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Human corpse manipulation and the body as symbol: A case study from the Eastern Pampa–Patagonia transition (Argentina) during the Final Late Holocene

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ABSTRACT

Human body manipulation and secondary burials are widespread funerary practices in many areas of the world. The archaeology of the Pampas and North-Eastern Patagonia, Argentina, is no exception. In this paper, archaeological case studies from the lower basin of the Colorado River during the Final Late Holocene (ca. 1000–250 years BP) are presented and discussed. Secondary burials were recovered that indicated an intentional manipulation of bodies. Evidences of cut marks and the coloring of bone surfaces were recorded. The bundles were composed of individuals of both sexes and diverse age categories. The Pampean region and North-Eastern Patagonia witnessed significant hunter–gatherer population dynamics during the last 1000 years BP. Climatic, ecologic, demographic, and economic explanations have been proposed as the background to these changes. In this paper, it is argued that accompanying these factors, as part of a broader socio-cultural scenario, were significant social interaction networks and processes of social complementarity between groups. In this context, it is proposed that the complexity observed in relation to the handling of bodies is part of a worldview in which the body was seen as material culture – as a symbol – that played an important role for the community in group identity maintenance in a cultural context undergoing significant organizational changes.

Introduction

Human societies have frequently sought to control the inevitability of death through the implementation of mechanisms for the physical and symbolic regeneration, replacement or restoration of biological and social life. Strategies for dealing with this matter typically include a combination of practices ranging from biological reproduction to the execution of complex funerary rites. Mortuary rituals are common to all societies and have been extremely variable across time and cultures (Carr, 1995; Metcalf and Huntington, 1991; Parker Pearson, 2002). The great importance of mortuary rituals in human societies is indicated by a range of practices. Mourning and purifications ceremonies, funeral feasts, the destruction of the house of the deceased, and the treatment of bodies are commonly part of such rituals (Alekshin et al., 1983; Conklin, 2001; Newing, 2005).

As part of these complex funerary practices in many societies worldwide, the human body experiences a series of manipulations between the time of the death of the individual and the fate of their bones. There is significant variability in mortuary practices and associated rituals across different social organizations such as hunter–gatherers, fishermen and gatherers, and hunter–gardeners, that include, to differing degrees, the manipulation of human bodies (for example, the Wayúu, Tiwi, Tlingit, Haida, Bororo, Begawan, Bara, Berawan, and Máanyan, among others contemporary societies; see Downs, 1956; Hertz, 1960; Hudson, 1966; Larsson, 2003; Metcalf, 1981; Metcalf and Huntington, 1991; Nájera and Lozano Santos, 2009; see examples in Kuijt (1996)).

Humans began to develop an interest in the remains of their dead early in prehistory, which is reflected in the deliberate treatment of the body, including the painting of bones with pigment and the burial of food, animals and other objects with the body. The earliest evidence of such practices has been found in Middle Paleolithic deposits in Israel (Qafzeh Cave) and France (Le Moustier, La Chapelle-aux-Saints, Krapina, etc.) involving the use of ocher on the body (Hovers et al., 2003; Riel-Salvatore and Clark, 2001).

Funerary practices not only encompass the burying of the body together with symbolic and ritual objects, however, but also involve the intentional modification of the corpse and the preparation of the place where it is finally deposited. Body manipulation can be diverse and triggered by social, environmental and historical factors (Carr, 1995; Chesson, 1999; Kuijt, 1996). Postmortem alteration of the body may involve partial or total removal of certain skeletal parts, dismembering and defleshing, painting, cremation, and so on (Hertz, 1960; Larsson, 2003). The earliest evidence

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of the intentional modification of the body is from eastern European contexts (ca. 30,000 years BP; Pettitt, 2002; Svoboda, 2008).

In South America, the handling and treatment of human bones and the presence of secondary burials become common during the Late Holocene, although these practices are known from different regions at least since the Early Holocene. Practices included the dismemberment of bodies by cutting and fracturing, secondary burials, intentional removal and recovery of bones from primary burials, the burial of isolated anatomical units (such as skulls), the painting of bones with pigment, cremation, and mummification (Arriaza et al., 2005; Bird, 1988; Gaspar et al., 2008; MacNeish and Vierra, 1983; Martínez, 2010a; Martínez et al., 2006; Rossen and Dillehay, 2001; Santoro et al., 2005; Scabuzzo and Politis, 2006; Stothert, 1985; among others; for a detailed description of examples of body manipulation and secondary burials in South America see Strauss, 2010).

Human burials are one of the most prominent components of the archaeological record of the lower basin of the Colorado River during the Late Holocene (3000–250 years BP). Burial practices, however, changed significantly through this period. Most strikingly, during the last ca. 800 years BP, bodies were subjected to intense manipulation as part of a complex organizational scheme that included the simultaneous performance of sacred and techno-economic activities (Martínez, 2010a).

Given the characteristics of the bioarchaeological record of the lower basin of the Colorado River, the objectives of this paper are to (a) characterize sites with human burials recorded in the study area that present evidence of body manipulation (e.g., secondary burials, traces of disarticulation, cut marks on bone surfaces, scraping, and coloring) and present data related to chronology, mode of burial, minimum number of individuals, age and sex structure represented, and objects associated with burials; and (b) explore the significance of these complex mortuary practices in the context of hunter–gatherer societies that experienced wholesale change in their social organization during the Final Late Holocene (the last 1000 years BP).

Archaeology and human body manipulation in the pampas and north-eastern Patagonia

The lower stream of the Colorado River valley is located in the Eastern Pampa–Patagonia transition, enclosed in the so-called *Diagonal Arida* (Abraham de Vázquez et al., 2000). A warm, arid steppe climate (annual rainfall of 466 mm) characterizes the environment, while the landscape is covered by shrub steppe, an open vegetal formation composed of xeric short trees mixed with hard and scarce herbaceous grasses. The area is an ecotone in which an association of vegetation, animal and fish communities is recorded (see Stoessel et al. (2008) and references therein) (Fig. 1).

