Published in final edited form as:

Am J Phys Anthropol. 2012 September ; 149(1): 151–153. doi:10.1002/ajpa.22105.

Response to Cole and Waldron's "Letter to the Editor: Syphilis Revisited"

Molly K. Zuckerman^{1,*}, Kristin N. Harper², and George J. Armelagos³

¹Department of Anthropology and Middle Eastern Cultures, Mississippi State University, Mississippi State, MS 39762

²Department of Environmental Health Sciences, Columbia University, New York, NY 10032

³Department of Anthropology, Emory University, Atlanta, GA 30322

We would like to thank Drs. Cole and Waldron for their thoughtful reading of our recent article on evidence for pre-Columbian Old World treponemal disease (Harper et al., 2011). This is a very controversial subject, and we are not surprised that other investigators have critiques of our survey. We welcome their comments, and look forward to hearing the responses of others. Here we would like to respond to some of the points that Cole and Waldron (2012) made in regards to our article.

Our rating system

First, Cole and Waldron (2012) state that the discrete 1–5 category rating system we used to assess the certainty of each case's dating could potentially lead to "bizarre" or "perverse" treatments of the data. We agree that creating a straightforward rating system could, by necessity, entail some simplifications of the available evidence. However, we did not come across any such examples in our analysis. Cole and Waldron cite the remains of Count Gottfried von Cappenberg as an example of one such "bizarre treatment" in our article. We assigned these remains, published in Kuhnen et al. (1999), a score of 3 (out of 5). This rating was based on an assigned, published "Radiocarbon date based on bone collagen in which 1493 AD falls outside the 95% confidence interval, but $\delta^{13}\text{C}$ values are not available or marine contribution to diet was not incorporated into the corrected date," our requirement for a score of 3 (Harper et al. 2011: 111, 119). Cole and Waldron argued that as von Cappenberg's date of death is known from the historical record, this case should warrant a score of 6—in other words, a score higher than that given for dating via any other type of evidence, including for remains confirmed to be pre-Columbian via radiocarbon dating. On the contrary, we argue that the von Cappenberg remains provide a perfect illustration of why radiocarbon dates are critical in establishing a pre-Columbian date.

These remains were recovered from the Cappenberg Church, where they were stored as relics. As the age-at-death assigned to the remains is compatible with that of Count von Cappenberg, who lived during the 12th century AD, Kuhnen and colleagues suggested that they were those of the Count. We think that most readers will agree, however, that a definitive attribution through these means is not possible. Close study frequently reveals that relics do not derive from the historical personages from whom they have been purported to come, such as the incorrect attribution of a rib to Joan of Arc now known to be from an Egyptian mummy (Rutler, 2007), or what has been identified as a fragment from a young

*To whom correspondence should be addressed: Molly K. Zuckerman, PO Box AR, Cobb Institute of Archaeology, Mississippi State, MS 39762, mkz12@msstate.edu, Phone: 662.325.7519, Fax: 662.325.8690.

woman's skull to Hitler (Goñi,2009). Given this well-established uncertainty, assigning the known date of death of von Cappenberg to these remains would simply not be good practice. While Kuhnen and colleagues state in their article that radiocarbon dating had been performed on the remains, no basic information such as a laboratory ID, specific date range, or the collagen content of the bones was provided. Therefore, no reliable date range is available at present. In light of these circumstances, we maintain that the score (3) they were assigned for dating methodology is appropriate and that radiocarbon dating is a critical component of establishing a pre-Columbian date.

Cole and Waldron also critique the diagnostic criteria employed in our review. According to them, the discrete 1–5 category rating system for diagnosis “greatly simplifies a complex and variable continuous disease progression.” We disagree with this statement. The criteria, derived from Hackett (1976), do include many of the diverse effects that chronic treponemal disease can have upon the skeleton, from the possible periosteal reactions of primary and secondary stage infection to the often distinctive lesions of tertiary disease, all of which we detail in our review. However, critically, the criteria *only* assign high scores to those lesions with a demonstrated specificity—and thus diagnostic value—for treponemal disease. To date, Hackett (1976) has produced the only published study to rigorously evaluate the specificity of various lesions for treponemal disease. This study compared skeletons of clinically diagnosed cases of treponemal disease, cases of other pathological conditions, and healthy controls. It revealed two diagnostic markers: the final three stages of the *caries sicca* sequence, and the combination of osseous expansions and nodes with superficial cavitations on long bones. Therefore, skeletons manifesting one or both of these lesions carry a high certainty of treponemal disease, and in our rating system, earned a high score, of 4 to 5. Hackett found that all other lesions commonly attributed to treponemal disease also occur in other conditions, and are thus of reduced diagnostic value.

