Author’s response to reviews

Title: Usefulness of a stool to stabilize dental chairs for cardiopulmonary resuscitation (CPR)

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Author’s response to reviews:

Dear Editor and Reviewers (BMC Emergency Medicine)

Thank you very much for reviewing our manuscript and offering valuable advice. We have addressed Reviewer’s comments with point-by-point responses, and revised the manuscript accordingly.

Reviewer reports:

David Häske, PhD MSc MBA (Reviewer 1): Dear authors,
Thank you for your creative study approach and the ability to read the manuscript.
I have some notes in the pdf to clarify terms and some comments in the results section.
I hope I can help you to improve the manuscript.

Thank you for your useful advices. We think it’ll help us improve our study. I replaced and inserted some words or terms by your meaningful comments in the PDF.

Romain Jouffroy, MD (Reviewer 2): Thank you for allowing me to review this interesting paper concerning the usefulness of a stool to stabilize dental chairs for external chest compression.

The text is well written with few typos (see below).
I have few remarks and suggestions on the form and on the background.
I hope my comments will be helpful to improve the quality of your manuscript.
- Overall the manuscript, please uniformize the references according to the Journal standards: actually some references are [3] and other 3

   My apologies for too many mistakes. We corrected all references as the Journal standards. - page References.

- page 2 line 10: I suggest replacing CPR should by CPR could

   I replaced the words with “CPR could”. page 2 line 3.

- page 2 line 46: please provide the overall mean+/s SD reduction ratio value and insert the p-value into bracket after significantly.

   I provided the overall mean+/s SD reduction ratio value by adding a sentence "and the overall mean was 62 ± 11%" and - page 2 line 15. I inserted the p-value into bracket after significantly. -- page 2 line 13.

- page 2 line 49: I suggest replacing "The reduction ratios were between nearly 39~85%, although it was different by chairs" by "The reduction ratio varies between nearly 39 and 85%".

   I replaced the words with "The reduction ratio varies varied between nearly 39% and 85%". page 2 line 14

- page 4 line 17: remove "immediately"

   I removed the word "immediately".

- page 4 line 21: delete "An ideal" before cardiopulmonary resuscitation

   I deleted the word "An ideal".

- page 4 line 28: replace should by must

   I replaced the word "must”. - page 4 line 7.

- page 4 line 28-33: delete external cardiac compression because you previously defined ECC.

   I deleted the word "external cardiac compression” and replaced “ECC”. - page 4 line 8.

- page 5 line 35: delete technic after ECC.

   I deleted the word "technic”.

- page 6 line 46: please insert references for ERC and AHA guidelines


- page 6 line 46: Three instead of 3 before health providers
I replaced the word “Three”. - page 6 line 10.

- page 8 line 50: Insert in the methods: Quantitative variables with a non-gaussian distribution are presented by median with interquartile range (quartile 1 - quartile 3). Conversely, quantitative variables with normal distribution are presented by mean +/- standard deviation (SD). How where compared the results with and without stool in case of normal distribution?

As all the data sets were found to be with non-normal distribution, I replaced "In view of the non-normal distributions" by "As all the data sets were found to be with non-normal distribution" and corrected 2 words in the following main sentence, accordingly, by replacing "data was" by "they were" - page 8 line 10-11.

- pages 8 and 9: please describe which variables had finally normal or non-gaussian distribution

As I described above, all the data sets were found to be with non-normal distribution. They were thus analyzed using a non-parametric method.

- page 9 line 10: to assert your sentence, please insert values and p value for the comparison before and after the use of the stool

I inserted a new table (Table 1) which was provided by Figure 3. This showed displacement (mm), reduction ratio (%) and p-value for the comparison before and after the use of the stool.

- page 9 line 18: please insert p-value after "the displacement of the backrest by ECC was 4.1 ± 1.3 mm with the stool, while that was 26.8 ± 4.5 mm without one". Please specify that this value corresponds to the overall mean for all dental chairs, if I well understand. After that, please provide a table with the values before and after with p value for all dental chairs.

These values are not the overall means but ones for the chair #2. This sentence is a continuation of the previous one, as intended to show an example of reduction. To show this more clearly, I connected the 2 sentences by replacing the colon by ", where". - page 9line 2. As I described above, I provided a table (Table 1) with the values for all dental chairs.

- page 9 line 18: Please define how was defined the reduction ratio

I inserted one sentence with one equation to show the definition of the reduction ratio. It reads "Equation 1 defines the reduction ratio. reduction ratio = 1 - average displacement with stool / average displacement without stool (1)". - page 9line 4-5

- page 9 line 43: do you mean "little" instead of "petite"?

Yes, I do. That mean “little”. But, I reduced the length of the whole sentence.

- page 9 line 56: cardiac arrest instead of "cardiopulmonary arrest"

I replaced the word “cardiac arrest”. - page 10 line 7.

- page 10 line 14: please insert the reference after "by using a stool"
I inserted the reference after “by using a stool”. The reference’s number is [6]. - page 10 line 9.

- page 11 line 7 to line 29: this part should be moved in the results section

Yes, I agree your meaningful advice. I removed that part “page 11 line 7 to line 29” in the results section. - page 9 line 6-13.

- page 11 line 46: delete the dot between stabilizer and where.

I am sorry an elementary mistake. I deleted the dot.

