

Tooth marks on isolated bones cannot be attributed to Tyrannosaurid play behavior

Rothschild (2014) argues that many tyrannosaurid tooth marks left on isolated dinosaur bones cannot be attributable to their feeding behavior but instead, can be attributable to their play behavior. However, the evidence suggested by Rothschild (2014) are very weak. Carnivores do consume parts like pes, which claimed to be not attractive to carnivores. Also, isolated bones do not suggest that the part was already isolated when the animal bit it and carnivores do not always consume bones even if they have the ability to do so. This suggests that tyrannosaurid bite marks on isolated bones, do represent feeding behavior.

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(Response to Rothschild, 2014)

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Rothschild (2014) suggested that many of the tyrannosaurid bite marks from isolated bones are not attributable to their feeding behavior since parts like pedal elements or ceratopsid occipital condyles have little nutritional value and not attractive to carnivorous animals, and evidences like shed teeth or deep tooth punctures were absent. Instead, he suggested that these bite marks are attributable to tyrannosaurid play behavior. However, the evidences suggested by Rothschild (2014) are very weak.

Firstly, parts like pes or limbs do consumed by predators. When the carcass was already severely slashed up, hungry carnivores will eat leftover parts even they have low nutritional value. Modern vultures do consume leftover carcasses after the predators like lions eat a bunch of the carcass, including the parts like Rothschild (2014) claimed as “nutritious and attractive”. These are even present in fossil records like *Sinocalliopteryx* ate *Sinornithosaurus* hindlimb including pes (Xing et al., 2012) and *Deinosuchus* bite marks left on tyrannosauroid metatarsal (Schwimmer 2010).

Second, isolated bones does not suggest that the part was already isolated when the animal bit it. Carcasses are largely dismembered after the carnivores eat it and it is also possible that only that parts were preserved. For example, ceratopsid occipital condyles, claimed as the best evidence for tyrannosaurid play by Rothschild (2014), are very hard and round parts so therefore can be preserved far longer than the other bones.

Third, carnivores do not always consume bones even if they have the ability to do it. Lions do consume prey bones but also lick the bones to get the leftover meats

on bones. Therefore, “lack of deep tooth pucture” and “tyrannosaurid could simply have bitten off such thin portions and that tyrannosaurids are known to have consumed bones whole” do not suggest that tyrannosaurids were not trying to get the leftover meat on the bones.

Forth, bite marks left on bones do not necessarily suggest that the animal was only trying to get that part of the carcass. They can be produced by cutting off the carcasses to consume it more easily. For example, bite marks on the occipital condyles could left by cutting off the head or eating the neck muscles around it, as suggested by Fowler et al. (2012)

In conclusion, though it is likely that dinosaurs did played since the modern animals like Komodo dragons or birds do play but bite marks left on the isolated bones are insufficient to evidence for tyrannosaurid play behavior.

References

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