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 reviewers for further constructive comments, addressed in detail below:

REVIEWER 1

Minor Essential Revision:

• There appears to be a discrepancy between the citation numbers in the text
  matching the citation numbers of the studies they refer to in the tables and in the
  reference list.

ANSWER: We have corrected the reference numbers so they are consistent throughout the manuscript.

• Table 5: There is the use of an ‘*’ twice, once in the title, once in the legend. In
  the first draft there was only one ‘*’ and it referred to Le Cornu, now they both
  refer to Figueirdo. Is this correct? Depending on this the ‘B’ in Table 6 may need
  to be adjusted.

ANSWER: We have modified the table so the “*” appears only once. The “*” refers to the Figueirdo
study and the “†” refers to the Le Cornu study.
REVIEWER 3

The authors, by and large, have done a good job incorporating the reviewers’ comments. Nevertheless, I have additional recommendations that I consider essential or compulsory:

1) I previously referred to the authors non-comprehensive search. Specifically, they neither searched all of the relevant databases nor consulted an expert. While these shortcomings are not fatal, they should be acknowledged in the Discussion.

ANSWER: We have acknowledged this limitation by adding the following sentence in the discussion:

“Because only published reports were examined (obtained from searches performed only on MEDLINE, EMBASE and Cochrane databases), a formal assessment of publication bias was not undertaken.”

2) The Background continues to meander. My attempt at an improvement follows:

A substantial minority of patients sustain postoperative complications[1] and accelerated, post-hospital discharge mortality.[2] In surgical procedures known to have a mortality of greater than 5% in the UK, 80% of deaths occur among elderly patients (mean age 75 years) and or during emergency procedures, even though they account less than 15% of total procedures.[3] Physician- and patient-friendly, practical and inexpensive measurements are required to objectively risk-stratify and guide perioperative management for this cohort of patients. Measurements of exercise capacity and muscle strength are associated with increased all-cause and cardiovascular mortality in the general population.[4-7] However, the comprehensive assessment of cardiovascular reserve – most objectively using
cardiopulmonary exercise testing[8] – is challenging for immobile patients, time-consuming, and costly to extend as a general screening tool to the wider, at-risk surgical population. By contrast handgrip strength is an inexpensive, objective bedside test which has established population norms[9-13] and has been extensively tested in a range of chronic general medical conditions.[14] It may reflect, in part, the association of impaired muscle strength with malnutrition[15] and cardiopulmonary or metabolic diseases.[4-7] Hand grip strength is assessed by instructing the patient to keep their shoulders adducted and neutrally rotated, the arm in a vertical position, the wrist in a neutral position and to squeeze the grip with maximal strength. The highest result in a seated or semi-seated position may be used.[16, 17] Whether a robust relationship between preoperative handgrip strength and postoperative outcomes exists is unclear, since variable, and frequently retrospective, definitions of postoperative morbidity have been employed as outcome.....

ANSWER: We have modified the background section as recommended.

3) I suggest the first sentence of the Abstract be rewritten as follows:

Reduced muscle strength- commonly characterized by decreased handgrip strength compared to population norms- is associated with numerous untoward outcomes.

ANSWER: We have modified the first sentence of the abstract as recommended.

4)"Its" in the Conclusions of the Abstract does not need an apostrophe. It should be "its."

ANSWER: This has been amended as recommended.
5) In what is now the second paragraph of the Background The authors describe the procedure for measuring handgrip strength. The procedure is consistent with that recommended by the ASHT, but researchers remain inconsistent in the manner in which they measure handgrip strength. I doubt that all the studies cited by the authors use the procedure described by the authors.

ANSWER: We acknowledge this by rewording the sentence so it reads: “Hand grip strength can be assessed by instructing the patient to keep their shoulders adducted and neutrally rotated, the arm in a vertical position, the wrist in a neutral position and to squeeze the grip with maximal strength.”

6) It’s good that the authors added information on when handgrip strength was measured in the studies they cite. However, doing so as they do in the text is tedious. I suggest the presentation of details in a table and a summary in the text.

ANSWER: We have presented this information in Table 2.

7) References 16 and 35 and references 9 and 38 are duplicative.

ANSWER: All duplicate references have been removed from the manuscript.