



News and Views

Aubesier 11 is not evidence of Neanderthal conspecific care

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“That the misnamed permanent dentition rarely outlasts the average lifespan of modern man is a well-known fact. But even among wild apes and monkeys the dental apparatus frequently breaks down before the death of its owner through the same pathological processes that prevail in man.”—Adolph Schultz (1956: 979)

Aubesier 11 is a hominid partial mandible, perhaps from the Middle Pleistocene, which has been referred to the Neanderthal lineage (Lebel et al. 2001). Lebel et al. (2001) claim that the pathological alterations (primarily antemortem tooth loss) of this partial mandible are such that the Aubesier 11 individual required the care of others to survive. Lebel et al. (2001) conclude that Aubesier 11 provides evidence that Middle Pleistocene hominid populations were characterized by “prolonged survival of individuals with serious impairments” (p. 11102) and that “these populations therefore had achieved a level of sociocultural elaboration sufficient to maintain debilitated individuals and to provide the motivation to do so,” (p. 11102).

But does this one partial mandible really provide clear support for an inference of conspecific care amongst Neanderthals and their kin? The hypothesis that Aubesier 11 must have required conspecific care to survive was not tested in Lebel et al. (2001). To remedy this, I tested their hypoth-

esis by comparing the pathological alterations of Aubesier 11 with those seen in wild adult non-human primates (DeGusta, 2002). Since similar, and more severe, pathological processes are survived by such non-human primates, Aubesier 11 does not indicate a greater level of conspecific care (DeGusta, 2002). In my view, Middle Pleistocene hominids may or may not have cared for conspecifics at varying levels, but Aubesier 11 does not allow us to infer anything about such conspecific care.

Subsequent to my analysis, Lebel & Trinkaus (2002) have recently repeated their claim that Aubesier 11 indicates a high level of conspecific care. They now consider non-human primates, which were not mentioned in their original report (Lebel et al., 2001). The basic chain of reasoning used by Lebel & Trinkaus (2002) is as follows. Most of the teeth in the Aubesier 11 partial mandible were lost or non-functional antemortem, with associated abscesses, and therefore they claim that the entire dentition was non-functional. Based on the limited skeletal remodeling, Aubesier 11 survived this for only a short period of time (Lebel et al., 2001), perhaps about 6 months (Lebel in Bower, 2001). Wild non-human primates, according to Lebel & Trinkaus (2002), do not survive with non-functional dentitions for that long. Therefore Aubesier 11 must have received care from conspecifics, perhaps in the form of provision of soft foods or assistance in food preparation.

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However, the argument of [Lebel and Trinkaus \(2002\)](#) is flawed in several ways. It is shown here that Aubesier 11 cannot be used as evidence of conspecific care.

Self-help

[Lebel and Trinkaus \(2002\)](#), and [Lebel et al. \(2001\)](#), fail to suggest any reason why Aubesier 11 would have been unable to obtain or manually process soft foods on his/her own, rather than relying on conspecifics to do so. There is no evidence of any condition, or even advanced age, that would have precluded Aubesier 11 from doing so. So even granting the rest of their argument, Aubesier 11 cannot be used as evidence of conspecific care.

“Projected” dental pathology

Based on the antemortem tooth loss and associated lesions of Aubesier 11’s partial mandible, [Lebel and Trinkaus \(2002\)](#) infer that the entire dentition was absent or non-functional. Their reasoning is that, “Given the tendency of lesions to spread through the periodontal and gingival tissues once present ([Schluger et al., 1990](#)), it is likely that the preserved portion of the alveolar process is representative of the general state of the alveolar bone throughout the mandible and maxilla,” (p. 669). However, as [Lebel and Trinkaus \(2002\)](#) admit, the actual pathogen(s) responsible for the observed defects are unknown. Furthermore, the degree and rate of spread of even a known pathogen is difficult to predict ([Ortner and Putschar, 1981](#)).