- I suggest inserting a table to complete the results provided by Figure 3. Figure 3 allows to observe the differences between with and without tool but doesn't provide the values. In my opinion, it is an important result to assert the conclusion.

Yes, I agree your meaningful advice. I inserting a new table (Table 1) which was provided by Figure 3.

Elizabeth Cuevas, Ph.D. (Reviewer 3): This is a very interesting study to improve the outcomes of CPR when cardiac arrest occurs during dental surgery. I think the burden of this outcome should be further enumerated in this study prior to publication - to describe the occurrence of such events in dental surgery and the outcomes/survival of these events. This study would have more impact if the burden of cardiac arrest during dental surgery was resulting in low quality or low compliance with AHA CPR guidelines, thus resulting in more deaths. Future efforts on this topic could include the further description of the difficulties of performing CPR in a dental surgery chair, and the difficulties of removing the patient to the floor or another suitable environment.

- What risks of harm or fall to the health care providers is anticipated with this method compared to traditional CPR?

In generally, dental chairs is are solidly made to hold, lifting and reclining a whole body. Furthermore, around the space of around a dental chair is so compact to do effective treatments between a dentist and staff. It’s a quite-narrow space like a cockpit of an airplane. In many clinics, there are only a few staff and work in a female-dominated profession. They could not move a patient from a dental chair to the floor through a small space and are short-handed to guarantee a the patient’s safety. Considering the difficulty of moving a patient to the floor and the time required to this transfer, we might wish to start CPR immediately in the dental chair.

- In the human subject section, it is noted that no subjects are used. However, were the three health care providers not assessed on their performance? Is an IRB required by your institution for their participation?

We inquired about regarding the necessity of that for our institutional IRB. Our IRB judged that this study was not necessary for requirement IRB’s approval. I added an “Ethics approval” of IRB. - page 13 line 5.

- Other suggested changes include minor grammar editing to improve clarity and verb agreement.
We carefully reviewed over our manuscript, and the manuscript was emended amended a grammar editing grammatically by English native speaker.

Namita Jayaprakash, MB BcH BAO, MRCEM (Reviewer 4): This is an interesting and innovative article by the authors N. Awata et al. 'Usefulness of a stool to stabilize dental chairs for external chest compression' is a simulation study involving the effectiveness of placing a stool behind eight different types of dental chairs and assessing the vertical displacement during external chest compression. This study is a validation of a recommendation from their previous work to place a stool during CPR when occurring during dental surgical procedures. This is an interesting study in that the authors recognized that despite incorporation into guidelines, the use of a stool for external chest compressions occurring during dental surgery faces a practical challenge in understanding efficacy given the number of brands and styles of chairs. The study results found that placement of the stool decreased the vertical excursion of the chair during external chest compression by different providers of varying statures.

The strengths of this stimulation study are that it evaluates the effectiveness of the stool in all 8 chairs when CPR is conducted by 3 different types of providers, which adds to generalizability. It also helps increase the opportunities for early CPR without delay of movement. This is a simple study which has the most benefit to the dental community where providers may find themselves in the unfortunate predicament of needing to perform CPR. It is not however clear why the patient in the dental chair is different from other scenarios in which the patient may have to be moved. The authors state on page 4, line 32 that it is difficult to move the patient from the dental chair to the floor. It would be useful to elaborate on why this would be different from moving a patient in cardiac arrest in any other sitting position to the floor. What does it take to move a patient from a dental chair to the floor? Is there information on the amount of delay in initiation of CPR with the process of moving the patient?

We gave a response about the commented which as was pointed out by Reviewer 4. In generally, dental chairs are are solidly made to hold, lifting and reclining a whole body. Furthermore, around the space of around a dental chair is so compact to do effective treatments between a dentist and staff. It’s a quite-narrow space like a cockpit of an airplane. In many clinics, there are only a few staff and work in a female-dominated profession. They could not move a patient from a dental chair to the floor through a small space and are short-handed to guarantee the patient’s safety. Considering the difficulty of moving a patient to the floor and the time required to this transfer, we might wish to start CPR immediately in the dental chair.

- Additionally, it would be helpful in the methodology to describe if the providers were performing CPR for ten rounds on the manikin on each chair sequentially. If the providers were sequentially performing CPR on the manikin in each of the chairs, how was provider fatigue accounted for?

After performing CPR on the manikin, every providers gave their impressions of fatigue and expressed in word.

- Additionally:
Page 4, line 14: The sentence "When the relief go wrong..." needs to be rephrased as it is difficult to follow. Would suggest something along the lines of 'When the thrust relief is ineffective, immediate cardiac arrest can occur.'

Yes, I agree your meaningful advice. I replaced that senses to 'When the thrust relief is ineffective, immediate cardiac arrest can occur.'- page 4 line 4.
Federico Franchi, M.D. (Reviewer 5): Awata N et al conducted an experimental study to evaluate the efficacy of the stool to stabilize height different dental chairs during external cardiac compression (ECC). They found that the stool significantly reduced the vertical displacement of the backrest against ECC. The study is well written and the methods are sufficient for the type of study and the results obtained. In the current form the paper needs some revisions. In particular, the length of the introduction and the discussion seem excessive for the type of study and the results obtained. The length of the introduction and discussion should be reduced by 20-30% and 30-40%, respectively. On the contrary, the results should be better described.

I really appreciate your help in proofing our article. I reduced the length of introduction (30%) and discussion (40%) for showing contents succinct and clearly.