To support their argument that our criteria cannot accurately capture the scope of treponemal disease, especially on complete, well-preserved skeletons, Cole and Waldron apply them to two hypothetical cases. They argue that one case, presenting only a stage 4 *caries sicca* lesion, would be deemed specific for treponemal disease (score: 4). The other, despite bearing “multiple caries sicca grade 3 cranial lesions, post cranial lesions “characteristically bilateral and systemic” that “predilect a range of skeletal elements, including long bone shafts, ribs, the sternum, scapulae, the medial portions of the clavicles, the cranium, and the hands and feet” “along with multiple gummatous lesions and evidence of destruction of the manubrium and sternum resulting from an aortic aneurysm,” would receive a lower score, indicating that the diagnosis was relatively weak. This is true, but not because our criteria capture an inaccurate snapshot of the range of treponemal pathologies. Though the second hypothetical case includes an impressive list of lesions sometimes associated with syphilis, it would earn a lower score (3), because none of the lesions described are specific to the disease (*unless* the gummatous lesions manifested as periostitic nodes and expansions, as noted in our criteria (Harper et al.,2011: 119)). While Cole and Waldron argue that if a “differential diagnosis reduces to just one condition, then that [diagnosis] is ‘certain,’” we hold this to be true only if the indicators used to diagnose the condition have been rigorously demonstrated to actually be specific to that condition. This is because often a differential diagnosis arrives at the most likely cause for a set of lesions, while allowing for uncertainty of diagnosis. In the case of Old World pre-Columbian treponemal disease, in which researchers are still searching for one unassailable case, “most likely” simply will not do, since alternative etiologies are still possible.

The case of Apple Down 152

We move now to the specific case of Apple Down 152 (Cole and Waldron, 2011), with which most of their critique is concerned. They draw attention to the fact that in our Table 1 we state that Apple Down cemetery was in use from the “late 5th/early 6th c. AD to 17th c” (Harper et al.,2011: 110). As they note, this is incorrect. This description should have read the “7th” century, not the “17th”. We sincerely apologize for this mistake, and thank them for pointing it out. That said, the score assigned to the remains was correct. We assigned the case a score of 2 because it met the corresponding description: “Dating based on artifacts found in close approximation to the skeletal remains in question or features of the grave that predate the 15th century” (Harper et al.,2011: 110, 119). In other words, because the remains did not have a radiocarbon date, we could not assign them a higher score. Cole and Waldron (2012) note that the Apple Down cemetery “is without doubt wholly early Anglo-Saxon within the date range quoted above”. However, we would draw their attention to the numerous examples cited in our article in which compelling archaeological contexts provided misleading dates for cases of treponemal disease. In several cases, remains were recovered from cemeteries or in close association with artifacts that substantially pre-dated 1493 AD, but radiocarbon dating of the remains themselves later yielded dates that spanned the post-Columbian period (e.g., Blondiaux,2008; 2010). These demonstrate that in the controversial field of Old World treponemal disease research, archaeological context is insufficient. Dates must be confirmed through an independent means: radiocarbon dating. Though Cole and Waldron believe the archaeological context Apple Down 152 was recovered from is more reliable than a radiocarbon date, we emphatically disagree. We do believe, however, that a compelling archaeological context certainly makes a solid radiocarbon date all the more convincing.

Cole and Waldron (2012) also raise concerns related to our treatment of their diagnosis of Apple Down 152, namely our description of the pathologies exhibited by the skeleton. In Table 1 of Harper et al. (2011), we provided a summary of the pathologies exhibited by each case evaluated in the review. This was done to reduce reader confusion by standardizing the descriptions of each case, as, collectively, the studies we reviewed used highly variable descriptive terminology. Cole and Waldron (2012) state that our summary of Apple Down 152 is a “misrepresentation” of their work. According to them, we overstated the evidence for gummata on skeleton 152 by describing the presence of “periosteal reactions, expansions, and regions of ‘irregular variation in thickness’ of periosteal new bone, reported as ‘suggestive’ of gummata, on multiple postcranial elements” (Harper et al.,2011: 110). First, let us note that this is nearly a direct quote from Cole and Waldron (2011:76), who wrote: “Several of the bones show regions of irregular variation in thickness of the periosteal new bone. These include the posterior midshaft of the left radius, the lateral side of the left humerus, and the medial side of the distal right tibia. These regions seem to have a sclerotic border and the periosteal bone appears to extend across the base of the lesions. These characteristics are suggestive of gummatous lesions.” Cole and Waldron’s comments seem to suggest that it is our omission of the mention of sclerotic borders that constitutes the misrepresentation. The sclerotic borders, as they argued in the 2011 paper, are critical to diagnosing these as pathological lesions rather than identifying them as taphonomic changes. However, we agreed with the authors’ conclusion that they are pathological, which is why the possibility of a taphonomic cause was not mentioned in our summary or reflected in the case’s diagnosis score.

