**Author’s response to reviews**

**Title:** Evaluation of the changes of orbital cavity volume and shape after Tooth-borne and Bone-borne Rapid Maxillary Expansion (RME). A comparative CBCT study using surface-based superimposition and deviation analysis.

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ANSWERS TO THE EDITOR AND REVIEWERS’ COMMENTS
(if possible, we would like to submit the manuscript to the SAME reviewers)

Editor

We thank the Editor for having taken our manuscript into consideration for publication in this prestigious journal. As recommended, we followed the reviewers’ suggestions to improve the quality of the manuscript. Thanks again.

# Reviewer 1
Language review - very good. We warmly thank the reviewer for his positive response on our study.

# Reviewer 2
We warmly thank the reviewer for his suggestions that have notably increased the quality of the manuscript.

1-I think you can write the introduction section more specific, it sounds similar to the other studies which was previously published. Please add null hypothesis to the study. According to the reviewer’s request, we’ve changed the introduction section. We’ve also added the null hypothesis.
2-Please mention the model and trademark of ICAT tomography machine. According to the reviewer’s request, we’ve made appropriate changes.

3-Please write the precise FOV of the machine. (large FOV is not a scientific description). According to the reviewer’s request, we’ve made appropriate changes.

4-Please write the mean amount of maxillary expansion in both of the groups. Please add these values to the manuscript and tables. You can correlate these changes with the orbital cavity changes. According to the reviewer’s request, we’ve reported the amount of maxillary expansion in the text and table 2. We’ve also performed regression analysis to correlate the amount of maxillary expansion with the orbital changes.

5-Please write the mean age of the groups. According to the reviewer’s request, we’ve made appropriate changes.

6-Please write the results of sample size analysis. You are writing a first study about this topic and I think you can not take a previous study as an example of sample size calculation. You may also use the post-hoc power analysis of your study. You should give the parameter that you used to determine the sample size, and please give the assumptions of the amount of change of the parameter in which you accepted as statistically significant. According to the reviewer’s request, we’ve reported the percentage at which the present study was powered to assess differences between the two groups.

7- (.stl). Please write the whole name, after that you can use the abbreviation. According to the reviewer’s request, we’ve made appropriate changes.

8-How did you calculate the method error, please describe your method. Please write the interval of readings. 8-Please merge the table 1 and 2, you can show the results in one table. According to the reviewer’s request, we’ve reported the interval of reading, also we’ve assessed the inter-examiner variability reporting the data in the text. Finally, we’ve merged data of table 1 and table 2 (new table 1).

9-Please add the before RME and after RME CBCT images of one example case of each group. According to the reviewer’s request, we’ve added a new figure 1 showing TB and BB maxillary expansion.

# Reviewer 3

We warmly thank the reviewer for his suggestions that have notably increased the quality of the manuscript.

1- Concerning the title, it is preferable to replace Bone-born rapid maxillary expansion by Bone-born Rapid Maxillary Expansion (RME). According to the reviewer’s request, we’ve made appropriate changes.
2- Page 1: In the abstract, for the study design, it will be advisable to add the malocclusion and age of patients briefly. According to the reviewer’s request we’ve made appropriate changes to the abstract.

3- Page 2: Name of the author: Manuel Lagravère. According to the reviewer’s request, we’ve made appropriate changes.

4- Page 3: line 20: 40 adolescents also add age and malocclusion. According to the reviewer’s request we’ve made appropriate changes to the abstract.

line 25: give more precision, 6-month after the end of expander activation or a 6-month after the beginning of expander activation. According to the reviewer’s request we’ve made appropriate changes to the abstract.

line 49: do not affect the anatomy or the volume of... According to the reviewer’s request we’ve made appropriate changes to the abstract.

5- Page 4: line 12: describe also the effect on the internasal suture which is important in RME. If the reviewer agrees, we would like to limit the list of the sutures to those being part of the orbital anatomy. However, we’ve reported specific reference concerning the effect of RME on internasal suture where we argued about circummaxillary sutures in general. Otherwise, if the reviewer retains essential to report this information we are willing to do it.

line 19: don’t use ”we". According to the reviewer’s request, we’ve made appropriate changes.

line 21: the effect of RME on orbital cavity should be explained more clearly, ie if it could have a negative effect according to the literature According to the reviewer’s request, we’ve changed the introduction section. We’ve also added the null hypothesis.

line 35: miniscrew in one word According to the reviewer’s request, we’ve made appropriate changes.

