2009.

The practise of intentional dental modification has a long history in various cultures across the globe for aesthetic, religious, ritual and socio-cultural reasons. A range of techniques for dental modification are known, such as filing, chipping, cutting, drilling, incising, inlaying with stone materials, and extraction or ablation (Alt and Pichler 1998; Vukovic *et al.* 2009).

Individual 72B's dental modification affects the upper incisors and canines, with the central incisors most prominently modified. All upper incisors and both upper canines appear to have been filed extensively, considerably reducing the crown height and leaving the occlusal surfaces extremely smooth and flattened. The central incisors have a further modification of the occlusal surfaces at both the mesial and distal margins, in the form of buccolingual grooves which extend across the entire occlusal surface. The grooves are 1.5 to 2mm wide and 1.5mm deep. In frontal view, the grooves appear to be semi-circular in shape, however the pits of the grooves are in actual fact almost completely flat (see Figure 2). The remaining teeth in the dentition are unmodified and only very slightly worn. There is no corresponding wear on the lower anterior teeth, excluding a masticatory activity as the cause. Moreover, the striking symmetry and precision of the grooves and flattened oc-

clusal surfaces indicate that the modification must have been intentional as opposed to activity-induced (i.e. the result of the use of the teeth as tools).

A small number of individuals with clear intentional dental modification has previously been found in the Caribbean region, however in all cases these individuals were identified as African slaves (Crespo and Giusti 1992; Handler 1994; Handler *et al.* 1982; Haviser, personal communication 2010; Rivero de la Calle 1974; Stewart and Groome 1968). As most of these burials were accidental discoveries, little information is available on their precise archaeological context. However, what is clear is to the dental modifications in these cases are significantly different in appearance and aetiology than the El Chorro de Maíta case. The African modifications tend to be achieved by rough chipping or cutting of the enamel, although more refined chipping also occurs. Furthermore, most African modifications resulted in a decidedly pointed or 'fang-like' appearance of the anterior teeth. The general appearance and degree of craftsmanship displayed in individual 72B is more



Figure 2 A: Frontal view of the upper incisors and canines of 72B, showing clear intentional dental modification, B: Oblique occlusal view of the upper incisors and canines of 72B.

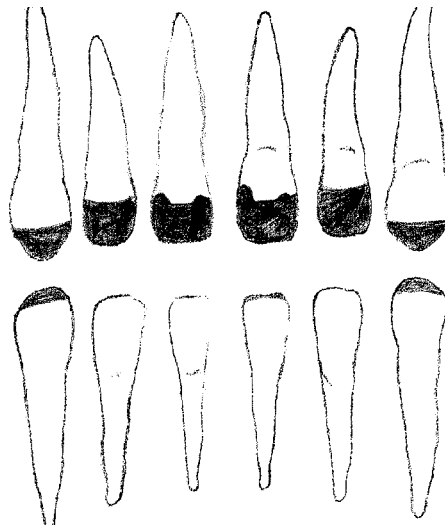


Figure 3 Schematic representation of the intentional dental modification in 72B.

consistent with Mesoamerican types. When compared to known types of dental modification from Mesoamerica as documented by Romero, the central incisors can be classed as category A4 with further A2 modifications of the occlusal surfaces, and the lateral incisors and canines as category A4 (Romero Molina 1986). No previous cases of this type of dental modification are known for the pre-Columbian Caribbean islands. Considering the absence of a precedent for individual 72B's type of dental modification in the Caribbean islands together with her dissimilar type of cranial modification, the possibility that this individual originated in Mesoamerica must be considered.

Early studies into dental modification resulted in elaborate classification schemes still in use today, often taking special care to separate the types of modification according to their geographical origin (see Romero Molina 1986; Rubín de la Borbolla 1940; Stewart 1941). More recent studies on Mesoamerican sites in Belize, Guatemala, Honduras and Mexico have highlighted regional and temporal differences in both style and technique of dental modification. Results point to the use of dental modification as a manner of expressing identification with a lineage, polity, ruler or region (Havill *et al.* 1997; López Olivares 1997; Tiesler Bloss 2001; Williams and White 2006). Through comparison of the type of dental modification present in the dentition of individual 72B with the types presented in these early and recent works it appears that this type of modification is most compatible with types known for the Mesoamerican region of Belize, Guatemala and Honduras. In particular, this type of modification has been documented for Postclassic sites in Belize (see Williams and White 2006). Considering the dating of the site of El Chorro de Maíta, which falls generally within the Postclassic time period, we tentatively suggest that individual 72B originated from the mainland region of Belize.

