Author's response to reviews

Title: Preoperative muscle weakness as defined by handgrip strength and postoperative outcomes: a systematic review.

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Author's response to reviews: see over
We thank the 3 reviewers for their helpful feedback and for providing the opportunity to improve the manuscript. Specific answers to reviewer comments, plus changes as highlighted in the text, are as detailed below.

**REVIEWER 1**

Major revisions:

1. Table 4 represents complications that were documented in general from each study. We have modified the paragraph to include where this data has come from.

2. [1] We have modified the title of Table 3 to reflect the fact that some studies use outcomes to define impaired grip strength.

   [2] The timespan of grip strength measurement prior to and following surgery have been included in the text.

3. [1] The column labels have been modified to clarify the table

   [2] The text has been modified to clarify which studies used LOS to define complications and the studies that analysed LOS and grip strength separately.

Minor revisions:

1. Mahalakshmi and Cook were the 2 blinded studies. These references have been added as requested.
2. Cook and Kalfarentzos references inserted as requested. The asterisk * has been explained as requested.

3. These studies provided age ranges with no mean value.

4. Sentence reworded as recommended.

Discretionary Revisions:

1. A short paragraph outlining technique of grip strength measurement has been added in the background as requested.

2. We have included the sentence: “One study explored the effect of pre-operative nutritional supplementation on grip strength.{Le Cornu, 2000 #2400} Although supplementation improved post-operative grip strength compared to the control group, it did not however have an effect on patient outcome”.

3. Table 1 has been cited as recommended.

4. The first sentence of the background paragraph has been modified as suggested.

5. The sentence has been moved as suggested.

6. The format of references has been modified as suggested.

7. This sentence has been moved as recommended.

REVIEWER 2- No comments attached
REVIEWER 3

Although not widely used in clinical practice to predict postoperative outcomes, handgrip strength is supported for such use by an abundance of research. The authors have done a good job of summarizing the research. I am unaware of any articles they missed in spite of their failure to search CINAHL or Web of Science and their providing no evidence of consultation with an expert regarding the comprehensiveness of their findings.

1) I found the Background to be a bit “meandering.” I believe it could be more direct and sequential. Perhaps minimizing information on exercise capacity and cardiopulmonary status would help.

Answer: We thank Reviewer 3 for confirming that our literature search is definitive. The background paragraph has been modified as suggested, including minimizing information on cardiopulmonary exercise testing.

2) A good Background or Introduction establishes need in two ways. One is to indicate the magnitude of the problem. The authors provide little information about the incidence of untoward postoperative outcomes.
Answer: We have added the following to the background section: In surgical procedures known to have a mortality of greater than 5% in the UK, elderly patients (mean age 75 years) and emergency procedures account for over 80% of deaths but less than 15% of total procedures. {Pearse, 2006 #3236}

The other is to indicate what has already known. For if the answer to an issue is already clear, there is little point in addressing it again. In the case of a review, this may boil down to the adequacy of other reviews (if any). The authors address adequacy by citing reference 8 (though they should indicate why it is inadequate). They do not site Bohannon (J Geriatr Phys Ther 2008), whose review includes many of the same articles that the authors cite.

Answer: We have cited Bohannon’s study as suggested and described the need for our review highlighting that it is very difficult to draw conclusions with regard to handgrip strength given the heterogeneity of definitions used for postoperative morbidity.

3) The authors indicate in the Background that grip strength has “established population norms.” There are several papers that purport to present norms. One or more should be cited.

Answer: Several of these articles have been referenced as requested.

4) The authors use the term “methodology” or “methodological” several times
(eg, page 6). Technically, the term means the study of methods. I suggest “procedural” or some similar alternative.

Answer: This has been modified as requested.

5) For consistency I suggest the authors indicate “…morbidity (n=10/15 studies)…” on page 3.

Answer: This has been clarified in the results section.

6) On page 7 (third line of results) the authors write “subspecialties were explored.” It should be “subspecialties was explored.” The subject is “range.”

Range is singular.

Answer: Modified as suggested.

7) On the bottom of page 10 the authors use the phrase “weaker strength.” I think “impaired strength” may be preferable.

Answer: Weaker has been changed throughout the manuscript, to “impaired strength” as suggested.