

Peer Review File

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Response to Reviewer A

Comment 1: Your analysis shows that augmented reality and robotics will likely be hot topics in the future. How about AI? I have also come across a lot of AI-based research for various applications such as surgical planning, robot assistance, etc. I am curious why nothing about AI came up evidently in your database.

Reply 1: Thank you for pointing out the importance of artificial intelligence (AI) in surgical techniques. After checking the keyword analysis results and the original data, we found that the keyword “artificial intelligence” first appeared in the past five years and appeared less frequently. In addition, papers involving AI have fewer citations and weaker centrality. The reason for this phenomenon may be the defects of the bibliometric analysis itself. We have further elaborated in the discussion section.

Changes in the text: We discussed the reason for the absence of “artificial intelligence” in Section 4.3. “Last, recent literature might not receive sufficient attention due to its recent publication and the consequent lack of citations. For instance, AI is developing rapidly with high value, and it has a wide application potential; however, the keyword “artificial intelligence” first appeared in the year 2020 and received less attention due to its novelty.” (page 16, line 397-399)

Comment 2: Line 96 - Two independent authors (XXX) verified the title and abstract of publications. Does XXX need to be replaced?

Reply 2: Thank you for your comment. The real author names were replaced with “XXX” by the editorial office to conduct a double-blind peer review and will be restored in the final version.

Changes in the text: None. “XXX” will be replaced in final production.

Comment 3: Line 159 - ... and the top 10 of them was listed in Table 2. It should be "are" listed in Table 2. I recommend checking the grammar and tense of the full article. Similarly, in line 220, it should be "researchers" should be actively encouraged.

Reply 3: Thank you for your kind review. We sincerely apologize for our grammatical and tense errors in the manuscript. We have tried our best to polish the language in the revised manuscript already.

Changes in the text: We modified our text as advised (page 9, line 184). And the tense of the full article was checked and corrected. The changes were marked in red in the tracked version.

Comment 4: I understand that you have listed the limitation of the data source being only from a single database, but can you explain why the authors decided to use only one source and not include any other source?

Reply 4: Thank you for giving us the opportunity to clarify this point. In this study, we chose to use only a single database based on these considerations: first, the literature provided by Web of Science Core Collection (SCIE) is highly representative and reliable with high quality; second, using a single source can maintain the consistency and comparability of the studies; third, using a single source does not have inconsistent format and duplicate record issue.

Changes in the text: We explained the reason why we chose Web of Science Core Collection as our single data source in Section 4.3. "The study utilized WOSCC database, a highly authoritative and widely recognized database, ensuring the reliability and accuracy of research results through high-quality literature data. This also maintained consistency as well as comparability of our study, and avoided inconsistent format and duplicate record issues." (page 15, line 378-381)

Comment 5: *It has been mentioned in the introduction that no bibliometric studies have addressed 3D technology in prostatectomy. However, there have been other reviews for 3D technology in prostatectomy. Please include a summary of what those reviews have done and what the gap is being filled by your bibliometric study.*

Reply 5: Thank you for your valuable suggestion. We have added a section to the manuscript summarizing the main findings of existing reviews and clearly pointing out the specific knowledge gaps filled by this bibliometric study.

Changes in the text: We added a section at the end of the introduction to summarize the reviews of 3D technology in prostatectomy. “To date, there were only reviews on the 3D technology in prostatectomy. Most of them only focused on a single specific topic such as 3D surgical guidance, 3D printing models, or 3D virtual models, but hardly provided an overall or dynamic view of this field.” (page 6, line 96-98)

Response to Reviewer B

Comment 1: *Novelty and Relevance: While the topic is novel, the bibliometric focus is somewhat narrow and lacks a comprehensive comparison with related fields like 3D visualization in other surgical procedures. The authors should better justify why this study adds value beyond isolated statistics.*

Reply 1: Thank you for your recognition of the novelty of our study. We agree that the study has a narrow focus, and we sincerely apologize for this. We have added comparison with other 3D visualization technologies in surgical procedures in the revised version to more fully demonstrate the value and contribution of this study. In addition, we have added a section in the introduction section to show the knowledge gap and the value of bibliometric study.