Isotopic perspectives on diversity

Strontium isotope analysis has been widely applied to the exploration of migration from the archaeological record (Beard and Johnson 2000; Bentley *et al.* 2007; Bentley *et al.* 2005; Bentley *et al.* 2002; Grupe *et al.* 1997; Knudson *et al.* 2009; Muller *et al.* 2003; Price *et al.* 2008; Schroeder *et al.* 2009; White *et al.* 2007; Wright 2005). Its primary benefits derive from the fact that it allows researchers to directly identify migrants (individuals who are interred in a region which is isotopically different from that one in which they raised), instead of relying on various proxy measures from the material record that characterizes more traditional approaches to migration studies in archaeology. The primary limitation of this approach is that only first generation migrants from isotopically different regions are identifiable (Price *et al.* 2006). Therefore, strontium isotope analysis alone (or any other single isotopic system) does not usually permit the direct identification of geographic origins. For these reasons, strontium isotope analysis and similar biogeochemical approaches are considered to be complementary with, various other macro-scalar approaches to migration and mobility which rely on human biological or material evidence.

The usefulness of strontium isotope analysis rests on several basic premises: 1) that strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) vary spatially; 2) that owing to broad similarities to calcium, strontium replaces calcium in the inorganic fraction of human bone and dental enamel; 3) that unlike bone, dental enamel is a relatively fixed tissue (once formed, it is metabolically and isotopically inert) and thus does not undergo subsequent remodelling throughout an organism's lifetime, meaning that dental enamel preserves the isotopic signal of the time of formation or mineralization; and 4) unlike most other light stable isotopes, strontium does not undergo substantial mass dependent biofractionation, meaning that very little alteration of isotopic ratios is observed as one moves through the food web (Bentley 2006; Price *et al.* 2002).

All aspects of strontium isotope analysis were conducted by Jason Laffoon at the Faculty of Earth and Life Sciences at the Free University Amsterdam, The Netherlands, according to protocols described in Booden *et al.* (2008). Samples were analysed for strontium isotope composition with a thermal ionization mass spectrometer (TIMS, ThermoFinnigan MAT 262 RPQ plus). All measurements were automatically corrected, using an exponential correction factor, to an $^{86}\text{Sr}/^{88}\text{Sr}$ value of (0.1194). For external reproducibility and quality control, we used the certified reference material NBS (NIST) SRM-987 as our external standard. Over the period of analyses, analyses of this standard produced results of ($^{87}\text{Sr}/^{86}\text{Sr}$ mean value = 0.710236 +/- .000009 standard deviation, 2 σ).

Herein we report on the data obtained from human (n=79) and faunal (n=8) samples. All strontium data for human samples were derived from dental enamel, primarily from premolars although other dental elements were analysed when a suitable premolar was not available. The faunal samples were collected and analysed both to contribute to assessments of the local range of biologically available strontium and to test the possibility of animal mobility. Faunal samples from controlled excavations of this site include three hutia (family *Capromyidae*) remains and two land snails (family *Camaenidae*) which form the basis of our initial local range estimates. In addition, samples from three domestic pigs (*Sus scrofa*) were also analysed to determine if these animals were being raised locally or imported into the site/region. Sr isotope analysis was conducted on dental enamel for the hutia and pig samples and on shell for the land snails.

Results of our strontium isotope analyses from El Chorro de Maíta are displayed in Figure 4. The human data is provided on the left side of the graph and is divided into four categories; adult females, adult males, unsexed adults, and juveniles (unsexed). The faunal remains lie on the right and are separated by type. We tentatively define the local range of $^{87}\text{Sr}/^{86}\text{Sr}$ as approximately 0.70795-0.70880, based on the absolute range of the faunal data (excluding the pig samples for reasons discussed below). This range is in rather good accordance with the majority of the human samples as would be expected if most local residents were buried in or near their place of birth. Therefore the majority ($n=60/79$, or ~74 percent) of the humans are determined to be local. All three pig remains have been identified as nonlocal and fall at or near the lower end of the range of human values.

As the geology of Cuba is rather complex (Pardo 1975) we have not placed too much reliance on the geological literature in our estimations of strontium isotope variation. In fact, owing to direct and indirect marine influences on the local ecosystem we support the approach proposed by Price *et al.* (2002) whereby local range estimates primarily rely on the analysis of local faunal remains. Since our local range estimate is based on a relatively few number of samples ($n=5$) we consider it to be preliminary at this time. Research to better refine the local range at the site itself including analyses of more local fauna samples and to determine the extent of spatial variation of strontium isotope signals throughout the region is ongoing.