The earliest human occupation of the Colorado River valley is no earlier than 3000 years BP. Although specific hunter–gatherer adaptations to these arid-riverine environments have been proposed (Martínez, 2008–2009), the area shares adaptive features with North-Eastern Patagonia. Among these, for the Initial Late Holocene occupations (3000–1000 years BP), a lower population density, higher residential mobility, short-term settlements, and a funerary pattern characterized by the presence of only primary burials were proposed (Martínez, 2008–2009, 2010b; Prates, 2008; Prates et al., 2010). Since ca. 1000 years BP, this region has been part of larger social networks. Archaeological research in the Pampas and North-Eastern Patagonia indicates major changes and a reorganization of cultural systems toward the Late Holocene (1000–250 years BP). These changes encompassed diverse socio-economic and demographic phenomena: population growth, population expansions, inter-ethnic contact, interaction networks at different spatial scales (local, regional, and extra-regional), territoriality, spatial circumscription and demographic packing, and, possibly, regionalization (Barrientos and Pérez, 2004; Berón, 2004,

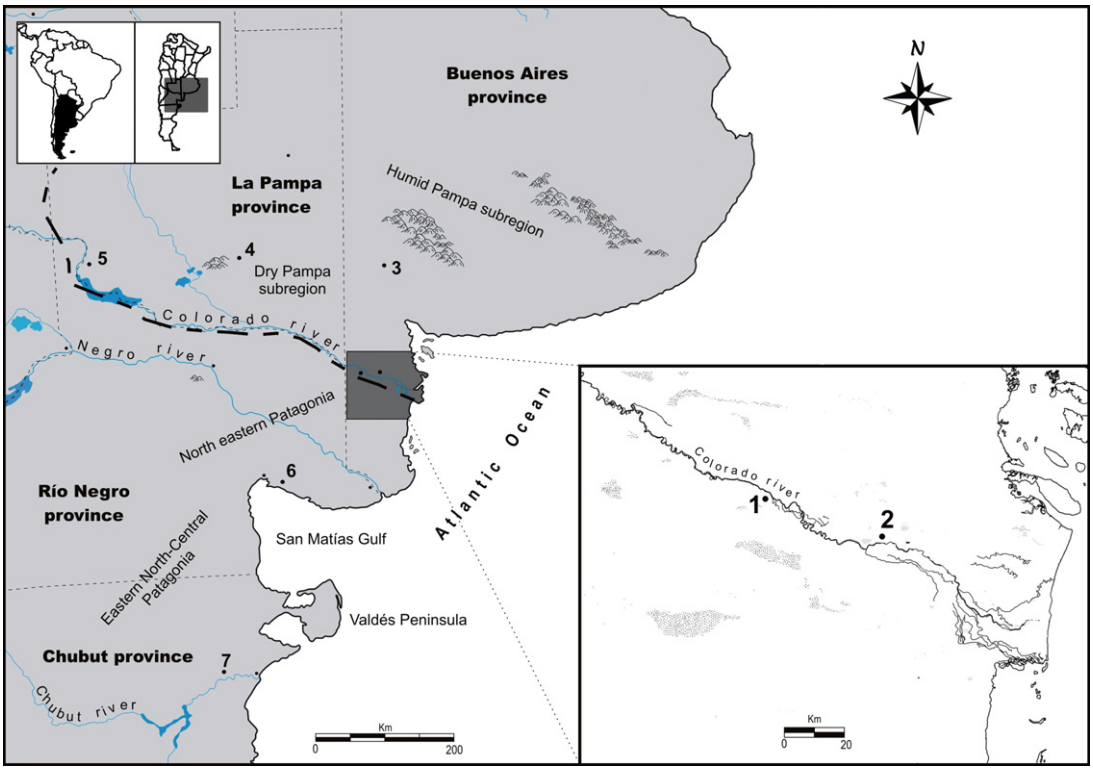

Fig. 1. The lower basin of the Colorado River in the context of eastern North-Central Patagonia. The location of the archaeological sites studied is shown in the lower right corner: (1) Paso Alsina 1 and (2) La Petrona sites. The remaining sites belong to formal disposal areas that contain secondary burials: (3) Los Chilenos site, (4) Chenque I site, (5) Médano Petroquímica site, (6) Bajo de la Quinta site, (7) Loma Torta site.

2007; Favier Dubois et al., 2009; Gómez Otero, 2006; Madrid et al., 2000; Martínez, 2010b; Mazzanti, 2006; Politis, 2008; Prates, 2008).

Along with this new socio-economic scenario, the manipulation of corpses and the appearance of formal disposal areas (sensu Littleton, 2002; Pardoe, 1988) emerge. While the practice of secondary burial is recorded in the Pampean region during the Early-Middle Holocene (e.g., Arroyo Seco 2 site, ca. 7600–6800 years BP; Scabuzzo and Politis, 2006) and during the Early Late Holocene (El Guanaco site, ca., 2470 years BP; Mazzia et al., 2004), it is during the Final Late Holocene (1000–250 years BP) that they become much more frequent. By this time, secondary burials also begin to appear and are extensively recorded in North-Eastern Patagonia and the Dry Pampa subregion (Berón, 2004; Favier Dubois et al., 2007; Martínez et al., 2006; Mendonça et al., 2010). During the Final Late Holocene, secondary burial practices for the Pampean and North-Patagonian regions become more complex in comparison with those found in the former region in earlier periods. They include more individuals and anatomical units per bundle, the arrangement of the bones within the bundles has a patterned, repetitive structure, and the bone surfaces are usually heavily colored by dying or painting. Secondary burials are recovered in isolation, in conjunction with primary burials, or in formal disposal areas and cemeteries (see cases in the Pampa and Patagonia regions in Barrientos et al., 2002; Bayón et al., 2010; Berón, 2004; Favier Dubois et al., 2007; Gómez Otero, 2006; Martínez, 2010a; Mendonça et al., 2010, among others).

Final Late Holocene secondary burials arranged in formal disposal areas or cemeteries (see discussion in Littleton (2002)) have been recorded in the Dry Pampas subregion (Chenque I and Médano Petroquímica sites; Berón, 2004; Mendonça et al., 2010), Humid Pampas subregion (Laguna de los Chilenos, site 1; Barrientos et al., 2002), North-Eastern Patagonia (Paso Alsina 1 and Bajo de la Quinta sites; Favier Dubois et al., 2007; Martínez et al., 2006) and Eastern North-Central Patagonia (Loma Torta site, Gómez Otero et al., 2009) (see Fig. 1). Other forms of body manipulation, such as the so-called *disposiciones*, have been recorded in the Dry Pampas subregion (Berón, 2004). For the lower stream of the Colorado River, the find of an isolated skull filled with foot and hand bones has also been reported (Del Papa et al., 2011). Secondary burials, either isolated or related to base camps, have been reported for the Pampas and North-Eastern Patagonia (see Martínez et al., 2006 and references therein).

The bioarchaeological record of the lower stream of the Colorado river

The bioarchaeological record of the lower Colorado River valley shows significant variability throughout the Late Holocene. Primary burials are found during the entire period. From 3000 to 800 years BP, this is the only form of burial practice recorded; from ca. 800 years BP, archaeological contexts show primary burials, secondary burials, and contexts where both modes are recorded together.

Primary burials

At La Primavera site (ca. 2900–2700 years BP), two incomplete primary burials were recovered. The buried individuals were adult males. One of the skeletons was on its side, legs flexed. No grave goods were recorded in association with the burial except for some possible personal ornaments, including an *Amiantis purpurata* shell. The archaeological material recovered at the site (lithic artifacts, faunal remains, etc.) led to the site's characterization as a multi-activity residential base where burials also took place (Bayón et al., 2004; Martínez, 2008–2009). At El Puma 2 site (ca. 1500 years BP), an isolated primary burial of an adult female was unearthed. The skeleton was also on its side, with legs flexed. No archaeological items were recovered in association with the burial. Don Aldo 1 site (ca. 800 years BP) revealed an adult male primary burial. The body was located on its side with legs flexed. No grave goods or personal adornments were found. Material evidence (e.g., artifacts and lithic debris, faunal remains, ceramic fragments, etc.) suggests that this site corresponds to a residential base where inhumations were also carried out (Prates et al., 2006).

