Answering Reviewers

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Manuscript Type: BASIC STUDY

Manuscript Title: Sacroiliac Joint Stability: Finite Element Analysis of Implant Number, Orientation, and Superior Implant Length

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We would like to thank the reviewers for their comments and constructive feedback. Each of the comments (in italics) has been addressed in a point-by-point manner below. The manuscript has been modified (and changes tracked).

Reviewer ID 00505434

This is a resubmission of a well written manuscript describe a well conducted study. The authors edited/improved the manuscript according reviewers' comments. The limitations of the study discussed by reviewers are now well addressed in this updated version of manuscript. I recommend to accept to publish but with a condition that the authors need to agree to accept the following changes to abstract: "CONCLUSION: Using a validated finite element model we demonstrated that placement of 3 implants across the sacroiliac joint using a transarticular

orientation with superior implant reaching the sacral midline resulted in the most stable construct. Additional clinical studies may be required to confirm these results."

The abstract conclusion has been updated to per the reviewer's request.

Reviewer ID 02705018

This is an overall well conducted study which I believe is appropriate for publication with only one issue to be taken into consideration. More specifically I would be happy if in the discussion session the clinical meaning of this research was discussed in more details.

The discussion has been updated to include 3 ways in which a surgeon could optimize implant placement for SI joint fusion.

Reviewer ID 03069301

The authors deal with pelvic fractures in the introduction but nothing is said during the discussion. Also the paper should be carried out under different simulation of sacral fracture patterns. That would give a practical application of this study. Otherwise the paper is well conducted and performed.

The introduction section references a number of biomechanics studies that were focused on implant placement techniques for unstable pelvic fractures to detail the current state of the literature. This literature is the most pertinent background for the sacral safe zones and sacral bone quality that are applicable for performing SI joint fusion. Although pertinent, sacral fractures are a different indication than that of minimally invasive SI joint fusion which was studied here.

We agree that different simulations could be run for sacral fracture patterns, if desired, but that was not the focus of the current study.

Reviewer ID 02444715

Sacroiliac Joint Stability: Finite Element Analysis of Implant Number, Orientation, and Superior Implant Length a well written basic science paper with no clear evidence of its applicability in real clinical practice It can be published as a low priority, but the authors need to emphasize more on clinical significance in the discussion

The discussion has been updated to include 3 ways in which a surgeon could optimize implant placement for SI joint fusion. Also, the abstract has been updated to say, "Additional clinical studies may be required to confirm these results."