Brazilian Journal of Physical Therapy 26 (2022) 100394

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Associação Brasileira de Pesquisa e Pós-Graduação em Fisioterapia

Brazilian Journal of Physical Therapy

https://www.journals.elsevier.com/brazilian-journal-of-physical-therapy

EDITORIAL

Maximising individualisation of sports injury risk reduction approach to reach success

We now have a high level of scientific evidence suggesting the efficacy of injury risk reduction measures (IRRM) (e.g., neuromuscular exercises, psychological interventions) to reduce sports injuries.[1,2] Randomised controlled trials and meta-analyses have shown that, at the group level, athletes in intervention groups (i.e., supposed to perform IRRM) present lower injury risks than athletes in control groups (i.e., supposed not to do IRRM).[1,2] However, compliance with IRRM has been reported to be low in the context of scientific studies[3] as well as adherence to IRRM in applied practice.[4] If the targeted end-users do not adopt, implement, and maintain IRRM in applied sport settings, the potential to reduce sports injuries may not be accomplished.[5]

One promising strategy to improve both IRRM effectiveness and athlete' adherence is through individualisation of IRRM and its implementation. Through this Editorial, we aim (i) to discuss the interest of individualisation of IRRM and its implementation and (ii) to propose practical suggestions to maximise individualisation in scientific studies and in real-world settings illustrated by the metaphor of the Trojan horse approach.

Individualise IRRM to better match athlete's characteristics

Although IRRM has shown evidence for efficacy at the group level,[1,2] this may vary at the individual level. Each athlete differs in their physical, psychological, and sociological characteristics. It is therefore reasonable to hypothesise that they are likely affected differently by IRRM. Some athletes could be "non-responders" showing no reduction in injury risk. This is supported by evidence reported in primary[3] and secondary prevention contexts.[6] Consequently, IRRM should be adapted to the athlete's characteristics in every dimensions (i.e. multifactorial: physical, psychological, and sociological, to match the sports injury's nature and reality), especially targeting the individual athlete's risk factors and deficiencies/deficits to better meet the athlete's individual needs.[7]

Individualise IRRM implementation to improve athlete 'buy-in'

Improvement of athlete's adherence is a part of the success of IRRM implementation.[4] After individualisation of IRRM, the next step is to act on the behaviour to help the athlete accepting, adopting, and implementing the IRRM. Knowledge from both (i) behaviour-change theories regarding motivation, beliefs, and intentions (i.e., determinants) to adopt IRRM, and (ii) context, environmental, social, and delivery factors (e.g., culture, other end-users behaviour, resources, time) that may facilitate or hinder successful outcomes, are crucial to success adherence in a sport setting.[2,5] These parameters may differ at the individual level.[8] Therefore, the method of presenting the measure to the athlete and the levers to favour the changes in their habits should also be individualised. In practice, the promotion of IRRM can be based on behaviour change determinants and principles (i.e., techniques) to be more effectively adopted.[8]

Practical suggestions to maximise individualisation

This approach is considered person-centred, especially end-user centred. It mainly means that the *athlete* is at the center of the individualisation (athlete-centred approach), but it may also be considered for other individual levels, such as the coach or health professional.

In practice, IRRM individualisation could be done through individual screening in different domains (e.g., physical, psychological, social) to determine individual deficiencies/deficits, which could differ from the mean group-level.[6] It should also target the known and valid injury risk and protective factors for a sport or a pathology. Such approach could help to better target appropriate needs for IRRM.[6,7] Individualisation of IRRM implementation could be achieved through individual screening of the socio-cognitive

https://doi.org/10.1016/j.bjpt.2022.100394

Fig. 1 Illustration of this conceptual strategy by the metaphore of the Trojan horse approach (refer to the Supplementary material for further details).

determinants of behaviours, by identifying adherence's barriers and facilitators, considering programme-related (e.g., intervention components), socio-cognitive (e.g., behaviour change determinants such as intention and self-efficacy), social (e.g., socioeconomic status), and organisational (e.g., club structures) factors.[5] This screening process may be performed regularly to adapt to the potential variations over time in an athlete's characteristics.[9] The content of the screening and their regularity should be of course adapted to the practical aspects (e.g., material, human resources, athlete's age and level), their scientific evidence, as well as the variations of the measured parameters.

The development of the overall approach requires a co-construction with multidisciplinary teamwork, including researchers, clinicians, end-users (e.g., coach, player, healthcare provider) and members of the target community, meaning a public involvement.[5] The athlete should be at the centre of the project. It also implies education of end-users, especially the athlete. Although increasing the knowledge on the health determinants or the preventative effect will not

automatically translate into changed behaviour, each individual's learning process and experiences, as part of their routine and culture, can play a role in the adoption and implementation of the IRRM program.[10] An example of such an approach is proposed in the Supplementary material.

Illustration of the maximised individualisation approach by the metaphor of the Trojan horse

We believe that maximising the individualisation of the overall injury risk reduction approach by individualising both the content (i.e., IRRM) and the form (i.e., IRRM implementation) should improve the chances of injury risk reduction. To help understanding, we illustrate this conceptual strategy by the metaphore of the Trojan horse approach (Fig. 1). We are aware that the Trojan horse was a wicked strategy to destroy the Trojans by inviting the foe without knowing it. In our approach, the IRRM-user should be aware about the strategy and be involved in the process, and it is not about doing the IRRM without knowing it. The present proposed approach here strives to optimize the likelihood to have a total matching between the strategy and the user, at two levels: the IRRM and the implementation.