In summary, from 3000 to 800 years BP, only primary burials were recorded, either isolated or in the context of residential bases. One striking aspect is that no objects interpreted as funerary goods or colored bones were recorded.

Secondary burials

The available evidence so far indicates that from 800 years BP, secondary burials were recorded in the study area. This burial practice is associated with sites defined as either multi-activity residential bases or exclusive areas of inhumation. Below is a description of the sites with the presence of secondary burials and body manipulation.

La Petrona site

The site is located on a prominent sand dune, 200 m from the north bank of the Colorado River and ca. 50 km from the Atlantic coast (Fig. 1). The dune was modified by plowing and subsequent erosion by eolian action. Due to these processes, the burials and artifacts originally associated stratigraphically were found on the surface of the dune. Two primary and two multiple secondary burials were recovered in an area of 25 m^2 (Martínez and Figuerero Torres, 2000).

One multiple secondary burial (LP1) is composed of three adults, two women, and one individual of undetermined sex. The presence and frequency of skeletal parts indicates that individuals are represented by incomplete skeletons. There is a pattern in the bone distribution: the bundle consists of a skull and pelvises at each end, long bones at the sides, and other bones (vertebrae, ribs, bones of the hands and feet) in the central part (Fig. 2A).

Bones from the burial lack any kind of anatomical articulation. Nevertheless, regularities in the disposition of some bone elements belonging to the same individual within the bundle were recorded. A close spatial association of bones anatomically related (e.g., humerus and radius), as well as associations between homologous bones (e.g., left and right femur), was recognized (Martínez and Figuerero Torres, 2000). Finally, bone elements of the axial skeleton, hands, and feet were found inside the central part of the bundle. All these features correspond to the intentional manipulation of the anatomical units in the bundle assemblage. Two radiocarbon dates indicate a chronology of 352 ± 51 years BP and 314 ± 45 years BP (Martínez, 2004).

The other secondary burial (LP2) is also composed of multiple, incomplete skeletal parts of three individuals, one adult female of unknown age, and an infant. The organization of bones within this bundle resembles LP1 (Fig. 2B). There were no anatomically articulated bones. However, some bones belonging to the same individual were found close together (e.g., scapula and humerus). Sediments with red pigment were present in the center of the bundle (Martínez and Figuerero Torres, 2000). A small number of bone elements with evidence of red coloring on the surface were recorded (González, 2010). Regarding the manipulation of corpses, there were small and faint traces of scraping and cutting related to body disarticulation and bone surface cleaning (Fig. 5A and B; Flensborg et al., 2011). Significant root action and the presence of

Fig. 2. Burials at La Petrona site. (A) secondary burial (LP1), (B) secondary burial (LP2), (C) primary burial (LP3), (D) primary burial (LP4).

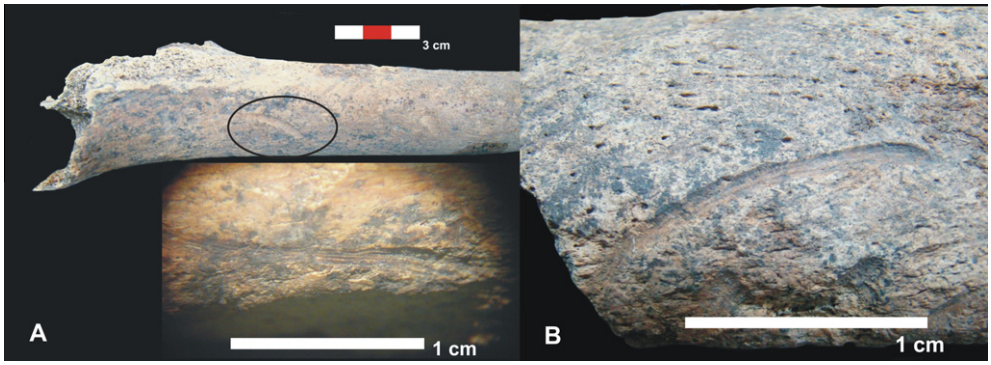

Fig. 3. Traces of body manipulation (scraping) on a left femur from burial 4 (LP4) at La Petrona site.

cracks due to desiccation on the bone surfaces were also recorded. Thus, it can be argued that more bones may have had traces of body processing, but taphonomic processes masked the anthropogenic traces (Flensborg et al., 2011; González, 2010). Two radiocarbon dates obtained from two bones from this bundle place the burial between 481 ± 37 and 770 ± 49 years BP (Martínez, 2004). Due to the fact that this bundle is a multiple secondary burial and the chronological data obtained, it is proposed that the two dates correspond to different individuals, suggesting that human groups were gathering up the bones of individuals who died at different times and, probably, at different places in the landscape in order to perform secondary burials (Flensborg et al., 2011).

A further primary burial (LP3) is composed of an incomplete skeleton of an adult female located on her side. The particularity of this burial is the absence of some of the anatomical units of a fully articulated skeleton: the bones from the third lumbar vertebrae down are absent, as well as the rest of the bones of the spine, the pelvic girdle, and the lower members (Fig. 2C). Interestingly, the clavicles and two thoracic vertebrae that occupy intermediate positions between other thoracic elements are also missing (Martínez and Figuerero Torres, 2000). Analysis indicates that this pattern cannot be attributed to the action of taphonomic or post-depositional processes. Instead, the absence of the anatomical units in this burial has been explained by the intentional removal and recovery of bones for the making of bundles (Flensborg et al., 2011; Martínez and Figuerero Torres, 2000). Two radiocarbon dates indicate a chronology of 411 ± 39 and 462 ± 39 years BP (Martínez, 2004).

The remaining primary burial (LP4) is composed of an incomplete skeleton pertaining to an adult female individual. Unlike the other burials, the anatomical units were mainly found scattered – only a few elements remained articulated. Taphonomic processes appear to have played an important role in the pattern of bone preservation and distribution (Flensborg et al., 2011; González, 2010; Fig. 2D). The remaining articulated elements were part of the pelvis and bones of the lower limbs, which were flexed. On some of the elements (e.g., pelvis and tibia), red mottling suggests the presence of mineral pigments (Martínez and Figuerero

