

Review of PeerJ-57152: Stress distribution and the influence of morphology during grasping in the bonobo (*Pan paniscus*) trapeziometacarpal joint

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Overview:

The submitted manuscript by van Leeuwen and colleagues details the results of a study investigating how the bony morphology of the trapeziometacarpal (TMC) joint influences stress distributions within the joint during five grasping types typically used by bonobos (here: n=5 individuals) during manipulation and arboreal locomotion. The study is using an FE approach to model stress distributions within the TMC joint and shows that simulated and expected stress patterns for each of the five grasps highly agree, including 86% (18 out of 21) of successful simulations.

Overall, this is an original study that provides needed information on the form-function relationship between the TMC joint morphology and hand grip use in bonobos; a primate species that is very under-represented in anatomical and biomechanical studies on great ape hand use. The manuscript is written in a clear and accessible style, enabling relatively easy appreciation of what can sometimes be an overly-technical topic. The small sample size is quite understandable, given the difficulties in obtaining cadaveric specimens of captive bonobos. Despite this limitation, the methods of data collection and analysis are appropriate, increasing the power of this study. The figures illustrate the text well and present the data clearly. My only substantive comments are quite minor and are listed below.

1) Introduction:

Lines 56 – 58: This sentence is quite densely packed with lots of information that can benefit from re-structuring, so it becomes easier to follow. Likewise, the term ‘semi-arboreal’ is not used in the literature to describe the degree of arboreality in bonobos (which is something we do not yet know for sure how arboreal wild bonobos actually are). I recommend to simply write something like this: “Bonobos are both arboreal and terrestrial, which use their hands/thumbs during both locomotion and manipulation” (REFS).

Line 62: Reference *Neufuss et al., 2017* did not investigate hand grip use during climbing but rather which types of hand grips bonobos utilize during stone tool use. There is only one study on bonobo hand use during vertical climbing (Samuel et al., 2018). I recommend moving *Neufuss et al. 2017* up to Line 58, where the authors introduce the two main grip types (power + pinch grip) that bonobos have been observed to use during different behaviours.

2) Discussion:

Line 253: delete “the” in [...] cause the joint to function less a **“the”** universal joint.

Line 278: delete “the” in [...] it is clear that **“the”** its joint morphology is relatively robust compared to the other specimens [...]

Line 339: add missing “be” in [...] joint which will **“be”** included in future research on adaptive morphology in bonobos.

Line 349: The authors state that the five studied grip types are commonly utilized by bonobos in the wild but do only cite captive studies in the introduction. This is because we have no wild data yet. I would thus recommend deleting the word “wild” and instead either write: [...] during five grasps commonly employed “in bonobos” or “captive populations”.

Line 351: add missing “be” in [...] the divergent signals can **“be”** attributed to the individual joint morphology.