Changes in the text: We have added the following section in introduction section: “To date, there were only reviews on the 3D technology in prostatectomy. Most of them only focused on a single specific topic such as 3D surgical guidance, 3D printing

models, or 3D virtual models, but hardly provided an overall or dynamic view of this field. No bibliometric studies have addressed 3D technology in prostatectomy.” (page 6, line 96-98) We also compared with the application of 3D technology in other surgical fields. “3D technology is widely used in other surgeries. In the field of cardio-thoracic disease, 3D printing significantly improves surgical planning and precision, thereby improving patient outcomes during complex surgeries. A bibliometric study on plastic surgery found that 3D printing, AR, and virtual reality have broad prospects in surgical training and planning; in addition, computer numerical control processing of 3D models has the advantage of higher processing accuracy. In the field of liver cancer resection, 3D technology is receiving increasing attention; 3D printing, 3D CT and 3D reconstruction is the mainstream of current research, and AR may trend in the future. Compared with other fields, research on prostatectomy is also related to information technology, but less in the field of materials science.” (page 15, line 368-376)

Comment 2: To make your methodology clearer and more organized, I recommend creating a table.

Reply 2: Thank you for your kind suggestion. We have replaced the methodology supplementary document with a more structured methodology table in “Supplementary Table S1”.

Changes in the text: No changes in the main manuscript text. “Supplementary Table S1” was updated to a methodology table and was re-uploaded.

Comment 3: The visualizations lack meaningful insights. The collaboration networks are too sparse, and the discussion does not explain the implications of weak or strong clusters. Provide more qualitative interpretation of the collaboration data, such as identifying gaps or opportunities for cross-institutional collaboration. Although keyword bursts and reference clusters are presented, the analysis seems descriptive rather than interpretative.

Reply 3: Thank you for your valuable comment. We have added a supplementary figure to further illustrate the author collaboration network. We have provided more qualitative analysis of weak or strong clusters, identifying gaps and opportunities for cross-institutional collaboration. We have also provided more in-depth explanations of keyword bursts and citation clusters, discussing the implications of these trends for future field directions and possible applications.

Changes in the text: “**Supplementary Figure S1**” was added to present a detailed view of the top clusters of authors. We have modified the general information section of discussion: “Interestingly, our institutional analysis revealed that American research institutions lead in terms of the number of published articles, while both European and American institutions dominate the top positions in centrality. On the contrary, the Asia-Pacific region and South American countries are not active enough in international cooperation, and African countries have very few publications, probably due to lack of resources. This demonstrates the creativity and leadership of the American and European institutions in this field, but also shows the urgent need for other countries to join in the collaboration. It is recommended to carry out more cross-institutional cooperation projects or promote cooperation through policy support and financial investment.” (page 11, line 277-284) We have further discussed cluster and bursts. “The use of 3D printed models has been shown to improve the psychological preparedness and comprehension of their condition of patients undergoing prostatectomy. The implementation of AR in conjunction with 3D printing further enhances surgical planning, which can be particularly beneficial in complex cases, especially in prostatectomy. And the surgical planning process also plays a crucial role in the training of surgical residents, by minimizing the learning curve associated with laparoscopic prostatectomy.” (page 12-13, line 305-322) “The role of multimodal approaches in the treatment of prostate cancer is shown in combining surgery with adjuvant radiotherapy, particularly in patients exhibiting adverse pathological features post-surgery. 3D-CRT enables clinicians to deliver higher radiation doses to the tumor while protecting adjacent organs at risk, and the precision of 3D imaging techniques helps better

treatment planning and execution, which is essential for optimal therapeutic outcomes.” (page 13, line 326-330) “One of the applications of AR in robotic-assisted radical prostatectomy is its use in guiding intraoperative frozen section analysis. By employing AR, surgeons can visualize the real-time location of the tumor in relation to surrounding tissues, which helps in making immediate decisions about the area of tissue removal. This capability not only enhances the accuracy of the procedure but also minimizes the risk of leaving residual cancerous tissue, which is critical for improving oncological outcomes. The improved precision provided by AR and robotic technologies can reduce the occurrence of postoperative complications, which are often costly and can prolong admission time.” (page 14, line 356-363)

Comment 4: Phrases like "provides valuable insights" and "promising development prospects" are overused without specifying the actual contributions or findings. Some figures, such as co-citation networks, are overcrowded and difficult to interpret. Additionally, certain key metrics (e.g., citation distribution over time) are presented without context.

Reply 4: Thank you for pointing this out. We apologize for confusing you that our expressions were not appropriate and the figures that were illustrated improperly. We have reduced the use of generic phrases and instead specified the actual contributions and findings of the research. We have optimized the figure layout of some figures to ensure clarity, and we have provided detailed explanations for each visualization to enhance its information value.

