

Editorial

Editorial: Joint Congress on Mechanical vibration and technological innovation in health (MEVITIH-2023): perspectives.

Taiar, R.¹

¹MATériaux et Ingénierie Mécanique (MATIM), Université de Reims Champagne Ardenne, F-51100 Reims, France; redha.taiar@univ-reims.fr;

Introduction

In this second issue of volume 1 of the Brazilian Journal of Mechanical Vibrations in Biosciences (BJMVB), the question concerning how the human body functions through the applications of the mechanical vibration and technological innovations in health was addressed. The management of human movements requires the control of different body segments which can be coordinated in multiple ways to perform a defined task. The way that the biological system functions in relation to human movement is particularly complex. Therefore, this requires a deep understanding of the interactions between physical sciences (metrology), sciences and technologies of information, and sciences of life (materials, fabrics, organs, and members). The purpose of this second issue (SI) is to specify the principles of physiology, functional anatomy, and mechanics to explore and understand biological problems by understanding the impact of the mechanical vibration and technological innovations in health. The researchers' objective for this SI was to summarize the most important parameters influencing human performance, in relation to health sciences in the lives of people from all age groups. In this second issue, the researchers were inspired by journal papers that aimed to promote the latest research in the fields of health, quality of life improvement, and sport rehabilitation, and to highlight the recent recommendations on the impact of mechanical vibration and technological innovations in health. This will help to prevent functional decline and frailty throughout the course of life. This prevention is in the form of a perspective approach via the utilization of the latest research applied in general health and it targets all stages of life. In addition, contributions to this SI aimed at prevention, improved performance, the management of diseases, modelization, simulation, quantification, and the computation of the musculoskeletal system, thus allowing researchers to quantify and improve the disparate parameters characterizing movement in different cases such as sport level, work, and patients' daily lives. The aim of this SI is to effectively combine and coordinate research and results in order to understand and improve human bodywork in medicine, in sport, and at work.

In this second issue, the contents of nine round tables that are included in the joint congress in "Mechanical vibration and technological innovation in health (MEVITIH-2023)" will permit the readers to address those questions. Herein, it is summarized the major contributions according to the subject categories. Overall, the studies showed the importance of this subject

in improving the quality of life of patients' lives by expanding upon current evidence. Moreover, the studies indicated directions for future research. The articles all focus on the optimization of the musculoskeletal system and the improvement of patients' quality of life. Many fascinating, high-quality methodologies have been developed across the different articles. All the ways on the impact of the whole-body vibration (WBV) on improving the health in human beings.

In round table 1: perspectives and challenges in whole-body vibration; covered by R. Rawer (history of vibration training/therapy), J. Rittweger (Exercise as a countermeasure for deep-space missions: rationale, evidence, and perspectives), R. Tair (Fundamentals of the applications of WBV in humans' examples and reflections), A. Sonza (pain mediation and human cutaneous mechanoreceptive afferents response after WBV).

In round table 2: Neurological approaches involving WBV; covered by MLM. Duarte (effect of WBV on cognitive tasks), A. Pin (comparison of physiotherapeutic treatment traditional kinesiotherapy and WBV in recovery of gait and balance disorders), R. Tair (Impact of orthosis and graded sensory-motor rehabilitation on gait improvement in functional neurological disorder: perspectives on the impact of WBV protocol).

In round table 3: technologies associated with health; covered by A. Seixas (predictors of ulceration in diabetic foot patients: the role of skin temperature and plantar pressure), R. Tair (the applications of biomechanics in the analysis of the impact of WBV effects), A. Sartorio (spinal posture and mobility of the spine and hip in obesity: novel approach), M. Das Graças Rodrigues de Araujo (contribution of the of LACIRTEM on WBV).

In round table 4: Translational research involving whole body vibration; covered by I F. Charas dos Santos (WBV in improving physical performance in dogs), T. Porto Amadeu (effects of WBV on tissue repair), N. Asad (WBV exercise on basic research and translational approaches).

