“**An Interactive Three Dimensional approach to Anatomical Description – The jaw musculature of the Australian Laughing Kookaburra (*Dacelo novaeguineae*)”**

Dear Editor,

We have considered the comments and suggestions from the second round of reviewers. We have made changes to the manuscript as suggested by the reviewers; however, there are some suggestions which we feel are not appropriate for given the aims and scope of our article.

In addition to the altered main text of our manuscript, our responses to each reviewer comment are provided below.

**Reviewer 1**

1. **The style of the reference should be formatted according to the PeerJ Instructions for Authors. For example, in the in-text citations, the format should be “First author et al., year” for four or more authors, the authors of this manuscript didn’t use a comma “,” after “et al.” for all of the in-text citations of this type. In addition, the volume numbers should be bolded.**

When editing this article we used the EndNote referencing settings downloaded from the PeerJ website to automatically format the references and citations. It appears that the PeerJ EndNote format differs from that outlined on the PeerJ website. We have changed the in-text citations to include a comma after et al. The PeerJ Instructions for Authors does not suggest that the reference volume numbers should be bolded so we have not done this.

1. **Some grammar and spelling mistakes need to be corrected, as shown below:
a. Abstract, line 7: in “We identified 14 major jaw muscles; 6 in the temporal group……”, the semicolon “;” should be changed to colon “:”
b. Discussion, lines 379 and 380: in “with the user able to interact with the model to gain finer understanding of structure”, “being” should be added between “user” and “able”
c. The authors used “visualization” and “visualisation” interchangeably throughout the manuscript, although they are both correct as one is American usage while the other one is British usage, it is better to use only one of them within one article to keep consistency.
d. References, lines 449 and 450: “Quayle MR. 2011. A Morphological Study of the Kingfisher Skull Environmental Science and Management Honours. University of Newcastle.” This reference seems cited incorrectly.**

We have followed all of these suggestions:
a. The semicolon was changed to a colon in Abstract line 7.
b. The word “being” was added to the suggested sentence.
c. “Visualisation” is now used throughout the whole article.
d. This reference is an Honours thesis and so it is referenced differently from the other articles. I have included the word “thesis” in this reference to make this clearer.

1. **Why Dacelo novaeguineae was picked for study using the interactive 3D visualization approach? The authors mentioned in the Introduction section that “The following description of the jaw musculature of the Australian laughing kookaburra (Dacelo novaeguineae) was stimulated by the need to incorporate detailed anatomical data into high resolution 3D finite element models as part of an analysis of skull biomechanics in 8 species of kingfisher (Alcedines) (Quayle 2011; Quayle et al. in prep.)”, however, a search for these two references “Quayle MR. 2011. A Morphological Study of the Kingfisher Skull Environmental Science and Management Honours. University of Newcastle” and “Quayle et al. in prep.” could not lead to any useful information about the purpose of this study. It is recommended that the authors should either check the accuracy of the citation of the first “Quayle 2011” reference or clearly state concisely why Dacelo novaeguineae was picked for this study.**

We feel that this sentence; “The following description of the jaw musculature of the Australian laughing kookaburra (*Dacelo novaeguineae*) was stimulated by the need to incorporate detailed anatomical data into high resolution 3D finite element models as part of an analysis of skull biomechanics in 8 species of kingfisher (Alcedines) (Quayle 2011; Quayle et al. in prep.)” already describes the reason we originally intended on documenting the jaw musculature of *Dacelo novaeguineae*. The jaw musculature of this species has not yet been described and we have done so using a novel method of 3D PDF, this is the focus of this article. The use of this jaw anatomy in the biomechanics of the kingfisher is a separate topic and there is no need to describe it further here. The reviewer could not find the mentioned references as one is “in prep” meaning in preparation and so not yet published, whilst the other is a honours thesis which is available from the University of Newcastle or from the author upon request.

1. **Throughout this manuscript the interactive 3D visualization approach was highlighted, along with a representative 3D visualization of the skull bones and jaw musculature of Dacelo novaeguineae presented in Figure 5 in the Appendix. However, for such an important 3D visualization model, the authors used the same picture that has been published in PLoS One in September 2013 in a paper titled “Embedding and Publishing Interactive, 3-Dimensional, Scientific Figures in Portable Document Format (PDF) Files” by David G. Barnes, et. al. Even if Plos One does not retain copyright of the published material, this is called “self-plagiarism”. Without any annotation, the exactly the same picture that has been published previously should not be included in a manuscript intended to be published as an original research article. It is recommended that the authors should use another picture of the skull bones and jaw musculature of Dacelo novaeguinea processed by the interactive 3D visualization approach.**

This comments suggests to us that the reviewer has fundamentally misunderstood the nature of the data that is represented in Figure 5. There are several reasons why this figure is not the same as that published in the Barnes et al. PLoSONE paper. Firstly, this figure is not simply a ‘picture’ as the reviewer suggests; it is a 3D model, a graphical representation of a 3D dataset that can be interrogated by the reader (a major aim of the present manuscript is, after all, to demonstrate the use of this technique to communicate anatomical information). Whilst the figure used in the PLoS ONE paper and the present manuscript share some parts of their datasets – the geometry of the bones and muscles – there are differences in the set up, labelling, annotation, and rendering between the two. The model submitted to PLoS ONE contained transparency of the skull when rendering some of the present views, whilst the model is figure 5 does not. The pre-set views vary between the two models. Importantly, the model in figure 5 has a labelling system embedded into the figure which allows the user to click on a muscle to display the muscle name; the PLOSone figure does not include this data.

