OPEN PEER REVIEW REPORT 1

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Title: Redistribution of Nerve Strain Enables End-to-End Repair under Tension without Inhibiting Nerve Regeneration
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COMMENTS TO AUTHORS

The authors' present original work related to end-to-end nerve repair, investigating the efficacy of repairs under different tension conditions. Overall the work is thorough and well-presented. However, revisions to the manuscript based on the below criticisms could increase reader clarity and improve the overall impact of this work.

1. The authors provide seemingly contradictory statements throughout the abstract and introduction. The hypothesis is that unloading the repair site will enable repair of larger nerve gaps. Yet at the end of the abstract the authors state that tension enhanced repair. Again in the introduction, the authors state that, "if such a repair places the nerve or the site of repair under substantial tension, outcomes are likely to be poor." But at the end of that paragraph the authors' state that repairs under slight tension outperform tension-free graft repairs for modest nerve grafts. In light of this statements, it is somewhat difficult to understand the authors motivation in investigating tension-free repairs when the argument seems to be clearly made that repair under slight, but not excessive (these terms would be more useful if more specifically defined) tension is superior. It becomes more clear to the reader later in manuscript that the advantage with the proposed tension-free approach is the fact that end-to-end repair would likely fail due to high tension, but this should be more explicitly stated in the introduction to better motivate the study.
2. In the nerve transection section, second paragraph, the authors' state that the nerve in the 4th group was repaired as above, but no repair procedure was previously detailed (perhaps the authors meant to refer to the procedure listed below that sentence). The sentence after that also needs a reference to a specific figure (rather than just "(Figure)").
3. Information regarding the length of time of loading would be informative (i.e., how long was the knee kept in extension and the ankle in dorsiflexion).
4. Was EMG testing performed on separate animals not contained in the two outlined cohort? What was the number of animals tested in EMG studies? How long was the NID in place before EMG testing?
5. Were sections for histology taken longitudinally or axially? (It's clear from the figures that these were axially, but this should be stated in the methods).
6. When the authors state that axons were counted in multiple 63x images, is this referring to multiple max-intensity projections, or multiple z-slices within a stack?
7. Are +/- values given after mean values standard deviations or standard error?
8. Figure 4B and 4C appear to be the same graph.