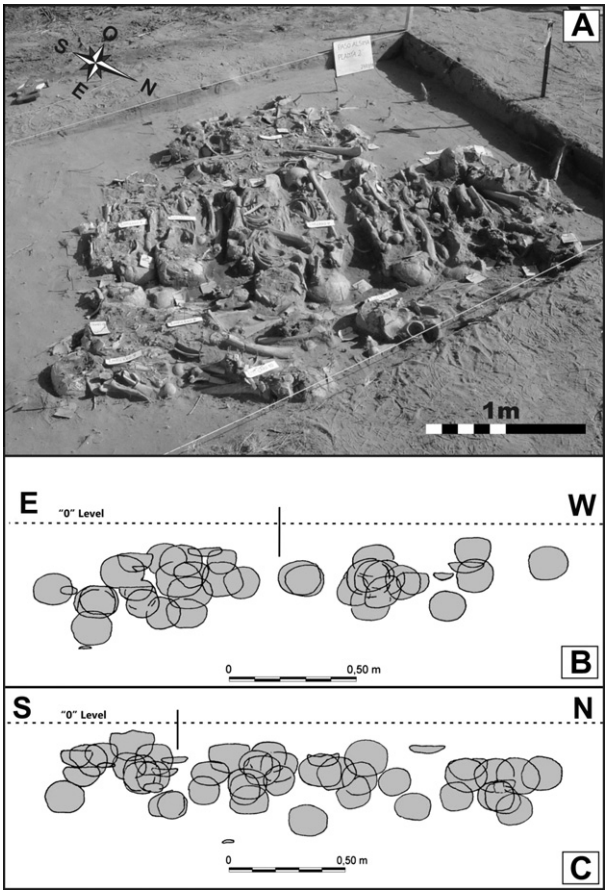

Fig. 4. (A) Secondary burials in a formal inhumation area at Paso Alsina 1 site. (B) and (C) These figures show two transversal cuts through the funerary structure in a north–south and east–west direction plotting the position of the skulls. The spatial arrangement of the skulls shows both the shape of the depression where the bundles were buried and the shallow depth (30–40 cm) at which the bundles were arranged.

Torres, 2000). There were traces of body manipulation such us defleshing and scraping (Fig. 3). Unlike the secondary burial LP2, marks were more frequent and visible, sometimes grouped in clusters, and indicate that soft tissue was removed before primary burial. Therefore, the body did not undergo a process of natural skeletonization as a result, for example, of primary burial. Rather, the skeleton was intentionally defleshed to extract the soft elements, which accelerated the decomposition of the body and possibly the disarticulation of the bones to facilitate their transport to other parts of the landscape (Flensborg et al., 2011). A radiocarbon date of 248 ± 39 years BP was obtained (Martínez, 2008–2009).

No grave goods or personal adornments were found accompanying these burials. The dune where the burials were deposited has a surface distribution of many different types of artifacts. Among those, a variety of types of projectile points and lithic debris, grinding tools, lip and ear ornaments, faunal remains, and pottery sherds were recorded. The characteristics of the archaeological record of La Petrona site enable it to be categorized as a multiactivity residential base where funerary practices were also conducted, including the handling of corpses and skeletons (Martínez and Figuerero Torres, 2000).

Paso Alsina 1

The Paso Alsina 1 site is located 400 m from the right bank of the Colorado River and 100 km from the Atlantic coast (Fig. 1). While the area has been modified by tillage activities and the construction of flood prevention structures (defenses), the original topography of the area where the site is located consisted of a chain of dunes. A total of 10 multiple secondary burials were recovered from a small area (6 m^2). As shown in Fig. 4, the secondary burials follow a spatial arrangement produced by an intentional mortuary practice of patterned orientation and contiguous and/or overlapping arrangement of bundles. The burials are distributed only ca. 30–40 cm vertically.

Six bundles were aligned in an east–west direction and the remaining four in a north–south orientation. The mortuary context does not present any evidence of modification produced by the inclusion of further interments, indicating that the bundles were made, transported, and deposited at this particular place in the landscape without further human disturbance or the removal of bones. Thirteen radiocarbon dates (see Table 4 in Martínez et al., 2009) from all bundles gave values consistent with each other, yielding a weighted average of 483 ± 20 years BP. According to this chronological pattern and the contextual features of the site, we

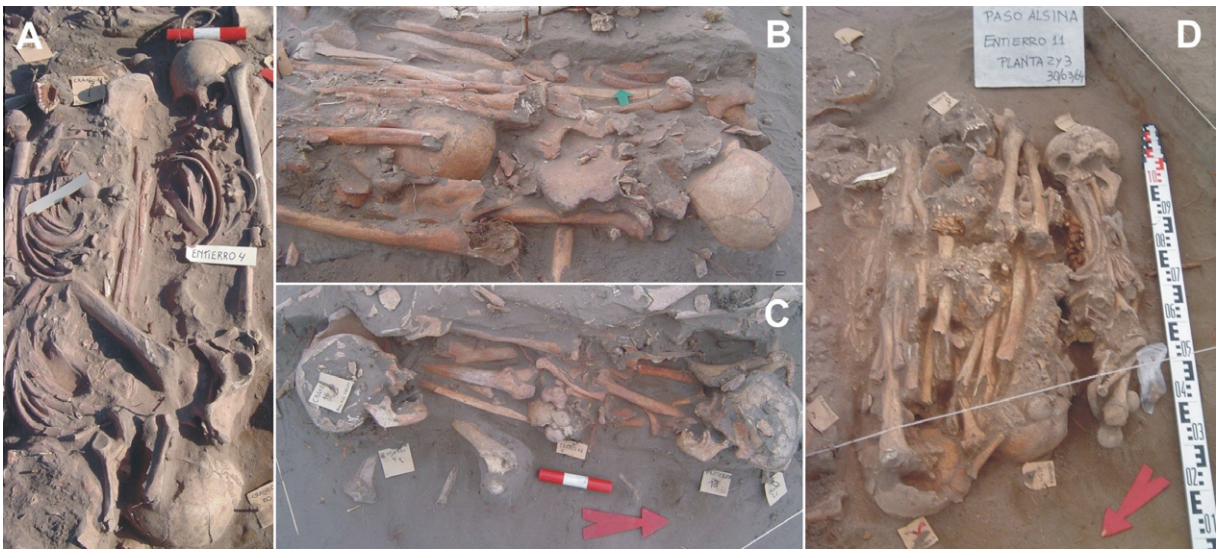

Fig. 5. Examples of variations in the so-called basic structure of funerary bundles at Paso Alsina 1. (A) Burial 4 and 5: note the groups of ribs aligned symmetrically on top of the bundles. (B) Burial 3: intense red ocher dying of bones and a skull located in the middle of the bundle. (C) Burial 8: skulls articulated with jaws and a skull located in the center of the secondary burial. (D) Burial 10: the most complex burial at the site, composed of a principal bundle (left) accompanied by a subsidiary one (right).

can infer that individuals died over a brief period of time and bundles were buried synchronously.

A minimal number of ca. 3200 bone elements (MNE) was quantified and, based on skulls, a minimal number of 56 individuals (MNI) estimated. The spatial arrangement of the anatomical units within the bundles showed a similarity in the association of bone elements, allowing a so-called basic structure to be defined. The basic structure consists of one to three skulls on the ends, bones of the pelvic and shoulder girdle associated with the skulls, long bones on the sides, and groups of ribs aligned symmetrically with each other on top of the bundles (Fig. 5A) (Martínez et al., 2006). Despite this formal pattern, each bundle presented differences with respect to the location and quantity of bone elements (e.g., more than three skulls on the ends, skulls in the middle of the bundle, etc.; Fig. 5B–D; see also Martínez et al., 2006).

