

## Fists of furry: at what point did human fists part company with the rest of the hominid lineage?

Combat is by definition competitive. Heritable advantages in fighting ability can be expected to play significant roles in replication of contributory genes. A recent paper (Morgan and Carrier, 2013) used innovative and interesting methodology to suggest that there has been strong selection on human hands to be used as weapons. Strong claims were advanced about the split of the human hand from the rest of the hominid lineage. However, this paper overlooked a key issue that actually might serve to make their case regarding sexual selection on hands even stronger than they appear to have realised.

In brief, human fists are not effective killing weapons, being only effective in the context of male–male within-group combat and used primarily to subdue. Such combat is ritualised, stylised, open to surrender from the defeated, and typically sub-lethal, although possessed of a credible threat of injury. Limited combat between males has been noted across taxa (Maynard-Smith and Price, 1973). With humans, limiting factors to fist damage have been revealed in cultural practices that are detectable across both time and space – specifically, that effective use of fists requires long acculturation and hand protection. In the structural trade-off between holding and hitting, human hands lean towards holding. For example, historical records show the use of hand wraps and wrist supports on ancient Greek, Mesopotamian and Egyptian boxers (Poliakoff, 1987), but not on wrestlers. Grabbing and holding do not require artificial aids for effectiveness. Striking does.

Ritual in-group combat should be distinguished from outgroup conflict (Fiske, 1992). In the latter, fists are rarely used due to the simple fact that unprotected fists are significantly less robust than heads and the other likely impact zones of trained fighters – such as the pyorrhoea-infected mouths that have been the common human experience until the era of recent dental hygiene. The protection used on fists by fighters across both time and space argue for a ritual element to human fist fighting that is absent from the context of outgroup conflict such as warfare – at least that in which killing is the goal.

Although many commentators have run all forms of human violence together, martial arts proper – in terms of being war training – is distinct from combat sports. The former focuses on killing, rapid subdual from ambush, or responses to ambush. There is no conception of a fair fight, and rarely one of surrender. Special forces training typifies this sort of violence and notably makes little or no mention of fist use (e.g. Fairbairn, 1942). Fights in this mode are nasty, brutish and short. Predators use this sort of mode to subdue prey and in a number of species this is distinct from the modes that males use to achieve dominance.

Combat sports occur within the context of ritual male–male competition. In other species there are also sub-lethal modes of combat with recognised methods of indicating submission (Maynard-Smith and Price, 1973). While there is much posturing and threat display – e.g. fist waving in humans – death is comparatively rare and even more rarely sought. In humans there are rules which are enforced with cultural norms.

What are the technical reasons for thinking that selection on human fists evolved in the context of the ritual rather than the warfare mode?

The most crucial point, which might be unknown to those who have not participated in much actual combat, is that the human fist is far from being an effective strike tool without much preparation. The hands of chimps – even when not closed – are far more effective

transmitters of force and have been witnessed as such (e.g. de Waal, 2007). This is as one might expect from an appendage that can also support the animal's entire weight. While it may be true that there is buttressing of the impact zone of the human fist (Morgan and Carrier, 2013), this does nothing to prevent the stretching of ligaments – especially between the metacarpals on impact. It is for this reason – and not to protect the knuckles – that boxers wrap up their hands. Even much so-called bare-knuckle fighting actually has the fighters bandaging their hands in advance. When this is not done, such severe damage may result that a hand may be lost entirely following combat. This was vividly detailed in a recent Channel Four documentary (*Gypsy Blood*, 2012). It should be noted that this danger is present even after much training and experience, giving the lie to the notion that hands can be conditioned for such combat.

While there are many fantastical allusions to warriors using fists in unprotected ways – and some so-called martial arts trade on these fantasies – when it comes to realistic combat sports, fighters protect their hands. It can come as a rude awakening to those who have only trained in non-full-contact sports, but many martial arts techniques do not withstand genuine contests. In reaction to this, about 20 years ago a series of competitions were arranged to destruct-test the martial arts. This Ultimate Fighting Championship has morphed into modern mixed martial arts – the closest thing to the early pankration of the ancient Greeks. In the earliest days of these mixed martial arts – the first ultimate fighting championship was held in 1993 – there was no hand protection. In consequence, even effective strikers, such as Gerard Gordeau, were routinely overwhelmed by grapplers. This was partly because hands would often be broken before the later rounds. Subsequent combat in mixed martial arts mandated hand protection that also allowed for grappling. It is important to emphasise that such protection is for hands more than heads. Folk who talk of 'taking the gloves off' being synonymous with harder hitting display their ignorance of the realities of fist fighting. Boxing with gloves on is far more likely to result in brain damage because one can hit considerably harder and for longer.

The mild sexual dimorphism in human fists supports the idea of fist-fighting occurring within circumscribed and increasingly ritualised cultural contexts, and it is in this light that splits from the rest of the hominid lineage are likely to have occurred.

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## Response to 'Fists of furry: at what point did human fists part company with the rest of the hominid lineage?'

Although it is true that hands do sometimes suffer serious injury when humans fight, epidemiology of interpersonal violence does not support the suggestion by King (King, 2013) that the fist is a fragile and ineffective weapon. In modern societies, interpersonal violence is the most frequent cause of fracture of the facial skeleton (Lee, 2009), and the fist is the weapon that is most frequently used to fracture the bones of the face (Le et al., 2001). A Swedish study on interpersonal violence reported 63 facial fractures and 57 concussions inflicted by fists, but only eight fractures of the metacarpal or phalangeal bones (Boström, 1997). Thus, human fists are effective weapons and, when humans fight, faces break more frequently than fists.

We agree with King's comment that fists of modern humans are used primarily in the context of within-group fighting and to subdue rather than kill. When modern humans wish to commit homicide, weapons such as clubs, knives or guns are generally involved. Nevertheless, we can be confident that such lethal weapons were of less importance, and may not have existed, when human-like hand proportions evolved in basal hominins. Fighting with fists is likely to have been much more important in the lethal interpersonal violence and intergroup fighting of australopiths than is the case in *Homo*.

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