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Reviewer A

Thank you for giving me an opportunity to review the paper entitled “Therapeutic Movement-Based ACL Return to Sports Bridge Program: An Evidence-Based Biological, Biomechanical and Behavioral Rationale”. In general, this manuscript is very interesting, reasonable and important. The Authors used proper literature and discuss it well.

I have only one suggestion, the Authors should precise which population they describe: professional athletes, recreational athletes or general population.

Reply: Thank you for your comments. We have revised the manuscript to make it clearer, now including information about the demographics of the subjects who participated in the bridge program. A group of 150, predominantly non-elite adolescent athletes (83 males) of 20.3 ± 7.2 years of age at 7.1 ± 2.5 months post-ACL reconstruction completed the bridge program.

Reviewer B

This commentary is aimed to describe a rationale behind a recently published post-physiotherapy return to sport bridge program, following an ACL injury and reconstruction. The scope of this paper is immense, attempting to cover almost all aspects of injury-related physiology, motor control, exercise and training principles, sports psychology and more. The result, however, is a mixture of unrelated segments packed with bombastic sentences and high-words, that do not seem to contribute to an overall message. Moreover, the commentary is meant to be “clinical”. But I fail to see any take-home message for clinicians. There are ample mentionings of “considerations” warranted from clinicians, but these are phrased as general statements with little to no context. They are often full of large terms that are not really elaborated upon but seem to be there just as “buzz words”. I do not see any way for these statements to actually influence clinical practice, as most of these are generic recommendations that without concrete suggestions lack any clinical relevance or impact. A few examples are:

- “Any return to sport bridge program or on field rehabilitation supplement should represent a therapeutic healing environment that facilitates motor control and learning, as well as, general movement education with sport-specific task self-efficacy development. In so doing, biological, biomechanical and behavioral healing timeframes, increased load tolerance, fatigue resistance, and overall performance resilience must be considered. Within this environment, the recovering athlete can benefit from both individual and small group activities using social cognitive theory principles to help guide them through cognitive appraisals, emotional and behavioral responses post-injury and surgery in addition to their physical recovery (21).”

- “Dynamic trunk and lumbopelvic region stability can also enhance dynamic knee stability to both help prevent injury and improve athletic performance (22).”

Is there really anything concrete a clinician can get from these two examples (and many others)??

Sections such as “Neuromuscular Control and Dynamic Knee Stability” are to some extent a collection of facts with no connecting thread. They once more feature many high-sounding words and complex terms that seemed to be mentioned just to make the text more “scientific”, but ultimately detract from it and the result is most definitely not suitable for clinicians.

Moreover, some parts should be more elaborated and instead comprised of unclear fragmented sentences. Specifically, the “Neuroplasticity” section. Other concepts such as the benefit of movement variability are shallowly discussed as if these are just snippets of a textbook with fragments being pasted with no connecting logic. These are important concepts that indeed have place in a commentary. However, a novice reader would never understand these the way they are written.

The figures are also not really helpful, as some of them are completely unrelated to their reference.

With regards to the second part of the commentary, this part, which describes the bridge program itself, is more interesting and can stand for an independent paper. However, it is referring an already published work and is phrased as a rehabilitation protocol. Crucial information is also missing, most importantly the physical activity type and level!

Reply: Thank you for your constructive comments. To improve the clarity and flow of the manuscript given the volume of information therein, we have modified its structure to better connect important information. Following the Introduction which introduces the purpose of this clinical commentary, we introduce the Return to Sports Bridge Program, followed by the reported outcomes. After this we now provide a section entitled Philosophy of Care which leads into Athletic Identity. The group that participated in this program were predominantly non-elite adolescent athletes. Foundational information regarding Athletic Identity was an important consideration in program development. Following this we have inserted a section entitled: Foundational Program Components. This section lists key program considerations such as the Specific Adaptations to Imposed Demands (SAID) Principle, Mobility and B-Articular Musculotendinous Extensibility, Fundamental Strength and Power, Movement Training Education, Motor Learning and Plan Development, Agility, Metabolic Energy Systems, and Fatigue-Resistance Training, Isolated and Integrated Neuromuscular Responsiveness, Neuromuscular Control and Dynamic Knee Stability, and lastly, a Conclusions section that summarizes these concepts better to provide clinicians with a take-home message.