Empirical evidence also falsifies the claim that the condition of a partial mandible can be reliably extrapolated to the entire dentition. Numerous primate specimens have a portion of the dentition as diseased as that of Aubesier 11, but with the remainder of their dentition at least partially present. To take just one example, the right side of the La Chapelle-aux-Saints 1 mandible displays more evidence of antemortem tooth loss than the corresponding portion of Aubesier 11, yet for the

rest of the dentition, only ~50% of teeth were lost antemortem in La Chapelle-aux-Saints 1 ([Trinkaus, 1985](#)).

Finally, [Lebel and Trinkaus \(2002\)](#) themselves state that Aubesier 11 was “still chewing” at the time of death based on the C₁ and P₃ wear, which would seemingly be impossible if the dentition were entirely absent or non-functional.

The non-human primate evidence

Regardless of whether the actual tooth loss in Aubesier 11 is considered, or its “projected” tooth loss, the condition in Aubesier 11 can be matched in wild adult non-human primates, as discussed in [DeGusta \(2002\)](#). [Lebel and Trinkaus \(2002\)](#) claim that, “in the documented cases particularly of large-bodied apes there are no known cases of more than 60% antemortem tooth loss” (p. 682). This is false. As noted in [DeGusta \(2002\)](#), both [Schultz \(1956\)](#) and [Colyer \(1936\)](#) document such specimens. In addition, according to [Trinkaus and Lebel’s \(2002\)](#) own tabulation (their Table 2), only a single “late archaic human” specimen has greater than 60% tooth loss. Furthermore, that single specimen is the Guattari I (Monte Circeo) cranium, for which evidence of antemortem (as opposed to postmortem) tooth loss is ambiguous.

[Lebel and Trinkaus \(2002\)](#) do mention one report of a wild chimpanzee with massive tooth loss, but dismiss it by quoting the original collectors as saying, “It is obvious that so dentally handicapped an animal could not have sustained life on a strictly ‘natural’ diet,” ([Jones and Cave, 1960](#)). But that statement is pure speculation, unsupported by any data, and contradicted by a number of other specimens ([DeGusta, 2002](#)).

[Lebel and Trinkaus \(2002\)](#) retabulate the data of [Lovell \(1990\)](#) on antemortem tooth loss in *Pan*, *Gorilla*, and *Pongo* in an attempt to provide a quantitative comparative basis for Aubesier 11 and other “late archaic humans” (their Table 2). However, their retabulation contains several errors. [Lebel and Trinkaus \(2002\)](#) state that, “The available free-ranging large-bodied ape data [from [Lovell, 1990](#)] have therefore been retabulated (Table 2) according to what percentage of the

Table 1
Percentage of sample with given levels of antemortem tooth loss¹

% Antemortem Loss	“Late Archaic Homo”	<i>Pan</i>
0%	82% (36)	83% (25)
1–10%	5% (2)	3% (1)
11–20%	5% (2)	3% (1)
21–30%	5% (2)	3% (1)
31–40%	0	0
41–50%	0	3% (1)
51–60%	2% (1)	3% (1)
100%	2% (1)	0

¹*Homo* data from Lebel and Trinkaus (2002), *Pan* data from Lovell (1990). Numbers in parentheses are sample sizes.

preserved alveoli indicate ante mortem tooth loss” (p. 671). But a comparison of the actual data described in Lovell (1990) with their retabulations reveals that Lebel and Trinkaus (2002) miscalculated the percentage tooth loss in at least four ape specimens by failing to take into account what portion of the dentition was preserved (despite Lovell’s clear descriptions). These errors have the effect of artificially minimizing the amount of tooth loss seen in wild apes, since all four reported percentages are lower than the actual percentages.

Furthermore, basic statistical comparisons reveal that there is no significant difference between the distributions of antemortem tooth loss in “late archaic hominids” (Lebel and Trinkaus, 2002) and that of *Pan* (Lovell, 1990), as shown here in Table 1. For example, approximately equal proportions of chimpanzees (6%), gorillas (5%), “late archaic humans” (4%) have lost more than 30% of their dentition antemortem.

For Aubesier 11, Lebel and Trinkaus (2002) state that three teeth (27%) were definitely lost antemortem, though they suspect that perhaps as many as nine teeth were lost or nonfunctional. Using the standards of Lovell (1990), Aubesier 11 would likely be scored as having 27% antemortem tooth loss (3 of 11), though perhaps as much as 55% (6 of 11). This fits in the observed range of antemortem tooth loss documented for other hominoids.

