NOTICE: This document contains correspondence generated during peer review and subsequent revisions but before transmittal to production for composition and copyediting:

- Comments from the reviewers and editors (email to author requesting revisions)
- Response from the author (cover letter submitted with revised manuscript)*

**The corresponding author has opted to make this information publicly available.*

Personal or nonessential information may be redacted at the editor's discretion.

Questions about these materials may be directed to the *Obstetrics & Gynecology* editorial office: obgyn@greenjournal.org.

Date: 09/23/2022
To: "Ladin Yurteri-Kaplan" [redacted]
From: "The Green Journal" em@greenjournal.org
Subject: Your Submission ONG-22-1484

RE: Manuscript Number ONG-22-1484

Surgical Ergonomics: A Wellness & Workforce Issue

Dear Dr. Yurteri-Kaplan:

Thank you for sending us your work for consideration for publication in Obstetrics & Gynecology. Your manuscript has been reviewed by the Editorial Board and by special expert referees. The Editors would like to invite you to submit a revised version for further consideration.

If you wish to revise your manuscript, please read the following comments submitted by the reviewers and Editors. Each point raised requires a response, by either revising your manuscript or making a clear argument as to why no revision is needed in the cover letter.

To facilitate our review, we prefer that the cover letter you submit with your revised manuscript include each reviewer and Editor comment below, followed by your response. That is, a point-by-point response is required to each of the EDITOR COMMENTS (if applicable), REVIEWER COMMENTS, and STATISTICAL EDITOR COMMENTS (if applicable) below.
The revised manuscript should indicate the position of all changes made. Please use the "track changes" feature in your document (do not use strikethrough or underline formatting).

Your submission will be maintained in active status for 21 days from the date of this letter. If we have not heard from you by Oct 14, 2022, we will assume you wish to withdraw the manuscript from further consideration.

EDITOR COMMENTS:

Please note the following:

* Help us reduce the number of queries we add to your manuscript after it is revised by reading the Revision Checklist at https://journals.lww.com/greenjournal/Documents/RevisionChecklist_Authors.pdf and making the applicable edits to your manuscript.

* Figures 1-3: Please resubmit figures as they appear unless changes are requested by Stats Editor.
* Figures 4-7: Please provide a letter of permission from the Mayo Clinic for print and online use.

REVIEWER COMMENTS:

Reviewer #1:
Intro Summary:
This paper discussed the relevance of surgical ergonomics. The subject is of high importance considering the attrition of gynecologic surgeons over the next few decades and the paucity of discussion within physician wellness. The authors make a good case for focusing on this issue.

Novelty:
There have not been many publications in the gynecologic literature that have focused on this topic. It is practical and impacts the way we train residents and take care of our surgeons. This article makes the case that research is sorely needed in gynecology.

Intro/Background:
- I enjoyed the short vignettes at the beginning but would omit the cesarean section as this paper focuses on gynecologic surgery (lines 33-35) or if the authors would like to include it, they need to add more content about obstetrics
- Please convert numbers 1-9 into words ie: 1 = one.
- A general statement of application to gynecologic surgeons might help build context for this paper. As it currently

stands, it makes general statements about all surgeons. Consider adding the capitalized portion to Line 37 "The above cases illustrate very real scenarios that confront GYNECOLOGIC surgeons. . ."

Work-related MSK disorders in healthcare
- Lines 49 and 50: be consistent with "work-related". Sometimes hyphenation is present, sometimes not.
- Line 59: perhaps add "holding non-ergonomic positions"
- Line 66: "surgical specialties"
- Line 73-74: awkward sentence, perhaps ". . .with little regard to the well-being of a surgeon, as demonstrated by under-reporting of injuries"
- Line 83-84: I'm not sure of the significance of the italicized portion or why it excludes 'design'.