Nonetheless, inferences can still be made based on the structure of the isotopic data patterns themselves and comparative correlations with other data sets from a contextual perspective. In other words, future research may suggest a slight broadening or shifting of the local range but this does not appreciably alter our initial interpretations, for example the fact adult males and females display broadly similar ranges and variance. However, there are some observable differences between these two groups. For example, to date 8 of the 30 adult females or possible females analysed are identified as nonlocals (~27 percent), while 10 of the 28 males or possible males analysed are identified as nonlocals (~36 percent),

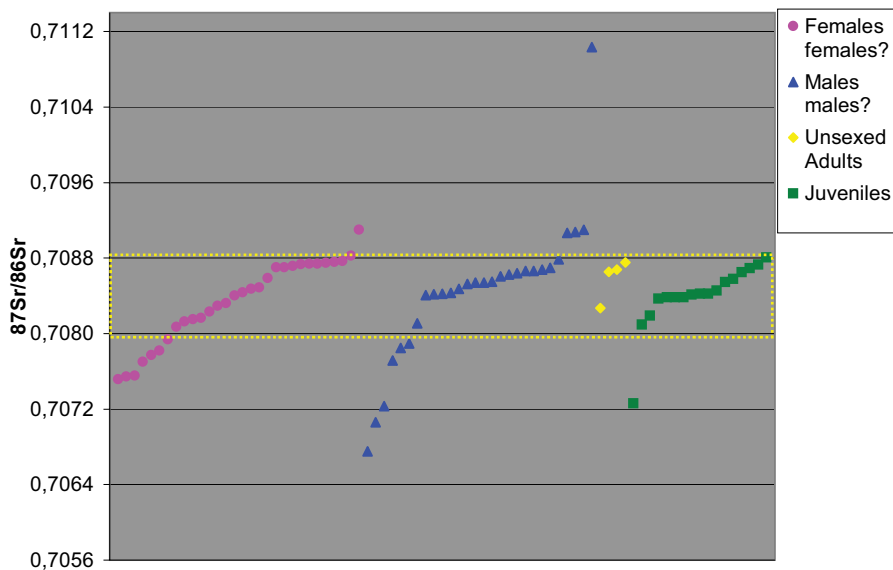


Figure 4 Strontium Isotope Results for El Chorro de Maíta.

suggesting slightly higher rates of male immigration relative to females. In addition, the Sr values from the males display greater variance with the 3 lowest and the single highest outliers. We interpret this as evidence of more variable geographic origins for these nonlocal males. In the absence of adequate chronological controls we cannot determine at this time whether these patterns reflect either or both, pre- and post-contact mobility patterns, although we might expect rather diverse origins for adult males in early contact period burial assemblages. Lastly, 16 of the 17 juveniles analysed have been identified as local. This agrees with expectations based on the premise that juveniles are less likely than adults to have migrated within their relatively brief life spans.

Other notable patterns are revealed through the comparison of the strontium isotope data set relative to other lines of evidence, for example mortuary practices (burial location, type, position, orientation) and dental and cranial modification practices. Of the adult females analysed, only one (no. 81) clearly lacks cranial modification, she has been identified as an individual of possible mixed African and Hispanic ancestry and has also been identified as a local. All four of the females interred with grave goods are locals, while none of the nonlocal females have been interred with grave goods. Of the four adult males with clearly unmodified crania, 3 are nonlocal, including no. 45 (discussed below), and one is local (no. 22), an individual identified as being of European ancestry. It is interesting to note that while brass tubes have been recovered from both local and nonlocal graves, ornaments of other materials such as stone and coral are exclusively found in association with local individuals. Also, various burial positions (flexed, semi-flexed, and extended) occur amongst local and nonlocal individuals.

The Sr isotope signatures of certain individuals require further elaboration. Burial no. 45 has an $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of 0.711033, which is a clear outlier for this population and for the Caribbean region in general. In fact, our analyses of several hundred Sr isotope ratios from the West Indies, and a review of previously published Sr isotope results from archaeological and geochemical research within this region revealed no results for local individuals which are this radiogenic (high). We interpret this highly elevated signal as supporting the hypothesis of a non-Caribbean origin for this individual, although this identification must remain tentative until a database of strontium isotope variation for the Caribbean region is developed, a project which is currently underway (Laffoon and Hoogland 2009). Strontium isotope signals alone cannot definitively pinpoint a specific geographic origin owing to the limitations of equifinality (Price *et al.* 2007). As burial no. 45 has been identified as a person of African ancestry, a comparison of his Sr signature with published Sr ranges for various regions of Western Africa, from which enslaved migrants were known to have originated from, may help to further narrow down this person's geographic origins (Schroeder *et al.* 2009).