Table 1 is also missing.

Overall, I feel that this paper requires massive editing and cannot be accepted in its current form.

Reply: Additionally, **Table 1** (which was inadvertently left out of the initial review) is included in the revised manuscript. We believe that these additions provide information of will benefit both the novice and experienced rehabilitation clinician, as well as clinical researchers. To improve flow some previous sections have been condensed. We apologize for **Table 1** not being available for the initial review.

Information provided by this table in combination with manuscript restructuring improves its organizational flow and clarity.

Reviewer C

I thank the authors for the opportunity to review this clinical commentary describing the biological, biomedical and behavioural rationale behind an evidence-based post-physiotherapy return to sport bridge program. Overall, this paper provides good insight into what factors should be considered in return to sport following anterior cruciate ligament rupture and the rationale behind the bridging program. However, the abstract and introduction could better describe the bridging program to give better context to the reader. It may be easier to follow if there are headings and sub headings that make connections directly to the components of the program. Currently it is a large list of components with good points to consider but lacks clear structure making it difficult to follow unless they are already familiar with the bridging program. Consideration of a table or more figures in the manuscript may be helpful to draw connections to exact components of the bridge program. It may also be misleading to call the program evidence-based without giving context of the level of 'evidence' or limitations that should be considered. More specific comments below:

Reply: We have revised the original manuscript structure to improve its organization flow and clarity. The Abstract and Introduction have also been revised with the same purpose in mind.

In this reorganized structure we have attempted to make better use of headings and subheadings. These changes and the inclusion of **Table 1** (which for some reason had inadvertently been omitted from the initial review) improves revised manuscript clarity and flow. In addition to the original **Table 1** we have added several figures and have also reordered several to better match the revised text and **Table 1**. Each figure is now cited in both the revised text and in **Table 1**. We have modified the title to: Therapeutic Movement-Based ACL Return to Sports Bridge Program: The Biological, Biomechanical and Behavioral Rationale.

Abstract

17 – where is this program from? This needs to be outlined in more detail for the reader to have more context such as the bridge program was based on a prospective cohort study of 150 subjects and was conducted 2x per week for 8 weeks as a supplemental return to sport.

Reply: the return to sport bridge program was developed by the first author. The outcomes of patients that participated in this program have been previously reported and is referenced (Knee Surg Sports Traumatol Arthrosc 2020;28(11):3676-85). More information about subject demographics have been included in the revised manuscript.

25 While components of the 'evidence-based bridging program' has been shown to produce patient outcomes that meet or exceed previous reports

- This doesn't specifically detail how this has been show? For example, level of evidence.

Reply: The evidence levels for re-injury incidence comparison studies are included in the revised manuscript.

26 ACL should be said first as anterior cruciate ligament (ACL)

Reply: Revised to "anterior cruciate ligament" (ACL).

Introduction

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- *The focus of the introduction seems like it should start with the issue that a large number of people return to sport may do so without necessary exposure to load and activity demands*

- *ACL should be said first as anterior cruciate ligament (ACL)*

Reply: We have re-ordered the Introduction section to better capture this important point. Revised to "anterior cruciate ligament" (ACL).

39 – 1:3 ratio is not clear, does this mean one in three people 20 years or younger are at risk of a second ACL rupture?

Reply: The 1:3 ratio statement has been clarified in the revised manuscript.

47 – how has symmetrical loading been shown to be the most common biomechanical factor contributing to second ACL injury risk

Reply: This has been re-phrased slightly in the revised manuscript. Asymmetrical loading has been shown to be an important factor that increases the risk for sustaining a second ACL injury.

Subheadings

- Overall the content was good but please see comments above about the structure.

Reply: Thank you. We have re-organized the structure of the revised manuscript to help with clarity and flow. Thank you for the thorough review of this manuscript.