In round table 5: Approaches in chronic diseases; covered by A.C. Lacerda (WBV in clinical, functional and biomarkers in chronic disease), A. Sartario (Respiratory muscle training in obese patients: integrative interventions to improve exercise tolerance), D. Da Cunha se Sa- Caputo (WBV in obese individuals: facts and perspectives).

In round table 6: Whole body vibration on bone muscle tissues; covered by P. S. Chagas Gomes (Acute and chronic effects of aging, disease, injury, resistance exercise and whole-body vibration on muscle quality: a look at muscle echo-intensity), J. A. Bachur (Approach to mechanotransduction in the joint environment and the whole-body vibration exercise in patients with osteoarthritis: a review), Liszt Palmeira de Oliveira (Functional evaluation on degenerative articular disease).

In round table 7: Systemic vibratory therapy in health promotion covered by J. Rittweger (on the importance of acceptance and feasibility for planning physical intervention studies), A. Seixas (systematic reviews and meta-analysis about WBV in musculoskeletal rehabilitation), L.L Paineiras-Domingos (Systemic vibration therapy in post-Covid respiratory symptoms: new perspectives for a multidisciplinary approach).

In round table 8: Rehabilitation with different approaches in elderly covered by V. Amaral (Immediate effects of WBV in Sarcopenic Older People), L. Palmeira de Oliveira (Risk of fractures due to the falls in elderly), D. da Cunha de Sa-Caputo (WBV as a tool for healthy aging), P. C. Handam (Viscosupplementation and strength training in patients with knee osteoarthritis).

In round table 9: Facts and challenges in systemic vibratory therapy covered by Luis Cristóvão (Laboratory results modulated by whole-body vibration), J. Rittweger (How to Assess Adverse Events in Whole Body Vibration Studies – Proposal for a Study Protocol), M. Bernardo-Filho (Mechanobiomodulation as a possible mechanism to justify the systemic vibratory therapy).

Conclusion

This second issue of volume 1 of the BJMVB is highly actual and informative as it relates to the latest research in the field of « Mechanical vibration and technological innovation in health». Moreover, there are perspectives that the contents on this issue will allow the readers to deepen their knowledge and understanding of the complexity of the responses of the neuromusculoskeletal system to vibratory stimulus in various populations and in animal models.

Funding

This research received no external funding.

Conflicts of Interest

The author declares no conflict of interest.

References

1. Taiar R, Machado CB, Chiementin S and Bernardo-Filho M (Editors). Whole body vibrations: physical and biological effects on the human body. CRC Press, Taylor & Francis Group, New York, 2019
2. van Heuvelen MJG, Rittweger J, Judex S, Sañudo B, Seixas A, Fuermaier ABM, Tucha O, Nyakas C, Marín PJ, Taiar R, Stark C, Schoenau E, Sá-Caputo DC, Bernardo-Filho M, van der Zee EA. Reporting Guidelines for Whole-Body Vibration Studies in Humans, Animals and Cell Cultures: A Consensus Statement from an International Group of Experts. *Biology* (Basel). 2021 Sep 27;10(10):965. doi: [10.3390/biology10100965](https://doi.org/10.3390/biology10100965)
3. Rittweger J (Editor). Manual of Vibration Exercise and Vibration Therapy. Springer: Cham, Switzerland, 2020
4. Sañudo B, Seixas A, Gloeckl R, Rittweger J, Rawer R, Taiar R, van der Zee EA, van Heuvelen MJG, Lacerda AC, Sartorio A, Bembem M, Cochrane D, Furness T, de Sá-Caputo D, Bernardo-Filho M. Potential Application of Whole Body Vibration Exercise For Improving The Clinical Conditions of COVID-19 Infected Individuals: A Narrative Review From the World Association of Vibration Exercise Experts (WAVex) Panel. *Int J Environ Res Public Health*. 2020 May 22;17(10):3650. doi: [10.3390/ijerph17103650](https://doi.org/10.3390/ijerph17103650)