Regarding the differential representation of skeletal parts, there is a tendency toward the greater presence of the appendicular over the axial skeleton. Despite this trend, however, the study of the frequencies of the anatomical parts showed a noticeably low representation of hand and foot bones. This may be related to several, possibly interrelated, causes. First, as part of the skeletonization process, the body may have been abandoned in open air conditions, and at the time of recovery, some anatomical units could have been lost either by natural dispersal after disarticulation or by the activities of predators (e.g., carnivores). Second, human groups may have partially recovered the anatomical units of the deceased originally buried in primary burials, such as the case of burial LP3 at La Petrona site. Third, during the process of skeletonization hand and foot, bones may have received differential treatment during skeletal part selection for making bundles. Fourth, these smaller anatomical units could have been lost or misplaced during the process of production and movement of bundles through the landscape (Martínez et al., 2007). Even so, a noteworthy feature of the site is that all anatomical units of the skeleton are present, although in different frequencies.

An interesting aspect to note is that most of the bones show no anatomical articulation with each other, except for some skulls and jaws and a few dorsal vertebrae (Fig. 5C and D). In this regard, the osteological record suggests that the bundles were made with individual anatomical units (Martínez et al., 2006, 2007). The clear evidence of manipulation of corpses is further reinforced by cases like that of a 2–3 year-old infant's skull intentionally disarticulated at the sutures, the bones of which (parietal, frontal, and occipital) were placed on top of each other and, in turn, assembled on top of an adult female's pelvis (Fig. 6).

The sex–age analyses indicate that individuals of both sexes and different age categories (fetuses, infants, children, adolescents, and adults) are present in the funerary structure (Bayala, 2010). Nonetheless, every bundle presents a differing age–sex structure: some burials (e.g., burials 4, 8, and 9) are composed of a larger number of sub-adult individuals, while others (e.g., burials 2, 3, and 5) are mostly represented by adults. Examples of this variability are described in Table 1.

Regarding traces of body manipulation, evidence of defleshing, cutting and scraping has been recorded (González, 2010; Martínez et al., 2006, 2007). Systematic analysis of two burials suggests that different anatomical units were targeted (e.g., foot bones, pelvises, long bones of the upper and lower limbs, scapulas, skulls, etc.; González, 2010). On most anatomical units, marks are present on two parts of the bones. On the one hand, those located in areas of the metaphysis and epiphysis and, on the other hand, the traces placed in the middle section of shafts and flat bones (e.g., skulls, scapulas). In the first case, the marks are short, notably deep, and closely grouped. The morphology, location, and frequency of traces indicate that they are the result of cutting and disarticulation. In the second case, similar traces were recorded but with a lower frequency. Elongated, isolated, and shallow marks with internal microstriations along the longitudinal axis were observed (Fig. 7). These characteristics may correspond to the action of defleshing and scraping the bone, perhaps with the purpose of removing the periosteum, and the preparation of the surface for further coloring as part of the mortuary ritual (González, 2010). Despite the presence of these anthropogenic marks, a significant number of skeletal elements do not show such modifications, suggesting that bones were in various stages of natural decomposition and skeletonization.

Fig. 6. Parietal, frontal, and occipital bones from an infant skull intentionally disarticulated and placed one on top of the other. Also note that the assemblage is placed on top of an adult female's pelvis.

Most of the anatomical units recovered from the site show an intense coloring of the bone surface (Fig. 8A and B), mostly red, although to a lesser extent yellow and green. The coloring is present in two ways: (a) adhering to the surface of bones, usually in the form of relatively thick layers, and (b) in compact sediments, clearly distinguishable from the sandy matrix surrounding the skulls. Analysis performed on red pigment using gas chromatography, mass and infrared spectrometry indicated the presence of hematite, saturated fatty acids, and hydrocarbons. This combination of substances suggests the use of wax as a binder (Martínez et al., 2006).

A remarkable aspect of the mortuary practice is the intensity of the application of color to all bones, regardless of their position

Table 1
Minimal number of individuals, chronology, sex, and age categories from four bundles from Paso Alsina 1 site.

Burial	^{14}C years BP	NME	NMI	Age					Sex		
				Adult	Adolescent	Child	Infant	Perinate	Male	Female	Indet
2	452 ± 35 471 ± 43	534	13	11	1	1	–	–	4	6	3
6	448 ± 43 476 ± 43	423	9	6	1	–	1	1	2	3	4
8	465 ± 41	257	13	9	1	1	2	–	4	4	5
9	446 ± 42	354	9	4	1	–	3	1	2	2	5

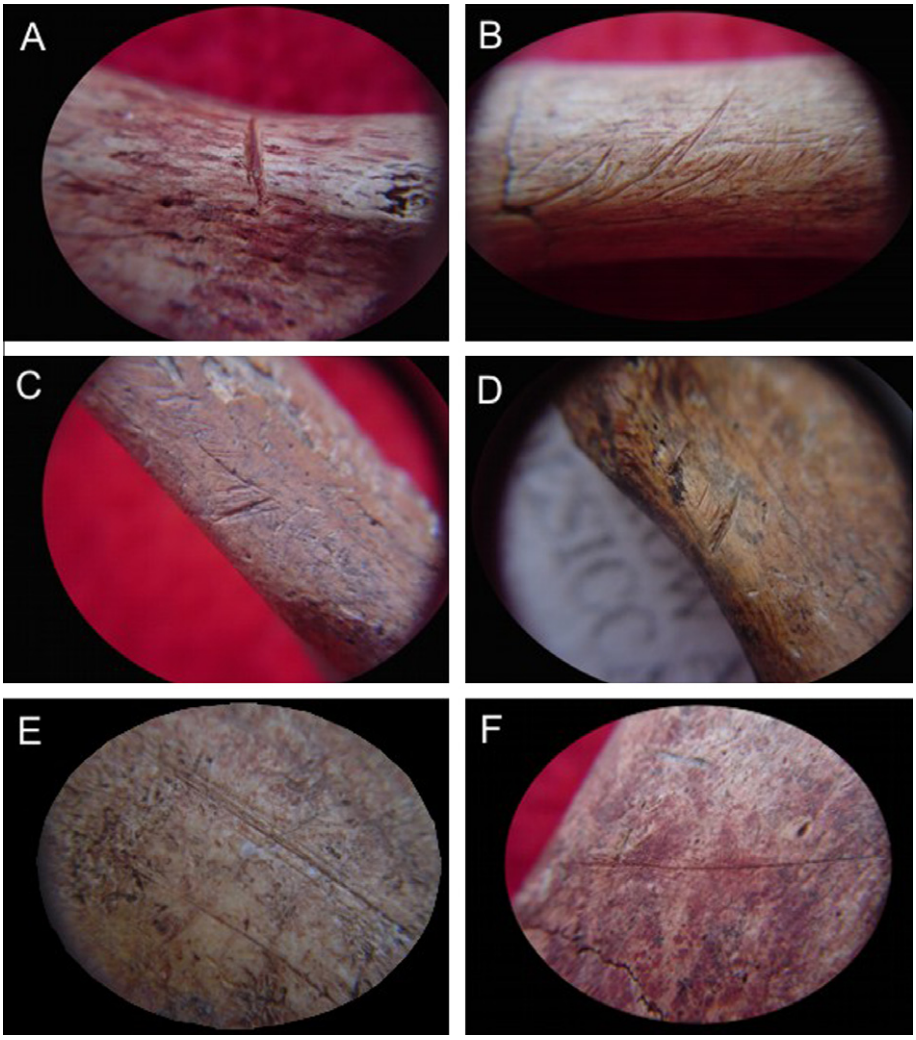

Fig. 7. Cut marks on bones element of burials 2 and 10. (A) Left ulna (Burial 2), dismembering mark; (B) Left ulna (Burial 2), defleshing marks; (C) Right scapula (Burial 10), defleshing marks; (D) Left clavicle (E10), dismembering marks; (E) Skull (Burial 2), defleshing marks. (F) Right rib (burial 2), scraping mark.