Changes in the text: The generic phrases were replaced, and the corresponding sentences were revised. “Therefore, 3D technology is in the developing stage, and is utilized increasingly in the field of radical prostatectomy.” (page 8, line 162-163) “Furthermore, by highlighting the current research frontiers and trends, as well as highly productive researchers and institutions, the study can help scholars better plan future research directions and help them find potential collaborators, thereby enhancing

the applicability and impact of its findings.” (page 15, line 318-383) “Our study illustrated the development trends and main contributors of 3D technology in prostatectomy, which may provide a reference for researchers, research institutions, medical facilities, and policy makers.” (page 16, line 407-409) The figure for co-citation reference and keywords were re-plotted to ensure clarity. (Figure 6A and 8A now) The author distribution over time and citation distribution over time were now presented. “Figure 5B shows the changes in author activity over time, with the color of the node indicating the approximate period of their research activity. Nodes colored purple signify periods of early activity, while those colored yellow indicate more recent activity.” (page 9, line 201-203) “The network diagram of co-cited articles can be seen in Figure 6A, where earlier cited articles are colored purple or blue, while the latest cited articles are colored red or orange, and articles with citations greater than 10 times are tagged on the diagram.” (page 10, line 234-236)

***Comment 5:** The article does not compare findings with bibliometric studies in adjacent fields (e.g., robotics in general surgery or 3D printing in oncology).*

Reply 5: Thank you for your valuable recommendation. We have added a section of bibliometric studies with adjacent fields to compare similarities and differences with prostatectomy-related studies.

Changes in the text: We have added comparisons with adjacent fields. “3D technology is widely used in other surgeries. In the field of cardio-thoracic disease, 3D printing significantly improves surgical planning and precision, thereby improving patient outcomes during complex surgeries. A bibliometric study on plastic surgery found that 3D printing, AR, and virtual reality have broad prospects in surgical training and planning; in addition, computer numerical control processing of 3D models has the advantage of higher processing accuracy. In the field of liver cancer resection, 3D technology is receiving increasing attention; 3D printing, 3D CT and 3D reconstruction is the mainstream of current research, and AR may trend in the future. Compared with

other fields, research on prostatectomy is also related to information technology, but less in the field of materials science.” (page 15, line 368-376)

Comment 6: The limitations section is weak and focuses mostly on language restrictions. Other important limitations, such as potential citation bias and the impact of recent publications receiving fewer citations, are not adequately discussed.

Reply 6: Thank you for giving us the opportunity to clarify this point. We apologize for the over simplistic limitation section. We have expanded the limitations section to discuss not only language limitations but also potential citation bias and the impact of fewer citations in recent publications.

Changes in the text: We have expanded the second and the last point of the limitation section. “First, the data source is limited to a single database, which does not fully cover all articles in this field. In future studies, after data standardization and deduplication, we will integrate data from multiple databases (such as Scopus, PubMed, and Google Scholar) to capture a wider range of relevant literature. Second, the inclusion is restricted to English-language original articles and review articles, thereby overlooking significant literature in other languages, and also excluded letters or meeting papers with possibly latest findings.” (page 15-16, line 384-396) “Last, recent literature might not receive sufficient attention due to its recent publication and the consequent lack of citations. For instance, AI is developing rapidly with high value, and it has a wide application potential; however, the keyword “artificial intelligence” first appeared in the year 2020 and received less attention due to its novelty.” (page 16, line 397-400)

Comment 7: The search terms are vague (“3D” OR “three-dimensional”), which may capture irrelevant studies and miss specific terms like “robot-assisted prostatectomy.”

Reply 7: Thank you for your comment. We are sorry for some inappropriate search terms. However, our current revision time is insufficient to complete the re-search and

analysis, and we sincerely apologize for this and will pay attention to the clarity of the search terms in future studies. We used the “Title-Keyword-Abstract” searching method to include only the relevant studies, which can reduce the influence of the vague terms. We also add a section to explain the exclusion of other publication types.

Changes in the text: We have added a sentence to illustrate the “Title-Keyword-Abstract” searching method” in the method section. “The search terms “(3D OR three-dimensional) AND (prostatectomy OR prostatectomies)” were used to search the Web of Science Core Collection (WOSCC) database in the form of title (TI), abstract (AB), and author keywords (DE), to improve search precision and obtain more accurate search results related to our research topic.” (page 6, line 106-107) We also explained the reason for exclusion of other publication types. “The inclusion criteria are used by the need for consistency, reliability, and relevance in the data being analyzed, because these document types typically present comprehensive findings and discussions that are essential for understanding the research landscape.” (page 6, line 109-112)