Dental Reduction and the Probable Mutation Effect

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KEY WORDS Probable mutation effect · Dental reduction ·
Relaxed selection.

ABSTRACT A recent test of the probable mutation effect can be interpreted
to suggest the operation of mutations under conditions of reduced selection in
the late Pleistocene reduction of the human dentition.

Suarez ('74) presents a test of whether the probable mutation effect is the likely
cause of Neandertal tooth size reduction. He uses the degree of bilateral asymmetry
as a population independent measure of variability, and compares the asymmetry
in what might be thought of as a European archaic Homo sapiens sample with the
asymmetry in living people. The method appears useful, but I believe it is neces-
sary to question the interpretation of the results.

The model tested has been clearly stated
by both Brace ('67) and Brose and Wolpoff
('71). This model suggests that the archaic sapiens sample maintains large incisors
and canines because it is selectively ad-

vantageous; that is, they are useful. As it
turns out, this sample has the largest in-
cisors of any fossil or living hominid sam-
ple. The canines are also quite large, but
they are smaller than in Homo erectus,
and thus are already in the process of re-
duction. The posterior teeth are much
smaller than Homo erectus and are much
further along in the process of reduc-
tion. The model of reduction due to mutation
accumulation allowed by relaxed selection
therefore predicts that the variability of
the incisors should be low, since these are
being maintained at a large size by stabil-
ing selection. The variability in the pos-
terior teeth, on the other hand, should be
quite high since these are in the process
of reduction and have been for some time.

The canines should be intermediate in
variability, although because the size re-
duction from Homo erectus is not great
one might expect the increase in variation
to be smaller than in the posterior teeth.

Suarez (74) presents the relevant data in his
table 2. Buccolingual or labiolingual diam-
eters give more genetic information than
mesiodistal length because they are not
subject to environmental modification from
intersitital wear.

The table compares variation in the
archaic and modern sapiens samples by
comparing the difference in asymmetry.
It shows no significant difference in the
incisors, a small level of significance for
the difference in the canines, and a very
high level of significance for the difference
in the posterior teeth. In the canines and
the posterior teeth the archaic sapiens
sample is in all cases the more variable.

Frankly, I could not conceive of data
better verifying the hypothesis that Pleisto-
cene dental reduction in the hominids is likely due to the accumulation of mutations allowed by relaxed selection.

LITERATURE CITED


