Toothcomb Homology and Toothcomb Function in Extant Strepsirhines

Robert H. Eaglen

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Contrary to some recent assertions, there are no persuasive ways for determining the homologies of indriid toothcomb teeth and the resulting dental formulas. Most of the presumably distinctive features of procumbent “canines” are also seen in incisors, and vice versa. Thus, there are at least three plausible dental formulas for indriid deciduous teeth and two for the permanent dentition. All formulas are compatible with the distribution of teeth in fossil strepsirhines. Similar arguments apply to strepsirhine toothcombs as a whole, but the absence of three-incisored ancestors in the fossil record strongly supports the conclusion that the dental formula of nonindriids is 2.1.3.3. for the lower dentition. There are also alternative interpretations of the original function of the toothcomb. Recent arguments which purport to demonstrate that the toothcomb evolved originally as a sap-feeding adaptation fail that purpose. The ontogeny of infant lemur behavior suggests that the original function involved grooming rather than feeding if the data are interpreted in a Haeckelian context.

KEY WORDS: dental homology; behavioral development; toothcomb; strepsirhines.

INTRODUCTION

In a series of recent articles, Schwartz (1974, 1978, 1979) and Gingerich (1977) have reopened a long-dormant debate on the homology of the anterior mandibular teeth of indriids. Schwartz believes that the lateral teeth of indriid toothcombs, both deciduous and permanent, are canines, and that the third deciduous mandibular teeth are unreplaced dp,s.
Gingerich, on the other hand, considers the former teeth incisors and the latter unreplaced canines.

Neither of these interpretations is novel; Schwartz (1974) presents a full review of the literature pertaining to indriid dental homologies. Some of the criteria proposed by these authors for determining the homology of these structures do appear to be new, however. The invocation of these additional criteria poses two important questions: (1) Can the homologies of indriid lower anterior teeth now be satisfactorily resolved? (2) Might reinterpretation of indriid toothcomb homologies alter our thinking about the traditional interpretation of strepsirhine toothcomb composition (that is, four incisors and two canines)?

In a related vein, Schwartz (1979) has also joined the argument on the original function of the toothcomb. He has suggested, on the basis of ontogenetic behavioral evidence, that the toothcomb evolved as a feeding rather than a grooming device.

In the course of research on the systematic relationships of extant strepsirhines, I have had the opportunity to examine the morphology and eruption patterns of the toothcomb in several lemuriform taxa. My observations indicate that the features cited as evidence of dental homology in indriids are either inappropriate or may reflect functional design features of toothcombs and comb-like dental structures. Since none of the criteria for determining indriid toothcomb homologies is conclusive, one can derive three different dental formulas for the deciduous teeth of indriids and two for the permanent dentition. Since all of these formulas are compatible with the dental formulas of early Tertiary strepsirhines, the use of such data in strepsirhine systematics would appear to be unwarranted. When applied to nonindriid strepsirhines, the criteria for determining toothcomb homology do not, by themselves, rule out the possibility that the strepsirhine toothcomb may consist of six incisors and no canines. Such an interpretation is dubious when one considers the dental formulas of fossil strepsirhines, however. Finally, the ontogeny of grooming and feeding behavior provides no support for the contention that the original function of the toothcomb was related to feeding. If anything, observations of this sort lend more credence to the grooming hypothesis.

**MATERIALS AND METHODS**

The morphology and eruptive patterns of strepsirhine toothcombs were examined in a series of cadavers ranging in age from newborn to 5 months. Sample sizes were as follows: *Lemur catta* (2), *L. fulvus* (7), *L. variegatus* (4), *Hapalemur griseus* (1), *Cheirogaleus medius* (2), *Microcebus murinus* (1), and *Propithecus verreauxi* (2). Patterns of gingival eruption