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News and Comments

"Osteobiographics" of Dos Coqueiros Paleoindian Reconsidered: Comment on Lessa and Guidon (2002)

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The Paleoindian burial from the Brazilian rockshelter site of Toca dos Coqueiros was discovered in July 1997 (Guidon et al., 1998). The site is one of several known Paleoindian sites in the immediate region of the Serra da Capivara National Park, located in the northeastern Brazilian state of Piaui (Guidon and Arnaud, 1991). The interred individual, carrying a calibrated date of 11,060 years BP (conventional radiocarbon age of 9,870 ± 50 years BP; beta 109844; Guidon et al., 1998), is significant in being one of the oldest human skeletons recovered in the New World, and was described as female (Lessa and Guidon, 2002). I had the opportunity to examine the Coqueiros individual and reconstruct the skull. I present illustrative data to support the view that the Coqueiros skeleton represents a gracile male. Comparative craniofacial morphometrics suggest as well that Paleoindian groups living in South America at this distant temporal horizon may not have been closely related to later and recent Amerind populations (Neves and Pucciarelli, 1991; Neves et al., 1998, 1999). Our craniometric evaluation of this individual supports that as well (Nelson et al., in press).

The cranial vault and much of the enveloping matrix had been stabilized with B72 resin, as these had been subjected to some crushing and fragmentation over the course of time. They did not, however, appear to be particularly deformed, but much of the vault was obscured by soil matrix impregnated with B72. The loose fragment assemblage included a considerable amount of facial material: nasals, maxillary frontal processes, the left malar, and superorbital portions of the frontal, including the glabella. Several basilar fragments were also present, representing the margins of the foramen magnum, sphenoid alae, portions of the occipital squamous, and temporals.

In addition to a significant quantity of diagnostic cranial fragments, the assemblage included numerous postcranial fragments. Among this material was the inferior ramus of the right pubis and enough of the posterior inferior iliac spine to reconstruct the posterior margin of the left greater sciatic notch. In addition, both femoral heads and the right humeral and radial heads were available for study.

A full reconstruction of the skull was undertaken. Sections of vault bone and matrix embedded in B72 were soaked in acetone, taken apart, cleaned, dried, and reassembled using a plastic-resin Duco™ cement. Loose craniofacial fragments were sorted, sided, and assembled. The bony facial reconstruction was articulated to the vault reconstruction. On the pelvis, the ventral ramus was reconstructed onto the larger portion of the right pubis in order to aid in identification of sex-based morphology. In addition, the posterior inferior iliac spine was reconstructed back to the left innominate, in order to establish the form of the greater sciatic notch.

The greater sciatic notch tends to be wider in females and narrower in males, though Fulginiti (1993) demonstrated variability in this tendency. In the dorsal midline, there is sex-based variability in the morphology of the sacrum as well. In males, the centrum of the first sacral vertebra tends to be wider than the alae, by approximately three-fifths vs. one-fifth for alar widths, while in females these widths tend to be more evenly apportioned at one-third each of the total sacral width across the top.

In the collections at the Fundacão Museu do Homem Americanos (FUMDHAM) is an unambiguous female Paleoindian skeleton dated to within 1,200 years of Coquieros. Lessa and Guidon (2002) mentioned this individual (Toca da Janela da Barro do Antonião), but stated that they could not use it for comparison. In addition, an unambiguous female os pubis, from a relatively recent burial context (within the past 500 years), was chosen from the collections for purposes of comparison (Fig. 1).

Figure 1 is a comparative photograph of the pubic bones from the Coqueiros, Antonião, and recent female skeletons. The Antonião individual is in a poor enough state of preservation that visualizing morphology beyond the width of the ventral surface and a hint of the subpubic angle is challenging. In the recent burial (see above), even though the ventral ramus is poorly reconstructed, form is clearly evident, and the width of the ventral surface of the element (with the attendant ventral arc) and subpubic angle are all clearly visible. These stand in stark

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Fig. 1. Coqueiros (top), Antonião (center), and recent (bottom) pubic bones, showing sexual dimorphism of os pubis.

Fig. 2. Antonião (top) and Coqueiros (bottom) innominates, showing greater sciatic notch dimorphism.

contrast to the configuration of the Coqueiros pubis, which is narrow across the ventral surface, has no discernible ventral arc, and is possessed of an extremely acute subpubic angle.