Cole and Waldron also take umbrage with our characterization of the endocranial lesions reported on Apple Down 152 as “likely unrelated” to the other pathologies present on the skeleton (Harper et al.,2011: 110). Apple Down manifests “slight” periosteal reactions with “small serpiginous grooves” over much of the intact endocranial surface (Cole and Waldron,

2011: 75). Here, we feel the need to clarify; while the endocranial lesions in close proximity to the main ectocranial lesion (*caries sicca*, stage 1–3) are most likely directly related, the evidence suggests to us that the other lesions are likely unrelated to the suite of pathologies Cole and Waldron diagnose as “putatively” syphilitic. This is based on published paleopathological descriptions of syphilis and the other treponematoses, such as those provided by Ortner (2003), Steinbock (1976), Waldron (2009), Aufderheide and Rodríguez-Martín (1998), and Powell and Cook (2005), all of which either do not mention endocranial involvement as an indicator for treponemal disease, or note that it is infrequent or absent in treponemal involvement of the skull. In fact, endocranial involvement indirectly associated with ectocranial lesions can be viewed as an indicator that a pathological process besides—or in addition to—treponemal disease may be at work (Ortner, 2003: 280–2). In light of the existing literature, we look forward to reading Cole and Waldron’s forthcoming article further exploring the relationship between endocranial lesions and early-stage tertiary treponemal disease.

In closing, we would like to note that we do not offer a competing diagnosis for Apple Down 152. Re-diagnosing all of the 54 reports assessed in the review was never our purpose (and in many cases, pathological skeletal evidence simply does not include lesions that allow researchers to arrive at any one etiology with a high degree of confidence (Ortner, 2003)). Instead, our stated goal was to evaluate the certainty of the diagnosis of treponemal disease for all of the reports we reviewed, including Apple Down 152. We hope that our review will spark further discussion about the methodologies, results, and implications of the existing reports of pre-Columbian treponemal disease from the Old World as well as possible Old World cases that have yet to be published or even recovered. We greatly look forward to these conversations.

Literature cited

- Aufderheide, A.; Rodríguez-Martín, C. The Cambridge encyclopedia of paleopathology. Cambridge: Cambridge University Press; 1998.
- Blondiaux, J. La paléopathologie des tréponématoses (The paleopathology of the treponematoses). In: Mariaud, O., editor. Ostéo-archéologie et techniques médico-légales: tendances et perspectives. Collection pathographie. Vol. 2. Paris: De Boccard; 2008.
- Blondiaux, J. Personal communication: radiocarbon dates of cases from Ardenne and Thaon. 2010.
- Cole G, Waldron H. Letter to the editor: syphilis revisited. *Am J Phys Anthropol.* 2012
- Cole G, Waldron T. Apple Down 152: a putative case of syphilis from sixth century AD Anglo-Saxon England. *Am J Phys Anthropol.* 2011; 144:72–79. [PubMed: 20721939]
- Göni, U. The Observer. London: 2009. Tests on skull fragment cast doubt on Adolf Hitler suicide story.
- Hackett, C. Diagnostic criteria of syphilis, yaws and treponarid (treponematoses) and of some other diseases in dry bones (for use in osteo-archaeology). Berlin: Springer-Verlag; 1976.
- Harper K, Zuckerman M, Harper M, Kingston J, Armelagos G. The origin and antiquity of syphilis revisited: an appraisal of Old World pre-Columbian evidence for treponemal infection. *Yearb Phys Anthropol.* 2011; 146(S53):99–133.
- Kuhnen C, Schultz M, Bosse A, Weber A, Preuschoft H, Müller K-M. Endemische syphilis an den rekonstruierten reliquien des Gottfried von Cappenberg (Endemic syphilis in the identified relics of Gottfried von Cappenberg: a paleopathological study). *Pathologe.* 1999; 20:292–296. [PubMed: 10501927]
- Ortner, D. Identification of pathological conditions in human skeletal remains. Amsterdam: Academic Press; 2003.
- Powell, M.; Cook, D. Treponematoses: inquiries into the nature of a protean disease. In: Powell, M.; Cook, D., editors. The myth of syphilis: the natural history of treponematoses in North America. Gainesville, FL: University Press of Florida/ Florida Museum of Natural History; 2005. p. 9–63.

Rutler D. Joan of Arc's relics exposed as forgery. *Nature*. 2007; 446:593. [PubMed: 17410145]
Steinbock, R. *Paleopathological diagnosis and interpretation*. Springfield, IL: CC Thomas; 1976.
Waldron, T. *Paleopathology*. Cambridge: Cambridge University Press; 2009.