We do not understand how the reviewer can suggest that we use “another picture of the skull bones and jaw muscles of Dacelo novaeguineae”, there is only one configuration of the skull and muscles, we have presented it. We cannot change the input data that creates the appearance of the model as the reviewer suggests as it is already correct, any change to jaw muscles would mean the model is no longer accurate.

We agree that self-plagiarism is an important issue; however, we have not presented information that is simply copied from previously published work. The Figure 5 presented in this paper contains detailed anatomical data that is simply not present in the figure we presented in PLoS ONE paper. The PLoS ONE paper was not focused on anatomy – rather, it sought to demonstrate the open source code that we have used to generate interactive 3D figures that can be embedded into PDF documents, and show its applicability to different disciplines (including, in that paper, anatomy, neuroscience, biochemistry, and astronomy). Neither is copyright infringement and issue; PLoS ONE does not retain copyright of published materials. The use of the figure is completely different between the PLoS ONE context (a method for 3D PDF creation) and the figure submitted here (an anatomical description). Any content relating to the generation of the 3D model in figure 5 has been referenced to the PLoS ONE article appropriately.

1. **The authors mentioned very simply that “This method of interactive visualisation is becoming increasingly popular, with publications in biomedical science (Kumar et al. 2009; Selvam et al. 2009), astrophysics (Barnes & Fluke 2008), invertebrate (Baeumler et al. 2008; Neusser et al. 2009; Ziegler et al. 2008) and vertebrate anatomy (de Bakker et al. 2012; Holliday et al. 2013; Ruthensteiner & Heß 2008) and paleontology (Knoll et al. 2012; Lautenschlager 2013).” in the Introduction section, and discussed “the role of 3D images in communicating anatomical information” in the Discussion section. However, it would be better if some more information on the significance and application of this interactive 3D visualization approach (e.g., how can this method be generalized to other subjects and what types of important information can be provided by this method) is added at the end of the Discussion section.**

We cannot comment on the use of this method in other subjects as we are not qualified to do so, therefore we have commented on the use of 3D models in communicating anatomical information. In the field of anatomy, this method of 3D data presentation has only been used in a few studies (which have been referenced), all of which use it to display and describe anatomy.

 **Reviewer 2**

1. **Is there any other ways to digitally analyzed the skull of adult laughing kookaburra except clinical computed tomography (CT) scanner, with a higher resolution?**

We have already included this in two paragraphs of the “Methodological issues” section of the discussion where we describe the use of small-animal CT, micro-CT and MRI imaging for collecting higher resolution data. We have included the pros and cons of each and stated that at the time of this study we did not have access to a small-animal CT scanner.

1. **Is this specimen representative? What's the age of the deceased laughing kookaburra, and whether this age of the kookaburra is able to represent an adult common kookaburra? It is better for the authors to describe more detailed on the specimen seletion.**

We have mentioned in the “Specimen” section of the Materials and Methods that the individual dissected was an adult. We do not know the exact age of the individual as it was a wild animal, but it was classed as an adult based on its size; kookaburras are familiar animals in Australia and this statement is uncontroversial. Anatomy of course varies amongst individuals of all species, but for the overwhelming majority of species the typical range of anatomical variation has never been quantified and the until this data is available it is impossible to say how ‘typical’ this specimen is. Detailed anatomical information of the head skeleton is contained as 3D data is Figure 5.

1. **To make it statistically significant, is one sample enough?**

As we did not use any form of statistical analysis, this comment is not relevant to our manuscript.

1. **The authors may want to discuss more detailed on the data compared with other previously reported kookaburra skull and muscle structures, especially muscle attachment points, to make their data and results more convincing and representative?**

We have already stated in the introduction that “The jaw muscles of several species of kingfisher (though not *Dacelo novaeguineae*) have been described by Burton (1984); however his illustrations are difficult to interpret, with little information identifying which part of the skull he is referring to in the figures. Burton's description did, however, reveal several variations in muscle origin and insertion areas between the kingfisher species he studied. This observation reinforced the need to document the kookaburra anatomy independently.” We cannot compare this data with previously reported kookaburra muscle structures as this data does not exist. This study is the first to look at *Dacelo novaeguineae* jaw musculature. To compare the data with the jaw musculature of another kingfisher species would be inappropriate as the attachment and geometry of the muscles vary between species.

1. **May want to discuss more on comparing with previously reported skull and muscle structures.**

See comment 9 response.

We hope that this revised edition of our manuscript complies with the reviewers comments.

Regards,
Michelle Quayle