Gyn Surgery section
- Line 93-94: please add a citation to the sentence with the 8% rate.
- Line 96: are the explanations attributed to the study or to this author's interpretation of the study? If part of the conclusions from the cited authors, I would move the citation to the end of the sentence.
- Line 104-105: This sentence is awkward. "unique to vaginal surgery"
- Line 110-113: Sentences are a bit redundant, could combine into one.
- Line 114-115: Awkward sentence. Please revise. Consider "but are widely applicable." Instead of "but are not specific to these fields."
- Line 123: Robotics is laparoscopy. I would rephrase to match traditional and robotic assisted laparoscopy, which is used in this paper.
- Line 125-129: After review of reference #17, this sentence is nearly identical to the abstract, but the changes the authors did make altered the findings (or made it more confusing). The reference is still relevant to this paper. Please re-write for clarity and in your own words.
- Line 130: Add 's' to lead?
- Line 137: Conventional or robotic-assisted, or both?
- Line 141-144: Please cite the multiple studies referenced in this sentence.
- Line 155: Please spell out the acronym RULA

Surgical Ergonomics is a Wellness & Workforce Issue section
- This section was extremely informative and the figures were clear.
- Lines 183-184: "ABC - Always Be Clutching" needs a bit more explanation. The acronym does not seem to be from the cited reference (#28); however, the authors in the paper do discuss the importance of using the clutch system to continually adjust the ergonomics.
- Line 200-201: Change of tense from past to present in this sentence and missing 'at' in front of Memorial Sloan Kettering.
- Line 207-208: Please reword - this sentence is difficult to read.
- Line 232: What does "SCORE" stand for? Or perhaps just state that ABS built ergonomics into their residency training curriculum standards.

Significance:
The authors make several compelling points regarding the need for physicians and administrators to recognize the physical strain caused by surgery. This article has the ability to alter practice.

Presentation
The figures are central to this paper and very much help the reader understand what the appropriate positions ought to be. The vaginal surgery figures are different than the open/laparoscopic/robotic figures. They omit the ideal degrees of flexion/extension, which are so clearly labeled on figures 4-6. Vaginal surgery is unique to our specialty and this information would be very helpful to the readership.

Reviewer #2: This commentary addresses the ergonomics of gynecologic surgery.

The article begins with 5 cases in which a gyn surgeon suffers a physical injury. I don't believe these cases enhance the article. If they are to be included, I would suggest that the authors could clarify the injury (for example, instead of "tendon injury", give a medical diagnosis that specifies the injury type and the specific tendon and explain how that injury would be incurred by the activity described).

The sections of the article that are strongest are those that provide specific information about the positions or activities of surgeons most likely to cause injury and those that provide specific recommendations for improved safety. Much of this information is found from lines 166 through 214.

I think the section "Work-related musculoskeletal disorders in healthcare" could be shortened and improved:
* Lines 48-62 could be eliminated.
* "The healthcare industry has one of the highest rates…." This does not acknowledge the variety of types of injuries, including biological and chemical exposures. Can the authors provide information specific to musculoskeletal injuries? If

not, these data may not be highly relevant to the topic of this commentary.
* In some cases, I found the language was not precise regarding published observations. Examples:
o Lines 74-76: "In one study, only 20% of surgeons reported their injury to their institution despite performing few operations during recovery from the injury". The article indicates that one third of surgeons who were injured "performed FEWER operations while they were recovering from their injury".
o Line 91 "Vaginal surgeons had one of the highest reported WMSD prevalence….": The work cited was a survey of vaginal surgeons without a comparison group.
o Lines 92-3 "WMSD caused 14% to miss work or modify work hours or surgical schedules…" I believe this was 14% of those reporting work-related MSDs.

Readers will probably recognize that some musculoskeletal injuries experienced by surgeons may not be attributed to performing surgery. For example, a certain number of musculoskeletal injuries would be expected among aging adults. Musculoskeletal injuries may be incurred during leisure activities or in other workplace settings. (And certainly there are jobs that expose workers to significant risks of musculoskeletal injuries.) Are there any studies that compare the incidence of musculoskeletal injuries among surgeons to other adults of similar age and health status? Or to non-surgical physicians? If not, the authors might consider acknowledging this perspective.

