

Anterior Dental Cutting at Laetolil

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ABSTRACT No evidence supports the interpretation of malocclusion in the LH-14 right P₃. The pattern of anterior cutting shown in the younger Laetolil specimens has its analogue in the deciduous dentitions of Pongo.

In a recent paper White (1981) asserts that the occlusal wear on the right P₃ of LH-14 is the result of malocclusion. We find this to be demonstrably incorrect. Although LH-14 is a set of isolated teeth (White, 1977; Wolpoff, 1979), there is evidence indicating that nothing is abnormal about the positioning of this tooth in the tooth row. The mesial interproximal facet is in a normal position, its buccal border is just below the most inferior extension of the mesial ridge, and the facet extends for about 2 mm lingually. There is a corresponding distal facet on the lower right canine which matches the P₃ facet when these teeth are in a normal alveolar position.

There are a number of facets on or adjacent to the distal surface of the right P₃. Of these, the only one to cover the entire height of the distal face is a concave facet somewhat displaced lingually from the center of the tooth. We believe this is the contact facet for the P₄. It is relevant that the most lingual aspect of the distal interproximal facet on the LH-14 P₃ is also concave.

Buccal to this LH-14 P₄ contact facet are three contiguous, lightly polished facets that extend across most of the remaining distal P₃ face. These facets, convex on the vertical axis, extend somewhat superiorly onto the occlusal surface, and consequently could not have been formed by interproximal attrition after the tooth had erupted.

We believe that the most lingual (concave) facet represents the mesial buccal contact for a P₄ which was rotated clockwise (as seen from above) out of its normal position. In the absence of the actual LH-14 P₄ this is impossible to prove, although there is evidence for another occlusal anomaly in this dentition. However, if correct, this rotation would expose the distal buccal face and edge of the P₃ to possible occlusal contact with the maxillary teeth,

thereby accounting for the two lightly polished, convex facets described above. If the P₄ were in normal position, the P₃ would have to be rotated to account for these facets, but the mesial contact with the canine argues against this alternative. The second interpretation is supported by White (1980), who does not recognize the implications of the normally positioned mesial contact facet.

The occlusal condition of the left LH-14 P₃ is, as White (1980, 1981) noted, at variance with the right tooth. The tooth is generally more worn, a wear plane that is concave on the vertical axis covers most of its distal occlusal face, and there is an unusual wear facet flattening the region surrounding the buccal cusp tip position and extending well onto the buccal face. The differences in the degree of occlusal wear and in its pattern lead us to question whether the left P₃ should be attributed to the same specimen as the other isolated teeth comprising LH-14. Morphological differences between the unworn portions of the left and right P₃ crowns include a much more pronounced bulge just above the cemento-enamel junction on the buccal face on the right tooth, and a greater height of this bulging region above the junction. Thus, we believe that the attribution of these teeth to the same specimen is uncertain.

However, if the association of both P₃'s in the same dentition is accepted, analysis of the contact between the left canine and the left P₃ shows it is the left premolar that has wear resulting from a malocclusion. The distal interproximal facet on the left canine is much like the one on the right, roughly elliptical in form with the long axis vertical (i.e., parallel with the long axis of the tooth). However, the mesial facet on the left P₃ differs from its right

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counterpart. It is slightly concave and has a long axis which is 45° clockwise from the vertical, as seen from the mesial face. The left canine and P₃ facets do not match when both teeth are in normal vertical position relative to each other. However, they match perfectly if the vertical axis of the left P₃ is rotated 45° clockwise, as seen from the distal surface. This rotation would bring the flat occlusal wear facet extending onto the buccal face (described above) fully to the functional occlusal plane, thus accounting for its unusual characteristics.

Such a rotation would also account for an unusual feature of the partially damaged left P₄. On this tooth, the undamaged lingual portion of the mesial facet is displaced to the buccal corner of the mesial face. Alignment of the adjacent P₃ in the rotated position described above would account for an interproximal contact in this position, assuming that the P₄ was in a normal occlusal relation in the jaw.

Finally, we have found that both Wolpoff and White were incorrect in their contention that the pattern of wear on the LH-14 right P₃ is unknown for any other primate. Discussion of whether or not such a pattern characterizes the younger *Australopithecus afarensis* specimens from Hadar must await their publication. However, an analogue can be found in the deciduous dentition of *Pongo*. Young specimens occlude a vertically short maxillary canine against a bicuspid dm₁ with a transverse ridge connecting the cusps. In specimens with M₁ unerupted, there is a distal wear facet on the maxillary dc at a close to 90° angle to the mesial-distal axis of the tooth. Articulation with the mandibles shows that this facet cannot result from wear across the buccal dm₁ face, which in any event is unworn in the specimens in question. Instead, the angle of the canine wear plane exactly corresponds to the wear facet that extends across the mesial face of the dm₁, sharpening the transverse ridge. A similar facet extends across the distal dm₁ crown face, caused by the mesial portion of the dm₁ crown. These occlusal facets parallel those described for the younger Laetolil specimen, except that in the hominid fossils it is a permanent upper canine that demonstrates the transverse distal facet, and a P³ that presumably occludes with the distal P₃

face. Just as the wear pattern on the P₃ seems to change with age at Laetolil, the dm₁ wear also becomes different in older *Pongo* individuals. However, in this case the wear shifts to a sharpening action of the maxillary dc against the buccal face of the dm₁, analogous to the adult condition in *Pongo*.

In sum, a very different, and we believe correct, interpretation of the wear on the LH-14 right P₃ can be contrasted with that suggested by White (1981). We believe there is clear evidence for C/P₃ cutting in this earliest hominid taxon. However, since there is only one tooth involved and because there are positional anomalies on both sides of the LH-14 dentition, the possibility remains that the right P₃ wear is also anomalous, corresponding to (unknown) problems in the maxillary dentition. Only future discoveries can fully resolve this issue¹. We have restricted our discussion to the known data. Casts of the specimens in question can be obtained from the National Museums of Kenya at very small cost, and we propose that readers interested in continuing or following up this issue obtain these casts and observe the relevant features for themselves.

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¹Publication of the BMNH Laetolil canine (White, 1980) with an obvious honing facet further supports our contention of anterior dental cutting.