Tyrannosaurids didn't use their claws in combat

Rothschild (2013) suggested that many of the facial and postcranial scars in tyrannosaurid specimens are in fact caused by claws of the other tyrannosaurids. However, the evidences suggested by Rothschild (2013) are very weak. Tooth marks can have very different shapes with real tooth sections or shapes, and multi-ton giants like tyrannosaurids would have been impossible to kick each others' faces. Also, the very short, range limited tyrannosaurid forelimbs would be impossible to hit the opponents' faces.

Tyrannosaurids didn't used their claws in combat

(Response to Rothschild, 2013)

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April 2015

Rothschild (2013) suggested numerous skeletal pathologies in tyrannosaurid specimens were in fact caused by tyrannosaurid manual, pedal claws. However, the evidences suggested by Rothschild (2013) are very weak.

Rothschild suggested that many holes or pathologies in tyrannosaurid specimens have different sizes and shapes compared to tyrannosaurid teeth but instead match to tyrannosaurid claws. However, tooth marks can have very different size and shape with real tooth section. For example, though some tyrannosaurid tooth marks do have a large, round penerating hole shapes similar to tyrannosaurid tooth section shapes (Erickson and Olson, 1996), others have grooves or cracks or smaller holes, radically different from tyrannosaurid tooth shapes (Longrich et al., 2010; Fowler et al., 2012). Also, tyrannosaurids have heterodont teeth (Smith 2005), and these heterodont teeth do show different tooth marks with lateral, conical teeth (Hone and Watabe, 2009). Therefore, this cannot be used as a evidence against tooth marks.

Tyrannosaurid body types and masses also do not support the "tyrannosaurids used their claws in combat" hypothesis. Relatively short tyrannosaurid forelimbs have very limited range of movement (Carpenter 2001). Therefore, it cannot attack the opponents' faces(nasals, maxillas, lacrimals and dentaries (Rothschild 2013)). Also, 8-ton large biped animal like *Tyrannosaurus* (Hutchinson et al., 2011) would have been impossible to attack the opponents' faces by feet. Even a single fall during jump or even jumping itself, could have been very fatal to such a large animal (Farlow et al., 1995).

Rothschild (2013) also suggested that some of these pathologies are more common in suggested "gracile(male)" morphs and this could be a evidence for dominance

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behavior or bellicose attitude of males. Though the dominance behavior might have been existed in large carnivorous animals like tyrannosaurids, tyrannosaurid skeletal morphs are more likely to reflect individual or geographic variation rather than sexual dimorphism(Brochu 2003) and the sample size of adult tyrannosaurids which show certain morphs is small(Thomas Holtz, pers., comm. 2014). Therefore, the evidence of this hypothesis is very weak and not supportive.

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