STATISTICAL ANATOMY OF TYRANNOSAURS

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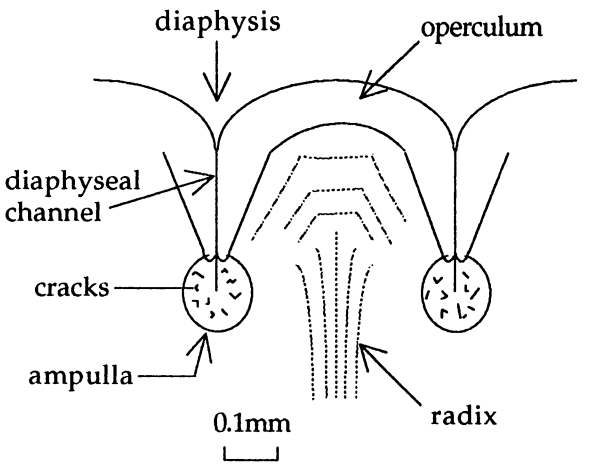
Since dinosaur fossils are not numerous enough for statistics, the idea of studying dinosaurs at all has been questioned. Teeth of Judith River tyrannosaurs (late Cretaceous of south-central Alberta, Canada) are sufficiently numerous and rich in anatomical structures for statistical analysis: **1.** No difference was found between widths of serrations of anterior and posterior rows (Mann-Whitney U test, two-tailed; n = 24 tooth fragments: $p > .05$; anterior and posterior x = 0.4 mm) : **2.** Reversals in uniform trends in serration width within each serration row were more numerous for the anterior (reversals = 51; non-reversals = 74) than for the posterior (reversals = 45; non-reversals = 135) serration rows (χ^2 (2x2) = 7.82; d.f. = 1; $p < .01$); **3.** Serrations of the anterior row are more steeply angled toward the point of the tooth than are those of the posterior row (Mann-Whitney U test, two-tailed, n = 21 tooth fragments; $p < .01$; anterior $\bar{x} = 8.9^\circ$; posterior $\bar{x} = 5.0^\circ$): **4.** Small teeth (mean length = 9.8mm) show less tendency to be scratched than large ones (mean length = 25.0mm) (t(d.f. = 234) = 4.64; $p < .01$); **5.** Inter-serrational slots of posterior row require less force ($\bar{x}$ = 0.14 newton) to cut standard nylon filament (diameter = 0.04mm; tensile strength = 0.42 newton) than did slots of the anterior row ($\bar{x}$ = 0.24 newton; Mann-Whitney U test, two-tailed; $p < .05$; n = 17 fragments); **6.** There is a significant difference between edge radii r (expressed in microns μ) of serrations of three classes of tyrannosaur teeth: unerupted/partially erupted ($\bar{x}$ = 78.2μ), vs. fully erupted but still attached to bone ($\bar{x}$ = 94.7μ), vs. shed ($\bar{x}$ = 139.3μ) teeth (two factor analysis of variance, F(2,173) = 10.86; $p < .05$). Teeth of Judith River tyrannosaurs possess numerous structures, both interior and exterior (see figure) whose geometry differs markedly from that of, e.g., troodon teeth (which may possess a radix, but no other differentiated internal structures), or thecodont teeth (which possess a peak of interior enamel intruding into each denticle and tilted toward the point of the tooth). Statistical anatomy of teeth may offer a rich source of information for studying taxonomy, evolution, and migration of tyrannosaurs.



SAGITTAL SECTION through one serration of Judith River tyrannosaur tooth.

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