within the bundle. Red dye or paint is present on all bone surfaces. This means that the coloring did not occur through a simple dispersal of pigment over the bones or as the result of a staining derived from the material (such as leather) that enveloped the bundle that was eventually dyed or painted. Coloring is present on all bone surfaces and even within the cutting and defleshing marks and inside postmortem fractures with exposed spongy tissue. It is likely that the bones were dyed or painted individually in the absence of soft tissue attached to the bone surface (Fig. 8C). Furthermore, the uniformity of the color and the staining of inner portions of

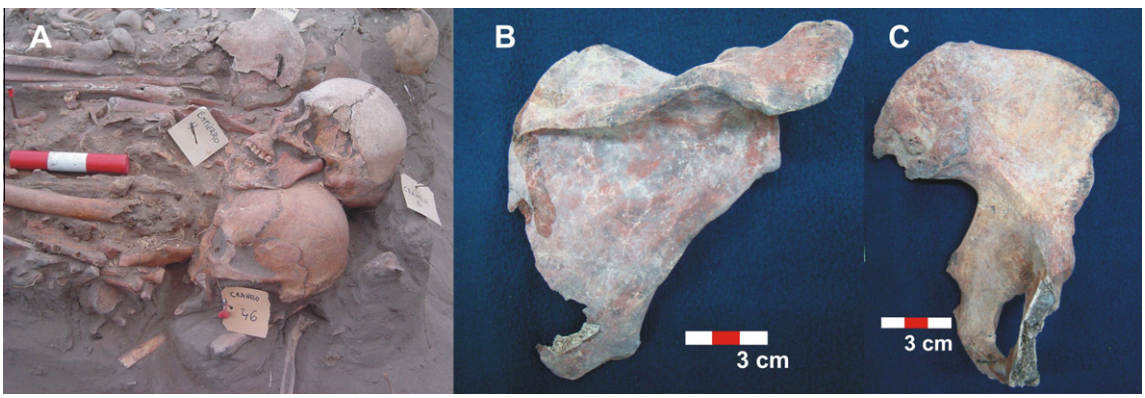

Fig. 8. Red ocher dying of bone surfaces. (A) Intense coloring on bones from bundle 4. (B) Red dye on a right adult scapula corresponding to burial 10, (C) painting on all bone surfaces of a left pelvis belonging to an adult female. Note the presence of coloring in the auricular surface that indicates that the bone was painted individually and in the absence of soft tissue attached to the surface.

some skulls and long bones suggest that the substance was liquid enough to reach even the internal portions of anatomical units.

As at the other sites in the area with human burials, there were no personal ornaments or funerary goods associated with individuals in the bundles or funerary structure. The only cultural materials recovered that were stratigraphically associated with burials were a few shell beads ($n = 10$), projectile points ($n = 5$), a unifacial tool and a fragment of pottery. One projectile point was found embedded into a vertebra. Other fractured projectile points were probably lodged in bones too, but at the time of their recovery were only spatially related to anatomical units. No other evidence of interpersonal violence indicated either by weapons or bone-surface trauma was recorded. The site was, therefore, defined as an exclusive area of inhumation that consists solely of multiple secondary burials deposited in a single event.

Comparison between sites with secondary burials

La Petrona and Paso Alsina 1 show similarities and differences in their mortuary records and chronology. Both sites are located on sand dunes next to the Colorado River. Radiocarbon dates from primary and secondary burials of La Petrona indicate a chronology of ca. 770–250 years BP, encompassing the date range obtained for Paso Alsina 1. Both sites are thus located in the Final Late Holocene. Overall, the basic structure and anatomical composition of bundles is repeated at both sites. In addition, no evidence of objects interpreted either as personal ornaments or funerary goods linked directly to the bundles have been recorded.

However, it is important to note some differences. At La Petrona site, the mortuary record is composed of incomplete primary and also secondary burials. Both types of inhumations show cut marks. The site presents two multiple secondary burials, one primary burial that has undergone a process of natural skeletonization where some anatomical units have been recovered, and another primary burial where the body has been skeletonized through intentional defleshing. Compared with Paso Alsina 1 site, the representation of bone specimens and individuals in the bundles is far smaller. In terms of coloring, at La Petrona site, slight evidence of ocher dyeing was observed in sediments and in some isolated anatomical units. In contrast, at Paso Alsina 1 site, the intensity of the coloring of bones and sediments is remarkable. No doubt some of these differences are due to the function of the sites. La Petrona was reoccupied over a 500-year span, where activities related to daily life overlapped in time and space with death rituals. The variability in mortuary practices and handling of bodies at a base camp indicates that domestic and sacred areas were not necessarily segregated (Martínez, 2010a). In fact, the ethnographic literature (Kuijt, 1996; Larsson, 2003) indicates that bundles are made in domestic spaces. Accordingly, La Petrona site could be a place where human groups combined different activities (e.g., domestic, ritual, and symbolic). Conversely, the funerary structure of Paso Alsina 1 site – where no evidence of domestic tasks has been recorded – corresponds to a single inhumation event. In this sense, the site represents the final deposition of secondary burials in a sacred place. The bodies contained in the bundles underwent different temporal, spatial, and death stories during which natural and cultural skeletonization occurred.

Based on the evidence we argue that both sites were occupied by forager groups that belonged to the same socio-cultural system, which is that described for the Final Late Holocene. As part of the sphere linked to treatment of the dead, an intensively scheduled mortuary ritual could have existed, during which the handling of bodies, including an intense repetition of all the activities mentioned above took place, and which probably implies a shared worldview. Interpretations about the rise of secondary mortuary practices and body manipulation toward the Final Late Holocene are provided in the next section.