Figure 2 illustrates the comparison between the left innominates and sciatic notches of the Antonião and Coqueiros individuals, and demonstrates a typical contrast between the wider female form (Antonião), and the more constricted male configuration (Coqueiros). Lessa and Guidon (2002, p. 102–103) reported a "wide and deep" preauricular sulcus on the Coqueiros innominates. Direct observation of this feature, and comparison with the Antonião innominates, suggest this to be an overstatement. A small fold in the cortical bone is on the light end of the range of expression of the preauricular sulcus: it is neither wide nor deep. By comparative contrast, the Antonião individual does display marked preauricular sulci bilaterally. Finally, there is the issue of the centrum-to-ala ratio in the sacrum. Across the superior aspect of the sacrum, the measure is approximately 120 mm. A ratio of 20%:60%:20%, or the generalized male expression, would put the actual dimensions in the range of 24 mm:72 mm:24 mm. A ratio of 33%:33%:33%, or the generalized female expression, would put the actual figures at 40 mm:40 mm:40 mm. Coqueiros measurements fall at 33 mm:54 mm:33 mm, or approximately 27%:45%:27%. These dimensions are clearly wider across the centrum than the ala. Nonetheless, this case is equivocal, as it falls approximately midway between the two ratios.

The observation by Lessa and Guidon (2002) of cranial morphological markers suggestive of sex pointed to the superorbital margins as the most male feature on the skull. Indeed, the generally light construction, pedomorphic forehead, and slight brow ridges might incline one toward a feminine interpretation, if there were no pelvic girdle or mandible to look at. The mastoid processes and nuchal markings are generally equivocal as well. On the other hand, even with the alveolar resorption evident on the mandible, the blocked, somewhat squared-off form of the chin is more typical of a male individual (see Fig. 8 of Lessa and Guidon, 2002, p. 104). However, it is size rather than any rugose morphology which argues as forcefully as anything in the skull that the individual was male. Glabella-occipital length for the Coqueiros individual is 185 mm, i.e., comparatively long-headed. Steele and Powell (1992) provided bivariate scatterplots of glabella-occipital length by maximum breadth for a number of Amerind (including Archaic and Paleoindian), Australian, Asian, African, and European samples, taken from a variety of sources. Plotted with the males, Coqueiros is consistent with the dolichocranic means, not far from their Texas Archaic, Eskimo, and Paleoindian samples. On the illustration of female cranial dimensions, the only other individual with a longer head is a female from the Upper Cave at Choukoutien, which is so distorted as to render it useless for multivariate comparisons based on craniometrics (C.L. Brace, personal communication). These observations are supported as well by similar plot comparisons using data from the University of Michigan Museum of Anthropology (UMMA) craniofacial database (Nelson, 1998; Brace et al., 2001).

Long bone head diameter, as a third-level diagnostic choice, figures into discussions of sexual dimorphism as well. Coqueiros' maximum femoral head diameter is 42.5 mm, the humeral head is 40.8

mm, and the radial head measures 20.2 mm. These dimensions all fall into the "probably female" category (Krogman, 1962; Ubelaker, 1978; Stewart, 1979). However, it is necessary to consider this individual in the context of the population from which s/he would likely have come, if possible. With the unambiguous Paleo-Indian female Antonião skeleton as close as she is in time (9700 years BP; Peyre, 1994), and available for comparison, much can be gained from a comparison with her dimensions. Antonião's femoral, humeral, and radial head maximum diameters are 37.9 mm, 36 mm, and 18 mm, respectively. These are considerably smaller than Coqueiros. If Coqueiros is male, as the pelvic and cranial morphologies indicate, together with the Antonião female we may note an early trend here toward generally gracile, small people. This observation was made by previous researchers as well (Mello e Alvim 1977; Neves et al., 1999).

Lessa and Guidon (2002, p. 103) reported that the sexing of this individual was assured of certitude by the use of genetic methods for determining sex. I can only say that for numerous reasons, including my own observations on these remains, I have reservations regarding that statement as well.

Beyond my disagreement with the determination by Lessa and Guidon (2002) of female sex for this individual, the report presents several other inconsistencies and errors, according to my examination of the remains. The pubis is incorrectly sided in the report (it is a right and not a left). The mandible and maxilla are listed as postcranial elements, and the report states that the maxillary left first and second molars were lost antemortem. Figure 9 of the report, however, illustrates the maxilla with the left first molar in place. Moreover, the presence of a patent socket for the second molar suggests it was lost postmortem, and not antemortem as the report indicates. The interdental groove identified by them is more likely an interproximal wear facet, based on the morphology of the facet and lack of grooving and parallel striae at the cemento-enamel junction. Grooving and parallel striae at the cemento-enamel junction are key diagnostics in the identification of this sort of wear (Willey and Hofman, 1994; Hillson, 1996). Given this, the interpretation of habitual behavioral patterns in the form of the palliative measures suggested in the report is inconsistent with the condition of the remains.

In conclusion, beyond the light build and generally gracile nature of the Coqueiros skeleton, the pelvic and much of the cranial morphology point to a male individual. The presence of inferred funerary offerings in the form of chipped stone points and other tools and flakes appear to support this as well. I am skeptical of their genetic determination of sex for this individual. Comparison with the unambiguously female Antonião skeleton both provides a relatively contemporaneous reference point and supports previous inferences that at least a portion of the Paleoindian population at this horizon would have been of a light, gracile build (Mello e Alvim, 1977; Neves et al., 1999).

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