Lebel and Trinkaus (2002) claim that, “it is apparent that ante mortem loss of more than eight

teeth (25% of the dentition) is relatively rare [in apes]...” (p. 671). In fact, this level of tooth loss occurs in 10% of Lovell’s (1990) chimpanzee sample. Even if the Lebel and Trinkaus (2002) claim of rarity is accepted, the key issue is the position of the lost teeth. If a chimpanzee lost eight teeth, all from the right side of the mandible, the result would match Aubesier 11 quite nicely. So, even according to Lebel and Trinkaus’s (2002) own summary, the condition of Aubesier 11 is not rare in non-human primates.

Considering non-human primates more broadly, Lebel and Trinkaus (2002) claim that, “wild-trapped individuals with extensively worn teeth disappear shortly after observation (Sauther et al., 2002)” (p. 672). But Sauther et al. (2002) report no such observations and make no such claim. In fact, Sauther et al. (2002) document the long-term *survival* of lemurs with serious dental pathologies: “In 1987 this old female was nearly completely edentulous (Fig. 1b), with most teeth worn to the gums, and only the toothcomb and upper canine still intact, albeit well worn. Yet she was in excellent health, lived through the 1990 census, and only disappeared by the 1991 census,” (p. 125). The only other individual noted as having disappeared in Sauther et al. (2002) lived for “several years” with poor dental health (the worst in their sample). Thus the data on wild lemurs reported by Sauther et al. (2002) demonstrate that primates with dental pathology comparable to that of Aubesier 11 can survive for several years, in “excellent health” in one case. Long-term survival of serious illnesses and injuries has been observed in other primates as well (e.g., DeGusta and Milton, 1998; Lovell, 1991).

Finally, Lebel and Trinkaus (2002) question the relevance of non-human primates, since “all of them are tropical and subsist, to varying degrees, on relatively soft portions of plants, as opposed to the predominantly animal-based diet of Aubesier 11” (p. 682). This overlooks the significant amount of hardened plant materials processed dentally by many primate taxa (e.g., Fleagle, 1999; Sauther et al., 2002). Furthermore, Aubesier 11 and its contemporaries, unlike non-human primates, possessed a sophisticated stone tool technology that permits extensive non-dental food processing.

Other sources

There are several papers not referenced in either [Lebel et al. \(2001\)](#) or [Lebel and Trinkaus \(2002\)](#) that bear on their interpretations. For example, [Dettwyler \(1991\)](#) provides a thorough and well-known critique of the inference of care and compassion based on fossil hominid (esp. Neanderthal) skeletal pathologies. Similarly, [Tappen \(1985\)](#) dissects the claim that La Chapelle-aux-Saints 1 was unable to masticate food effectively. As previously discussed, [DeGusta \(2002\)](#) tested the hypothesis that Aubesier 11 is evidence of conspecific care by considering non-human primate skeletal pathologies. [Lebel and Trinkaus \(2002\)](#) and [Lebel et al. \(2001\)](#) do not cite any of these papers. The net effect is that published data and interpretations that challenge their claims have been omitted from [Lebel and Trinkaus \(2002\)](#).

Conclusion

The Aubesier 11 partial mandible cannot be used to infer an increased level of conspecific care in Middle Pleistocene hominids relative to other primates ([DeGusta, 2002](#)). The arguments to the contrary put forth in [Lebel and Trinkaus \(2002\)](#) are flawed. The level of tooth loss seen in the Aubesier 11 partial mandible is also seen in some wild adult non-human primate specimens. Such primates also sometimes survive other serious injuries and illnesses, such as malaria, polio, and gunshot wounds ([DeGusta, 2002](#)). Thus the occasional survival, for a limited period of time, of similar pathological conditions by Middle Pleistocene hominids cannot be taken as an indication of greater conspecific care. In the case of the Aubesier 11 partial mandible in particular, there is no evidence that the individual could not have obtained soft foods on his/her own, or processed foods using stone tools on his/her own. Based on multiple lines of evidence, the hypothesis that Aubesier 11 is evidence of increased conspecific care in Middle Pleistocene hominids is falsified.

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