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Abstract

Fifer (1987) has provided a very useful hypothesis to explain the advent of bipedal gait and locomotion. Through re-focusing attention on a functional argument centred on throwing behaviour he has invigorated the debate surrounding the origins of the *hominidae*. The present article provides evidence of plastic and pathological osteological indicators of throwing that may aid in more precisely elucidating the timing of this adaptative event and its subsequent development.

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The Throwing Hypothesis and Hominid Origins

Fifer (1987) has provided a very useful hypothesis to explain the advent of bipedal gait and locomotion. Through re-focusing attention on a functional argument centred on throwing behaviour he has invigorated the debate surrounding the origins of the *hominidae*. The present article provides evidence of plastic and pathological osteological indicators of throwing that may aid in more precisely elucidating the timing of this adaptative event and its subsequent development.

Introduction

FIFER (1987) has made an excellent contribution to the question of the origin of bipedal gait and locomotion. His argument, which postulates that habitual bipedal stance derives from the evolution of the defensive use of thrown stones, has great merit for several reasons. It provides a means by which to explain the advent of bipedalism and accounts for the observed anatomical changes in the post-cranial skeleton, why these changes most likely occurred on the savanna, how they contributed to a pre-adaptation for tool use and to the origin of the hominoid brain. In addition, Fifer provides an avenue of investigation which does not invoke the polemic that has characterised most debate on the subject between the "Hunting Hypothesis" as recently restated by TOOBY & DEVORE (1987) and the "Woman the Gatherer Hypothesis" as restated by TANNER

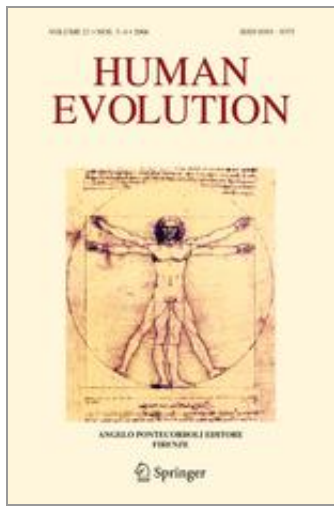
(1987). Moreover, Fifer has suggested an hypothesis which can be tested using archaeological and osteological remains.

The timing of the adoption of throwing behaviour should depend on when throwing became an adaptive component of hominoid behaviour. Fifer states that his argument does not hinge upon the timing of the advent of this behaviour, suggesting that it may have developed in a protohominid living between 10 to 7 m.y.a. and perhaps even more recently. There is some evidence, however, which can be used to determine more precisely when throwing became adaptive.

The Australopithecines, perhaps also those specimens identified as *Homo habilis*, once considered to be savanna-dwelling habitual bipeds, now appear to have possessed a much more arboreal climbing component to their behaviour as suggested by several researchers based on osteological evidence (e.g. STERN & SUSMAN, 1983; SUSMAN *et al.*, 1984, 1985; SENUT & TARDIEU, 1985; LEAKEY *et al.*, 1987; JUNGERS, 1988). These species, with brains similar in size to modern pongids (FALK, 1987a, 1987b), may have used throwing behaviour in a manner similar to that reported by GALDIKAS (1983) among Orangutans, who throw well-aimed branches with both hands at targets located beneath them on the ground; or, when terrestrial, in a manner similar to that observed by GOODALL (1986) among chimpanzees. Goodall (*ibid.*) reports that although chimpanzees possess a good aim with one or both hands, their missiles often fall short of the target and are rarely used in serious fighting, usually being reserved for use in intimidation displays with conspecifics or predators. In these species throwing may be employed only to disturb, rather than to inflict bodily harm (PLOOIJ cited in ISAAC, 1987; GOODALL, 1986).

The earliest undisputed member of the genus *Homo*, *Homo erectus*, may have been the first

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