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| **Numbered Reviewer Remark and Manuscript Line Number** | **Author Response** | **Revised Manuscript Line Number and Text Change** |
| Reviewer 1: |  |  |
| Title 1.      It is not clear to me that the authors have evaluated "the effect of rehabilitation protocols". Perhaps a more appropriate title is a Systematic Review of the Rehabilitation Protocols Following Flexor Tendon Repair. | OK | Title: A Systematic Review of the Rehabilitation Protocols Following Flexor Tendon Repair |
| Material & Methods 2.   Why did the authors limit the literature search to only these terms? Did the authors consider a broader search of the literature using MeSH subject headings? | We began with a broader search of “flexor tendon repair rehabilitation” but this returned a high variation of relevant articles including various anatomical sites. The term “finger” returned fewer results than “hand”. We have added lines describing how our search was narrowed. Pertinent cited references were also searched for completeness | Line 73-77. |
| 3.      Line 72. Why did the authors choose 1980 as the cutoff date? | Our search actually did not produce any articles in the English literature before 1980. This has been clarified. | Line 76. “The search returned articles published from 1980-2011.” |
| 4.      Line 88. The word "data" is plural; the plural verb should used and this should be changed throughout the manuscript. | OK | Pleural verb now used throughout manuscript |
| 5.      Line 90. Why did the authors analyze these data in 5 year intervals and would it be different if different intervals were selected? **Also in total 34 studies (over a 25 year period) were included in this review, is there sufficient power to analyze these data in 5 intervals?** | We have now explained why we chose 5-year intervals and also included 10-year interval analysis over the past 20 years in our results section (which reinforces a trend for decreased rupture rate overall and in active protocols). | Lines 95-99.  Lines 132-135. |
| 6.      **Lines 90-94. The relationships evaluated and the statistical tests used should be described in the Methods**. | See right. | Fisher Exact test was use to test the association between complication/rupture/decreased ROM rates and rehab methods (passive/active/continuous motion). The test results show there are strong association between complication and Rehab Methods, as well as Decreased ROM and Rehab Methods.  The odds for Ruptures by passive is 0.66 compared to by active, while the odds for decreased ROM by passive is 1.71 compared to by active. |
| Results **7.      Line 116. Does Table 2 report all the tendon repairs from the 34 papers reviewed? If so, I would question the validity of grouping all of the data together. These tendon injuries were in different zones and therefore the postoperative protocols would differ. How was this accounted for in the different studies? Also were all of the surgical procedures the same and the timing and details of the various postoperative protocols similar in the studies? As the authors state in the Discussion there was variation in the exact protocols instituted. In general, if the level of evidence is low and the surgical and postoperative details are different between studies, it is not clear to me that one should combine these data.** | Yes, table 2 does include all tendon repairs from all studies. We have now attempted to pull out some of the variables for further comparisons. **(new data)**  **? Add sentence in discussion of how protocols may differ based on zone of injury but how several papers implemented same protocol with different zones**  As we described extensively in the discussion it is impossible to standardize every article in a way for ideal data analysis, however we do think that the systematic data analysis of passive vs active rehabilitation contributes to a general understanding of outcomes and complications associated with each general protocol despite the multiple uncontrollable variables. | See Discussion |
| 8.      These studies spanned a 25 year period. Was any consideration given to changes in practice over that period of time? | Yes. This is discussed in the discussion. **We have now also compiled data on surgical technique and materials** | Lines 175-186 |
| 9.      The authors state in the Methods that 2 reviewers were used for the level of evidence. Was this also used for the review of articles and were there any disagreements? This should be reported in the Results. | Yes. This is already mentioned in Materials and Methods. Disputed articles were discussed and also reviewed by a 3rd senior author | Lines 70-71. |
| Discussion 10.     Line 184-196. The statements in these sentences are beyond the scope of this study and should be deleted. The final sentence should be added to the previous paragraph as the concluding statement. | **We disagree?** This systematic review proves that outcomes comparison is difficult for flexor tendon repair across the literature due to the various outcomes reporting methods. We provide an outline for standardizing this method and believe this is an important concept to take away from our study.  **Or just delete?** |  |
| Tables & Figures 11.     Table 2. The number of studies that were in each group should be stated. Also in the decreased range column, was any consideration given to reports of more than 1 tendon repair in the hand? There may be factors that contributed to decreased range and if 3 fingers were included from 1 hand this increases the combined frequency reported. | OK. **Have looked into data of multiple tendon repairs** | Table 2 now includes # of studies in each group |
| Reviewer 2: |  |  |
| line 97 - Move "in the 34 artilces reviewed" to the beginning of the sentence. | OK | Line 104. In the 34 articles reviewed, the rehabilitation protocols most commonly used were early mobilization with passive motion and early mobilization with active motion |
| Line 128-129 - OMIT | OK | Line 138. Omitted opening sentence of discussion |
| Line 131 - insert "various" before "early active motion protocols and omit "as well as" and replace with "and" | OK | Line 138-140. Analyzing all flexor tendon zones and literature of all levels of evidence, our study showed a higher risk of rupture in the various early active motion protocols (p=0.02) and a higher risk of decreased digit range of motion in the passive protocols (p<0.01). |
| Line 134 - reference Table 2 | OK | Line 142 (Ref Table 2) |
