Abstract Submitted
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Lizard locomotion on weak sand[1] DANIEL GOLDMAN, WYATT KORFF, HOMERO LARA, ROBERT FULL, Department of Integrative Biology, University of California at Berkeley — Terrestrial animal locomotion in the natural world can involve complex foot-ground interaction; for example, running on sand probes the solid and fluid behaviors of the medium. We study locomotion of desert-dwelling lizard *Callisaurus draconoides* (length 16 cm, mass=20 g) during rapid running on sand. To explore the role of foot-ground interaction on locomotion, we study the impact of flat disks ($\approx$ 2 cm diameter, 10 grams) into a deep (800 particle diameters) bed of 250 μm glass spheres of fixed volume fraction $\phi \approx 0.59$, and use a vertical flow of air (a fluidized bed) to change the material properties of the medium. A constant flow Q below the onset of bed fluidization weakens the solid: at fixed ϕ the penetration depth and time of a disk increases with increasing Q. We measure the average speed, foot impact depth, and foot contact time as a function of material strength. The animal maintains constant penetration time (30 msec) and high speed (1.4 m/sec) even when foot penetration depth varies as we manipulate material strength. The animals compensate for decreasing propulsion by increasing stride frequency.

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