Open surgery could include cesarean delivery. Can any comments be made?

Given that the authors suggest the perspective (line 43) of the "surgeon as a high performance athlete", are there lessons from athletics that could be considered? Should surgeons "train" for the physical requirements of surgery? The authors may want to consider this citation, which includes some links to videos:
Stretching and Strength Training to Improve Postural Ergonomics and Endurance in the Operating Room.
Winters JN, Sommer NZ, Romanelli MR, Marschik C, Hulcher L, Cutler BJ.Plast Reconstr Surg Glob Open. 2020 May 13;8(5):e2810. doi: 10.1097/GOX.0000000000002810.

Some of the comments in the manuscript suggest that the surgeon is helpless and a victim of the OR environment. (For example, line 40: "little to no attention is placed upon the price a surgeon may pay to perform often delicate work" or lines 58-59: "Operating room conditions are often harsh, due to non-ergonomic positions for long periods of time without rest….") But I believe most other members of the team regard the surgeon as having the most opportunity to influence the OR environment. I don't think that any other member of the team has as much control of the environment in the OR as the surgeon. I wonder if the focus of the article could be on what we, as surgeons, can do to protect ourselves (and our team members). As written the implication of much of the text is that the surgeon is as powerless as the factory worker.

The figures illustrating best practices for surgeon position are very helpful.

I think they could make more specific suggestions about a curriculum of ergonomic education in residency training. Such an educational program could be very valuable and impactful if taught correctly and based on high-quality evidence.

The suggestions in the table are very helpful. Could these suggestions be linked to references?

Additional considerations:
Please streamline wording and content to improve ease of reading.

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Vivian W. Sung, MD, MPH
Deputy Editor, Gynecology–Elect

The Editors of Obstetrics & Gynecology

Dear Editors and Reviewers,

Thank you for taking the time to review our manuscripts. We have addressed each of the comments below.

Editors Comments:

* Figures 1-3: Please resubmit figures as they appear unless changes are requested by Stats Editor. *Watermark required until acceptance of manuscript. Then can send without watermark.*

* Figures 4-7: Please provide a letter of permission from the Mayo Clinic for print and online use. *The current real life pictures are owned by Dr. Yurteri-Kaplan. The cartoon pictures were created by our illustrators at Cleveland clinic. Once manuscript accepted we can send final art along with copyright license..*

Reviewer comments:

Reviewer #1

Intro/Background:

- I enjoyed the short vignettes at the beginning but would omit the cesarean section as this paper focuses on gynecologic surgery (lines 33-35) or if the authors would like to include it, they need to add more content about obstetrics.
  We have excluded the obstetric vignette.
- Please convert numbers 1-9 into words ie: 1 = one.
  Can you please clarify where in the background numbers are used? Please direct us to the line.
- A general statement of application to gynecologic surgeons might help build context for this paper. As it currently stands, it makes general statements about all surgeons. Consider adding the capitalized portion to Line 37 "The above cases illustrate very real scenarios that confront GYNECOLOGIC surgeons. . ."
  We have added "gynecologic" as recommended.

Work-related MSK disorders in healthcare:

- Lines 49 and 50: be consistent with "work-related". Sometimes hyphenation is present, sometimes not.
  This has been changed to be consistent throughout the manuscript.
- Line 59: perhaps add "holding non-ergonomic positions"
  Thank you for the recommendation but holding seems a bit awkward of a word here. We considered adding "performing static non-ergonomic positions for long period of time" but that seems redundant given static is a long period of time and inherently you hold or perform a position.
- Line 66: "surgical specialties"
  Thank you for highlighting this. It was changed.
- Line 73-74: awkward sentence, perhaps ". . .with little regard to the well-being of a surgeon, as demonstrated by under-reporting of injuries"
  This has been changed.