| Line 135- 144 - consider moving this paragraph to the beginning of the discussion section.  thereby making a better transition into the conversation of ruptures that occurs in the third paragraph. | OK | Moved paragraph to beginning of discussion. Now Lines 138-147 |
| Line 135 - Make this an active vs passive statement by OMITTING "As discussed in"  - So sentence will read as "Many of the papers in our review <discuss how> active motion protocols <aim to> increase early tendon excursion.... | OK | Line 138. Many of the papers in our review discuss how active motion protocols aim to increase early tendon excursion thus preventing adhesion formation and producing final outcomes of increased functional motion |
| Line 147 - change "Various" to "Many" or "Some" or don't quantify at all and replace "decribe" with "inconsistently report patient noncompliance" | OK | Line 155-157. Many studies inconsistently report patient noncompliance ruptures, which may provide a false representation of complications for the given protocol. |
| Line 172 - 173 - OMIT sentence begining with "biomechanical studies, along with...." This is not an article reviewing literature that compares 4 strand vs 2 strand repairs. Also this is also generally accepted and not necessary to include here. | OK | Deleted line 180-181.  Deleted reference 37 |
| Line 178 - combine sentences -- multitude of article variables including ....." | OK | Line 183-185. Determination of the optimal rehabilitation method via systematic analysis of a majority of level IV literature is difficult due to the multitude of article variables including patient population, injury pattern, surgical technique and materials, and rehabilitation modifications. |
| Line 179-180 - Omit "are major factors that incfluence functional outcomes and complications" | OK | Line 183-185. Determination of the optimal rehabilitation method via systematic analysis of a majority of level IV literature is difficult due to the multitude of article variables including patient population, injury pattern, surgical technique and materials, and rehabilitation modifications. |
| Line 180 - add "and therapist" after surgeon | OK | Lines 185-186. Other aspects of treatment such as surgeon and therapist experience and patient compliance may also contribute. |
| Line 181 - add "may" between compliance and also. | OK | Lines 185-186. Other aspects of treatment such as surgeon and therapist experience and patient compliance may also contribute. |
| Line 195 -196 - not sure what you mean here. | Subjective patient satisfaction improves with improved digit ROM. This has been reported in previous studies.  Revised sentence and cited Trumble et al | Line 201-202. Patient satisfaction should be reported in every study and will likely increase with improved digit motion (5). |
| Reviewer 3: |  |  |
| 1.Line 16: It is not clear if the authors are referring to Dynamic flexion protocols as in Kleinert's where the extension is active and the flexion is passive or the Duran protocol where both flexion and extension is fully passive.  Also, do you mean "fingers" with decreased range of motion instead of "tendons"? | We have grouped both Duran’s and Kleinert’s type protocols into passive range of motion protocols. Yes, “fingers” with decreased range of motion is what we mean. | Line 16-18. Early passive range of motion, including both Duran’s and Kleinert’s type protocols, results included 57 ruptures (3.57%) and 149 fingers with decreased range of motion (9.32%) out of 1598 total tendon repairs. |
| **2. Line 27: It is not clear how the authors came up with this specific conclusion. As the paper's hypothesis is not directed to evaluation of guidelines.** | **? delete** |  |
| 3. Line 63: In the abstract you have mentioned reviewing literature from 1980-2011 which is a 31 year span, but here you note 25 year interval. Please clear the discrepancy. | We have now explained why we chose 5-year intervals and also included 10-year interval analysis over the past 20 years in our methods and results section | Lines 95-99.  Lines 132-135. |
| 4. Line 72: It is not clear how the authors were blinded. Who blinded the authors? | Abstracts from the search were pasted into a document deleting journal, author & institution. After selection of the blinded abstracts by the authors, the corresponding article search number could be paired with the journal, author and institution from the original search. | Line 71-73. To prevent selection bias during review, abstracts from the search were numbered and pasted into a document after deleting publication journal, author & institution. |
| 5. Line: Did the authors also search under the keyword "finger" in addition to "hand" | The term “finger” returned fewer results than “hand” and did not maximize results including all zones of flexor tendon injury. We have added lines describing how our search was narrowed. Pertinent cited references were also searched for completeness | Line 73-77. |
| 6. Line 87: It is not clear what is meant by "passive". Does it include the Passive flexion and active extension or only the full passive protocol where the flexion and the extension of the finger are passive? | We have grouped both Duran’s and Kleinert’s type protocols into “passive” range of motion protocols. | Line 90-91. Early stage protocols were divided into immobilization, passive motion (including both Kleinert’s and Duran’s type protocols), active motion, and continuous motion for comparison purposes. |
| 7. Line 135: Please provide reference for this statement | OK | Line 142: (5,10,31,32,36) |
| 8. Line 144: Please provide reference for this statement. | OK | Line 149: (5) |
| 9. Line 163: Since the strength of the repair is not only dependent on the number of the strands crossing the repair but also on the size of the suture, please provide a comment on the suture sizes involved in the literature that is reviewed. | **Suture size data now included** |  |
| 10. Line 181: Another point to be noted is the experience of the therapist and other therapy related parameters like access, and compliance. | OK | Line 187-188. Other aspects of treatment such as surgeon and therapist experience and patient access and compliance may also contribute. |
| As a hand surgeon reading this article, I hope to see a better analysis of data for practical application including correlation of surgical and suturing technique, postoperative rehabilitation, and reported complication. Some of the important parameters not noted are: time from injury to surgery, size and material of the sutures used to repair the tendon, what portion of the patients actually received the prescribed therapy, and the night time splinting protocol. |  |  |