Burial no. 72B has been highlighted as unique based on the presence of cranial and dental modification types which are rare for this region but have been reported for Mesoamerican groups, and a unique burial treatment for this assemblage (prone with large stones placed on the lower extremities), as previously discussed. The $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of individual no. 72B is 0.707546, a result that also clearly identifies this individual as a nonlocal. Although this signal is also consistent with natal origins in many regions of the Caribbean, the available contextual evidence suggests a possible Mesoamerican origin for this individual. This Sr isotope signature is consistent with geographic origins in the Yucatán Peninsula, particu-

larly with reported Sr ranges from the Southern Maya lowlands (Hodell *et al.* 2004; Wright 2005).

Lastly, all three Sr results from the domestic pig samples fall outside of our local range estimate, suggesting nonlocal origins for the pigs also. This illustrates two important points about this analytical technique; 1) that caution must be taken in the selection of 'local' faunal samples for local Sr range estimates owing to the possibility that certain species are often highly mobile, in this case probably attributable to transhumance, and 2) that Sr isotope analysis thus offers the potential to investigate non-human mobility as well (Hoppe *et al.* 1999; Schweissing and Grupe 2003).

Discussion and conclusions

Our multidisciplinary approach to the cemetery of El Chorro de Maíta has profoundly altered the perception of this site, in part owing to a better understanding of the diverse influences in the formation of this mortuary space. Understanding the nature of these diverse influences has been complex given the difficulties in establishing a chronology for the burials.

The reanalysis of the human remains has indicated that the cemetery contained a much higher proportion of children between 5 and 9 years of age than would typically be expected for a cemetery assemblage which accumulated over a long period of time. These findings seem to indicate a single or short-term catastrophic event, such as a natural or man-made disaster or a disease epidemic. The latter is most likely, considering the temporal context of the site and the results of the preliminary palaeopathological analysis. Furthermore, another important result of this study has confirmed the speculated European origin of individual no. 22, while also identifying no. 45 as an individual of African origin and no. 81 as a mestizo of mixed African and European ancestry.

The identification of European brass provides a reliable chronological indicator, showing that the cemetery was maintained during the post-Columbian period and that many of the burials date to this time period. The latter corresponds well with the observed catastrophic mortality profile of this burial population, as increasing contact during this period led to the exchange of diseases to which the indigenous population had no resistance. At this time in El Chorro de Maíta traditional indigenous mortuary practices were combined with new cultural influences, such as extended (Christian) burial positions and processes of adoption of European materials into indigenous culture. The predominant fronto-occipital parallel cranial modification, typical for Late Ceramic Age cultures in the Greater Antilles, appears to have served as an indigenous group identity marker at El Chorro de Maíta. Its absence in individuals' no. 22, 45, and 81, together with clear evidence of different ancestry, may have been a visible marker of their foreign affiliations. In other cases, especially amongst the children, the absence of cranial modification could be related to changes generated by European actions. Individual 72B is the only person showing a different type of cranial modification (fronto-occipital vertical). This female also has remarkable dental modification of the upper front teeth. These two traits together are unique among known indigenous burials from the Caribbean islands, and along with this person's strontium isotope signature appear to indicate a Mesoamerican origin (possibly Belize). Although we do not have reliable chronological data for this individual at this time, it is possible that her presence here is tied to colonial activities, including the forced migration of indigenous slaves to the Caribbean and Cuba from different regions of the Americas (Deagan and

Cruxent 1993:94). Similar causes can be suggested for individual no. 45, although in this case the burial is clearly post-contact and the origin is most likely Europe or Africa, areas from which early slaves were taken to the Antilles.

The strontium isotope analysis shows that the bulk of the population at El Chorro de Maíta is of local origin, while it has also revealed the presence of a substantial number of nonlocal individuals of diverse geographic origins, including at least two possible long distant migrants or foreigners originating from outside of the Antilles. Furthermore, the presence of individual no. 81 indicates genetic mixing between the different groups represented at the site.

The resulting picture generated by the mixture of cultural elements at El Chorro de Maíta is that of a dynamic situation where conscious incorporation of certain European cultural elements by the indigenous population took place.

Historical and archaeological investigations (Deagan and Cruxent 1993:94-95) have already indicated that in many early Caribbean colonial settlements indigenous populations were grouped together with Europeans, Africans and *mestizos*. However, the fact that individuals of indigenous Caribbean, Mesoamerican, African, European and mixed ancestry were all buried in the cemetery of El Chorro de Maíta indicates a degree of diversity that has hitherto not been identified in the Caribbean archaeological record. While many questions still remain, our new integrated osteoarchaeological approach has shed light on the brief but turbulent period of changing cultural and social dynamics at El Chorro de Maíta. This period appears to have been characterized primarily by a high degree of cultural, social and biological diversity. Further investigation of the site of El Chorro de Maíta, including the radiocarbon dating of individual no. 72B, will lead to an even better understanding of a period in the history of the Caribbean which is still poorly understood.

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