Discussion

The bioarchaeological record of the lower stream of the Colorado River shows significant variability throughout the Late Holocene. As mentioned above, such temporal–spatial variability is even greater when considering neighboring areas such as the Humid and Dry Pampas subregions and North-Eastern Patagonia. Regional hunter–gatherer groups interconnected as part of an intensely dynamic population scenario toward the Final Late Holocene (1000–250 years BP). A specific ritual (e.g., mortuary) can be adopted or shared by different groups participating in a "regional cult". However, specific adjustments to such rituals can be made in relation to the individual/s being buried and the underlying social order to which they belonged (Bloch, 1987 in Beck (1995)). The notable change in the attitude and behavior toward the treatment of the dead during the Final Late Holocene reveals a significant investment of work and dedication and a marked increase in the complexity of funerary rites at a regional scale.

Economic and demographic approaches explain the intensity in the handling of corpses and, particularly, secondary burials, as the result of changes in the organization and complexity of socio-cultural systems (Byrd and Monahan, 1995; Goldstein, 1981; Saxe, 1970; Schroeder, 2001, among others). Several archaeological lines of inquiry indicate that important changes occurred in the socio-ecological context of hunter–gatherer groups that inhabited the Pampas and North-Eastern Patagonia during the last 1000 years BP. In this regard, changes in social structure and organization accompanied the changes in burial practices. In this sense, processes such as population growth, spatial circumscription, demographic packing, territoriality and, possibly, regionalization, changes in settlement systems (e.g., more stable, longer, and repeated occupations of particular places), mobility (e.g., reduction in the residential component), subsistence patterns (diversification of exploited resources and, in some areas, intensification), and lithic technology (e.g., technological innovations, more frequent use of pottery technology and grinding tools) were recorded (Armentano, 2004; Barrientos and Pérez, 2004; Barrientos and Gordón, 2004; Favier Dubois et al., 2009; Gómez Otero, 2006; Gordón, 2011; Madrid et al., 2000; Martínez, 2008–2009, 2010a,b; Politis, 2008; Prates, 2008, among others). For the particular case of North-Eastern Patagonia, some authors suggest that ecologic, demographic, and economic causes together were the main triggers for these changes (Barrientos and Pérez, 2004; Barrientos and Gordón, 2004; Gordón, 2011). Particularly, a connection between the environmental effects of the Medieval Climatic Anomaly (henceforth MCA; ca. 1200–800 years BP; Stine, 1994; for variations in the chronology of the MCA see Morales et al., 2009) and socio-ecological and demographic processes such as those mentioned above have been proposed. For Southern Patagonia, paleoclimatic reconstructions derived from multi-proxy studies carried out in lacustrian environments (e.g., Lago Cardiel and Laguna Potrok Aike) clearly yield evidence of the MCA (Stine, 1994; Haberzettl et al., 2005; see discussion in Morales et al. (2009)). However, the paleoclimatic archives currently available for North-Eastern Patagonia are insufficient to assess whether the MCA and its main effects (such as severe droughts) in fact occurred, and, if so, what its intensity and impact on human populations was (Martínez and Martínez, 2011; Prates, 2008; Stoessel et al., 2008). Moreover, the phenomenon varies regionally (Morales et al., 2009), even presenting opposed evidence in relation to some parameters (such as moisture) at different latitudes (e.g., Agosta et al., 2005; Villalba, 1994; Soon et al., 2003; see discussion and references in Morales et al., 2009).

In addition, major changes in the reorganization of cultural systems vary chronologically throughout the neighboring micro-regions of eastern North-Central Patagonia (see Fig. 1) during the Late Holocene. For example, on the northern coast of the San Matías Gulf (Rio Negro Province), changes in subsistence and lithic technology are dated to ca. 1700 years BP (Favier Dubois and Kokot, 2011; see also Favier Dubois et al., 2009). In North-Central coastal Patagonia, at the mouth of the Chubut River and on the Valdés Península, the main cultural changes in hunter–gatherers organization occurred after 1000 years BP, at around 750 BP (Gómez Otero, 2006). Similarly, a reorganization of human groups from ca. 1000 years BP onwards has been proposed for the study area, as mentioned above (Martínez, 2008–2009).

Given the picture of uncertainty painted by the effects and chronology of the MCA for eastern North-Central Patagonia and the micro-regional variations in the timing of social reorganizations, the most parsimonious scenario is that the MCA was not the main factor driving social change but, at best, one among several, operating in conjunction with other environmental as well as historical and social factors (see Gómez Otero, 2006, p. 433). Social interaction networks and social complementarity resulting from frequent and fluid contacts between groups at local, regional, and extra-regional scales played an important role in the aforementioned social reorganization (Berón, 2004, 2007; Curtoni, 2006; Gómez Otero, 2006; Madrid et al., 2000; Martínez, 2008–2009; Mazzanti, 2006). Such social and historical factors often accompany population growth, competition, territoriality, and regionalization (David and Lourandos, 1998, pp. 194–198; Gamble, 1986; Lourandos, 1997, pp. 24–25; see also Mazzanti, 2006, p. 295) and tend to emphasize issues of identity and belonging (Hertz, 1960; Kuijt, 1996; Metcalf and Huntington, 1991). The manipulation of human bones may then reflect changes in worldview and ways of perceiving nature and the relationship with "the other" (Chénier, 2009).

Mortuary rituals have significant power to define, develop and maintain identities, and strengthen social relationships and collective social memory. Chénier (2009) argues that the handling of human remains and secondary burials are the result of a society's need to bring their dead to particular places in the landscape, to have their relatives buried next to them, and to strengthen corporate relationships at these locations (Shaffer, 2005). The use and reuse of some parts of the landscape eventually give rise to formal disposal areas and cemeteries (Goldstein, 1981; Littleton, 2002, 2007; Littleton and Allen, 2007; Pardoe, 1988; Saxe, 1970).

The evidence described for the Paso Alsina 1 and La Petrona sites indicates that these hunter–gatherer societies had a particular connection with specific sectors of the landscape where the handling of corpses of individuals who died at different times occurred. The variability in ways of handling bodies at La Petrona site, the time span of the activities, and the reoccupation of the site enable some possible connections between people and places to be established. On the one hand, individuals may have had knowledge of several generations of previous burials in specific sectors of the landscape. Similar situations have been reported for mortuary contexts in semi-arid landscapes of southeastern Australia (Littleton, 2002). On the other hand, it is possible that after repeated occupations of the same place, human bones were found by chance, taken as ancestral, and included in secondary burials. These two possibilities are not necessarily mutually exclusive and indicate that the sites can be classified as persistent places (sensu Schalanger, 1992).

Funeral activities related to the manipulation of bodies and secondary burials may have resulted in the need to transport the dead elsewhere for burial (Hershkovitz and Gopher, 1990; Kuijt, 1996; Mariotti et al., 2009) and, thus, to protect and ensure rights to parts of the landscape through ancestor worship (Buikstra and Charles, 1999; Carr, 1995; Chapman, 1981; Pardoe, 1988). Secondary burials, whether directly visible or remembered, reinforced relationships with inherited land (Morris, 1991, see Littleton, 2007). It is clear that the handling of the dead and secondary burials – along with other elements of social organization – involved a new way of thinking about, perceiving, and creating the landscape (Hirsch, 1995; Ingold, 1993; Taçon, 1994). This new sense of place had implications for the territorial demarcation of used and exploited spaces. For the Pampean region, socially constructed landscapes – where different cultural practices generated order and hierarchies of space in "places" – constituted identity markers and acted as mnemonic references for individuals and groups (Curtoni, 2004, 2006; Curtoni and Berón, in press; Mazzanti, 2006).