- Line 83-84: I'm not sure of the significance of the italicized portion or why it excludes 'design'.
  Thank you changes have been made. Also added "physical work environment to fit the work, instead of forcing the worker to fit the working environment."

Gyn Surgery Section:

- Line 93-94: please add a citation to the sentence with the 8% rate.
  Added the citation.
- Line 96: are the explanations attributed to the study or to this author's interpretation of the study? If part of the conclusions from the cited authors, I would move the citation to the end of the sentence.
  The first portion of the sentence was cited because it comes from the study, while the second part of the sentence is our opinion.
- Line 104-105: This sentence is awkward. "unique to vaginal surgery"
  Thank you for recommendation. We edited to state "In vaginal surgery, the surgeon can…"
- Line 110-113: Sentences are a bit redundant, could combine into one.
  This was changed.
- Line 114-115: Awkward sentence. Please revise. Consider "but are widely applicable." Instead of "but are not specific to these fields."
  Thank you change made.
- Line 123: Robotics is laparoscopy. I would rephrase to match traditional and robotic assisted laparoscopy, which is used in this paper.
  Thank you change made.
- Line 125-129: After review of reference #17, this sentence is nearly identical to the abstract, but the changes the authors did make altered the findings (or made it more confusing). The reference is still relevant to this paper. Please re-write for clarity and in your own words.
  Thank you change made.
- Line 130: Add 's' to lead?
  Thank you change made.
- Line 137: Conventional or robotic-assisted, or both?
  Traditional laparoscopy. Clarification made.
- Line 141-144: Please cite the multiple studies referenced in this sentence.
  Citation added
- Line 155: Please spell out the acronym RULA
  Added Rapid Upper Limb Assessment (RULA)

Surgical Ergonomics is a Wellness & Workforce Issue section:

- Lines 183-184: "ABC - Always Be Clutching" needs a bit more explanation. The acronym does not seem to be from the cited reference (#28); however, the authors in the paper do discuss the importance of using the clutch system to continually adjust the ergonomics
  Clarification added.

- Line 200-201: Change of tense from past to present in this sentence and missing 'at' in front of Memorial Sloan Kettering
  The program was implemented in the past and resulted in 88% changing their practice and 74% improving strain that occurred. The implementation and change occurred in the past. We did include 'at'.
- Line 207-208: Please reword - this sentence is difficult to read.
  Thank you we have reworded this sentence.
- Line 232: What does "SCORE" stand for? Or perhaps just state that ABS built ergonomics into their residency training curriculum standards.
  Removed SCORE.

Presentation

- The figures are central to this paper and very much help the reader understand what the appropriate positions ought to be. The vaginal surgery figures are different than the open/laparoscopic/robotic figures. They omit the ideal degrees of flexion/extension, which are so clearly labeled on figures 4-6. Vaginal surgery is unique to our specialty and this information would be very helpful to the readership.
  We have added text to the vaginal surgery figures. We have also added more cartoon depictions showing incorrect ergonomic positioning along with correct ergonomic positioning.

Reviewer #2

- The article begins with 5 cases in which a gyn surgeon suffers a physical injury. I don't believe these cases enhance the article. If they are to be included, I would suggest that the authors could clarify the injury (for example, instead of "tendon injury", give a medical diagnosis that specifies the injury type and the specific tendon and explain how that injury would be incurred by the activity described).
  The prior review enjoyed the vignettes and we believe they set the stage for the discussion. We have included the medical diagnosis and injury.
- Lines 48-62 could be eliminated.
  We have shortened based on your comment and removed redundancy while maintaining some critical points.
- "The healthcare industry has one of the highest rates…." This does not acknowledge the variety of types of injuries, including biological and chemical exposures. Can the authors provide information specific to musculoskeletal injuries? If not, these data may not be highly relevant to the topic of this commentary.