6- Page 5: More comparison to other studies should be done and the background is not well elaborated in the introduction. In addition, a null hypothesis(es) could be added at the end of this paragraph. According to the reviewer’s request, we’ve changed the introduction section. Unfortunately, this topic was not well investigated in literature and it is impossible to make comparison. We’ve tried to do our best. We’ve also added the null hypothesis

line 34: More precision should be given on the bilateral crossbite, how many teeth at least? According to the reviewer’s request, we’ve made appropriate changes.

line 39: Eligibility criteria instead of inclusion criteria. According to the reviewer’s request, we’ve made appropriate changes.

line 39: Age should be figuring with approximately the stage of maturation of the intermaxillary suture. The reviewer’s is right; however, we did not perform an evaluation of maturation stage of the midpalatal suture. However, according to the knowledge in this topic, (Fernanda Angelieri, Lucia H. S. Cevidanis, Lorenzo Franchi, João R. Gonçalves, Erika Benavides, James A. McNamara, Jr. Midpalatal suture maturation: Classification method for individual assessment before rapid maxillary expansion. Am J Orthod Dentofacial Orthop. 2013 Nov; 144(5): 759–769) the mean age of the study sample is compatible with an initial stage of ossification which justified the usage of bone-borne maxillary expander.

line 55: Hyrax-type expander. According to the reviewer’s request, we’ve made appropriate changes.
7- Page 6: line 5: Figure 1b not related to the expander? Better to add the photos of the expanders. Figure 1B was a typo, we apologize for the mistake; however, we have added the photos of both the TB and BB expanders to the manuscript.

line 10: how the opening of the intermaxillary suture was confirmed? Clinically by the occurrence of an interincisal diastema, and/or by an occlusal X-ray done to show the split, especially that the age goes to 15 years old. The reviewer is right, we didn’t report this assessment for summary reason. Sorry for the mistake. Clinical assessment of maxillary expansion was achieved by visual inspection of the interincisal diastema.

line 17: How was the transverse retention ensured (composite or ligature) and what was the mean opening of the screw (number of turns and amount of mm). Transverse retention was achieved blocking the expansion screw with flowable composite, however we didn’t report this information into the manuscript since we consider it redundant. According to the reviewer’s request, we added this information in the text.

We didn’t record the number of activation made for each patient. The extension of the expansion protocol was based on clinical outcomes, i.e., carried the achievement of the overcorrection of the maxillary constriction.

line 25: Even with an ethical committee approval, the necessity of CBCTs at T1 and T2 should be justified. In this instance, the existence of a bilateral crossbite considered as a severe transverse skeletal discrepancy could justify the 3D acquisition (British guidelines and SEDENTEXCT Radiation protection). The reviewer’s is absolutely right, thanks for your question. Unfortunately, SEDENTEXCT guidelines do not justify CBCT scans for severe transverse malocclusion. A specific paragraph is dedicated to the potential use of CBCT (not routinely) to diagnosis infra-bony defect or severe periodontal damage, which somehow may be related to the potential side-effects of maxillary expansion on the vestibular alveolar bone. However, it would seem like a forcing. Anyway, we specified in the text that the study sample was acquired from previous published material which allowed us to expose patients to radiation.

line 32: thickness of slices to add. With CBCT the thickness of the slices corresponds to the voxel size which was 0.30 mm. The distance between 2 slices was 0.3 mm which provided accuracy in anatomic registration.

8- Page 7: line 17: converted and rendered. According to the reviewer’s request, we’ve made appropriate changes.

9- Page 8: line 34: workflow. According to the reviewer’s request, we’ve made appropriate changes.

line 52: Interexaminer reliability would have been advised in this study. According to the reviewer’s request, we’ve assessed the inter-examiner variability in this month reporting the data in the text.

10- Page 11: line 5: circumaxillary. According to the reviewer’s request, we’ve made appropriate changes.

line 52: to affect the architecture of the orbits or the craniofacial anatomy. According to the reviewer’s request, we’ve made appropriate changes.
11- Page 13: more caution should be taken because in some cases the expansion could be more much aggressive with regard to the type of Bone-borne RME expander used. We absolutely agree with the reviewer and we thank him for this valuable suggestion. Accordingly, we’ve mitigated the statement according to the what we found.

12- Conclusion: it should much more elaborated explaining the limitation of the study and future perspective. May be a team work with ophtalmologist for example could be more beneficial to assess the clinical relevance. A long follow-up of these patients could be also advised. According to the reviewer’s request, we’ve reported a specific section dedicated to the study limitations. Thanks for you suggestion

13- References: a pdf copy with all the above-mentioned corrections, in addition to the references one, will be sent to editor and author.