In this illustration (Fig. 1), the Trojan horse symbolises a method of presenting IRRM (i.e., IRRM implementation) to an athlete (i.e., the village), and the soldiers on the Trojan horse represents IRRM. We suggest that the horse itself (i.e., represented by the colour) should meet the individual athlete's preventive behaviour change determinants (i.e., represented by the villages' colour) to improve the village's probability of acceptance. Also, the soldiers (i.e., IRRM) on the horse should be adapted to the villagers' weakness and strength (i.e., athlete's risk and protective factors) to provide benefits at the individual level for injury risk reduction.

Perspectives

This maximised individualised approach is proposed to be used whatever the sport (i.e., individual and teams sports) in both scientific studies and real-world settings. We are aware about the complexity and probably the difficulty to implement this approach in both settings. However, this challenge seems as high as the goal of injury risk reduction, and it is likely the price to pay to reach success. We believe that promoting IRRM based on individual characteristics and enhancing IRRM adoption of athletes and their staff, this global individualised approach, can help to improve both adherence and in turn effectiveness of IRRM. Although its efficacy should of course be evaluated, we believe that such an approach can have direct benefits for athletes and their entourage to optimise the chances of injury risk reduction.

Conflicts of interest

None declared. EV and PE are Associate Editors for the BJSM. EV is the Editor in Chief of BMJ Open Sports and Exercise Medicine. PE is Associate Editor for the BMJ Open Sports and Exercise Medicine.

Acknowledgments

The authors would like to thank Dr. Callum Browstein (Univ Lyon, UJM-Saint-Etienne, Laboratoire Interuniversitaire de Biologie de la Motricité, EA 7424, F-42023 Saint-Etienne, France) for his contribution to this project. The present editorial was written in the context of the FULGUR project (ANR-19- STPH-003) funded by the French Research Agency in the perspective of the Paris 2024 Olympic and Paralympic Games in collaboration with French Federations of Athletics, Rugby and Ice Sports, Universities of Nantes, Côte d'Azur, Savoie Mont Blanc, Jean Monnet Saint-Etienne, Saclay, the Mines Saint-Etienne, the CEA and the CNRS. The University Jean Monnet Saint-Etienne and the French Institute of Sport (INSEP) are partners of the French-speaking network ReFORM. ReFORM and the Amsterdam Collaboration on Health & Safety in Sports (ACHSS) are recognised as Research Centres for the Prevention of Injury and Illness and the Protection of Athletes by the Olympic Committee (IOC), and received funding from the IOC to establish a long-term research program on the prevention of injuries and illnesses in sports to protect athlete health.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.bjpt.2022.100394.

References

1. Lauersen JB, Bertelsen DM, Andersen LB. The effectiveness of exercise interventions to prevent sports injuries: a systematic review and meta-analysis of randomized controlled trials. *Br J Sports Med*. 2014;48:871–877.
2. Gledhill A, Forsdyke D, Murray E. Psychological interventions used to reduce sports injuries : a systematic review of real-world effectiveness. *Br J Sports Med*. 2018;52:967–971.
3. Hespanhol LC, van Mechelen W, Verhagen E. Effectiveness of online tailored advice to prevent running-related injuries and promote preventive behavior in Dutch trail runners : a pragmatic randomized controlled trial. *Br J Sports Med*. 2018;52:851–858.
4. Owoeye OBA, Rauvola RS, Brownson RC. Dissemination and implementation research in sports and exercise medicine and sports physical therapy : translating evidence to practice and policy. *BMJ Open Sport Exerc Med*. 2020:e000974.
5. Finch C. A new framework for research leading to sports injury prevention. *J Sci Med Sport*. 2006;9:3–9.
6. Welch N, Richter C, Moran K, Franklyn-Miller A. Rehabilitation interventions need more than methodological standardization : an individualized approach. *BMJ Open Sport Exerc Med*. 2020:000899.
7. Roe M, Malone S, Blake C, et al. A six stage operational framework for individualising injury risk management in sport. *Inj Epidemiol*. 2017;4:26.
8. Kok G, Gottlieb NH, Peters G, et al. A taxonomy of behavior change methods : an intervention mapping approach a taxonomy of behavior change methods : an intervention. *Health Psychol Rev*. 2016;10:297–312.
9. Esmaeili A, Stewart AM, Hopkins WG, et al. Normal variability of weekly musculoskeletal screening scores and the influence of training load across an Australian football league season. *Front Physiol*. 2018;9:1–10.

10. Van Tiggelen D, Wickes S, Stevens V, Roosen P, Witvrouw E. Effective prevention of sports injuries: a model integrating efficacy, efficiency, compliance and risk-taking behaviour. *Br J Sports Med*. 2008;42:648—652.

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Received 26 July 2021; Received in revised form 7 December 2021; Accepted 24 January 2022

Available online 12 February 2022