  This statement was made from data found on U.S. Occupational Safety and Health Administration website and does not break down the type of injuries occurring in the 582,800 cases: musculoskeletal injuries vs. biologic or chemical exposure. We believe it is still important to highlight because it does include WMSD and does give some sense of the problem.

- Lines 74-76: "In one study, only 20% of surgeons reported their injury to their institution despite performing few operations during recovery from the injury". The article indicates that one third of surgeons who were injured "performed FEWER operations while they were recovering from their injury".
  Thank you for your comment, the statement was correct to accurately reflect the studies findings.
- Line 91 "Vaginal surgeons had one of the highest reported WMSD prevalence….": The work cited was a survey of vaginal surgeons without a comparison group.
  Thank you for identifying this discrepancy. The statement has been corrected.
- Lines 92-3 "WMSD caused 14% to miss work or modify work hours or surgical schedules…" I believe this was 14% of those reporting work-related MSDs.
  Thank you the statement has been corrected.
- Readers will probably recognize that some musculoskeletal injuries experienced by surgeons may not be attributed to performing surgery. For example, a certain number of musculoskeletal injuries would be expected among aging adults. Musculoskeletal injuries may be incurred during leisure activities or in other workplace settings. (And certainly there are jobs that expose workers to significant risks of musculoskeletal injuries.) Are there any studies that compare the incidence of musculoskeletal injuries among surgeons to other adults of similar age and health status? Or to non-surgical physicians? If not, the authors might consider acknowledging this perspective.
  Our article focuses on WMSD in gynecologic surgeons. When we did a search, there were no studies comparing incidence of WMSD in gynecologic surgeons to other surgical specialties, non-surgical physicians, or age matched adults. We will add a statement regarding the anticipated natural wear and tear that may occur with age and outside activity.
- Open surgery could include cesarean delivery. Can any comments be made?
  While cesarean deliveries are included in open surgery there if very little data on this for us to report on. We will focus only on gynecologic surgery for this manuscript.
- Given that the authors suggest the perspective (line 43) of the "surgeon as a high performance athlete", are there lessons from athletics that could be considered? Should surgeons "train" for the physical requirements of surgery? The authors may want to consider this citation, which includes some links to videos: Stretching and Strength Training to Improve Postural Ergonomics and Endurance in the Operating Room.
  Winters JN, Sommer NZ, Romanelli MR, Marschik C, Hulcher L, Cutler BJ.Plast Reconstr Surg Glob Open. 2020 May 13;8(5):e2810. doi: 10.1097/GOX.0000000000002810.
  This is a wonderful article with helpful videos and we included this at the end of Surgical Ergonomics is a Wellness & Workforce Issue prior to future directions.
- Some of the comments in the manuscript suggest that the surgeon is helpless and a victim of the OR environment. (For example, line 40: "little to no attention is placed upon the price a surgeon may pay to perform often delicate work" or lines 58-59: "Operating room conditions are often harsh, due to non-ergonomic positions for long periods of time without rest….") But I believe most other members of the team regard the surgeon as having the most opportunity to influence the OR environment. I don't think that any other member of the team has as much control of the environment in the OR as the surgeon. I wonder if the focus of the article could be on what we, as surgeons, can do to protect ourselves (and our

team members). As written the implication of much of the text is that the surgeon is as powerless as the factory worker.
We do not believe the surgeon is a victim rather we are hoping to shine a spotlight on a problem that many of us do not acknowledge but suffer from. As a society we need to shift the paradigm to address WMSD as a real issue and make a change starting with the surgeons. Also we need to teach ourself and future generations how to protect ourselves from these real injuries.

- I think they could make more specific suggestions about a curriculum of ergonomic education in residency training. Such an educational program could be very valuable and impactful if taught correctly and based on high-quality evidence.
  We have included the 4 parts that we believe should be included in the curriculum in our closing statements.
- The suggestions in the table are very helpful. Could these suggestions be linked to references?
  References have been added.
- Please streamline wording and content to improve ease of reading.
  Thank you for your comment, we have streamlined.