Secondary burial, which could take place months or years after the death of an individual, requires a great deal of planning and cooperation and the participation of a large number of people. The manipulation of bodies is thus beyond the sphere of the individual. The intensity in the handling of bodies indicates that the whole community was organized for the purpose of performing multiple activities such as defleshing, disarticulation, coloring of bones, preparation of hides for packaging the bundles, and the transportation and relocation of bundles throughout the landscape (Metcalf, 1981; Schroeder, 2001). Therefore, Paso Alsina 1 and La Petrona sites may have been part of a communally scheduled funerary scheme, consisting of a systematic plan that involved a set of mortuary practices that took place during a given lapse of time. The sites represent different archaeological manifestations arising from the same funerary scheme.

Secondary mortuary rituals impact both individuals and communities and have significant power to define, develop and maintain identities, and to strengthen social relations and collective social memory (Kuijt, 1996; Poyil, 2009). According to Chesson (1999), secondary mortuary rituals include a strong communicative act (see also Bradley, 1991). Weiner (1976) argues that secondary mortuary rituals are part of spectacular moments of visual communication in which participants can access, resist, and renegotiate their relationship in the context of reaffirming the structure and cosmology of the community. Abundant ethnographic cases illustrate how primary and secondary mortuary ceremonies offer to the living a rich arena in which identity and alliances are negotiated as part of the process of remembering the dead (Hertz, 1960; Kan, 1989; Poyil, 2009; Schiller, 1997; Weiner, 1976). As part of this process, social systems of inheritance and membership of social groups, whether based on kinship or socially acquired, promote ways of coping with death. Ancestor cults can play a central role. In this sense, secondary mortuary rituals may include multiple levels of social organization, including band-level, co-resident groups, corporate kin groups, and corporate group structures in the form of lineal descent systems (e.g., lineages), which emphasize the community over the individual (Kuijt, 1996, p. 318). In this case, the body is not the product of the individual but a social and communal endeavor included within a wider framework of beliefs and human action (Chesson, 1999; Goodale, 1985; Hertz, 1960, p. 86; Kuijt, 1996, p. 318; Morris, 1991).

The body can be argued to be a field of human action, thus enabling the recognition of cultural and historical specificities, and as such can be understood itself as material culture (Sofaer, 2006, pp. xv, 87). Societies that incorporate ritual practices associated with the handling of corpses and secondary burials "...demonstrate by this activity a greater cognitive concern with the bones" (Schroeder, 2001, p. 90). The skeleton, then, does not play a passive role but rather is active. The body is used as a symbol (Bowie, 2006; Sofaer, 2006) to represent beliefs, social and political hierarchies, values, sense of membership, and the social identity

of individuals and communities (Chesson, 1999; Goodale, 1985; Hertz, 1960; Schroeder, 2001).

The archaeological record presented here does not suggest that the objects associated with the bodies played an important symbolic role for the community. Material culture – either everyday techno-economic artifacts or a set of objects constituting part of the grave goods – has potential meaning and symbolic efficacy (Insoll, 2004; Bowie, 2006; Womack, 2005). The symbolic meaning of the same object passing through everyday mundane activities (e.g., subsistence) to sacred spheres changes (Bradley, 2005; Brück, 2004; Renfrew, 1994; for a discussion of this issue in the regions under study see Berón, 2006; Bonomo, 2006). This meaning, however, is experienced as such either by individuals alone or by groups of individuals (Brück, 2004; Parker Pearson, 2002; Womack, 2005). These complex processes of assigning meaning and symbolic efficacy to material culture make it difficult to place an object or group of objects in categories such as grave good. In this paper, the latter concept is understood as a set of material culture that is intentionally located in close spatial relationship with the burial, with the items presenting some regularity or pattern in their arrangement that is meaningful for a community (see discussion in Martínez, 2010a). The pattern of recovery of the objects found at the sites discussed here does not coincide with that expected for grave goods. The most parsimonious explanation is that they were personal ornaments or simply belongings (e.g., shell beads from necklaces, anklets, and so on) whose meaning could probably be assigned to the sphere of the individual; projectile points were associated with bodies as a consequence of interpersonal (domestic or intergroup) violence (Flensborg, 2010, Gordón, 2011), and pottery could have been accidentally gathered together with bones in the process of making bundles in other parts of the landscape. Hence, regardless of the mode of burial and chronology, none of the sites presented grave goods. Consequently, we argue that it was the body as material culture that acted as a symbol in the context of ritual activities. In other words, the handling of the body, specifically in the context of the secondary burials, was the emblem that ensured the symbolic efficacy that is the essence of ritual (Bowie, 2006; Maisonneuve, 2005).

According to Bell (1997; see also Insoll, 2004, p. 3), the elements that make up ritual in general are formalism (formal activities), traditionalism (activities that appear to be identical to or consistent with prior examples), invariance (precisely governed repeated actions), and unchallenged, rule-governed behavior. Public rituals, which involve a significant number of people, consist of repetitive actions that can produce visible material correlates (e.g., burials). The existing social order is projected through execution and repetition (Bradley, 1991, p. 212). Public rituals can thus be understand as "prescriptive structures" (*sensu* Sahlins, 1985; see also Bradley, 1991, pp. 211–212; Maisonneuve, 2005).

An analysis of the archaeological record of secondary burial in the study area suggests that these four basic elements of ritual were present in the ideologically infused practices that produced it: the repeated pattern in the internal structure of bones within the bundles demonstrates invariance in the procedure of handling dead bodies. The recurring pattern in the composition and arrangement of the bones (e.g., the "basic structure") within the funerary bundles, the treatment of individual anatomical units regardless of the sex or age of the individuals, and the intense coloring of the bone surfaces are the materialization of ritual and ensured its symbolic efficacy.

The two case studies presented here (La Petrona and Paso Alsina 1 sites) suggest that the rituals should be seen at a broad temporal and spatial scale and that the secular and sacred spheres are intimately connected: the ancestors, physically represented and symbolized by their bodies, traversed different temporalities (ritual and mundane) and places (sacred and secular).

Conclusions

It is important to rethink the reasons for the change in burial customs of the hunter–gatherers who inhabited the Pampas and North-Eastern Patagonia during the last ca. 1000 years BP. The complexity observed in relation to the handling of bodies seems to go beyond the boundaries of environmental, ecological, economic and demographic explanations. Although no doubt these factors play an important role in hunter–gatherers organization, the explanations for changes are incomplete without considering historical and social processes. As such, it is worthwhile to explore the impact that social interaction networks and complementarity among groups at the local and regional scale may have had on funerary practices. The argument in this paper, then, is that the management of the body – the body as material culture, as a symbol and field of action – played an important role in these communities for the maintenance and strengthening of group identities in a cultural context in which there were significant organizational changes coupled with intense population dynamics.

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