Opponent's Report on PhD thesis public defense

Yuqi He: "Biomechanical exploration of lower extremity injury mechanism during table tennis topspin forehand and implication for skills optimization and motor control"

Opponent: Dr. Singh Tej

I. Structural aspects

The dissertation was written in the English language. The structure adheres to the guidelines set out by the Doctoral School of the University of Pannonia. The full length of the work is 136 pages. The thesis has a clear structure, with distinct sections such as introduction, material and methods, results and discussion followed by limitations and conclusions. The thesis is well-structured with clear and informative section titles that help the reader comprehend the order of the content. The thesis exhibits a coherent and rational progression of material, beginning with the introduction of the research topic and then presenting the methodology, results, and discussions. The use of subsections within major sections enhances the logical organization of content. Ideas and concepts are presented coherently, with smooth transitions between sections and paragraphs. The use of clear and concise language contributes to the overall coherence of the thesis. The introduction effectively sets the stage for the research, introducing the problem and the motivation for the study. The background information provides context for the reader, creating a foundation for the subsequent sections. The incorporation of citations and references enhances the credibility of the literature review. The materials and method section is detailed and well-explained, providing clarity on the research design, data collection, and analysis procedures. The inclusion of equations and tables adds to the transparency of the research methodology. The presentation of results is clear, with tables and figures effectively illustrating the data. The analysis is thorough, with appropriate statistical methods contributing to the robustness of the findings. The discussion section logically interprets the results and relates them back to the research questions. Conclusions are drawn based on the evidence presented, providing a succinct summary of the key findings.

Overall, Theses structured into 4 main sections and no annex added. The number of figures is 38, table 15. The whole text and figures are clear and understandable. I had no problem with the figures, tables, and context. The references in the text are precise and correct.

The author mentions 13 publications from this thesis, from which 8 in peer-reviewed journals, and 4 at Q1 level.

II. Contextual aspects

The topic of the dissertation is up-to-date. Table tennis holds significant importance in various aspects, ranging from physical health to social and cognitive benefits. Table tennis, particularly the execution of the topspin forehand, involves complex and rapid movements that place significant demands on the lower extremities. Understanding the biomechanical mechanisms of injury during this stroke is crucial for optimizing skills and motor control, thereby preventing injuries and enhancing performance. By focusing on biomechanical analysis, technique refinement, strength and conditioning, players can enhance their skills while minimizing the risk of injury. In this work author used experimental and analytical approaches ensuring not only better performance but also longevity in the sport.

III. Scientific thesis points

1. **I accept the 1st thesis point.** Author claimed that the highest peak pressures appear in the medial-lateral rear foot and the lateral forefoot during the backward phase if one-step movement is considered. Concerning the chasse-step, the most dangerous area for possible injury was found to be the toe during the forward phase.
2. **I accept the 2nd thesis point.** Author developed and produced portable cryotherapy equipment for the recovery of lower limb fatigue in professional table tennis players. The statement based on the results from the 24 hour post-intervention, the effect of cryotherapy on dynamic balance recovery was significantly better than no cryotherapy.
3. **I accept the 3rd thesis point.** Author claimed the first to report a complete kinematic and kinetic description of the lumbar movement

concerning cross-court and long-line topspin forehand using computational simulation and experiments.

Statement

This PhD work proves a lot of new scientific results; all the required changes advised by the reviewers are now included in the dissertation; peer-reviewed journal publications support the findings/results thus I suggest presenting this dissertation to the public defense.

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Place: Szombathely, Hungary

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