Author's response to reviews

Title: A New Lumbar Posterior Fixation System, the Memory Metal Spinal System. An In-vitro Mechanical Evaluation.

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Author's response to reviews: see over
Covering letter:

Editorial comments:

- Structure the abstract: The abstract has been structured according to the biomedcentral guidelines.
- Include a ‘Competing interests’ section: done
- Include an ‘Authors contributions’ section: done
- Include an ‘Acknowledgements’ section: done

Referee 1:

- Provide a figure of the devices assembled in plastic vertebral body models. See figure 2
- Cite the ASTM standard used for testing: See lines 131-132 + 214-224 in the manuscript.
- Please explain the reason for adapting a square cross-sectional shape of the rod for the device as opposed to circular section in the predicate device. How clinically relevant is this shape? See lines 148-149 in the manuscript.

Referee 2:

- I would suggest professional language editing before revision, there are some typographical and grammatical inconsistencies in the manuscript.: Despite the fact that the other reviewers found the quality of written English acceptable, we hired a professional language editor to make correction were necessary.
- The abstract is good, however I find the mini abstract difficult to read. There is no clear summary of findings and conclusions. Please rephrase: The abstract has been structured according to the guidelines and is rephrased. The mini abstract is deleted.
- In the introduction, at the end of the first section, the authors state “instrumented spinal fusion plays a major part (suggestion: “an important role”) in the development of adjacent segments degeneration” and they hypothesize that the more flexible memory metal may decrease this chance. Please clarify this hypothesis from the point of view that all systems offer support until fusion after approximately one year is obtained; after fusion I do not see any hypothetical benefit. See also end of introduction (line 146-147) where again is stated that with the memory metal “there should also be less degeneration of adjacent segments: We confirm that after fusion has been accomplished there is no longer a benefit
- Introduction, second section (line 109-110), the authors present the unilateral rod as an advantage to “facilitate a TLIF procedure, because the rod will not obstruct a TLIF cage”. In my hands I insert the cage prior to rod fixation and therefore I do not see this advantage: This potential benefit is absolutely totally dependent on the surgeon preference.
- M&M, first section on RODS. This is not entirely clear to me. Especially the first 6 sentences are hard to read or understand. Also the authors state, “The A was set between...” Explain where A stands for: The section has been rephrased and additional explanation is given. See lines 143-145
- M&M, last section. Not that pre-bent rods are in the meantime also available in the conventional systems with rounded titanium rods: Confirmed
M&M Connector Bridge. The first two sentences are difficult to understand. I would suggest that the authors present an illustration of the new device in the corpectomy model for clarity purposes: See figure 2.

M&M, section The titanium Moss Miami components. Please elaborate on the potential difference in cross-sectional thickness of the two rods studied (5.5 mm diameter titanium versus a 6.35mm square cross section (line 185) for the memory metal) and the consequence of influencing the parameters studied: We evaluated the mechanical properties of the new Memory Metal Spinal System compared to the Titanium Moss Miami Spinal System. This system has proven clinical efficacy and safety. The only available titanium rod in this system is 5.5mm.

Results. All sub sections should elaborate more on encountered differences between the two constructs and statistics should be included in the text: The statistics and differences are outlined in tables 1-3 and figures 3-5.

Discussion. See earlier; the discussion is too short and should also deal with potential use in future, limitations of the study, other literature on single rod systems etc etc.: The discussion has been modified.

As for Table 1 and table 2 I believe they do not add relevant information and I suggest to delete them: They are deleted.

Section on testing protocol. Mention in first sentence both spinal systems: The sentence has been rephrased (line 202).


Results section. As for Table 3 and figure 2 I do believe that the figure does not add much information and can be deleted. The same accounts for table 4 and figure 3 respectively: There is a new list of tables and figures.

Referee 3

I think this manuscript has no new information about Memory Metal Spine System. Authors did only basic biomechanical studies, and on the other hand, in 2011, Newton PO et al. have already reported a paper ‘Dual and single memory rod construct comparison in an animal study’ in Spine: We’re sorry to have to read that the article did not delight you. The article to which you referred is a comparison between a dual and single memory rod in creating deformity in an animal model. That was of course an interesting study. We on the other hand don’t think it is comparable to the objective in our study.

Referee 4

The manuscript is well designed and data is appropriate. We know that dynamic systems provoke bone fusion. This technique provides a new concept for dynamic system. Nitinol is used as a dynamic system to provide continuous loading on bone graft. Discussion and conclusion are well balanced and they are adequately supported by the data: Many thanks for your enthusiastic review.